

Vladimir L. Uskov · Robert J. Howlett  
Lakhmi C. Jain  
Editors

# Smart Education and e-Learning 2017

 Springer

# Contents

## Smart Pedagogy

<b>Smart Pedagogy for Smart Universities</b> . . . . .	3
Vladimir L. Uskov, Jeffrey P. Bakken, Archana Penumatsa, Colleen Heinemann, and Rama Rachakonda	

<b>Information Channel Based Measure of Effectiveness of Computer-Assisted Assessment in Flipped Classroom</b> . . . . .	17
Jerzy Rutkowski and Katarzyna Moscinska	

<b>Efforts for Upward Spirals Based on Both Teacher and Student Feedback on Smart Education</b> . . . . .	28
Nobuyuki Ogawa and Akira Shimizu	

<b>Analysis of Students' Behaviors in Programming Exercises Using Deep Learning</b> . . . . .	38
Toshiyasu Kato, Yasushi Kambayashi, Yuki Terawaki, and Yasushi Kodama	

<b>A Serious Game to Promote Environmental Attitude</b> . . . . .	48
Veronica Rossano, Teresa Roselli, and Gabriella Calvano	

<b>Making MOOCs More Effective and Adaptive on Basis of SAT and Game Mechanics</b> . . . . .	56
Lubov S. Lisitsyna and Evgenii A. Efimchik	

## Smart e-Learning

<b>The Development of the Critical Thinking as Strategy for Transforming a Traditional University into a Smart University</b> . . . .	67
Adriana Burlea Schiopoiu and Dumitru Dan Burdescu	

<b>RLCP-Compatible Virtual Laboratories with 3D-Models and Demonstration Mode: Development and Application in e-Learning</b> . . . . .	75
Lubov S. Lisitsyna, Evgenii A. Efimchik, and Svetlana A. Izgareva	
<b>Remote Laboratory Environments for Smart E-Learning</b> . . . . .	82
Hugh Considine, Andrew Nafalski, and Zorica Nedic	
<b>An Automata Model for an Adaptive Course Development</b> . . . . .	92
Andrey V. Lyamin and Elena N. Cherepovskaya	
<b>Algorithm of Contextual Information Formation for Smart Learning Object</b> . . . . .	102
Asta Slotkienė	
<b>Information Technologies in Musical and Art Education of Children</b> . . . . .	112
Nataliya G. Tagiltseva, Svetlana A. Konovalova, Nataliya I. Kashina, Elvira M. Valeeva, Oksana A. Ovsyannikova, and Sergey I. Mokrousov	
<b>A SPOC Produced by Sophomores for Their Junior Counterparts</b> . . . .	120
François Kany and Bruno Louédoc	
<b>An Outcome-Based Framework for Developing Learning Trajectories</b> . . . . .	129
Andrey V. Lyamin, Elena N. Cherepovskaya, and Mikhail S. Chezhin	
<b>A Simple MVC-Framework for Local Management of Online Course Material</b> . . . . .	143
Frode Eika Sandnes and Evelyn Eika	
<b>Multi-agent Smart-System of Distance Learning for People with Vision Disabilities</b> . . . . .	154
Galina Samigulina, Adlet Nyussupov, and Assem Shayakhmetova	
<b>Use of Smart Technologies in the e-Learning Course Project Management</b> . . . . .	167
Martina Hedvicakova and Libuse Svobodova	
<b>Approaches to the Description of Model Massive Open Online Course Based on the Cloud Platform in the Educational Environment of the University</b> . . . . .	177
Veronika Zaporozhko, Denis Parfenov, and Igor Parfenov	
<b>Systems and Technology for Smart Education</b>	
<b>Building Smart Learning Analytics System for Smart University</b> . . . . .	191
Vladimir L. Uskov, Jeffrey P. Bakken, Colleen Heinemann, Rama Rachakonda, Venkat Sumanth Guduru, Annie Benitha Thomas, and Durga Poojitha Bodduluri	

**A Half-Duplex Dual-Lingual Video Chat to Enhance Simultaneous Second Language Speaking Skill** . . . . . 205  
 Bui Ba Hoang Anh and Kazushi Nishimoto

**A Recommender System for Supporting Students in Programming Online Judges** . . . . . 215  
 Raciél Yera, Rosa M. Rodríguez, Jorge Castro, and Luis Martínez

**Assessment of Students’ Programming Skills by Using Multi-Style Code Editor** . . . . . 225  
 Elena N. Cherepovskaya, Ekaterina V. Gorshkova, and Andrey V. Lyamin

**DILIGO Assessment Tool: A Smart and Gamified Approach for Preschool Children Assessment** . . . . . 235  
 Antonio Cerrato, Fabrizio Ferrara, Michela Ponticorvo, Luigia Simona Sica, Andrea Di Ferdinando, and Orazio Miglino

**Eye Tracking Technology for Assessment of Electronic Hybrid Text Perception by Students** . . . . . 245  
 Kirill Zlokazov, Maria Voroshilova, Irina Pirozhkova, and Marina V. Lapenok

