Editorial

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Biographical notes: Lorna Uden is an Emeritus Professor of IT Systems 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, service science and innovation, semantic web, and problem-based learning.

Welcome to this issue of *IJLT* consisting of six-papers. The first paper is by Edys Quellmalz and Daniel Zalles, entitled 'Datasets for inquiry in geoscience: a design model'. This paper describes the results of a proof of concept project, datasets for inquiry in geoscience (DIGS). The three goals of the project were to:

1 study the impacts on student learning of web-based supplementary curriculum modules in which secondary students used real geoscience datasets, visualisations, and software tools to conduct investigations within two-fundamental topics of study, climate change and plate boundaries

2 develop designs and prototypes of technology-based performance assessments to provide evidence of students' geoscientific knowledge and inquiry skills

3 develop extension scenarios to overview examples of curriculum modules and performance assessments that could be developed for other Earth Science standards and curriculum topics.

The project promoted and tested knowledge and inquiry strategies not typically addressed in geoscience curricula and assessments.

The second paper is, 'Predicting and preventing student failure – using the *k*-nearest neighbour method to predict student performance in an online course environment'. The authors Tuomas Tanner and Hannu Toivonen study the problem of predicting student performance in an online course. Their specific goal is to identify at an early stage of the course those students who have a high risk of failing. They employ the *k*-nearest neighbour method (KNN) and its many variants on this problem. Extensive experimental results from a 12-lesson course on touch-typing, with a database of close to 15,000 students is presented. The results indicate that KNN can predict student performance accurately, and already after the very first lessons. We conclude that early tests on skills can be strong predictors for final scores also in other skill-based courses. Selected methods described in this paper will be implemented as an early warning feature for teachers of the touch-typing course, so they can quickly focus their attention on the students who need help the most.

The third paper is by Jeremiah Sullins, Scotty D. Craig and Arthur C. Graesser. In their paper, 'The influence of modality on deep-reasoning questions', they investigated the influence that modality (print versus spoken text) had on learning with deep reasoning questions. Half the participants were randomly assigned to receive deep-reasoning questions during the learning session. The other half received the same information in the absence of deep-reasoning questions. The participants that received deep reasoning questions were randomly assigned to one of two different groups. One group received deep reasoning questions as on-screen printed text while the other group received deep reasoning questions in a spoken modality via a text to speech engine. Participants who received deep reasoning questions had higher post-test scores than those who did not, a finding that replicates previous research. Additionally, learning was better for the learners who received printed text than spoken messages, a finding that is not compatible with a number of theoretical and empirical claims in the literature.

The fourth paper, 'Fostering social capital in a learning network: laying the groundwork for a peer-support service' is by Sibren Fetter, Adriana J. Berlanga and Peter Sloep. These authors describe how to attain and sustain an online learning network. They argue that this can be achieved by:

1 improving the relationship characteristics

2 increasing the sense of belonging to the community

3 heightening the mutual support.

It is hypothesised that these improvements can be brought about by using so-called ad hoc transient groups (AHTGs). These groups are a means through which learners are brought together for a specific, learning-related goal ('ad hoc') and for only a limited amount of time ('transience'). In order to deepen the concept of AHTGs, a relevant theoretical background as well as requirements for peer-support service that utilises ad hoc transient groups is provided. This is followed by an example on how the service can be implemented in an existing learning network (eTwinning). Finally, conclusions are drawn and future research discussed.

The fifth paper is by Diana Ragbir and Permanand Mohan. In their paper, 'The service integration framework: integrating non-generic learning services into IMS LD', they argue that The IMS LD specification provides a standard notation for encoding the pedagogical structure of lesson plans. It enables instructors to create lesson plans that are interoperable documents that can be reused. However, this standard has several limitations that must be addressed before it can become fully accepted by the e-learning community. One of these limitations is the lack of pedagogical expressiveness, that is, the ability to express any learning process in a lesson plan using the specification. The service integration framework (SIF) has been developed to address this limitation. It provides a framework to integrate new non-generic learning services that are not defined in the specification in a way that does not break the specification. It thus adds to the learning services available which can be used to describe a learning process. Through SIF, the pedagogical expressiveness of IMS LD can be improved by increasing its ability to express all learning situations and thus, encouraging reuse and increased adoption by educators.

The final paper is 'Adaptive e-learning using ECpAA rules, Bayesian models, and group profile and performance data', by Sanghyun S. Jeon and Stanley Y.W. Su. These authors argue that an e-learning system must be capable of gathering and correctly

evaluating a learner's profile and performance data in order to deliver individualised instruction to the learner. However, the learner's data can be incomplete, inaccurate and/or contradictory. They can also be correlated. This paper describes an approach that aims to alleviate these data problems by evaluating the data of each new learner probabilistically based on the data of earlier learners. The probabilistic rule model allows the system to apply adaptation rules to examine learners' data at various stages of a learning activity, and determine the suitable actions to take to personalise the instruction. Adaptation rules are processed by a rule engine and a Bayesian model processor to achieve adaptive content search and selection, adaptive processing of learning objects, and continuous improvement on the accuracy of learner evaluation.