CIP - Kataložni zapis o publikaciji Narodna in univerzitetna knjižnica, Ljubljana

37.091.3:53(082) 004.032.6:37.091.3(082) 37.091.64(082)

JOINT International Conference MPTL'16-HSCI 2011 (2011 ; Ljubljana) Proceeding book of the Joint International Conference MPTL'16 -HSCI 2011 : MPTL'16 Workshop on Multimedia in Physic Teaching and Learning [and] HSCI 2011 Conference Hands on Science, 15th -17th September 2011, University of Ljubljana, Slovenia / [organised by Multimedia in Physics Teaching and Learning Group [and] Hands on Science Network [and] University of Ljubljana, Slovenia [and] Faculty of Computer and Information Science (FRI) ; editor Saša Divjak]. - Ljubljana : organizers, 2011

80 izv.

ISBN 978-961-269-637-5

 Gl. stv. nasl. 2. Divjak, Saša 3. MTPL Workshop (16 ; 2011 ; Ljubljana) 4. Conference Hands on Science (2011 ; Ljubljana) 5. Multimedia in Physics Teaching and Learning Group 6. Hands on Science Network 7. Univerza (Ljubljana) 8. Fakulteta za računalništvo in informatiko (Ljubljana) 260438272



PROCEEDING BOOK OF THE JOINT INTERNATIONAL CONFERENCE MPTL '16 - HSCI 2011

MPTL '16 Workshop on Multimedia in Physics Teaching and Learning Hsci 2011 Conference Hands on Science

> 15th-17th September 2011 University of Ljubljana Slovenia

Proceeding book of the joint international conference MPTL '16 - HSCI 2011

MPTL '16 Workshop on Multimedia in Physics Teaching and Learning, Hsci 2011 Conference Hands on Science

Organised by:

Multimedia in Physics Teaching and Learning Group

Hands-on Science Network

University of Ljubljana, Slovenia

Faculty of Computer and Information Science (FRI)

With the collaboration of :

Ministry of Education and Sport and Ministry of Higher Education, Science and Technology, Slovenia

MERLOT Physics

Conceptual Learning of Science Group (CoLoS)

MOSEM1 and MOSEM2 European Projects

e - Education project

MIŠKA, education and event organization, Ltd

With the support of :

Microsoft Slovenia

Faculty of Computer and Information Science (FRI)

Municipality of Ljubljana

Marand Ljubljana

The Conference is under the auspices of EURASC the European Academy of Sciences.

Publisher: Organizers
Editor: Saša Divjak
Design coordination: Matej Gruden, Blaž Učakar
Printing: Printstudio Pancopy
Print run: 80
Published in March 2012



NED AL TALKS

GENERAL TALKS	
SIMULATING WHAT YOU SEE: COMBINING COMPUTER MODELING WITH VIDEO ANALYSIS Douglas Brown, Wolfgang Christian	10
ALIGNING EJS SIMULATIONS FROM THE COMPADRE OSP COLLECTION WITH THE UNITED STATES HIGH SCHOOL PHYSICS TEACHING STANDARDS Mario Belloni, Wolfgang Christian, Francisco Esquembre	18
ACTIVE LEARNING IN LECTURE WITH INTERACTIVE LECTURE DEMONSTRATIONS (ILDS) INCLUDING THOSE USING A PERSONAL RESPONSE SYSTEM (CLICKERS) David R. Sokoloff	27
LEARNING AND TEACHING MATHEMATICS USING SIMULATIONS Dieter Röß	35
TRACKS:	
T1: Multimedia for formal education	45
T2: School reform and multimedia didactics	71
T3: Learning WEB environments	76
T4: Role of multimedia in innovation of teaching and learning	81
T5: Design of e-materials and learning	107
T7: Usage of technological interacting tools	131
T8: Science education	185
T9: Science teaching and learning	269
T10: Science and society	339



TRACK 1: MULTIMEDIA FOR FORMAL EDUCATION	
A MULTIMEDIA APPLICATION FOR THE EDUCATION OF PHYSICS-CLASS STUDENTS ON THE USE OF BIOCLIMATIC DESIGN IN BUILDINGS Ioannis Karras, Dimitrios Zevgolis, Harry D. Kambezidis	45
PLUG AND PLAY SYSTEM FOR HANDS ON AND REMOTE LABORATORIES Franz Schauer, František Lustig, Miroslava Ozvoldova	50
THE INTERNET AS A TOOL FOR TEACHING PHYSICS: AN EXPERIMENT IN A PUBLIC SECONDARY SCHOOL IN BRAZIL Eloneid Felipe Nobre, Daniel Luz Pinheiro, Francisco Herbert Lima Vasconcelos	57
MULTIMEDIA-ORIENTED CONCEPTUAL MODELING OF PHYSICAL SYSTEMS Herman Mann	63
TRACK 2: SCHOOL REFORM AND MULTIMEDIA DIDACTICS	
INQUIRY-BASED LEARNING IN SCIENCE ENHANCED BY ICT IN THE FRAMEWORK OF NEW SCHOOL REFORM IN SLOVAKIA Ješková Zuzana, Kireš Marián	71
TRACK 3: LEARNING WEB ENVIRONMENTS	
ATUTOR: CUSTOMIZED WEB LEARNING ENVIRONMENT AT TERNOPIL NATIONAL TECHNICAL UNIVERSITY Iryna Berezovska, Natalya Zagorodna, Oleksandr Matsyuk	76
TRACK 4: ROLE OF MULTIMEDIA IN INNOVATION OF TEACHING AND LEARNING	
ICT SUPPORT OF SCIENCE LEARNING TASK SOLVING BY STUDENTS WITH DYSCALCULIA AND GIFTED STUDENTS Josef Trna, Lucie Makydova, Lenka Pavlickova	81
INVESTIGATING MAGNETIC BRAKING THROUGH A MICROCOMPUTER BASED LABORATORY Pasquale Onorato, Anna De Ambrosis	88



