Preface

The concept of inclusive education implies providing all students with the same opportunities to learn and receive a high quality education regardless of their personal, social, or cultural background. It is a new area which goes beyond traditional integration approaches in order to endow the educative system with the capability to adapt to the diversity of the students without the use of special classrooms to separate students with different abilities and facilitating the full participation of everyone.

In order to make inclusive education a reality in the near future, technological advances in applied e-learning, cognitive learning, virtual learning environments, educational multimedia, web-based teaching, and learning and tutoring systems, become fundamental. In addition, novel approaches to human-computer interaction are essential to make these contents available for every student regardless of their disabilities and learning styles.

The objective of this edited volume is discussing the current state of the arts in these topics, bringing together the perspectives from different knowledge areas such as human-computer interaction, virtual environments, educative multimedia, and adaptation to educational special needs. This way, it will help researchers to broaden their research spheres and improve their understanding of how Technology and Education can enrich mutually. It will also help postgraduate and doctoral students in identifying new and challenging research problems in all the areas involved.

The 15 chapters of this book have been organized in the following 5 sections: 1) Multimodal Interfaces, 2) Virtual Environments, 3) User Modeling, 4) Adapted Contents, and 5) Devices and Simulators.

The first section describes the potential of multimodal interfaces to facilitate universal access to learning contents. Chapter 1 presents a state of the art of the advances in the development of multimodal conversational interfaces to guarantee accessibility to educational technology. Chapter 2 describes the case of the PreLingua tool for voice therapy, which merges speech processing techniques and an adapted visual interface to train patients who present speech development delays or special voice needs in the environment of special education. Chapter 3 explores additional possibilities for interactive teaching agents that process non-verbal input modalities such as eye-gaze and facial expressions. Embodied conversational agents combine the modalities described in the previous chapters, as discussed in Chapter 4, which closes the section with a study of the use of embodied conversational agents in interactive applications for children with special needs.

The second section is comprised of two chapters that describe the pedagogical possibilities of virtual worlds. Chapter 5 presents a study about using virtual environments for long-life learning and their differences with respect to traditional teaching approaches; while Chapter 6 describes practical experiences of the pros and cons of applying such technologies for inclusive middle education.

In the third section, several approaches to user modeling are discussed. In Chapter 7, conversational behaviors are modeled in order to provide adapted human-computer interaction. In Chapter 8, this ad-
aptation is tackled from the perspective of adjusting speech-based interfaces to the language disorders that are associated with certain intellectual disabilities. In Chapter 9, the user model is compiled using emotional parameters in game-based learning, as they are closely related to the student’s performance and motivation.

The fourth section examines contents adapted to users with special needs. The section starts with Chapter 10, which analyzes a vast amount of digital educational objects with respect to their accessibility. Chapter 11 presents three communication aids in which the multimedia learning contents are transformed into dot codes for special needs and regular schools. Chapter 12 presents the Evaluator tool, which can be used for automatic grading adapted to the language skills of the students.

The fifth section focuses on devices and simulators. Chapter 13 explores the possibilities of mobile devices including a captioning service for disabled and non-native users. Chapter 14 and 15 center in university teaching, the former discusses the applications of remote response devices, and the latter the use of simulators to explain abstract concepts.

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