Editors: H. Fujita, J. Sasaki

Selected Topics in Education & Educational Technology

9th WSEAS International Conference on Education and Educational Technology (EDU '10)

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Iwate Prefectural University

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Preface

This year the 9th WSEAS International Conference on EDUCATION and EDUCATIONAL TECHNOLOGY (EDU '10) was held at the Iwate Prefectural University, Japan, October 4-6, 2010. The conference remains faithful to its original idea of providing a platform to discuss educational software and development, distance learning and distance teaching, multimedia for education, web-based education, e-school and e-university, e-learning and e-pedagogy etc. with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

Table of Contents

Plenary Lecture 1: Teaching Digital Citizenship 14
Lesley S. J. Farmer

Plenary Lecture 2: Mechatronic Education - An Important Way to Improve the Technological Education for Young People in Romania 15
Luciana Cristea

Plenary Lecture 3: Flexible Learning in Developing Regions 16
Love Ekenberg

Plenary Lecture 4: Web Mining – An Effective Method in Course Development and Learning Management 17
Imre J. Rudas, Peter Toth

Plenary Lecture 5: Teaching STEM Courses with Virtual Reality based Course Delivery System 18
M. Nasseh Tabrizi

Ability Training Through Partnered Education 19
Catherine W. Cook, Frank P. Decaro, Nicole E. Decaro

Examination of Learning Activities by Web Mining Methods 31
Imre J. Rudas, Peter Toth

Modern Tools to Teach-Learn-Assess for the Mathematical Subjects in Order to Acquire Important Professional and Practical Skills for the Labour Market 37
Oana Maria Pastae, Brandusa Prepelita-Raileanu

The Interdisciplinary Nature of Technology Education: What Makes its Implementation Successful? 43
Howard Nicholas

Effective e-Pedagogy for Virtual Science Learning with High Ability Secondary School Students 49
Wan Ng

Bridging the Gap between Higher Education, Academic Research and Romanian Business Community 56
Brandusa Prepelita-Raileanu, Oana Maria Pastae

Evaluation of the Immune Status of University Sport Spaces 62
Nasri Behzad

An Interactive Tool for Teaching and Learning English at Upper Primary Level for Mauritius 65
S. Pudaruth, A. Mantaye

Career Aspiration and the Influence of Parenting Styles: A Review of the Literature 71
Thanita Lerdpornkulrat, Ravinder Koul, Chuchai Sujivorakul

Facilitate Learning of Visual Language Skills in Engineering Students 77
Siu-Kay Pun

Disciplinary Differences in Personal Attributes: A Review of the Literature 83
Chanut Poondej, Ravinder Koul, Chuchai Sujivorakul

English as a Medium of Instruction in Thai Universities: A Review of Literature 89
Chadarat Hengsadeekul, Thammanoon Hengsadeekul, Ravinder Koul, Sittichai Kaewkuekool

Overcoming Measurement Hurdles in Statistical Education Research using Rasch Measurement Model 95
Zamalia Mahmud, Ida Rosmini Othman, Jamilah Othman, Mohd Saidfudin Masodi

Statistical and Experimental Methods used in Medical Education Related to the Aerobic and Anaerobic Effort Capacity at Athletes 102
Alina Martoma

Proposal and Analysis of Models Measuring Educational Effects for Assurance of Education Quality and Improvement of Student Satisfaction 108
Michiko Tsubaki, Masaki Kudo

A Technology Towards Bridging the Digital Divide: Applications and Acceptance 118
Norizan Abdul Razak, Nor Fariza Mohd Nor, Mohd Yusof Abdullah, Jalaluddin Abdul Malek, Ali Salman, Yoong Siew Wai

Challenges in Building Structure Engineering Education 123
Carlos Cuadra

Mapping the Landscape of Students' Learning Information Skills and Constructing Knowledge in Malaysian Higher Education 126
Aidah Abdul Karim, Rosseni Din, Norizan Abdul Razak, Mohd Yusof Abdullah, Supyan Hussin

Design and Development of a Business Modelling and Simulation Application for the Improvement of the Students' Management Skills 132
Rozalia Nistor, Costel Nistor, Mihaela-Carmen Muntean

Motivational Goal Orientation and Self-Efficacy Beliefs of Computer Science Undergraduate Students in Thailand 138
Thanita Lerdpornkulrat, Chanut Poondej, Noraphat Chatthin

