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## Editorial

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**Biographical notes:** Dr. Uden works at 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. Dr. Uden is also the founder and editor of the *International Journal of Web Engineering and Technology* (IJWET) and *International journal of Learning Technology* (IJLT), published by Inderscience.

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This issue contains four papers. It covers a wide range of web applications from requirements modelling to ontology Petri net modelling. The first paper begins with the design of web applications. In their paper, 'A transformational approach to produce web application prototypes from a web requirements model', Valderas *et al.* describe a web requirements model. Although there are many approaches to modelling and developing web applications, according to these authors, very few actually deal with how to elicit and represent requirements, how to go from a requirement model to a conceptual model. In this paper, Valderas *et al.* present a web requirements model that provides analysts with techniques that allow them to specify not only the functional and data requirements of a web application, but also the navigation at the early stages of development. The approach is based on traditional task metaphors for capturing functional requirements specification, but is extended by introducing information about the interaction between user and the system. The authors have developed a methodological guide to extract the navigational structure of a web application from the task-based requirements model. They have also introduced a strategy based on graph transformation that allows automation of the navigational model from early requirements specifications. Using the automatic code capabilities, these authors also show how the graph transformation-based strategy allows them to obtain web application prototypes from early requirements specifications. This requirements model appears to have the potential to allow developers to identify, specify and describe tasks that web application users must achieve. The development of tools that can trace performance changes in web application prototypes would be very useful.

From requirements model in the first paper, we move on to the second paper, which is concerned with business processes in web applications. Today's web applications are more complex data- and operation-intensive rather than simple read-only websites. These complex data- and operation-intensive applications provide users with a set of activities to assist them in carrying out activities according to a given set of business rules. Because of the inherent complexity of transactions involved in these applications, they present

designers with new challenges and issues when developing those applications. A web transaction has a state that needs to be managed depending on user content navigation and the execution of activities. The order in which the user is required to execute the activities involved in the transaction and the properties assigned to each of these can impact on the user's experiences when using the application. Treating transactions as by-products of web application development processes often results in poor usability and erroneous behaviour. Although several hypermedia and web models and methodologies have been extended in order to provide designers with a way of tackling design of transactions, Distante *et al.* in their paper, 'A comprehensive design model integrating business processes in web applications' declare that the weaknesses associated with these methodologies are the lack of user-centredness and poor integration with the information and navigation design. In this paper, they present a comprehensive design model for integrating business processes in web applications. Their model is based on UWAT+, a revised and extended version of the Ubiquitous Web Application (UWA) Transaction Design model for designing application transaction, which overcomes the weaknesses experienced in the original model. Distante *et al.* suggest that UWAT+ provides designers with an effective approach to capture and model the transactions of a web application according to the user's perspective, to clearly represent the way transaction execution and content navigation interact with each other, and to define which information objects are needed by the user when executing a given activity and how a component activity will be customised depending on the execution context and state. The paper describes the adoption of UWAT+ in the design of a web system for managing the process of competitive tendering for an Italian local public health company (AUSL). Although the development of processes are important for the data and operation-intensive transactions, it is also important to consider the usability as well as the business modelling of web applications.

Another issue that is very important in web applications is that of security. Although the internet offers tremendous opportunities for e-business, the most important problem facing e-commerce is the lack of security. Although public-key infrastructure has been important to address the security concerns of internet applications, they do not provide access control mechanisms. According to Yang in his paper, 'Designing secure e-commerce with role-based access control', the current access approach on the internet using user name and password to differentiate users does not determine whether a user is authorised to use a privilege. Yang believes that a trust relationship between users is required to deal with the access control problem of e-commerce on the internet. Digital credentials can be used to manage trust establishment in e-commerce applications. According to Yang, digital credentials are online counterparts of paper credentials. They are signed by Certificate Authority (CA) issuers and can be made verifiable and unforgeable. In his paper, Yang describes an Object-oriented Role-based Access Control (ORBAC) model for e-commerce using XML and a role assignment algorithm. The method uses an XML-based security policy to simplify security administration for e-commerce. Yang believes that using XML is well-suited to define ORBAC security policies. It allows for easy extension and modifications, thus providing a degree of flexibility. In this approach, the authorisation is independently defined and is separated from the implementation. Although the proposed approach is a good one, more evaluations are needed in order to assess its effectiveness.

Besides security, another important issue that is of great concern to web developers is that of evaluation. The fourth paper addresses web application evaluation. Evaluation is a crucial part of web development because evaluation provides information as to how usable, efficient, effective and acceptable the web applications are to the users. If users are not happy with the application, no matter how useful it is, they will not accept the software. In the fourth paper, 'WAQE: a Web Application Quality Evaluation model', Mavromomstakos and Andreou describe a web application evaluation model. According to Mavromomstakos and Andreou, although several researchers have proposed various recommendations or evaluation techniques for web applications, quality evaluation of web application is often a neglected issue. While several useful guidelines and design principles have emerged to assist developers in the development process, they do not constitute an evaluation method. Mavromomstakos and Andreou propose a web application quality evaluation method based on two axons: internal and external. The first axon (internal) views the web application as a system that supports and promotes the business goals of the organisation and evaluates the web characteristics based on general software quality standards and other web quality factors as developed by the ISO9126 quality model. The second axon (external) is concerned with the web domain as observed by end users. Importance criteria are utilised to determine the level of importance for each requirement as perceived by the organisation experts and the users in each corresponding axon. The level of importance for a web characteristic is determined by the functional and non-functional requirements associated with a specific web application domain. The results of the two axons combine to determine the overall quality of the web application. It is also important to periodically continue conducting quality assurance tests once the web application is launched. The results of the tests are used to further enhance and improve the accuracy of the model by adding functions to serve new requirements or by modifying and enhancing the existing functionality. Mavromomstakos and Andreou demonstrated their evaluation model using two web applications. These authors point out that the main aim of WAQE is not the final result – the quality value – but the evaluation process itself that allows the identification of issues that may have not yet been examined and revealed, and features that need further improvement/enhancement, and the study of the differences between the quality as perceived by the organisation's experts and the users of the web application. Further research and more case studies are needed to validate the effectiveness of the model. Greater attention should be paid to the context of use during the evaluation process.