



THE ATHENS INSTITUTE FOR EDUCATION AND RESEARCH

Abstract Book:

**13th Annual International Conference on
Information Technology & Computer
Science**

15-18 May 2017, Athens, Greece

Edited by
Gregory T. Papanikos

2017

Abstracts

13th Annual International
Conference on Information
Technology & Computer Science
15-18 May 2017, Athens, Greece

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Preface

This book includes the abstracts of all the papers presented at the *13th Annual International Conference on Information Technology & Computer Science, 15-18 May 2017*, organized by the Athens Institute for Education and Research (ATINER). In total 47 papers were submitted by over 50 presenters, coming from 21 different countries (Australia, Austria, Brazil, Canada, China, Czech Republic, FYROM, Germany, Hong Kong, India, Israel, Italy, Japan, Jordan, Qatar, Singapore, South Africa, Switzerland, Thailand, UK and USA). The conference was organized into 13 sessions that included a variety of topic areas such as information systems, online education, technology management, and more. A full conference program can be found beginning on the next page. In accordance with ATINER's Publication Policy, the papers presented during this conference will be considered for inclusion in one of ATINER's many publications.

The purpose of this abstract book is to provide members of ATINER and other academics around the world with a resource through which to discover colleagues and additional research relevant to their own work. This purpose is in congruence with the overall mission of the institute. ATINER was established in 1995 as an independent academic organization with the mission to become a forum where academics and researchers from all over the world could meet to exchange ideas on their research and consider the future developments of their fields of study.

It is our hope that through ATINER's conferences and publications, Athens will become a place where academics and researchers from all over the world regularly meet to discuss the developments of their discipline and present their work. Since 1995, ATINER has organized more than 400 international conferences and has published nearly 200 books. Academically, the institute is organized into seven research divisions and 38 research units. Each research unit organizes at least one annual conference and undertakes various small and large research projects.

For each of these events, the involvement of multiple parties is crucial. I would like to thank all the participants, the members of the organizing and academic committees, and most importantly the administration staff of ATINER for putting this conference and its subsequent publications together.

Gregory T. Papanikos
President

FINAL CONFERENCE PROGRAM
**13th Annual International Conference on Information Technology &
Computer Science, 15-18 May 2017 Athens, Greece**

PROGRAM

**Conference Venue: The Stanley Hotel, 1 Odiseos Str., Karaiskaki Square,
Athens, Greece**

C O N F E R E N C E P R O G R A M

Monday 15 May 2017

08:00-08:45 Registration and Refreshments

08:45-09:00 (Room C - 1st Floor) Welcome and Opening Address by Gregory T. Papanikos,
President, ATINER.

09:00-11:00 Session I (Room D - 3rd Floor): Online Education

Chair: Olga Gkounta, Researcher, ATINER.

1. *Maureen Andrade, Associate Vice President, Utah Valley University, USA. Online Learning: Strategies for Success.
2. *Laura Gaudet, Professor and Chair, Department of Counseling Psychological Sciences and Social Work, Chadron State College, USA & Peter Moriasi, Assistant Professor, Chadron State College, USA. Implementation and Evaluation of Screencast Videos for Graduate Online Counseling Courses.
3. Khaled Asad, Lecturer, Al-Qasemi Academic College of Education and Beit-Berl Academic College of Education, Israel, Moanes Tibi, Lecturer, Beit-Berl Academic College of Education, Israel & Jamal Raiyn, Head of the Faculty of Exact Sciences, Al-Qasemi Academic College of Education, Israel. Teaching Programming to Primary School Pupils through Visual and Interactive Programming Environments.
4. Barbie Stanford, PhD Student / Graduate Teaching Assistant, Sam Houston State University, USA, Ana Marcela Montenegro, PhD Student / Graduate Teaching Assistant, Sam Houston State University, USA & Lori Haas, Assistant Professor, Sam Houston State University, USA. Blogging and Online Book Clubs: Preservice Teachers' Experiences and Perceptions.

11:00-12:30 Session II (Room D - 3rd Floor): Education Technology I

Chair: Maureen Andrade, Associate Vice President, Utah Valley University, USA.

1. Patricia Alejandra Behar, Professor, Federal University of Rio Grande do Sul, Brazil, Tassia Grande, Researcher / Teacher, Federal University of Rio Grande do Sul, Brazil, Leticia Machado, Researcher / Teacher, Federal University of Rio Grande do Sul, Brazil & Larissa Camargo Justin, Student, Federal University of Rio Grande do Sul, Brazil. Construction of Digital Educational Materials for Seniors.
2. Alfred Klampfer, Vice Rector, Private University of Education, Austria. Virtual / Augmented Reality in Education. Analysis of the Potential Applications in the Teaching / Learning Process.
3. *Franz-Josef Schmitt, Scientist, Technische Universität Berlin, Germany, Christian Schroeder, Researcher, Technische Universität Berlin, Germany, Marcus Moldenhauer, Researcher, Technische Universität Berlin, Germany & Thomas Friedrich, Professor, Technische Universität Berlin, Germany. Student Centred Teaching in Laboratories Supported by Online Components in the Orientation Program MINTgruen.
4. Juanjuan Chen, PhD Student, The University of Hong Kong, Hong Kong & Minhong Wang, Associate Professor, The University of Hong Kong, Hong Kong. Concept Mapping-Mediated Inquiry Learning in an Online Environment.