CSL Proficiency Test Construction – based on CEFR B1 Level Reading and Listening Subject 142
Rih-Chang Chao, Bor-Chen Kuo, Hsuan-Po Wang, Ya-Hsun Tsai

A Case Study of Academic Performance of Off-Campus Engineering Students in a Malaysian University 148
Norhayati Ahmad, Kartini Salam, Rosnani Yahya, Norlida Buniyamin

Mobile Learning: An Application Prototype for AVL Tree Learning Object 152
Mohammad Noor Ibrahim, Saipunidzam Mahamad, Edrea Chua Ning Wei

Web-Based Application for Online Self Testing and Knowledge Evaluation in the Field of Microbiology 157
Mihaela Elena Idomir, Valentin Idomir, Angela Repanovici

Experience of Robotic Teaching for Malaysian Gifted Enrichment Program at PERMATApintar 163
Rizauddin Ramli, Melor Md. Yunus, Noriah Mohd Ishak

ARchive System for Cross-Reference Across Distributed Environment (ARCADE) Applicable to Sharing of Educational Materials among Inter-University Consortium 167
Takuya Matsuhira, Yoshiya Kasahara, Yoshihiro Takata

Educational Software for the Calculation of Thermodynamic Values of Real Gases for the Training of Engineering Students in Romania 171
Sorin Neacsu, Silvian Suditu, Catalin Popescu

Evaluation of Academic Performance of Electrical Engineering Bachelor Degree Students from Various Entry Levels: a Case Study 177
Pauziah Mohd Arsad, Norlida Buniyamin, Norulhuda Abd Rasheid

Mechatronic Education - An Important Way to Improve the Technological Education for Young People in Romania 183
Luciana Cristea

English as a Medium of Instruction in the Public Higher Education Institution: A Case Study of Language-in-Education Policy in Malaysia 188
Zuraidah Zaaba, Ibianaflorinciliana Niane Anthony Aning, Haijon Gunggut, Farida Ibrahim Mahmoud Ramadan, Katsuhiro Umemoto

The Method Used for Measuring the Customers' Satisfaction 197
Nedelcu Anisor, Dumitrascu Adela-Eliza, Cristea Luciana

Some Analysis Elements of the Reliability and Quality of Industrial Processes 201
Adela-Eliza Dumitrascu, Anisor Nedelcu, Luciana Cristea

Evaluation of ICT Usage for General or English Learning Purposes 205
Melor Md. Yunus, Chua Pei Lin, Maimun Aqsha Lubis, Rizauddin Ramli

The Use of ICT in Teaching Islamic Subjects in Brunei Darussalam 212
Maimun Aqsha Lubis, Melor Md.Yunus, Abdullah Awang Lampoh, Noriah Mohd Ishak

The Effectiveness of Strategies and Techniques in Teaching and Learning Islamic Education 218
Maimun Aqsha Lubis, Melor Md Yunus, Noriah Mohd Ishak, Tajul Arifin Muhamad, Mohammed Diao

Practice and Evaluation of Nursing Education using a Sequence of Events Creation Supporting System 224
Norio Ishii, Saori Sakuma

Design and Evaluation of an Application Software for Informal Peer Group Learning 229
Kenneth Thilakarathna, Chamath Keppitiyagama, Kasun De Zoysa, Henrik Hansson, Prasadi Jasinghe

The Readiness of the Orang Asli Youths in Venturing into Entrepreneurship 235
Norasmah Othman, Mohd Hasril Amiruddin

Comparability between Fuzzy Sets and Crisp Sets: A Semantic Web Approach 241
Kamaluddeen Usman Danyaro, Jafreezal Jaafar, Shahir Liew

A Multidimensional Computerized Adaptive Testing System for Enhancing the Chinese as Second Language Proficiency Test 245
Hsuan-Po Wang, Bor-Chen Kuo, Rih-Chang Chao

An Application of Bayes' Theorem to Evaluate Synthetic Speech for Computer-Assisted Language Learning 253
Min Kang, Harumi Kashiwagi, Yaheng Zou, Kazuhiro Ohtsuki, Makoto Kaburagi

Mechatronics Integrated Systems used in Optical Recognision of Digitised Documents 258
Angela Repanovici, Luciana Cristea, Mihaela Baritz