**The Smart MiniFab: An Industrial IoT Demonstrator Anywhere at Any Time** . . . . . 253  
 Tobias Schubert, Benjamin Völker, Marc Pfeifer, and Bernd Becker

**“Semograph” Information System as a Framework for Network-Based Science and Education** . . . . . 263  
 Konstantin Belousov, Elena Erofeeva, Yuliya Leshchenko, and Dmitriy Baranov

**Social Interactions in a Virtual Learning Environment: Development and Validation of the Social Map Tool** . . . . . 273  
 Magalí Teresinha Longhi, Ana Carolina Ribeiro Ribeiro, Fátima Weber Rosas, Leticia Rocha Machado, and Patricia Alejandra Behar

**Education Information Interaction in a Group on the Basis of Smart Technologies** . . . . . 282  
 Natalya V. Gerova, Marina V. Lapenok, and Irina Sheina

**Smart Evaluation of Instrument Scan Pattern Using State Transition Model During Flight Simulator Training** . . . . . 292  
 Kavyaganga Kilingaru, Zorica Nedic, Jeffrey Tweedale, and Steve Thatcher

**Technologies for the Development of Interactive Training Courses Through the Example of LMS MOODLE** . . . . . 302  
 Leonid L. Khoroshko, Maxim A. Vikulin, and Vladimir M. Kvashnin

**Analysis of Big Data in Colonoscopy to Determine Whether Interval Lesions are De Novo, Missed or Incompletely Removed . . . . .** 310  
Piet C. de Groen, Wallapak Tavanapong, JungHwan Oh,  
and Johnny Wong

**Smart Teaching**

**Smart Teacher . . . . .** 321  
Blanka Klimova

**Search, Exchange and Design of Learning Objects in Learning Objects Repositories . . . . .** 330  
Daina Gudoniene, Danguole Rutkauskiene, and Valentina Dagiene

**Technology-Enhanced CLIL: Quality Indicators for the Analysis of an on-Line CLIL Course . . . . .** 339  
Michele Della Ventura

**Motivation of Students and Young Scientists in Robotics . . . . .** 348  
Dmitry Bazylev, Denis Ibraev, Alexey Margun, Konstantin Zimenko,  
and Artem Kremlev

**Attention Retention: Ensuring Your Educational Content Is Engaging Your Students . . . . .** 358  
Mariia Kravchenko and Andrew K. Cass

**Utilization and Expected Potential of Selected Social Applications in University Setting – a Case Study . . . . .** 371  
Miloslava Černá and Libuše Svobodová

**Electronic Mind Maps as a Method for Creation of Multidimensional Didactic Tools . . . . .** 381  
Marina Mamontova, Boris Starichenko, Sergey Novoselov,  
Kirill Zlokazov, and Marina V. Lapenok

**M-learning and the Elderly: Construction of Inclusive Pedagogies . . . . .** 391  
Leticia Rocha Machado, Jozelina Silva da Silva Mendes,  
Deyse Cristina Frizzo Sampaio, Tássia Priscila Fagundes Grande,  
and Patricia Alejandra Behar

**Developing a Web-Based Application as an Educational Support. . . . .** 400  
Petra Poulova and Blanka Klimova

**The Use of LMS Blackboard Tools by Students in “Enterprise Accounting” Subject . . . . .** 409  
Libuše Svobodová and Martina Hedvičáková

**Teaching Students the Basics of Control Theory Using NI ELVIS II . . . . .** 420  
Dmitrii Dobriborsci, Dmitry Bazylev, and Alexey Margun

**Use of Automatic Image Classification for Analysis of the Landscape, Case Study of Staré Jesenčany, the Czech Republic. . . . .** 428  
 Eva Trojovská, Pavel Sedlák, Jitka Komárková, and Ivana Čermáková

**Smart Education: National Initiatives and Approaches**

**Birth and Major Strategies of Smart Education Initiative in South Korea and Its Challenges . . . . .** 439  
 Seyeoung Chun

**Impact of International Accreditation for Education in the Russian Federation. . . . .** 450  
 Alexey Margun, Artem Kremlev, Dmitry Bazylev, and Ekaterina Zimenko

**Algebraic Formalization of Sustainability in Smart University Ranking System . . . . .** 459  
 Natalia A. Serdyukova, Vladimir I. Serdyukov, Alexander V. Uskov, Vladimir A. Slepov, and Colleen Heinemann

**Government Enterprise Architecture for Big and Open Linked Data Analytics in a Smart City Ecosystem. . . . .** 475  
 Martin Lnenicka, Renata Machova, Jitka Komarkova, and Miroslav Pasler

**User Identification in a Variety of Social Networks by the Analysis of User’s Social Connections and Profile Attributes . . . . .** 486  
 Marina V. Lapenok, Anna V. Tsygankova, Nataliya G. Tagiltseva, Lada V. Matveyeva, Olga M. Patrusheva, and Natalya V. Gerova

**Author Index. . . . .** 497