12:30-14:00 Session III (Room D - 3rd Floor): Information Systems Development I

Chair: Franz-Josef Schmitt, Scientist, Technische Universität Berlin, Germany.

1. *Harish Bahl, Professor, California State University, Chico, USA. Improving Application Software by Integrating Master Scheduling with Material Requirements Planning in Supply Chain Management.
2. Ovidio Felipe Pereira da Silva Junior, Professor, Universidade do Vale do Itajaí, Brazil, Bruno Panerai Velloso, Professor, Instituto Federal de Santa Catarina, Brazil, Maria de Lourdes de Souza, Professor, Universidade Federal de Santa Catarina, Brazil & Carmem Regina Delziovo, Secretaria de Estado da Saúde do Governo do Estado de Santa Catarina, Brazil. Maternal Mortality Analytical Observatory: Management Information System Design to Generate Accurate Indicators e Mortality Ratios.
3. Petr Kurka, Professor, Academy of Sciences and Charles University in Prague, Czech Republic. Bimodular Number Systems.
4. Carsten Lecon, Professor, Aalen University of Applied Sciences, Germany. Rapid Learning Object Generating for Blended Learning Scenarios.

14:00-15:00 Lunch

15:00-17:00 Session IV (Room D - 3rd Floor): A Colloquium on Online & Distance Education

Chair: Till Haenisch, Professor, BW State University, Heidenheim, Germany.

1. Emanuel Johannes Spamer, Executive Director, Unit for Open Distance Learning, North-West University, South Africa, Johanna Maria Van Zyl, Director, Unit for Open Distance Learning, North-West University, South Africa & Martin Combrinck, Manager, Unit for Open Distance Learning, North-West University, South Africa. Critical Success Factors at a South African Dual Mode University: A Case Study. (EDUONE)
2. Lindsey Hamlin, Director of Continuing and Distance Education, South Dakota State University, USA, Merrill Johnson, Professor, Colorado State University, USA & Richard Speaker, Retired Professor, University of New Orleans, USA. From Oculus Rift to Pokémon Go: Is Augmented Reality the Next Wave for Online Learning? (EDUONE)
3. Celeste Lawson, Head of Course, Professional Communication, CQUniversity, Australia. Engaging Online and Distance Students in Teamwork Assessment for Higher Education. (EDUONE)
4. *Lydia Rose, Associate Professor, Kent State University, USA. Rethinking the “Live” Component of Online Courses: Advantages and Disadvantages of the Polished Canned Course. (EDUONE)
5. Qiyun Wang, Associate Professor, National Institute of Education, Singapore & Choon Lang Quek, Nanyang Technological University, Singapore. Designing a Blended Synchronous Learning Environment for Graduate Students. (EDUONE)
6. Michele Domenico Todino, PhD Student, University of Salerno, Italy, Stefano Di Tore, Researcher, University of Salerno, Italy, Giuseppe De Simone, Researcher, University of Salerno, Italy & Maurizio Sibilio, Professor, University of Salerno, Italy. Virtual Reality Head-Mounted Display Used in Online & Distance Education. (EDUONE)

17:00-18:30 Session V (Room D - 3rd Floor): Cloud, Internet of Things, Industry 4.0

Chair: Lydia Rose, Associate Professor, Kent State University, USA.

1. *Till Haenisch, Professor, BW State University, Heidenheim, Germany. An Architecture for Reliable Industry 4.0 Appliances.
2. Faisal Abu Rub, Head of MIS Department, University of Petra, Jordan. Influence of Cloud Computing Technologies on Achieving Agility in Organizations: An Empirical Investigation.
3. Nicola Fabiano, Partner at Studio Legale Fabiano, Italy. Internet of Things and the Legal Issues related to the Data Protection Law according to the new European General Data Protection Regulation.

18:30-20:30 Session VI (Room A- Ground Floor): A Symposium on Academic Publishing and Researching in the 21st Century

Chair: Alexander Makedon, Head, Education Research Unit, ATINER.

1. Gregory T. Papanikos, President, ATINER, Greece. “ATINER’s Experience with Publishing”.
2. Yaacov Katz, Professor Emeritus, Bar-Ilan University & President, Michlalah Jerusalem Academic College, Israel. “Journal Prestige and Journal Ranking”.
3. Janet Alsup, Professor, Literacy and Language Education, & Head, Department of Curriculum and Instruction, Purdue University, USA. “Negotiating Tensions between Tradition and Innovation: Academic Publishing and Research in the US”.
4. Carmen Cozma, Professor, “Alexandru Ioan Cuza” University of Iasi, Romania. “Sharing editorial experience concerning the academic journal Agathos: An International Review of the Humanities and Social Sciences”.
5. Patricia Scherer Bassani, Professor, Feevale University, Brazil. “Brazil’s Experience with Publishing and Researching”.
6. Vladimir V. Petrov, Associate Professor, Novosibirsk State University, Russia. "The Development of Entrepreneurial Universities in Russia in the Context of Globalization".
7. Effie Papoutsis-Kritikos, Professor, Chair and Counselor, Northeastern Illinois University, USA. “Budget Effects on Publishing and Researching”.
8. Denver J. Fowler, Assistant Professor, Educational Leadership, The University of Mississippi, USA. “Research and Publication in Higher Education: Redefining Our Emphasis”

For details on the discussion please [click here](#).

