

Ubiquitous and Mobile Learning in the Digital Age

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Editors

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 Springer

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Preface

This edited volume contains selected expanded papers from the Cognition and Exploratory Learning in the Digital Age (CELDA) 2011 conference (<http://www.iadis.org/celda2011/>), together with invited chapters on emerging research issues. It addresses the current developments concerned with context-aware adaptive and personalized learning systems, mobile and ubiquitous learning environments and social web technologies, as well as virtual worlds and game-based learning for informal and formal educational settings. These developments have created both opportunities and areas of concern. Hence, this edited volume aims to cover both technological and pedagogical issues related to these developments.

We organized the chapters included in this volume around four themes: (a) context-aware adaptive and personalized systems for formal and informal learning; (b) mobile and ubiquitous informal and formal learning environments; (c) social web technologies for new knowledge representation, retrieval, creation, and sharing in informal and formal educational settings; and (d) virtual worlds and game-based informal and formal learning.

In Part I, context-aware adaptive and personalized systems for formal and informal learning, several issues are described and discussed. In the first chapter, the authors address the increased interest on context-aware adaptive and personalized mobile learning systems that aim to provide learning experiences delivered via mobile devices tailored to the educational needs, the personal characteristics, and the particular circumstances of the individual learner or a group of interconnected learners. Their chapter is an introduction to the field of context-aware adaptive and personalized mobile learning systems (Demetrios G. Sampson & Panagiotis Zervas, Chap. 1). The next chapter discusses the increased use of cloud computing in education. The pros and cons of the use of current cloud services in education are presented, with a focus on privacy and security issues. The US context is studied, concluding with suggestions for safe and sensible use of cloud computing in education (Alan S. Weber, Chap. 2). Next, a context-aware mobile content adaptation mechanism and a corresponding process based on a notation language (namely, IMS Learning Design specification) are presented, along with design requirements for tools that enable authoring and delivering of context-aware learning designs

with mobile content adaptation features (Panagiotis Zervas, Demetrios G. Sampson, Sergio Eduardo Gómez Ardila, & Ramón Fabregat, Chap. 3). Lastly, a student-centered multi-agent system with adaptive features for virtual courses design and construction is proposed (Demetrio A. Ovalle, Francisco J. Arias, & Julian Moreno, Chap. 4).

In Part II, chapters focus on mobile and ubiquitous informal and formal learning environments. At the first chapter of this part, the authors present a mobile learning platform, which provides opportunities to students to diversify learning according to their own needs by using text, audio, and video educational materials (Elissaveta Gourova, Asya Asenova, & Pavlin Dulev, Chap. 5). Next chapter describes two case studies based on activity theory, with the use of cell phones in Calculus I classes, and analyzes the data collected (Silvia Cristina Batista, Patricia Alejandra Behar, & Liliana Passerino, Chap. 6). The following chapter is about mARble[®], an augmented reality mobile learning environment, which is used in a medicine course (Urs-Vito Albrecht, Marianne Behrends, Herbert K. Matthies, & Ute Von Jan, Chap. 7). The last chapter of this part explores location-based environments for learning by addressing the technological, pedagogical, and educational issues in location-based context-aware mobile learning. The chapter demonstrates that context-aware mobile learning is an effective approach in implementing location-based environments for learning, bringing great opportunities for ubiquitous learning in the digital age (Qing Tan, Tzu-Chien Liu, & Martha Burkle, Chap. 8).

In Part III, chapters address social web technologies for new knowledge representation, retrieval, creation, and sharing in informal and formal educational settings. In the first chapter of this part, authors present a set of teaching strategies, tasks, and practices for the development of cross-curricular competences in engineering through web 2.0 social objects (Mercedes Rico, Julian Coppens, Paula Ferreira, Héctor Sánchez, & J. Enrique Agudo, Chap. 9). The next chapter presents Presence Plus, a model for identifying social presence in educational forums and chats. The chapter concludes with a brief description of the software developed to process text cues as an aiding tool for tutors as well as results from a manual and automatic analysis of corpus used in the study (Hélvia Pereira Pinto Bastos, Júlia Kikuye Kambara da Silva, Magda Bercht, & Leandro Krug Wives, Chap. 10). In the final chapter of this part, the author uses MediaWiki for exploring the data logs generated by wikis as students performed collaborative writing activities and written comments posted by students on the discussion page of the wiki (Said Hadjerrouit, Chap. 11).