Health Promotion – Strategies and Topics Educating the Students from Nursing and Optometry Department 263
Liliana Rogozea, Roxana Miclaus, Angela Repanovici, Victoria Burtea

Student Satisfaction in Web-based ERP-Simulated Learning Environments 268
Penjira Kanthawongs, Nittana Soulisak, Penjuree Kanthawongs

Education and Visual Training for Children and Young People Vision Eyecare 274
Baritz Mihaela, Cotoros Diana, Rogozea Liliana

The Acculturation of ICT Among Rural Women E-Entrepreneurs: Issues and Challenges 278
Norizan Abdul Razak, Jamaluddin Aziz, Fuzirah Hashim, Zaini Amir, Shariya Haniz Zulkifli

The Application of Micromouse and MATLAB in Teaching Autonomous Mobile Robots 284
Juing-Huei Su, Chyi-Shyong Lee, Hsin-Hsiung Huang

Towards International Electronic Government for Student Management of the Scholarship Section of the Dubai Police 290
Saif Mubarak

Industry-based Training Course for Line Following Maze Robot Implementation 298
Chyi-Shyong Lee, Hsin-Hsiung Huang, Juing-Huei Su, Yu-Jhe Huang, Tsai-Ming Hsieh

Validity of UKM2 Intelligence Test using Rasch Analysis 303
Siti Rahayah Ariffin, Shafiza Mohamed, Anita Isa, Sharida Hanim Sarif, Abdul Ghafur Ahmad

Mobility and Mobile Client in Education 309
Tomas Kozel, Filip Maly, Antonin Slaby

A Validity and Reliability of Learning Style Instruments Using e-LeS Online Web Based System 313
Siti Rahayah Ariffin, Shah Nazim Shahar, Maimun Aqsha Lubis, Mohd Kashfi Mohd Jailani, Parilah Mohd Shah, Lim Liut Sun

A Survey on Educational Methods Using "CollabTest", a Web-based Learning System Enabling Students to Create Quizzes Collaboratively 318
Masanori Takagi, Tetsuya Kaneko, Masamitsu Mochizuki, Jun Sasaki, Yoshimi Teshigawara

Developing Sustainable Approach in Architectural Education: Lesson from Critique Session Experience of Architecture Studio Program 325
B. Hassanpour, N. Utaberta, M. M. Tahir, N. A. G. Abdullah, N. Spalie, A. I. Che-Ani

Gender Differential Item Functioning (GDIF) in an Online Intelligence Test 331
Ariffin Siti Rahayah, Syakima Ilyana Ibrahim, Nurul Huda Mohd Abd Malek, Sharida Hanim Sarif, Siti Fatimah Mohd Yassin

Performance Based Multiple Intelligences Test Analysis 336
Siti Rahayah Ariffin, Mohd Kashfi Mohd Jailani, Rosseni Din, Roseni Ariffin, Abdul Ghafur Ahmad

Internet Technologies in Educational Television 341
Danimir Mandic, Ezzadeen Kamuka

Metacognitive Skills and the Development of Metacognition in the Classroom 347
Saemah Rahman, Ruhizan M. Yasin, Siti Rahayah Ariffin, Najmi Hayati, Suriani Yusoff

New Types of Education - Premises for Formation of Physical Education and Sports Teachers 352
Constantin Pehoiu

Education, Stress, Vulnerability, Physical Activity at Teen Age 361
Constantin Pehoiu

Constructivist Approach to Planning and Implementation Didactic-IT Innovation in Education 370
Nada Vilotijevic, Danimir Mandic, Ivko Nikolic

Work Culture of Production Employees in Multinational Companies in Indonesia: Implication to Training and Development 374
Ruhizan M. Yasin, Syahril, Ramlee Mustapha, Saemah Rahman

An Analysis of the Performance of the Automatic Sun Tracking System for Dual-Axis Solar Cell 378
Yanawan Kengthanoommar, Narong Mungkung

E-learning and Security Problems in Claud Computing Environment 381
Danimir Mandic, Vladimir Urosevic, Mihajlo Tijanic

Teaching Digital Citizenship 387
Lesley S. J. Farmer

Authors Index 393

Plenary Lecture 1

Teaching Digital Citizenship

Professor Lesley S. J. Farmer
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USA
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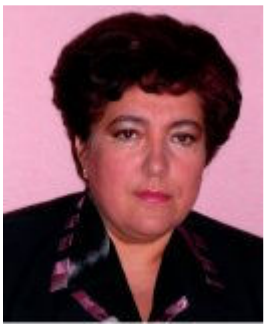
Abstract: State and national legislation is mandating responsible digital competency for all ages. Educators need to develop and deliver technology-based curriculum that addresses how learners can effectively and responsibly access, assess, use, share and produce digital information as well as contribute positively to the digital world. This presentation showcases engaging, interactive curriculum, learning objects, and learning activities for K12 school communities.