21:30-23:30 Greek Night and Dinner (Details during registration)

Tuesday 16 May 2017

07:30-10:30 Session VII (Room A- Ground Floor): An Educational Urban Walk in Modern and Ancient Athens

Chair: Gregory Katsas, Vice President of Academic Affairs, ATINER & Associate Professor, The American College of Greece-Deree College, Greece.

Group Discussion on Ancient and Modern Athens.

Visit to the Most Important Historical and Cultural Monuments of the City (be prepared to walk and talk as in the ancient peripatetic school of Aristotle)

11:00-13:00 Session VIII (Room D - 3rd Floor): Education Technology II

Chair: Harish Bahl, Professor, California State University, Chico, USA.

1. *Savilla Banister, Professor, Bowling Green State University, USA & *Rachel Reinhart, Professor, Bowling Green State University, USA. Developing and Implementing Instrumentation for Digital High School Curricula: A Regional Study of a Rubric for Instructional Quality.
2. Menachem Domb, Professor, Ashkelon Academy, Israel. An Adaptive Classification Framework for Data Streaming Anomaly Detection.
3. *Richard Kitchen, Professor, University of Denver, USA. Is Computer-Assisted Instruction (CAI) Reliable to Promote Students' Mathematical Reasoning?
4. Ziaul Abedin Forhad, Lecturer, Assumption University, Thailand. In-service Teachers' Attitudes toward and Usage of Information Communication Technology (ICT) Tools in Professional Practice; A Study of an International School in Bangkok, Thailand.
5. *Adam Hart, PhD Candidate, University of Salford, UK. Experiential Learning Technologies in the Modern Music Classroom.

13:00-14:00 Lunch

14:00-16:00 Session IX (Room C-1st Floor): A Panel on Education, Technology, Social Media, and Transformative Change: Interdisciplinary Perspectives

Chair: Ksenia Troshina, Instructor, The Hong Kong Polytechnic University, Hong Kong.

1. Leila Nunes, Professor, Universidade do Estado do Rio de Janeiro, Brazil. Improving the Performance of Multifunctional Resource Rooms Teachers in Using Alternative and Augmentative Communication (AAC) Resources. (EDUTEN)
2. Catia Walter, Adjunct Professor and Researcher, State University of Rio de Janeiro, Brazil. How to Promote new Practices using Alternative and Augmentative Communication with Especial Students. (EDUTEN)
3. Nikhil Ghodke, Assistant Professor, Manhattanville College, USA. Using Image-Editing Tools as a Fun Activity to add to Pedagogy. (EDUTEN)
4. Sonia Tiwari, Guest Lecturer, Educational Multimedia Research Center, India. Design and Evaluation of Character-Driven Applications for Elementary Education. (EDUTEN)
5. Janice Tsang, English Teaching Assistant, The University of Hong Kong, Hong Kong. Struggles of Independent Intellectuals in Hong Kong: A Case of Hong Kong Reader Bookstore and the Intercommon Institute. (EDUTEN)
6. *Sinela Jurkova, PhD Candidate, University of Calgary, Canada. Transcultural Competence as Transformative Learning that Fosters an Inclusive Society. (EDUTEN)

14:00-16:00 Session X (Room D - 3rd Floor): Management Information Systems Development

Chair: Richard Kitchen, Professor, University of Denver, USA.

1. Manfred Roessle, Head, Faculty of Business Information Systems, Aalen University of Applied Sciences, Germany & Rene Kuebler, Research Fellow, Aalen University of Applied Sciences, Germany. Quality Prediction on Die Cast Sensor Data.
2. Volodymyr Voytenko, Professor, Sheridan Institute of Technology and Advanced Learning, Canada. Context-Aware Mobile Applications and Their Integration with Decision Support Systems.
3. Marwa Qaraqe, Assistant Professor, Hamad Bin Khalifa University, Qatar & Qammer Abbassi, Post-Doc, Texas A&M University at Qatar, Qatar. Performance Evaluation of Body-Centric Nano Communication at Terahertz Frequencies.
4. Bernardo Panerai Velloso, Executive, Bernardo Panerai Velloso MEI, Brazil, Maria de Lourdes de Souza, Professor, Universidade Federal de Santa Catarina, Brazil & Ovidio Felipe Pereira da Silva Junior, Professor, Universidade do Vale do Itajaí, Brazil. Analytical Observatory: Management Information System on Psychoactive Substance Dependence.