In Part IV, the chapters focus on virtual worlds and game-based informal and formal learning. At the first chapter of this part, the authors present an educational system referred to as Cyber Assistant Professor 2 (CAP2), which is an interactive e-education system based on the three-dimensional computer graphics (3D-CG) animation and voice synthesis. The chapter reports results about the effectiveness of the presented system (Hiroshi Matsuda & Yoshiaki Shindo, Chap. 12). Next chapter presents a case study of experiential learning in healthcare simulation. The case study focuses on measuring learners' experiences from educational medical simulations (MedSims) with regard to three dimensions: functional skills, attitudes toward

usefulness of MedSims in professional education, and career intentions (Pamela Leonard, Elena Libin, Yuri Millo, & Alexander Libin, Chap. 13). In the next chapter, the authors discuss ideas related with using tangible programming as a motivating activity for computer science. The results of their survey highlight the difficulty both of measuring (and understanding) students' attitudes toward programming and the continuing need for innovative research and design in responding to this issue (Yingdan Huang, Jane Meyers, Wendy DuBow, Zhen Wu, & Michael Eisenberg, Chap. 14). The next chapter presents an example of a recent study on a game-based platform for English teaching and learning and discusses the role of game-based learning in primary school viewed from the perspective of educational policy. The authors focus mainly on data which have been produced in connection with a research project, and they approach the issue of policies through three case studies of educational policy in Denmark, Portugal, and Vietnam (Bente Meyer, Birgitte Holm Sørensen, & Lars Birch Andreasen, Chap. 15). In the last chapter of this part, the authors present a serious game environment to support organizational changes in industry by helping to understand product lifecycle management (PLM) (Thibault Carron, Philippe Pernelle, & Jean-Charles Marty, Chap. 16).

Part V presents an epilogue, which provides a discussion of issues associated with research and development to effect a more productive connection between technology and the design and deployment of assessments that can *measure what matters* and support learning in a digital world. The chapter focuses on presenting a cognitive model of multisource comprehension and on using that model to design and deploy technology-based assessments of components of multisource comprehension (James W. Pellegrino, Chap. 17).

This is the fourth edited volume resulting from a CELDA conference. We are convinced that this work covers the current state of research, methodology, assessment, and technology. When we have so many outstanding papers as were presented in Freiburg, Germany, 2008; Rome, Italy, 2009; Timisoara, Romania, 2010; and Rio de Janeiro, Brazil, 2011, we will certainly seek to also have future edited volumes, as this benefits the entire professional and research community.

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Dirk Ifenthaler research interests focus on the learning-dependent progression of mental models, complex problem solving, decision making, situational awareness, and emotions. He developed automated and computer-based methodologies for the assessment and analysis of graphical and natural language representations (SMD Technology, HIMATT, AKOVIA). Additionally, he developed components of course management software and an educational simulation games (DIVOSA, SESim). He is also interested in the development of educational software and learning management systems (LMS) as well as technology integration into the classroom. Dr. Ifenthaler has published multiple books and book chapters as well as numerous articles in leading journals of the field.

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Pamela Leonard focuses on project management, consultation, and support for regional patient safety/risk management initiatives. She leads clinical quality improvement activities that address patient safety initiatives and system improvement activities in partnership with operations and medical group. She facilitates the

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Alexander Libin is a scientific director at the SiTEL and MHRI of MedStar Health. He leads the research efforts of interdisciplinary teams working across health care, medical training and education, and cybertechnology. Dr. Libin works as a PI and a Co-PI on various clinical, educational, and multimedia projects funded by the NIDDR at the ED, TATRC at the DOD, Navy Office of Research, as well as participating in the nationwide collaborative efforts such as GHUCCTS at the Georgetown-Howard Universities. Dr. Libin is a published researcher who is proficient in both quantitative and qualitative methodology. More than 50 papers and 11 books in four languages (Russian, English, Spanish, and Japanese) on a wide range of topics in multimedia technology and cyberpsychology, public health and health literacy, disability and rehabilitation have appeared in national and international journals. His work in Rotherapy and Robotic Psychology, together with Dr. Elena Libin, resulted in his being acclaimed as an outstanding contributor to the assistive technology field and resulted in two chapters for the *Encyclopedia of Applied Psychology* (Oxford, 2005).

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Tzu-Chien Liu is the director and professor of the Graduate Institute of Learning & Instruction, National Central University. His research interests mainly focus on mobile learning and ubiquitous learning, instruction and learning sciences, the cognitive base of technology application, and innovative technology for education, interactive learning, and assessment. He has (co-)authored more than 140 book chapters and refereed journal and international conference papers. Dr. Liu is the associate editor of the *Journal of Research in Education Sciences* (Scopus index) and guest editor

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