

Smart Education and e-Learning 2016





Editors
Vladimir L. Uskov
Computer Science and Information Systems,
InterLabs Research Institute
Bradley University

Peoria, IL

USA

Robert J. Howlett KES International Shoreham-by-sea UK Lakhmi C. Jain University of Canberra Canberra Australia

and

Bournemouth University Poole

UK and

KES International Shoreham-by-sea UK

ISSN 2190-3018 ISSN 2190-3026 (electronic)
Smart Innovation, Systems and Technologies
ISBN 978-3-319-39689-7 ISBN 978-3-319-39690-3 (eBook)
DOI 10.1007/978-3-319-39690-3

Library of Congress Control Number: 2016941070

© Springer International Publishing Switzerland 2016

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or ormissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG Switzerland

Contents

Part I Smart University: Conceptual Modeling	
Smart University Taxonomy: Features, Components, Systems	3
Smart Universities, Smart Classrooms and Students with Disabilities	15
Innovative Approaches Toward Smart Education at National Institute of Technology, Gifu College Nobuyuki Ogawa and Akira Shimizu	29
University Smart Guidance Counselling	39
Teacher's Role in a Smart Learning Environment—A Review Study	51
Toward Smart Value Co-education	61
Smart University Management Based on Process Approach and IT-Standards	73
A Formal Algebraic Approach to Modeling Smart University as an Efficient and Innovative System Natalia A. Serdyukova, Vladimir I. Serdyukov, Vladimir L. Uskov, Vladimir V. Ilyin and Vladimir A. Slepov	83

viii Contents

Conceptual Framework for Feedback Automation in SLEs	97
Development of Smart-System of Distance Learning of Visually Impaired People on the Basis of the Combined of OWL Model	109
Part II Smart Education: Research and Case Studies	
Data Mining of Students' Behaviors in Programming Exercises Toshiyasu Kato, Yasushi Kambayashi and Yasushi Kodama	121
Social Network Sites as a Good Support for Study Purposes	135
Design and Application of MOOC "Methods and Algorithms of Graph Theory" on National Platform of Open Education of Russian Federation Lyubov Lisitsyna and Eugeniy Efimchik	145
A Framework for Human Learning Ability Study Using Simultaneous EEG/fNIRS and Portable EEG for Learning and Teaching Development Boonserm Kaewkamnerdpong	155
A Conceptual Framework for Knowledge Creation Based on Constructed Meanings Within Mentor-Learner Conversations	167
Inductive Teaching and Problem-Based Learning as Significant Training Tools in Electrical Engineering	179
A Supporting Service in Teacher Training: Virtual Newspaper Nuray Zan and Burcu Umut Zan	189
Participation in State R&D Projects Jointly with Industrial Enterprises: Factor in Employability Improving of University Graduates Alexey Margun, Artem Kremlev, Aleksandr Shchukin, Konstantin Zimenko and Dmitry Bazylev	203
On-Line Formative Assessment: Teaching Python in French CPGE François Kany	213
PageRank Algorithm to Improve the Peer-Led Team Learning Pedagogical Approach	225

Contents ix

Developing Computational Thinking Abilities Instead of Digital Literacy in Primary and Secondary School Students	235
Innovations in Subjects Knowledge Technologies	247
Economic Aspects of the Introduction of the SMART Technology into Kindergartens and Primary Schools—Czech National and Local Scene	255
Part III Smart e-Learning	
An Integrative Approach of E-Learning: From Consumer	
to Prosumer	269
Using E-Learning in Teaching Economics at Universities	
of the Czech Republic	281
The Gamification Model for E-Learning Participants Engagement Danguole Rutkauskiene, Daina Gudoniene, Rytis Maskeliunas and Tomas Blazauskas	291
RLCP-Compatible Virtual Laboratories in Computer Science Evgeniy A. Efimchik, Elena N. Cherepovskaya and Andrey V. Lyamin	303
Combining Science with Art to Educate and Motivate Patients Prior to Colorectal Cancer Screening. Piet C. de Groen, Shreepali Patel, Mariana Lopez, Michael Szewczynski and Rob Toulson	315
Tangible Interfaces for Cognitive Assessment and Training in Children: LogicART	329
On the Process of Mobile-Assisted Teaching and Learning at FIM UHK—Analysis and Reflection Ivana Simonova and Petra Poulová	339
Assessment of Outcomes in Collaborative Project-Based Learning	
in Online Courses	351

x Contents

Thomas Staubitz, Maximilian Brehm, Johannes Jasper, Thomas Werkmeister, Ralf Teusner, Christian Willems, Jan Renz and Christoph Meinel	363
Sequencing Educational Contents Using Clustering and Ant Colony Algorithms María José Franco Lugo, Christian von Lücken and Esteban Ramírez Espinoza	375
Students' Assessment Preferences in ESP in the Smart Learning Environment	387
Smart Technologies in Psycho-Oriented Strategies of Adaptive Education	397
Elderly People and Their Use of Smart Technologies: Benefits and Limitations	405
Part IV Smart Education: Software and Hardware Systems	
Smart Classroom	415
Creating a Smart Virtual Reality Simulator for Sports Training and Education	423
Using Embedded Robotic Platform and Problem-Based Learning for Engineering Education Fredy Martínez, Holman Montiel and Henry Valderrama	435
Learning Object Assembly Based on Learning Styles	447
Transmedia Storytelling for Social Integration of Children with Cognitive Disabilities	463
Application of Semantic Web Technologies to Facilitate Use of E-Learning System on Mobile Devices	473

Contents xi

Applications of Innovative "Active Learning" Strategy in "Control Systems" Curriculum Dmitry Bazylev, Alexander Shchukin, Alexey Margun, Konstantin Zimenko, Artem Kremlev and Anton Titov	485
Learning Strategies for Cryptography Using Embedded Systems Edwar Jacinto, Fredy Martínez and Fernando Martínez	495
Introducing Smart Technologies for Teaching and Learning of Fundamental Disciplines	507
Redefining Knowledge Management Education with the Support of Personal Knowledge Management Devices	515
Interactive Educational System Based on Generative Approach, and the Problem of Answer Checking	527
Part V Smart Technology as a Resource to Improve Education and Professional Training	
Smart Technologies in Foreign Language Students' Autonomous Learning	541
Formation of the Individual Learning Path in the Information and Educational School Environment	553
Information Education in Russia	563
Implementation of the Internet for Educational Purposes	573
Assessment of Levels of Formation of Competence of Students as Users of Information and Communication Technology in the Field of Health Care	585
Intelligent System of Training and Control of Knowledge, Based on Adaptive Semantic Models Tamara Shikhnabieva and Sergey Beshenkov	595

xii Contents

Use of Electronic Mind Maps for Creation of Flexible Educational Information Environments	605
and Margarita Kusova	
Exploiting the Characteristics of Lecturers Based on Faculty Performance Evaluation Forms Thuc-Doan Do, Thuy-Van T. Duong and Ngoc-Phien Nguyen	617
Teaching Big Data Technology Practices in Cloud Environment Alexander Shmid, Boris Pozin and Mikhail Ageykin	631
Author Index	641