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EDITORIAL

Universal access to technology-enhanced learning

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Within the context of human–computer interaction (HCI), the concept of universal access introduced a new perspective that promotes the accommodation of a wide range of human abilities, skills, requirements, and preferences in the design of information technology. This automatically reduces the need for many special features, while fostering individualization, quality of interaction, and ultimately, end-user acceptability [5]. The notion of universal access reflects the concept of an information society in which anyone can potentially interact with information technology, at anytime and at anyplace, in any context of use, and for virtually any task [3]. Consequently, technology-enhanced learning (TEL) is an extremely important part in this context. However, designers and developers of this type of technology often ignore the needs, demands, and requirements of the end users, and consequently fail to examine how the end-users learn, work, and communicate with this technology. This is often related to a lack of general usability engineering methods [2], as for example end user-centered methods [1]. Design and development, which are based only on the potential of technology and ignores the human abilities, are insufficient. Consequently, it is necessary to carefully study which combination of media, device, and application is most advantageous to further increase the quality in both design and development of TEL. This must be made at the intersection of psychology and computer science, where HCI and usability engineering traditionally work. The underlying goal is to strengthen interdisciplinary research and development to bring clear benefits and increased value for the end users. However, a great deal of research and development is still necessary to bridge the gap between psychology and informatics and to gain a deep understanding of learners. TEL must serve the end users, because "Successful technologies are those that are in harmony with end users' needs." [4].

This special issue represents a first step towards addressing some important topics in the domain of universal access to TEL (UATEL). It includes eight papers, selected out of the thirteen received through a review process, whereby each paper was reviewed by at least three experts.

In the first paper, Martin Ebner and his colleagues report about the increasing application of Wikis for educational purposes. Although many studies reported a great success of Wikis in terms of active participation, collaboration, and a rapidly growing amount of content, successes were often linked to direct incentives or even pressure. Ebner et al. argue that this contradicts the original principles of Wikis and weakens the psycho-pedagogical impact. In a study, they focused on investigating the success of Wikis in higher education when students are neither enforced to contribute nor directly rewarded. The results of their research show that, in total, none of the 287 students created new articles or edited existing ones during a whole semester. This shows that problems are not technological, but rather sociological and psychological, and that future research must increasingly address socio-motivational and psychological aspects. This is necessary to utilize Wikis for educational purposes and fully exploit their visionary ideas.

In the next paper, Andrina Granić reports about her experiences with usability assessment of intelligent learning and teaching systems, which are based on the TEx-Sys model and intended to enhance the process of knowledge

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acquisition in daily classroom settings. The applied scenario-based usability evaluation, as a combination of behavior and opinion-based measurements, enabled to quantify the usability in terms of users' (teachers' and students') performance and satisfaction. In her paper, Granić indicates that useful usability assessments with a significant identification of interface limitations can be performed quite easily and rapidly.

In the third paper, Thomas Kleinberger and his colleagues show that successful situational learning, including continuous media support, requires both sophisticated technological and appropriate psychological concepts to enable learners, independently of age group, to easily access the so-called continuous media learning objects (CMLO). He shows that these must be properly adapted to the needs, demands, requirements, and previous knowledge of the end-users. In his paper, Kleinberger et al. covers three main issues: (1) adaptive situational learning with continuous media and shortcomings of some current solutions; (2) outline of an integrated approach for adaptive multimedia presentations enabling universal access for situational learning; and (3) description of the MultimEdia MOdule RepositorY (MEMORY) system implementing this approach; the basic idea being to define multimedia presentations as dynamic processes, comparable to a computer program.

In the fourth paper, Renate Motschnig-Pitrik and her colleagues present three easy but effective TEL scenarios: specific reaction sheets, cooperative writing, and self-evaluation. With these scenarios, Motschnig-Pitrik et al. address universal access by providing web-based support and services with a potential for building the learners' capacity of gaining access to both personal and technical resources. In her paper, she uses a uniform description template for each scenario, including intent, motivation, conceptual model, and research context. This is complemented by reports on the authors' experiences with applying the scenarios in recent years, and by qualitative and quantitative results from multiple action research cycles.

In the sixth paper, Margit Pohl and her colleagues report about design and development of a course in sustainable product design for employees. This includes learners having low computer literacy and learners who are reluctant to use electronic communication. The main assumption of the paper is that collaborative learning has to be designed according to the learners' needs, taking into account their low computer literacy. She indicates that active tutoring is especially important to motivate learners and to constitute a community of practice.

In the seventh paper, Sheikh Iqbal Ahamed and his colleagues presents the Ubicomp Assistant, which is an integral service of a middleware designed and developed for handheld devices, and has been designed to accommodate different types of users (e.g., education, healthcare, marketing, or business). This customizable service employs the ubiquitous nature of current short range, low-power wireless connectivity, and readily available, low-cost lightweight mobile devices. These devices can reach other neighboring devices using a free short-range ad hoc network.

Finally, in the eight and last paper, Carol Shepherd discusses the benefits, advantages, and disadvantages of students taking advanced placement (AP) courses online; this is important due to the fact that high school students—in her example from the US—are increasingly participating in AP courses, although this opportunity is not equitable across the country, as many students are unable to take these classes. The assumption is that, by effectively utilizing technology, AP courses can be offered to all students, in all countries, from all socio–economic groups.

The editor of this special issue cordially thanks the Editorial Board of the International Journal of Universal Access in the Information Society, and in particular Professor Constantine Stephanidis for his ongoing, continued support and advice. I would also like to thank all reviewers, whose expertise was invaluable for ensuring the scientific quality of this issue. Finally, I would like to thank all authors for their substantial work to promote UATEL. This is only a first step within the large area of research worldwide. However, every step, which promotes the idea of universal access in information society, is important.

1 List of reviewers

- Ray Adams, School of Computing Science, Middlesex University London (UK)
- David Andrew, School of Computing, London Metropolitan University (UK)
- David Benyon, School of Computing, Napier University Edinburgh (UK)
- Dawn Carmichael, Department of Computer Science, University of Abertay (UK)
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