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PAPERS

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Preface to the special issue on LED-ICT

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BIOGRAPHICAL NOTES

Ahlame BEGDOURI, is a professor of computer science at the Faculty of Sciences and Technology of Fez, University of Sidi Mohamed Ben Abdellah, Morocco. She received her Ph.D. in computer science on the quality of service of multimedia traffic over Internet as a best effort network, from Mohamed V University of Rabat, Morocco on 1999. She is a certified instructor in Routing & Switching (HCIA Instructor certification on 2019). Her current research topics cover context-aware systems, Communities of practice, mobile and social learning and intelligent environments.

She was the coordinator of an FP7 funded project MoICT (2011-2014) and the local coordinator of an AUF funded research project DISCOMOB (2012-2015). She was an associate member of the Moroccan ICT-NCP (FP7 National Contact Point in ICT) between 2010 and 2013 and chair of the "Moroccan IEEE Education Chapter" between 2016 et 2018. She received on 2016 the "Technical English Award" prize awarded by the "Executive Committee of IEEE Morocco-Section" in recognition of the efforts to establish the Technical Englisg Program Initiative (TEPI) in Morocco since 2011.

Edmundo TOVAR, received the computer engineering degree and Ph.D. degree in informatics from the Madrid Technical University (Universidad Politécnica de Madrid, UPM), Madrid, Spain, in 1986 and 1994, respectively.

He is a Certified Software Development Professional (CSDP) (2005 -), Professional Software Engineering Master Certification (2015-) of the IEEE Computer Society and leader of he Information Systems Task Force in Merlot.

He is currently with the UPM as a Professor of information technology in enterprise. He has served as an elected member of the Board of Directors of the OpenCourseWare Consortium (2009–2013), Executive Director of the OCW Office of the UPM (2008–2012), and Executive Director of the Open Education Office at UPM (2013-2016).

Member of the IEEE Education Society Board of Governors (2005–2012) currently he is President -Elect (2019–2020) and President (2021-2022)

PREFACE

Over the past few years, there has been an exponential increase in the number of learners with learning disabilities and difficulties in their adaptation to the educational programs. Learning disabilities may concern the acquisition, organization, retention, comprehension

or processing of information. They mainly affect oral language (communication), written language (reading and writing) as well as mathematics (calculation, logical reasoning and problem solving). Several disorders or syndromes of neuropsychological origin can be at the origin of these learning disabilities such as “Dys” disorders (Dyslexia, dysgraphia, dysphasia, etc.), attention deficit (with or without hyperactivity), memory disorders, Asperger's syndrome, autism, etc.

Learning disabilities can have a significant impact on the learner's life and his academic performance. The difficulties are even greater when the educational system adopts classical teaching methods which make the learning more complex.

On the other hand, organizations as United Nations recognize the right of persons with disabilities equal access to quality education and lifelong learning as one of the basic human rights.

In this particular learning landscape, the increasing use of ICT is offering new opportunities to break the barriers found in the traditional learning processess. ICT may play a major role in supporting disabled learners. Indeed, several technology-based solutions are developed in order to compensate the inconveniences and adapt the educational practice. As example, we can cite assistive technology for learners which allows increasing learners’ autonomy, differentiated learning activities, communities of practice for generalizing good practices and pedagogical advice, etc. Several other fields are still to be explored like serious games, ambient intelligent systems, etc.

Learning disabilities and ICT support is a fairly recent research topic which involves the complementary fields of education, instructional design and ICT. The objective is to construct a common understanding of the physical disorders causing the learning disabilities in order to develop innovative pedagogical models, appropriate training plans and adaptive digital tools to support learners and lead them to success.

Considering the state of the art and the research needs in this field, we can broadly classify the main research orientations, challenges, and directions into the following general categories:

- Modeling : identifying a unfied view and an in-depth understanding of the learning disabilities by the means of modeling them, their context or the solutions to be proposed, etc.
- Engineering : designing architectures, frameworks, and approaches for the development of intelligent, adaptive and context-aware solutions for the learners integrating new technologies like robots, serious games, augmented reality, etc.
- Evaluation : Evaluating the proposed solutions in order to measure their performance, benefits and limitations.

This LED-ICT special issue includes four papers with contributions related to all of the above-mentioned research categories.

The paper "A Learning Disabilities Model and Solutions Collection for an Adaptive Dialogue System for teaching" by Mohammed TAOUIL, Ahlame BEGDOURI and Aicha MAJDA aims at the design of an adaptive intelligent dialogue system as a learning support to an apprentice with learning disabilities. The solutions proposed do far in the existing research works in this field try to deal with one leaning disability at a time. A unified vision of the learning disabilities and their potential solutions is therefore an

increased need. The authors propose a generic data model of Learning disabilities as well as a collection of potential ICT supported solutions categorized according to the proposed classification of learning disabilities.

The paper "The Use of ICT in Dealing with Reading-related Learning Difficulties: A Literature Review with a Special Focus on Reading Arabic Texts" by Mohamed Aymane Sbai and Maha El Biadi gives a litterature review on learning disabilities virsus learning dificulties and the reading activity (sub-skills, models and theory). The focus has been put on some special characteristics of the Arabic language in an attempt to explain the problems that most learners face when learning Arabic as well as advantages of using ICT in order to deal with them.

The third paper "Social Robots for Reinforcing Attention and Forming Emotional Knowledge of Children with Special Educational Needs" by A. Lekova, T. Tanev, S. Kostova, P. Dachkinov, V. Vassileva-Aleksandrova and O. Bouattane proposes to use social robots in order to reinforce children abilities in education. The authors previously designed an EEG based Brain-Computer Interface which measures and features the brain electrical activity in real time in order to analyze the correlated attentional or emotional states of a child. They propose to use the BCI output to assist special educators in the assessment of the emotional and cognitive performance of a child or to be used directly as input for robot control. Therefore, the main contributions of the research work in this paper is the proposal of frameworks and protocols to transfer data on the child state to the robots. Some experimental results have been also presented.

The paper "Evaluation of an Educational Game for Children with Dyslexia: FunLexia-A Case Study" by Nihal OUHERROU, Fatimaezzahra BENMARRAKCHI, Oussama ELHAMMOUMI and Jamal EL KAFI deals with the evaluation of FunLexia, an educational game that they designed and developed to help children with dyslexia to read Arabic. Due to the lack of research works on the appropriate evaluation methods of ICT tools supporting children with learning disabilities, the authors propose an evaluation for FunLexia that combined different usability methods. An evaluation that was conducted by specialists in the field of special education for children with dyslexia. The results show that the educational game of Funlexia has potential benefits to help children to learn Arabic and suggest features and aspects that need improvements for the next version of the educational game.

Beeing convinced of the interest, the societal dimension and the increasing need of solutions for this field amoung the research community as well as the beneficiaries, we hope that all the readers of this special issue will find in it interesting and valuable materials.

The guest editor would like to thank primarily all the authors for their contributions to the special issue. Our thanks go out also to the reviewers who provided the authors by their valuable comments and feadback. We are especially grateful to Professor Mohamed El Mohajir, the IJIST Editor-in-Chief, for his collaboration and kind help to make this issue possible.