16:00-17:30 Session XI (Room D - 3rd Floor): Information Systems Development II
Chair: Savilla Banister, Professor, Bowling Green State University, USA.
<ol style="list-style-type: none">1. Linda Hayden, Professor, Elizabeth City State University, USA. Mentoring the Next Generation of Science Gateway Developers and Users.2. Susantha Herath, Professor and Chair, Department of Information Systems, Saint Cloud State University, USA & Jayantha Herath, Saint Cloud State University, USA. Transforming Next Generation Minds and Lives: Interdisciplinary Cybersecurity for non-Computing Majors.3. Philipp Kornreich, Professor Emeritus, Syracuse University, USA. Information Theory Model for the Analysis of Symbol Strings.4. Alexis Koster, Professor, San Diego State University, USA. The Transformative Impact of Internet Music Distribution.
17:30-19:00 Session XII (Room D - 3rd Floor): Education Technology III
Chair: Thomas Fehlmann, Senior Researcher, Euro Project Office AG, Switzerland.
<ol style="list-style-type: none">1. Patricia Scherer Bassani, Professor, Feevale University, Brazil, Cristina Ennes da Silva, Researcher, Feevale University, Brazil & Inajara Vargas Ramos, Researcher, Feevale University, Brazil. Personal Learning Environments as a Strategy to Promote the use of Digital Technologies in Education.2. Eliane Schlemmer, Researcher, Unisinos, Brazil, Wagner dos Santos Chagas, Unisinos, Brazil & Cleber Portal, Unisinos, Brazil. In Vino Veritas: The Game.
19:00-20:30 Session XIII (Room D - 3rd Floor): Special Topics
Chair: Carsten Lecon, Professor, Aalen University of Applied Sciences, Germany.
<ol style="list-style-type: none">1. Goran Bidjovski, Assistant Professor, University American College Skopje, FYROM. Displaying Navigation from Websites on Users Computers and Analyzing Their Characteristics.2. *Thomas Fehlmann, Senior Researcher, Euro Project Office AG, Switzerland. The Role of Mathematics for Success in Business.3. Haruka Miyazawa, PhD Student / Junior Research Associate, Osaka University / RIKEN Quantitative Biology Center, Japan. Information, Computation and Linguistic System. (COMSCI)4. <u>Marina Burdack</u>, Academic Staff, Aalen University of Applied Sciences, Germany & Manfred Rossle, Professor, Aalen University of Applied Sciences, Germany. Flexible Serious Game to Train Business Processes in Higher Education.5. Jan Collie, Senior Forensic Investigator, Discovery Forensics Ltd, UK. A Strategic Model for Forensic Readiness.

21:00- 22:30 Dinner (Details during registration)

Wednesday 17 May 2017 Educational Tour: (Details during registration)
Thursday 18 May 2017 Educational Tour: (Details during registration)

Faisal Abu Rub

Head of MIS Department, University of Petra, Jordan

Influence of Cloud Computing Technologies on Achieving Agility in Organizations: An Empirical Investigation

Winning new customers, increasing customer satisfaction, and meeting customers' expectations are considered priority in most organization, but organizations face very dynamic and changeable business. Therefore, organizations need to handle unexpected challenges through smart ways in order to achieve organizations' goals. Today, many organizations invest in cloud computing technologies. Many Cloud Computing Technologies can be considered as essential pillar for most of organizations to accomplish their goals. This paper aims to investigate the impact of cloud computing technologies usage on achieving agility in organization. A new model has been developed. An empirical investigation was performed on a banking sector in Middle East to test the new model. Although the initial results show that the impact of cloud computing technologies usage on bank's agility is significant, the variance of bank's agility that is explained by cloud computing technologies is weak. This indicates that there are other significant variables that contribute to the agility in organization within banking sector. Moreover, the results show that the current agility drivers (competency, flexibility, quickness and responsiveness) are more restricted on manufacturing than banking sector. Finally, further work should look at the drivers of agility given the difference in the characteristics between service sectors and manufacturing sectors.

Maureen Andrade

Associate Vice President, Utah Valley University, USA

Online Learning: Strategies for Success

Distance education is a common way to meet the increasing demand for higher education and provide flexibility for today's diverse learners. However, success in distance courses requires learners to possess some degree of autonomy, particularly the ability to control the factors and conditions that affect learning. The presenter will introduce a model for online course design and teaching based on the theories of transactional distance (Moore, 2013) and self-regulated learning (Dembo, Junge, & Lynch, 2006; Zimmerman, 2002). The model can be applied to a variety of contexts.

To enable learners to take responsibility for their learning, the model integrates the components of transactional distance—structure, dialogue, and autonomy—with the dimensions of self-regulated learning—motive, methods of learning, time, physical environment, social environment, and performance. The latter are associated with higher learner achievement in a variety of contexts including face-to-face and distance (e.g., see Andrade & Bunker, 2009; Dembo, Junge, & Lynch, 2006; Caneiro & Steffens, 2006; Zimmerman & Risemberg, 1997).

Structure occurs through the course design (e.g., lessons, assignments, due dates) while dialogue is reflected in teacher-student interaction (e.g. feedback, e-mail, announcements, discussion). Learners are less autonomous when levels of structure and dialogue are high and more autonomous when they are low. The dimensions of self-regulation, reflected in goal setting, strategy application, and reflection, facilitate the development of learner autonomy. As students interact with the content, other learners, and the instructor; apply concepts; and participate in self-regulated learning activities, they can increase their self-regulation and likelihood of persisting in the course.

The presenter will introduce the model and share examples of self-regulated learning activities in online English language courses. Participants will explore how the dimensions of self-regulated learning can be integrated into courses they are designing or teaching in order to increase learner success in distance courses.

