Editorial

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Biographical notes: Lorna Uden teaches computing in the Faculty of Computing, Engineering and Technology at Staffordshire University. Her research interests include technology learning, HCI, activity theory, knowledge management, web engineering, multimedia, e-business and problem-based learning. She has published widely in conferences, journals and chapters of books.

Supporting learning and evaluation

This issue consists of six papers covering topics from theoretical foundation for virtual communities of practice (COPs) to the contribution of a public e-learning platform. We are entering into an exciting age in learning. The use of technology for teaching and learning is on the increase. Many universities are embarking on some form of e-learning programmes. Researchers are actively involved in developing methods of improving learning using technology.

This issue begins with a paper by Allen, Evans and Ure, on virtual communities of practice. In their paper, 'Virtual communities of practice: vehicles for organisational learning and improved job performance', Allen, Evans and Ure argued that communities of practice are founded on theories of learning and can serve as an effective learning environment. Communities of practice (COPs) are theoretically valid methods of learning to improve performance because they satisfy the conditions for learning to occur according to constructivism, Allen, Evans and Ure argue that virtual communities of practice (VCOPs) can meet the learning needs of today's growing business. These authors suggest that VCOPs can help employees learn by:

- situating learning in the workplace
- providing just-in-time learning and content-specific solutions to problems
- increase employee interaction.

The use of VCOPs can indeed be used as effective workplace learning environments to help employees learn and solve problems, because principles of VCOPs align well with current theories of learning.

From VCOPs we move to the learning of science using Computer-Supported Collaborative Learning in our second paper. The paper, 'Fostering scientific inquiry in schools through science research course and Computer-Supported Collaborative Learning (CSCL)' is by Tan, Hung and So. This paper describes the study on fostering scientific inquiry skills using CSCL by students in a Singapore school, using a tool called

Knowledge Forum (KF). Acquiring scientific skills is complex because it involves a range of competencies. According to Tan, Hung and So, science learning should extend beyond the acquisition of facts to methods and procedures of scientific investigation and students should be engaged in the processes of improving from everyday thinking to scientific thinking as in scientists' communities. Consequently, science learning should take place in a learning community that emphasises collaborative science learning and the specific ways of communication in the science community. The authors of this paper describe CSCL technology that can be used effectively to support the process of scientific inquiry in schools, using Knowledge Forum. Tan, Hung and So show that using a CSCL tool such as Knowledge Forum has enhanced students' scientific inquiry skills, especially in the areas of identifying variables and stating hypotheses.

Factors identified that contributed to the process of online collaborative scientific inquiry include: focusing on task, direct engagement with scientific problems, recognition of self as epistemic agent and provision of scaffolding. This paper demonstrates the importance of providing students with appropriate learning environments where they can be scaffolded towards the acquisition of knowledge, skills and practices of real world scientists. It is important that we move away from the mere transmission of content to a process-oriented approach where students learn in scientists' communities of practice.

The question often asked is what sort of online help is available to be used to assist learners? Paper three focuses on this topic. The paper, 'Assisting online helpers' by Kumar, Greer and McCalla talks about a framework for online help tools. According to Kumar, Greer and McCalla, current help technology is limited by shortcomings in understanding the context, an inability to match a help request to an appropriate help response, and failure to respond within time limitations. An approach to overcoming these limitations is to take a moderately intelligent system and incorporate a human in the loop (HITL). This paper describes embedding HITL techniques in an online help companion called helper's assistant. The online assistant has necessary background knowledge about the helper, the learner and their online interaction. It uses this knowledge to help the helper provide assistance to the learner. A helper is chosen from a pool of ready, able and willing helpers based on online social skills, help preferences and subject knowledge. The helper can be a dedicated expert helper or a peer colleague. The helper communicates with a learner using online tools over the internet. Helper's assistant provides the helpers with appropriate help resources and guides them through a suite of suitable pedagogical plans that assists them to provide better help.

Although online help research has advanced since the early 1980s, it still falls short of duplicating the sophistication, subtlety and depth of an experienced human helper. The approach adopted by the authors of building intelligent tools to support humans helping humans, rather than having to make the tools intelligent enough to stand in front of the learner is a good way of helping us move towards providing online help research. Further work will be needed to validate the effectiveness of this framework however.

Most online help systems are in the form of texts. This brings us to the topic of our next paper on online chat for learning. Paper four, exploring the affordances of online chat for learning is by Looi. Text chat is still a popular method for online distributed learning despite its limitations and the advent of new technologies like avatar or graphic chat, audio and video conferencing. There are several advantages offered by online text chat. The persistence of chat conversations in digital medium allows them to be searched, browsed, replayed, annotated, analysed, visualised, restructured and recontextualised. The paper by Looi discusses ways of making the conversations better,

enabling more natural and coherent conversations, in order to facilitate conversation so that meaningful learning takes place. It is a survey paper reviewing the different types of online chat technologies currently in use, that can be used to support, analyse and visualise chat conversations. Although there are technology tools or support that can help with the issues facing online chat, further exploration and research is required to determine what methods work well and what do not. Studies would be useful to compare the different kinds of engagement in text chat.

From online chat we move to the issue of evaluation for technology learning. Evaluation is a crucial part of learning technology. Paper five, 'A learner evaluation of the use of intranet-based instructional resources and a managed learning environment (MLE) in support of the teaching and learning of computer-aided engineering (CAE)' is by Page. Instead of focusing on meta-technologies for evaluation of learning technologies, this paper focuses on the processes and techniques for the evaluation from a user perspective. The author reports on the observed outcomes of integrating an MLE with using intranet-based learning resources for the delivery of computer-aided engineering modules for undergraduate engineering courses. Evaluation was conducted using the degree of confidence that the learner has in fulfilment of the learning objectives of the modules. It uses structured questionnaires to each year-group of students undertaking the modules. The questionnaires were aimed at assessing each student's confidence, perceptions and usage of the MLE, intranet-based and self-assessment tutorials. The questionnaires used a 4-point Likert scale to indicate the degree of confidence that the students had in attainment of the learning outcomes of the modules. According to the author, the result of using the MLE has been useful to both students and teacher. Whilst eliciting the degree of confidence that the learner has in fulfilment of the learning objectives of their modules has yielded positive results, this should be viewed with some caution because students in general lack the necessary skills to determine their learning outcomes.

The papers so far have been concerned with applications of learning technology. In the last of the papers, instead of focusing on application, paper six describes a public e-learning platform. This final paper 'Contributions to a public e-learning platform: infrastructure, architecture, frameworks, tools' is by Naeve, Nilsson, Palmer and Paulsson. According to these authors, although standards such as IEEE-LOM provide increased interoperability for learning objects, cross search of repositories is still not possible. The goal of a global e-learning community is yet to be realised. In order to overcome this, Naeve, Nilsson, Palmer and Paulsson propose a learning environment known as a public e-learning platform (PeLP) that is based on an open source and open international ICT standards, where educational services can be developed and exchanged between, as well as within, systems. These authors present a number of contributions to the PeLP in the form of infrastructure, architecture, frameworks and tools. All of these are based on the emerging next-generation internet – the semantic web. The use of semantic web for e-learning has potential. Many e-learning applications are highly monolithic. They lack flexibility. Semantic web offers new technologies for developers in e-learning by providing more intelligent computer support such as software agents and self-describing systems. It is my belief that semantic web provides a means to realise many e-learning visions. This is particularly so in our so-called knowledge economy. There are many research issues that still need addressing before our visions are realised.