THE IMPLEMENTATION OF THE NEW TECHNOLOGIES IN THE SCHOOL SUBJECTS "ART-MUSIC" AND "CREATIVE MUSIC EXPRESSION" Lorena – Mihelač	97
SOHO: SUNSPOTS ONLINE - HELIOS OBSERVATORY Tatjana Gulič	103
TRACK 5: DESIGN OF E-MATERIALS AND LEARNING	
NEWTON S SECOND LAW – VIRTUAL EXPERIMENTAL ACTIVITY Edite Pereira Briosa, Paulo Simeão Carvalho	107
SIMULATION OF MULTI-CYLINDER ELECTROSTATIC LENSES WITH EASY-JAVA Ernesto Martin Rodriguez, Victor Perez, Genoveva Martínez, Miguel Sancho, Francisco Esquembre	114
VIRTUAL EXPERIMENT IN PHYSICS AS TOOL OF TEACHING MODERN PHYSICS: THE MICHELSON'S INTERFEROMETER Marcos Araujo Silva, Nildo Loiola Dias, Eloneid Felipe Nobre, Alexandre G. Pinheiro	120
THE EXPERIENCE OF TEACHING "BIOLOGY OF CINEGETIC SPECIES" IN LIFELONG LEARNING COURSE IN E-LEARNING ENVIRONMENT Sonia Seixas	125
TRACK 7: USAGE OF TECHNOLOGICAL INTERACTING TOOLS	
A THIN LENS VIRTUAL AND REMOTE LABORATORY AT THE NEW FISLABS PORTAL Luis de la Torre, Juan Pedro Sanchez, Ruben Heradio, Jose Sanchez, Carmen Carreras, Manuel Yuste, Sebastian Dormido	131
EFFICIENT SOUND CARD BASED EXPERIMENTION AT DIFFERENT LEVELS OF NATURAL SCIENCE EDUCATION Zoltan Gingl, Robert Mingesz, János Mellár, Balazs Lupsic, Katalin Kopasz	138
COMPACT USB-BASED INSTRUMENTS FOR EDUCATION AND REMOTE LABORATORY PROJECTS Robert Mingesz, Zoltan Gingl, Janos Mellar, Gergely Vadai	144



5

PRODUCTION OF EDUCATIONAL MATERIAL FOR THE TEACHING OF CHEMISTRY Sérgio Leal, João Paulo Leal	151
DYNAST — SOFTWARE FORMULATING EQUATIONS OF PHYSICAL SYSTEMS AUTOMATICALLY Herman Mann	158
FROM BRICKS TO CLOUDS Udo Strasilla, Eric Strasilla	162
PRISM FOIL AS AN EXAMPLE OF USE OF MODERN TECHNOLOGY IN ACTIVE LEARNING METHODS Mihael Gojkošek, Gorazd Planinšič	172
THE LCD MONITOR AS A TOOL FOR INVESTIGATING COLOUR PHENOMENA IN ADHESIVE TAPE Sergej Faletič, Gorazd Planinšič	179
TRACK 8: SCIENCE EDUCATION	
THE HUNVEYOR-PROJECT - A NOVEL WAY OF TEACHING SCIENCE AND PHYSICS György Hudoba , SzaniszloÅL BeÅLrczi	185
BRIDGING ART AND PHYSICS IN TEACHING PROCESS Dorothy Sebestyen	192
CHEMISTRY EDUCATION: CHILDREN AND CHEMISTRY Josep M. Fernández-Novell, Carme Zaragoza Domènech, Josep Fernández Zaragoza	197
1ST HANDS-ON SCIENCE SCIENCE FAIR Zita Esteves, Manuel F. M. Costa	204
REMOTE LABORATORIES AND SCIENCE EDUCATION BY INTEGRATED E-LEARNING František Schauer, Miroslava Ožvoldova, František Lustig	212
THE USE OF ICT IN PRESCHOOL EDUCATION FOR SCIENCE TEACHING WITH THE VAN HIELE THEORY Zaranis Nicholas, Kalogiannakis Michail	219
REMOTE EXPERIMENT IN CHEMISTRY FOR SCIENCE EDUCATION František Schauer, Žaneta Gerhátová, Petr Čerňanský, Lukáš Tkáč	226