Khaled Asad

Lecturer, Al-Qasemi Academic College of Education and Beit-Berl
Academic College of Education, Israel

Moanes Tibi

Lecturer, Beit-Berl Academic College of Education, Israel

&

Jamal Raiyn

Head of the Faculty of Exact Sciences, Al-Qasemi Academic College of
Education, Israel

Teaching Programming to Primary School Pupils through Visual and Interactive Programming Environments

New generations are using and playing with mobile and computer applications extensively. These applications are outcomes of programming work that involves skills such as, computational and algorithmic thinking. Learning programming is not easy for all students, neither for children. In recent years, academic institutions like MIT institute and hi-tech companies such as Google and Khan Academy, have introduced online programming environments to facilitate learning and teaching programming. Most of these environments are web-based, interactive and supported with visual Multimedia features. Therefore, they became easy to use, very attractive and helpful to teach children how to program and to develop their algorithmic skills and computational thinking.

The proposed presentation will describe a research aimed at examining teaching a course to primary school children, through three on-line visual and interactive environments: "Plastelina" for logic games, "Code with Anna and Elsa" via Hour of Code project for block-programming, and the "Turtle Academy" for open textual programming in Logo language

The research included the development, implementation and evaluation of a course comprise of 12 meetings, total of 24 hours, taught to 22 pupils in 4th and 5th grades at elementary school in in northern Israel. During the program, the children solved interactive logic games, built programs using visual programming blocks and wrote text programs using the Logo language. The pupils were asked to build/write basic and challenging programs and accomplished a final programming project.

Data were collected by means of pre-post attitude questionnaire, written exam, analysis of the final project and class observations.

Experimental results indicate that teaching programming in visual and interactive developing environments fosters children problem solving skills. In addition, the presentation will report more results of the research such as the students' achievements in learning programming in the course and its impact on children attitudes to learn programming and computers.

Harish Bahl

Professor, California State University Chico, USA

Improving Application Software by Integrating Master Scheduling with Material Requirements Planning in Supply Chain Management

Supply chain management planning systems begin with supply network planning. As a next step, in order to fulfill production requirements, each production facility makes decisions about master production schedules (MPS) for all products and, subsequently, material requirements planning (MRP) and capacity requirements planning for all subassemblies and components made in the production facility. Currently, these decisions are made iteratively and by trial and error methods, resulting in inefficient and suboptimal decisions. This paper proposes a linear programming model to help managers make these decisions in an integrated model to avoid iterative loops. This model can be incorporated in supply chain management software for improved managerial decisions. The proposed model is illustrated with the formulation and solution of a sample problem.

Savilla Banister

Professor, Bowling Green State University, USA

&

Rachel Reinhart

Professor, Bowling Green State University, USA

Developing and Implementing Instrumentation for Digital High School Curricula: A Regional Study of a Rubric for Instructional Quality

As our world has continued to become more dependent on digital communication and collaboration, online learning environments have become more sophisticated. Demand for online and/or hybrid-learning materials has increased, not only in higher education arenas, but in elementary and secondary schools, as well. This study focuses on developing and implementing an evaluative rubric for high school digital curricula created for a United States regional consortium of schools, charged with expanding quality digital learning environments for their students.

Digital instructional units for ten high school courses were created. Each Design Team, consisting of 4-7 teachers, developed digital curriculum for one of the ten core high school courses. With the goal of creating 1/3 of a year's curriculum, teams developed 2-4 units per course. A total of 30 units were developed and evaluated.

In collaboration with project leaders, the Center for Assessment and Evaluation Services (CAES) developed the Evaluation Rubric for Digital Curriculum that was used to assess curriculum units. The rubric consisted of 36 criteria organized by eight areas: 1) Overview, 2) Learning Targets, 3) Instructor Support, 4) Accessibility, 5) Instructional Materials, 6) Learner Interaction and Engagement, 7) Technology, and 8) Assessment. A variety of sources contributed to rubric development: Quality Matters K-12 Secondary Rubric (2013), Blended Course Peer Review Form (Blended Learning Toolkit, 2014), and the National Standards for Quality Online Programs (iNACOL, 2009). The evaluation process utilized a team of reviewers: five content experts, and three curriculum/technology experts. A third evaluator then summarized the two reviews for every unit, providing a score for each criterion along with detailed comments and feedback.

Based upon these results, the area of Assessment was in most need for improvement, followed by Technology and Instructor Support. Project Leadership met with CAES to discuss revision priorities and communication methods with Design Teams.

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Construction of Educational Materials Digital for Seniors

The increasing use of digital technologies for the elderly, such as mobile devices, computers and their online tools, provides new research in education. A possibility to accommodate this new profile of elderly people is through the use of educational materials covering the older audience needs. Building digital educational materials is relevant (DEMs) that can meet this audience, considering, in addition to usability issues, but also their cognitive and motor needs, their social context and previous knowledge of life. The DEM is one that have digital resources in their manufacture. Since usability is the factor that ensures that products are efficient, pleasant and easy to use, the user's point of view. The purpose of this research is to discuss possible indicators for the construction of DEM for the elderly. The methodology was qualitative and quantitative type design science research. The study involved 23 elderly people, aged over 60 years. The results show that the DEMs for the elderly should be developed considering the following: ability to support the DEM, the prevention of errors, aspects related to the text (size, etc.), visual design according to the public, distribution of elements on the screen properly, the size of buttons, navigation, accessibility, interactivity, the language used, autonomy, motivation to learn and the ability to provide a critical reflection or not. It is observed that owing to the variety of resources that can compose a DEMDs, it is relevant investigate in accordance with the policies if they are in agreement with the public that will be used. Thereby, an investigation is increasingly relevant about important characteristics with regard of these materials, including with the regarding usability.