Brief Biography of the Speaker:
Dr. Lesley Farmer, Professor at California State University Long Beach, coordinates the Librarianship program. She earned her M.S. in Library Science at the University of North Carolina Chapel Hill, and received her doctorate in Adult Education from Temple University. Dr. Farmer has worked as a teacher-librarian in K-12 school settings as well as in public, special and academic libraries. She chaired the Education Section of the Special Libraries Association, and is the International Association of School Librarianship Vice-President of Association Relations. A frequent presenter and writer for the profession, Dr. Farmer's research interests include information literacy, collaboration, and educational technology. Dr. Farmer's most recent book is Technology Management Handbook for School Library Media Centers, published by Neal-Schuman in 2009.

Plenary Lecture 2

Mechatronic Education - An Important Way to Improve the Technological Education for Young People in Romania



Professor Luciana Cristea
Department of Precision Mechanics and Mechatronics
"Transilvania" University of Brasov
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Abstract: The Mechatronics is the synergetic combination of precision mechanical engineering, electronic control and systems thinking in the design of products and processes. Mechatronics as a highly interdisciplinary domain involves sensors, actuators, data bases, system modelling, locomotion, system control and data acquisition. In Mechatronics there is a need to develop interdisciplinary programs to better prepare graduates to design, build, and operate the products and systems of today and tomorrow. The European Commission recognises that meeting the Lisbon challenge requires to rethink education and training to promote efficient and optimal learning. The tasks and the problems solving in mechatronics requires cognitive and operational knowledge and practical experience about building systems, diagnosis and maintenance-techniques. Any education programme that aims to be useful and to support the local industry has to have a balance between academic and practical work. The curricula in the Mechatronics field, developed according to European standards, have to assure high performances in design, manufacturing, services, and research, performances perfectly matched with the needs of highly computerized society.

Brief Biography of the Speaker:
Prof. Dr. Eng. Luciana CRISTEA is professor in the Department of Precision Mechanics and Mechatronics from "Transilvania" University of Brasov-Romania, coordinator of the Precision Mechanics Specialization, coordinator of the research department "High-precision Mechanical Products and Mechatronic Systems" from "Transilvania" University of Brasov, coordinator of the Conceiving Division of Products Testing-Assessment and Quality Guarantee (CATEPAC) – SAVAT Platform. She has been involved in the research activity since 1988 (as a scientific researcher at ICSITROA Brasov and as a member of the teaching and researching staff at the "Transilvania" University Brasov). She participated in 32 research contracts, in 17 as a coordinator, from 1990 up to date. She published 9 books in consecrated publishing houses (1 book in an international publishing house), 12 university courses and manuals, 148 scientific papers in the field of Precision Mechanics and Mecahtronics and is the author of 3 inventor patents. She is PhD coordinator since 2004.
Since 2008, Professor Luciana CRISTEA is the Head of the Department of Precision Mechanics and Mechatronics from "Transilvania" University of Brasov-Romania;
Domains of interest: Precision mechanics and mechatronics, Control and serving automat systems, Technologies and systems of dimensional inspection and serving; Optimisation of supplying, transportation, and dosing systems utilized in control automates fabrication, Structural improvement of automatic Microsystems, Mechanical engineering.
Former approached research domains: Fabrication, forming operations, and industrial control using robots and automatic instalations (1990-92); Research and simulation of supplying, dosing and transportation systems utilised in industrial automatisations for optimisation (1994-96); Structural improvement and modernizing of automatic dimensional control systems designated to re-technologisation and assembly organs production quality guarantee (1988-2002); Modular conceiving of automatic dimensional control systems for control equipment optimisation and re-technologisation, and products quality guarantee (2002-2006); Conceiving products testing-assessment and quality guarantee (2005-2006); Miniatural robotic system with reconfiguration and self-multiplication abilities (2006-2008).
She is member of the Romanian General Association of Engineers (AGIR), funding Member of the Romanian Association of Precision Mechanics and Optics (AMFOR) and Funding Member of the Romanian Society of Mechatronics (SROMECA).