THE INFLUENCE OF GUIDED ACTIVE LEARNING IN CHEMISTRY (GALC) ON 13-YEAR-OLD STUDENTS' UNDERSTANDING OF THE HYDROCARBONS Jasmina Kolbl, Iztok Devetak	233
IMPLICATIONS OF TEACHERS ATTITUDES ABOUT SCIENCE AND TECHNOLOGY RELATION Ximena Vildósola Tibaud, Josep Castelló Escandell, Paloma García Wehrle	237
HANDS-ON EXPERIMENTS FOR DEMONSTRATION OF LIQUID CRYSTALS PROPERTIES Maja Pečar, Jerneja Pavlin, Katarina Susman, Saša Ziherl, Mojca Čepič, Lara Vereš	242
PHYSICS OF THE CARDIOVASCULAR SYSTEM Ineke Brouwer, Felix ter Beek, Roy Bakker, Gerrit Kuik	248
MOVING BEYOND THE CLASSROOM WITH S.O.S PROJECT: CHILDREN ARE EXPERIENCING NATURE FIRST HAND& DISCOVERING THE SCIENTIFIC PROCESSES INVOLVED Nilgün Erentay	252
GREEK PRIMARY STUDENTS' ATTITUDES TOWARDS THE USE OF ICT FOR TEACHING NATURAL SCIENCES Zaranis Nicholas, Kalogiannakis Michail	264
TRACK 9: SCIENCE TEACHING AND LEARNING	
KIDS UNIVERSITY AND THE FAIR OF NATURAL SCIENCE IN OLOMOUC Renata Holubova	269
THE CASIMIR EFFECT: A MULTIMEDIA INTERACTIVE TUTORIAL Assunta Bonanno, Michele Camarca, Peppino Sapia	274
OVERCLOCKING: A HANDS-ON EXPERIMENT IN INFORMATION TECHNOLOGY TEACHING Pavlo Drevnytskyj, Iryna Berezovska	279
PHOTOGRAPHING MIRAGES ABOVE THE SEA SURFACE Jesús Blanco García, Jose Benito Vazquez Dorrio, Fernando A. Ribas Pérez	282
HANDS-ON EXPERIMENTAL ACTIVITIES IN INQUIRY- BASED SCIENCE EDUCATION Josef Trna, Eva Trnova	293



7

HIGH-TECHNOLOGY MATERIALS FOR HANDS-ON ACTIVITIES IN CLASSROOM Carmen Pérez Pérez, Jose Benito Vazquez Dorrio, Antonio Collazo Fernández	299
PROJECT BASED COMPETITIVE LEARNING IN HIGH SCHOOL Bozena Mannova	306
REMOTE EXPERIMENTATION AT PRIMARY SCHOOLS Michaela Žovínová, Miroslava Ožvoldová	311
THE CINEMA AS STRATEGY OF TEACHING FOR THE COMPRENSION OF SCIENCE AND THE SCIENTIFIC CONTENT IN SECONDARY EDUCATION: THEORIES OF DARWIN AND THE FILM »CREACIÓN« Matias Donoso, Ximena Vildósola	318
NEW MATERIALS : LIQUID CRYSTALS – WHAT TO LEARN ABOUT THEM? Mojca Čepič	322
PARADOXICAL QUANTUM EFFECTS AS MOTIVATING TOOLS FOR INTRODUCTORY QUANTUM MECHANICAL COURSE Nagy Péter, Tasnádi Péter	327
AN INTERACTIVE COMPUTER-BASED MATERIAL FOR RANDOM-WALK PHENOMENA Nagy Péter, Tasnádi Péter	334
TRACK 10: SCIENCE AND SOCIETY	
DESIGN AND CONSTRUCTION OF SOLAR OVENS: A PRACTICAL APPROACH TO THE GREENHOUSE EFFECT AND CLIMATE CHANGE Javier Diz-Bugarin, Montserrat Rodriguez-Paz	339
LEARNING THE IMPORTANCE OF THE SUN AS AN IMPORTANT ENERGY SOURCE BY BUILDING "SOLAR CARS" José André Pereira, Manuel F. M. Costa	346
PAPER - MODULAR MULTIFUNCTIONAL SKYLIGHT Jose Manuel Pereira da Silva, Ana Teresa Ribeiro Vaz, Rita Francisca Soares Costa	352



PAPER (POSTER) - ROBOWIKI: RESOURCES FOR EDUCATIONAL ROBOTICS

Célia Rosa Ribeiro, Manuel F. M. Costa, Clara Pereira Coutinho

SCIENCE ON STAGE ACTIVITIES AS AN INSPIRATION FOR INQUIRY BASED SCIENCE EDUCATION

Kireš Marián, Ješková Zuzana

TABLE OF CONTENTS

362

372