Goran Bidjovski

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Displaying Navigation from Websites on Users Computers and Analyzing Their Characteristics

In this scientific paper, the subject of the research is description of opportunity of navigation through the websites, with special emphasis on analyzing different type of navigation systems. Very important part of my work is analyzing the characteristics of variety navigations structure on the web pages, as well as analyzed technical method of displaying of navigation in computer monitor chosen by the web designer, along with its characteristic, on computers of various users. In addition, users can have different operating systems, different browsers, and different preferences in terms of their computers settings. All this technical issues will have an impact on how those websites will looks on the user's computer. Also is description interpretation of navigation on user's computer monitor. Special overview is made for correlation between navigations and all the other graphic elements in website from point of view of visual harmony of web pages. Additionally, overall directions for using navigation type and their characteristics when designing web pages, same as description of some advice and opinions on the same topic. After that, we analyze several problems which arise from displaying navigation on the web pages of the computer of users. In this text we will come across a few solutions for all of them, as well as recommendations for when to choose which solution.

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&

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Flexible Serious Game to Train Business Processes in Higher Education

In the digital age, we have many technologies and methods from the field of game programming to develop serious games for the adult education. But adults associate learning in daily life with work and effort. They don't see, that new knowledge can be learned playfully. But people have a special characteristic, which has been used mainly by the entertainment industry, they like to play. The attention of the education sector has increasingly been drawn to this feature. Because skills and deep understanding knowledge are key factors in professional life because of the change from the industrial age to the information age and the foreseeable lack of specialists.

So-called serious games for education and training are developed in growing numbers. They are based on the most important characteristics of games, their content, course and structure have to be pedagogically prepared and didactic concepts have to be fulfilled.

In a Serious Game the learner is in a protected learning environment which reflects the real working environment, he can generate knowledge from mistakes without fear of consequences and can transfer the knowledge in the real world. A well-known Serious Game in the field of medicine is the "3D Virtual Operating Room".

But what about students who are at the beginning of their education and who don't have the necessary knowledge to successfully play a serious game? Would it not be useful if the trainer could configure the learning area itself and these people might have a learning success?

These general findings have now been used to develop a first prototype of a serious game that includes a generator for flexible configuration of business processes. This generator is used to configure the learning area and to generate a coherent game in which the selected business processes are displayed visibly.

The paper is intended to show how the technologies of the entertainment industry can be interlinked with the knowledge of the education industry in a serious game to allow playful learning of business processes. It is also intended to show how the trainer can configure the learning area using predefined rules to generate a coherent game.

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&

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Concept Mapping-Mediated Inquiry Learning in an Online Environment

Concept mapping has been widely used in education to support the communication of complex ideas. It has a potential to support learning in inquiry and problem-solving contexts by explicitly representing complex ideas and the relationships among them, making thinking and reasoning visible, and facilitating argumentation. However, there are few empirical studies on deploying it as a supporting tool for learning in inquiry and problem-solving contexts. This pilot study explored the implementation of concept mapping in a problem-solving based online learning module, and its effects on student attitude towards collaborative inquiry learning, and motivational and emotional experiences. The participants were 42 students (mean age 17 years, 18 male, 24 female) from a senior high school. They learned in small groups of three or four members to explore a fish death problem in an online environment, and constructed concept maps to support their thinking and reasoning during the problem-solving process. The mean score on individual post knowledge test (with the total score being 86) was 67.47 ($SD = 7.78$). Results from the questionnaire data showed that students had positive attitude towards collaborative inquiry learning ($M = 4.31$, $SD = 0.60$), and favorable motivational and emotional experiences in the inquiry process ($M = 3.73$, $SD = 0.69$). With respect to their response to the open-ended question, some students considered the concept-mapping mediated approach to be a new learning experience enabling them to learn how to think from different perspectives and in a logical way; others reported that they acquired a deeper understanding of the knowledge, improved problem-solving abilities and strategies, and developed teamwork spirits. The findings demonstrate how concept mapping can support student problem-solving process and enhance their learning motivations and emotions.

Jan Collie

Senior Forensic Investigator, Discovery Forensics Ltd, UK

A Strategic Model for Forensic Readiness

Forensic readiness has been defined as: ‘...the capability of an organisation to use digital evidence in a forensic investigation’. For businesses, especially medium or small enterprises, gaining this capability can seem time consuming and expensive: it may involve a number of processes, it may require new hardware and software and people with specialised skill sets may need to be hired in order to implement any plan. Yet developing and maintaining a forensic readiness capability is vital in the digital age. Fraud and cybercrime cost almost £11bn in the UK alone last year. Across the European Union, the annual cost of cybercrime now accounts for 0.41% of national GDP. Recent figures have also shown that up to 95% of digital incidents are caused by malicious insiders.

This research proposes a structured, strategic approach to forensic readiness for businesses that is economic to implement and run. It is based on people and processes rather than complex electronic systems. Key to this approach are a firm’s best asset - its own staff. It is theorised that the foundation stone of forensic readiness is a strong internal security culture. In order to achieve this aim, an unique, scalable model for efficient and inclusive planning is put forward with a reporting construct which assures company-wide involvement.