Plenary Lecture 3

Flexible Learning in Developing Regions

Professor Love Ekenberg
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Abstract: Education is a key area for development at an individual, community, national- and international level. Skilled people are employable and thereby generate their own professional identities, businesses and livelihoods. Although efficient and large-scale education is vital for building up stable knowledge economies, many countries have weak educational structures and lack basic resources. However, indiscriminate acceptance and use of e-learning can increase the digital divide rather than reduce it. In this talk, we discuss emerging issues from which we develop theoretical assumptions aimed at suitable approaches for effective adoption and utilization of e-learning to support teaching and learning processes. In particular, we present some recent initiatives for efficient e-learning undertaken by Dept. of Computer and Systems Sciences at Stockholm University (DSV).

Brief Biography of the Speaker:
Ekenberg has been working with development cooperation (EU, World Bank, Sida, WHO, Swedish Ministry of Foreign Affairs), including technical infrastructure development, IT policies and organization development as well as human resources. Ekenberg has been project leader, manager and coordinator of around 20 major national and C:\Program Files (x86)\Eudora\attach\liten xlove ekenberg.jpginternational projects and has authored or co-authored over 150 peer-reviewed journal and conference papers as well as three books. Ekenberg is Full Professor in Computer and Systems Sciences at Stockholm University, Full Professor of Information Systems at The Swedish Royal Institute of Technology as well as Guest Professor in Computer Science at Mid Sweden University. He has a Ph.D. in Computer and Systems Sciences as well as a Ph.D. in Mathematics. He his currently head of Dept. of Computer and Systems Sciences at Stockholm University, consisting of around 200 employees, 80 PhD students and handling around 4500 undergraduate students.

Plenary Lecture 4

Web Mining – An Effective Method in Course Development and Learning Management

Professor Imre J. Rudas
President of Obuda University, Hungary
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Professor Peter Toth
Director of Centre for Engineering Education
Obuda University, Hungary
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Abstract: The development of e-Learning, the use of Learning Management System and Learning Content Management System are becoming more and more dominant in engineering education, especially since "caned" solutions are easy to "configure" for desired purposes. However, the quality issue is only a second criterion in development process, making content and conventional teaching strategies to be the main issue. The two main criterion is "content and form" – the precise pedagogic aims, didactic structure and suitably tailored environment. Apart from these, we should also evaluate the customs of accessing the system and course pages of users, both tutors and learners. Thus we obtain some usability indicators by usage of web mining methods in order to recognize and understand the users' activities and behavior, to identify learning strategies and problems in virtual learning environment. By this approach the web mining method accommodates organically to a development model of virtual learning environment. This presentation shows such indicators and their relationship to the efficiency and the effectiveness of virtual courses.

Brief Biography of the Speakers:

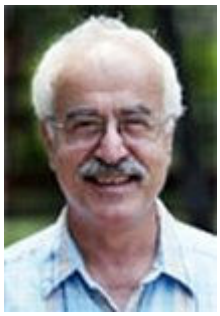
H Prof. Dr. Imre J. Rudas graduated from Banki Donat Polytechnic, Budapest in 1971 and received the Master Degree in Mathematics from the Eotvos Lorand University, Budapest while the Ph.D. in Robotics from the Hungarian Academy of Sciences in 1987. He is active as the President of Obuda University and as a professor of John von Neumann Faculty of Informatics. Prof. Rudas is a Fellow of IEEE, Administrative Committee member of the Industrial Electronics Society, member of the International Board of the Robotics & Automation Society, Chairman of the joint Hungarian Chapter of these Societies, and RAS and IES Chapter Coordinator of Region 8. He is also a registered expert of the United Nations Industrial Development Organization and the EU. He is the President of the Hungarian Fuzzy Association and Steering Committee Member of the Hungarian Robotics Association and the John von Neumann Computer Society. Prof. Rudas serves as an associate editor of IEEE Transactions on Industrial Electronics, member of editorial board of Journal of Advanced Computational Intelligence and Control Engineering Practice, member of various national and international scientific committees. He is the founder of the IEEE International Conference Series on Intelligent Engineering Systems Prof. Rudas was the General Co-chair of ICAR2001, and also serves as General Chairman and Program Chairman of numerous scientific international conferences. His present areas of research activity are: Robot Control, Soft Computing, Computed Aided Process Planning, Fuzzy Control and Fuzzy Sets. Prof. Rudas has published more than 280 papers in various journals and international conference proceedings.

