

# Preface

This edited volume contains selected expanded papers from the CELDA (Cognition and Exploratory Learning in the Digital Age) 2010 Conference ([www.celda-conf.org](http://www.celda-conf.org)). It addresses the main issues concerned with problem solving, evolving learning processes, innovative pedagogies, and technology-based educational applications in the digital age. There have been advances in both cognitive psychology and computing that have affected the educational arena. The convergence of these two disciplines is increasing at a fast pace and affecting academia and professional practice in many ways. Paradigms (such as just-in-time learning, constructivism, student-centered learning and collaborative approaches) have emerged and are being supported by technological advancements such as simulations, virtual reality and multi-agent systems. These developments have created both opportunities and areas of serious concern. Hence, this volume aims to cover both technological as well as pedagogical issues related to these developments.

We organized the papers included in this volume around five themes: (a) Student-centered Learning, (b) Collaborative Learning, (c) Technology, Learning and Expertise, (d) toward Web 3.0 in Education, and (e) Exploratory Technologies. Each of the editors took lead responsibility for reviewing and editing the papers associated with one theme.

In Part I, student-centered learning, several issues are described and discussed. The authors address the issue of technology enhanced learning environments and propose an architecture to dynamically identify students' learning styles from their behaviour in a learning system, and updating their learning styles based on their behaviours. These learning styles' information is later accessed by an adaptivity module to provide students with customize feedback about their learning styles as well as about how to improve their learning processes (Graf, Kinshuk, Zhang, Maguire & Shtern, Chap. 1). Other way to enhance learners' efficiency is through the proposal on an annotation-based pedagogical process called SQAR (Survey, Question, Annotation and Review). SQAR aims to help the learners to enhance their learning activity and fosters learners' evolution (Mostefai, Azouaou & Balla, Chap. 2). Also an important issue in student-centered learning is the students' assessment. A survey is presented to analyse and infer from current and future online formative

assessments. The results provide insights on how to better plan online formative assessments having into account the expectancies of both students and tutors (Minder, Schmitz & Schär, Chap. 3). Lastly, informal learning and assessment has also been addressed by authors that investigated learners' performance and attitude toward a community-based project management learning system and the role of participatory media and Web 2.0 technologies in the whole process (Mohamed & Koehler, Chap. 4).

In Part II, chapters focus on collaborative learning issues. One way to achieve collaborative learning is through the use of games. A game has been devised specifically to accomplish this goal using mobile technologies (Sultana, Feisst & Christ, Chap. 5). Other authors propose a generic framework that complies with the rules of both higher education and life-long learning, and propose a virtual collaboration prototype (Porumb, Orz & Vlaicu, Chap. 6).

In Part III, chapters address technology, learning and expertise issues. Authors start by reporting the results of a survey conducted in an Australian University to explore the types of learning outcomes academics target in their curricula. This is assessed in lign with having in consideration how technologies are used to assess the referred outcomes (McNeill, Gosper & Hedberg, Chap. 7). The next chapter introduces mashups as a realistic method to develop new educational tools. The educational mashups can operate as a tool that combines data from an extensive variety of sources on the web, which can motivate students to share their learning experiences (Karavirta & Korhonen, Chap. 8). After that, three projects are presented to draw attention to several e-mentoring issues for example the nature of the mentoring process and the timing of the mentoring intervention. These projects demonstrate that a successful communication is critical to the improvement of the interaction between mentor and mentee (Lord & Coninx, Chap. 9). Finally, the authors recommend a new instructional design framework called IPTEACES (Involvement, Preparation, Transmission, Exemplification, Application, Connection, Evaluation and Simulation), which propose a suitable learning strategy for different learners in order to fit different learning profiles (Pena & Isafas, Chap. 10).

In Part IV, the chapters focus the issues of Web 3.0 in Education. Firstly, the authors compare two different representation methods that can encourage interaction behaviors between students within Virtual Learning Environments (VLEs). They believe that learning is a dynamic process of knowledge creation made by the learners' community with the help of the teacher (Pasqualino, Barchiesi & Battistoni, Chap. 11). Next, it is presented the results of a learning exercise in which students from two universities in the United States create a Website to promote a fictitious product online. In this exercise they must apply several different Search Engine Optimization (SEO) techniques to establish those which are the most useful (Frydenberg & Miko, Chap. 12). Other authors explore 3D Virtual Worlds (VWs) as an environment, which can introduce new educational benefits. By using 3D VWs, teachers can foment more interactive learning experiences to their students through the high representation fidelity that 3D Virtual Worlds can offer (Sampson & Kallonis, Chap. 13). In order to establish more adaptive e-learning environments, it is critical

to focus on the user as an individual with his own characteristics. To finish, it is described an exploratory study, which examine several cognitive processes of undergraduate students throughout mental rotation tasks (Mazman & Altun, Chap. 14).

In Part V, exploratory technologies are presented. Educational games are described as potential successful learning environments, due to the fact that they can stimulate the player by mixing casual and familiar content with educational content. It is described a solution on how motivation can be calculated and assessed during the game play (Ghergulescu & Muntean, Chap. 15). Other authors show that there is a common tendency of using merely acceptable-answer frequencies to evaluate if a student learning is both mathematically and psychologically unacceptable (Powell, Bernauer & Agnihotri, Chap. 16). Next, it is explored how an interactive cubic user-configurable modular robotic system, called Number Blocks, can facilitate the learning by 7–8 year old children regarding numbers and their pronunciation. This system merges physical interaction, learning and immediate response (Majgaard, Misfeldt & Nielsen, Chap. 17). Last, it is explored several reasonable ideas to produce devices for children through Computer-controlled Fabrication. The design and printing of physical objects has been growing and can be used for numerous educational purposes (Eisenberg, Ludwig & Elumeze, Chap. 18).

This is the third edited volume to result 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, and Timisoara, Romania, 2010 we will certainly seek to also have future edited volumes, as this benefits the entire professional community.

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Towards Learning and Instruction in Web 3.0

Advances in Cognitive and Educational Psychology

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