Menachem Domb
Professor, Ashkelon Academy, Israel

An Adaptive Classification Framework for Data Streaming Anomaly Detection

IoT and Control systems are enriched with sensors, which collect vast amounts of temporal data. Connecting these systems to the Internet increases the possibility of malicious data loaded to the system. Protecting the system from such cases requires anomaly detection means, which are used for classifying new cycles, identify anomalies and predicting future behavior. Typical anomaly detection tools require considerable computation power and space, which standard sensors are lacking. Due to these limitations, the original data cannot be stored as is, but rather must be compressed in such a way that it will still be valuable for classifying and analyzing new data cycles. We propose an adaptive method of representing the data in an optimal way. The approach is based on an adaptive composite of contributing parameters. The selected parameters and measurements can be adjusted to comply with the structure of the specific domain. We detail the workflow of finding the optimal parameter mix resulting with an optimal separation and reliable classification. We demonstrate our approach using an experimental case study.

Nicola Fabiano

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Internet of Things and the Legal Issues related to the Data Protection Law according to the new European General Data Protection Regulation

The Internet of Things phenomena should consider the legal issues related to the data protection law.

IoT is not exempt from the privacy and security risks because of the use of the technologies that often cannot guarantee absolutely any security level. There are several risks and threat in the Internet of Things but it is not possible to mention all of them. The main risk for privacy is the profiling because in this way is possible to identify a natural person through his/her personal information. However, regarding the privacy and security risks there are some issues with potential consequences about data security and liability. The IoT system allows you to transfer data on the Internet including personal data.

In this context it is important to consider the new European General Data Protection Regulation (GDPR) that will be in force on 25 May 2018.

The GDPR introduces Data Protection Impact Assessment (DPIA), data breach notification and very hard administrative fines in respect of infringements of the Regulation.

A correct law analyzes consents to evaluate the risks and prevent wrong use of personal data and information.

Thomas Fehlmann

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The Role of Mathematics for Success in Business

In old times, kings, emperors and polis states gathered scientists around them in order to raise knowledge about successful warfare and economics. The foundation of the University of Alexandria gave the Ptolemy kings in Egypt a significant advantage in the world of the 3rd century AD. Islamic empires and the Ottomans later profitably supported universities, thus withstanding Christian kingdoms of the west. Later, things turned around, some empires forgot about science, and Europe forged the leading nations based on their superiority in applying scientific results to power.

Mathematics played a major role for instance for the artillery, with its ability to predict ballistics.

Today, this is still the case, although not always visible to the general public. Many modern money-generating businesses rely on mathematics, often not exactly known to the user. Who is aware what made the digital storage and distribution of pictures and music possible? What exactly has Google Search in common with Linear Algebra? What is the foundation of Big Data? When was this invented? Was it already Euclid, or did something important happen after the 3rd century AD? Many people today have mathematical skills not superior to Euclid's students, but mathematics in the 20th century possibly made the biggest steps forward ever.

This talk explains a few of these secrets. The paper presents modern experiences from the last 40 years how to make businesses successful with a little bit of advanced mathematics – advanced means, Euclid didn't yet know about it.

In the Eighties, writing software was still a challenge. Computers were not performant and resources limited. Writing software was a tedious task, taking long. Nevertheless, logical programming offered a way to speed up programming and making it less error-prone. A story tells about a company that was able to deliver prototyping new software within a week, won the final contract and became a world-leading company afterwards.

In the Zeros of this century, writing software has become an engineering discipline, and the race was for features and functions. However, resources were still limited. Six Sigma transfer functions helped startup companies to concentrate resources on those tasks that customers liked most. It became possible to analyze customer

preferences based on the New Lanchester Theory, an application of Six Sigma transfer functions, and even predict the evolution of customer's needs, for instance with the Net Promoter[®] Score method, another application of Six Sigma transfer functions.

In the Tens of this century, the ICT world is changing at an incredible pace. Digitalization changes the way we do business. From a competitive approach, it moves into a collaborative approach, where alliances and the user's involvement transform customers into partners. With the Internet of Thing (IoT), everybody becomes programmer and creates applications for fun and for breadwinning. Now security and safety issues become predominant. The use of Combinatory Logic is required for managing and controlling the IoT. Features and functions, systems and programs are no longer stable and static but dynamically adapt to new wishes and ideas of its users.

We will sketch the mentioned techniques for logical programming, for Six Sigma transfer functions, and explain how combinatory allows measuring quality, security and safety of today's IoT applications, autonomous cars and beyond. Finally, a few consequences on education will be drafted and discussed.

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&

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Maternal Mortality Analytical Observatory: Management Information System Design to Generate Accurate Indicators e Mortality Ratios