Dr. Peter Toth Peter is Professor of Centre for Engineering Education at Obuda University, Hungary where he is participating in technical initial teacher training and in-service training courses. Currently he is a director of the Centre. He earned his MSc in Engineering Education at the Budapest University of Technology and Economics, and Peter Toth has Ph.D degree in Educational Research from Eotvos Lorand University. He plays leading role in planning, development and managing traditional and virtual engineering programs. Dr. Toth is doing research on pedagogy of virtual learning environment, improvement of problem-solving thinking and analyzing of spatial abilities in engineering education. His actual research area is analysis of students' activities and behavior in virtual learning environment by web mining methods.

He has been contributing in some European researches and projects on pedagogical aspects of e-learning and development of creativity and abilities of future engineers and teachers as well. He is member of Committee for Teacher Training of Hungarian Rectors' Conference and secretary of Informatics Section of Pedagogical Committee of Hungarian Academy of Sciences. Dr. Toth has issued about 60 papers in several journals and conference proceedings.

Plenary Lecture 5

Teaching STEM Courses with Virtual Reality based Course Delivery System



Professor M. Nasseh Tabrizi
Director of Graduate Studies
Director of Technology Innovation Lab
Department of Computer Science
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Abstract: We report our findings of an NSF funded study (Tabrizi, PI; Farwell, CoPI; Russell, CoPI) assessing the effectiveness of the Agent Based Virtual Reality (AVR) delivery system used to deliver STEM education at East Carolina University. Our preliminary review of the collected data shows the system is effective at supporting student learning and aiding faculty in meeting their learning objectives for individual courses. Additionally, our initial data gathered and redistributed to us by an independent data gathering organization for fall 2009 and spring 2010 deployment of the AVR system, indicate significant increase in student learning as measured by pre and post testing in classes as broadly distributed as: networking, biotechnology, statistics, technology law and technical writing.

Brief Biography of the Speaker:
Tabrizi received his B.S. degree in Computer Science from Manchester University, UK. He then completed his M.S. and Ph.D. from Automatic Control and Systems Engineering Department, Sheffield University, UK. Tabrizi worked in Manchester University for two years prior to his appointment at East Carolina University in 1984. He is the Graduate Program Director of Computer Science and founder and director of Software Engineering program at East Carolina University. His research interests are in the areas of Virtual Reality, Modeling and Simulation, Computer Vision, Signal and Image Processing, Software Engineering Education, Internet and Multimedia, Assistive Technologies, and Computer Science Education. Tabrizi and his research team have prototyped different project in his Technology Innovation lab including Archival Data Extraction and Assessment (ADEAP) system, electronic medical records management, an agent and virtual reality-based course delivery system, RFID based learning assessment system, and virtual reality based home inspection and training system. Tabrizi has participated on several major grants. His research team is involved in creation of innovative technologies including the recent one on development of multi-touch table top screen. Tabrizi publications include diverse areas of research in computer science, technology, and software engineering. He was named ECU's scholar teacher in 2000 and has received best paper award.

Authors Index

Abdullah, M. Y. 118, 126
Abdullah, N. A. G. 325
Ahmad, A. G. 303 336
Ahmad, N. 148
Amir, Z. 278
Amiruddin, M. H. 235
Aning, I. N. A. 188
Anisor, N. 197
Ariffin, R. 336
Ariffin, S. R. 303, 313
Ariffin, S. R. 336, 347
Arsad, P. M. 177
Aziz, J. 278
Baritz, M. 258
Behzad, N. 62
Buniyamin, N. 148, 177
Burtea, V. 263
Chao, R.-C. 142, 245
Chatthin, N. 138
Che-Ani, A. I. 325
Cook, C. W. 19
Cotoros, D. 274
Cristea, L. 197
Cristea, L. 183, 201, 258
Cuadra, C. 123
Danyaro, K. U. 241
De Zoysa, K. 229
Decaro, F. P. 19
Decaro, N. E. 19
Diao, M. 218
Din, R. 126, 336
Dumitrascu, A.-E. 197, 201
Farmer, L. S. J. 387
Gunggut, H. 188
Hansson, H. 229
Hashim, F. 278
Hassanpour, B. 325
Hayati, N. 347
Hengsadeekul, C. 89
Hengsadeekul, T. 89
Hsieh, T.-M. 298
Huang, H.-H. 284, 298
Huang, Y.-J. 298
Hussin, S. 126
Ibrahim, M. N. 152
Ibrahim, S. I. 331
Idomir, M.-E. 157
Idomir, V. 157
Isa, A. 303
Ishak, N. M. 163, 212, 218
Ishii, N. 224
Jaafar, J. 241
Jailani, M. K. M. 313, 336
Jasinghe, P. 229
Kaburagi, M. 253
Kaewkuekool, S. 89
Kamuka, E. 341
Kaneko, T. 318
Kang, M. 253
Kanthawongs, Penji. 268
Kanthawongs, Penju. 268
Karim, A. A. 126
Kasahara, Y. 167
Kashiwagi, H. 253
Kengthanoommar, Y. 378
Keppitiyagama, C. 229
Koul, R. 71, 83, 89
Kozel, T. 309
Kudo, M. 108
Kuo, B.-C. 142, 245
Lampoh, A. A. 212
Lee, C.-S. 284, 298
Lerdpornkulrat, T. 71, 138
Liew, S. 241
Liliana, R. 274
Lin, C. P. 205
Lubis, M. A. 205, 212
Lubis, M. A. 218, 313
Mahamad, S. 152
Mahmud, Z. 95
Malek, J. A. 118
Malek, N. H. M. A. 331
Maly, F. 309
Mandic, D. 341, 370, 381
Mantaye, A. 65
Martoma, A. 102
Masodi, M. S. 95
Matsuhira, T. 167
Miclaus, R. 263
Mihaela, B. 274
Mochizuki, M. 318
Mohamed, S. 303
Mohd Nor, N. F. 118
Mubarak, S. 290
Muhamad, T. A. 218
Mungkung, N. 378
Muntean, M.-C. 132
Mustapha, R. 374
Neacsu, S. 171
Nedelcu, A. 201
Ng, W. 49
Nicholas, H. 43
Nikolic, I. 370
Nistor, C. 132
Nistor, R. 132
Ohtsuki, K. 253
Othman, I. R. 95
Othman, J. 95
Othman, N. 235
Pastae, O. M. 37, 56
Pehoiu, C. 352, 361
Poondej, C. 83, 138
Popescu, C. 171
Prepelita-Raileanu, B. 37, 56
Pudaruth, S. 65
Pun, S.-K. 77
Rahayah, A. S. 331
Rahman, S. 347, 374
Ramadan, F. I. M. 188
Ramli, R. 163, 205
Rasheid, N. A. 177
Razak, N. A. 118, 126, 278
Repanovici, A. 157, 258, 263
Rogozea, L. 263
Rudas, I. J. 31
Sakuma, S. 224
Salam, K. 148
Salman, A. 118
Sarif, S. H. 303, 331
Sasaki, J. 318
Shah, P. M. 313
Shahar, S. N. 313
Slaby, A. 309
Soulisak, N. 268
Spalie, N. 325

Su, J.-H. 284, 298
Suditu, S. 171
Sujivorakul, C. 71, 83
Sun, L. L. 313
Syahril 374
Tahir, M. M. 325
Takagi, M. 318
Takata, Y. 167
Teshigawara, Y. 318
Thilakarathna, K. 229
Tijanic, M. 381
Toth, P. 31
Tsai, Y.-H. 142
Tsubaki, M. 108
Umemoto, K. 188
Urosevic, V. 381
Utaberta, N. 325
Vilotijevic, N. 370
Wai, Y. S. 118
Wang, H.-P. 142, 245
Wei, E. C. N. 152
Yahya, R. 148
Yasin, R. M. 347 374
Yassin, S. F. M. 331
Yunus, M. Md. 163 205
Yunus, M. Md. 212 218
Yusoff, S. 347
Zaaba, Z. 188
Zou, Y. 253
Zulkifli, S. H. 278