Maternal death is considered to be associated with preventable causes, usually because it is an event that affects a specific population with a clearly established duration. The United Nations General Assembly 189 Member States have agreed on a global commitment to the reduction of maternal mortality as a Millennium Development Goal. Two indicators are being used to measure the obtained results: the ratio of maternal mortality and the proportion of births attended by trained health professionals. In Brazil, it was identified that the maternal mortality ratio demonstrates the non-attainment of the agreed reduction and also the occurrence of unsafe practices that carry risks for the woman and for the newborn. In this context arise social technologies to improve society by supporting the process of the pregnancy and pós-natal period, such as the Analytical Observatory, a Management Information System, which has the function to generate reports out of the follow from up the Maternal Mortality Rates. The aim of this work is to design a technological architecture for an online analytical observatory capable to handle the data and generate the described indicators. Online Analytical Processing was used, in the manner of a data structure and processes with the capability to manipulate and analyze the available data. The Observatory is accessed as an online service, in the client-server model where the workload is distributed between the client applications (user application and/or browser) and server (Web site and data servers). MySQL is employed in the data structure, conditional to the technology already in place in the present records. MySQL is free software that allows robust applications with functions and procedures necessary for the Observatory. Java Server Faces runs on the server, a programming language that allows

the creation of web sites with focus on high performance, easy maintenance and integration of various databases in a Model, View, Controller architecture. xHTML structures the web pages, part of the user interface along with JavaScript, a client-side interpreted programming language. Free JavaScript libraries named Google Charts and Charts JS are adopted for the specific task of generating charts. The proposed system is under development as a functional prototype.

Ziaul Abedin Forhad

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**In-service Teachers' Attitudes toward and Usage of
Information Communication Technology (ICT) Tools in
Professional Practice; A Study of an International School in
Bangkok, Thailand**

Information Communication technology (ICT) tools are referred by each and every inventions of the modern society that have been considered as the key strand for teaching and learning process. Using ICT tools in their professional practice, countless in-service teachers are developing their students' learning process effectively in many countries around the world. The purposes of this study are: a) to explore the attitudes toward ICT tools of in-service teachers of an international school in Bangkok. b) to search the usage of ICT tools in their professional practice. The study revealed that, majority of the in-service teachers cherishing positive attitude toward ICT tools but significant number of in-service teachers are not using ICT tools adequately in their professional practice. Plausible reasoning for this discrepancy is discussed.

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&

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Implementation and Evaluation of Screencast Videos for Graduate Online Counseling Courses

Screencast videos are effective pedagogical tools for graduate online Counseling courses as they can be viewed by students for both initial learning and subsequent review (Northern Illinois University, spring, 2010). A screen cast is a video recording of the actions on an instructor's screen, with an accompanying audio file, while the instructor describes an assignment for students (EDUCAUSE Library, March 15, 2006).

During a screencast video, the instructor can highlight key content in an assignment, provide website tours and highlight professional links, rubrics and archived materials for students. Through the use of both print materials (assignment directions and grading rubrics) and audio/visual files (screen cast), the instructor can assist students as they create curricular folders, case management practice files and/or human development psychological reviews in key graduate Counseling courses.

These presenters have used screencast videos in graduate online Counseling courses to deepen the understanding of School Counseling and Clinical Mental Health Counseling students. Screen cast videos have assisted School Counseling students as they developed competency and indicators curriculum plans for elementary and secondary students in academic development, personal and social development and career development domains in the State of Nebraska.

The use of screen cast videos have deepened the understanding and awareness of graduate Counseling students in a Clinical Mental Health Counseling program as they engaged in two very diverse tasks: (1) For the Multicultural Counseling course, interviewed a person from a diverse cultural group and (2) created a culminating case management practice file for a Drug and Alcohol licensure course.

Following the use of screen cast videos in online graduate Counseling courses for one year, the presenters found the use of screen cast videos increased student's understanding of the assignment and

grading rubric, decreased the number of confusing questions and requests for help by students to the instructor and dramatically increased by the quality, value and worth of student submissions as indicated by both the students and the instructor. In this presentation, the use of screencast videos in graduate online Counseling courses will be demonstrated; student evaluation of the instructional videos, as they pertain to increased student learning, will be described.

Nikhil Ghodke

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Using Image-Editing Tools as a Fun Activity to add to Pedagogy

Change of pace in context of content delivery in a classroom can enhance student experience with regards to engagement and retention of content. Fun activities present a good candidate for this alteration of pace with a goal of enhancing engagement, retention of content and deliver on learning objectives. The first research question inquires: What are some of the fun activities being utilized in classrooms today and are the claims substantiated. Examining this question was motivated further, by both the perceived potentials and hindrances of such activities; for example, the class size, the availability of technology tools and other factors. The paper specifically looks at a spinning wheel game utilized in a media/communication class. This particular game is also known as winning prize wheel game, available for free online, and customizable as well. In the particular class where this was utilized, the students had prior working knowledge of image editing software's like Photoshop, and this activity can be adapted to any other image editing software. Online resources such as software tutorials for image editing are made available to the class prior to this activity.

This activity serves to ease the monotony of the course, gets the students to interact with each other, have fun, and ideally works well towards the middle/end of the semester. The students are split in to groups of 2 or 3 and given access to a computer/laptop. The prize wheel with its slots contains names of topics covered during the course, e.g.- gender, race issues and could have names of media publications, elements of design, etc. As the wheel is spun and depending on which topic the wheel stops, the groups of students have 3-4 minutes to discuss amongst themselves and edit images. They work as a team developing the artwork and draw out points to discuss at the end of this 30- 45 minutes activity.

When this activity had been conducted in the past, the students had produced unique artwork and produced unique narratives around the topics. These observations motivate future research of similar activities in classrooms. This work-in-progress is part of a larger study of prototyping and evaluating activities for aiding pedagogy.

Till Haenisch

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An Architecture for Reliable Industry 4.0 Appliances

Industry 4.0 or the Internet of Industrial Things means interconnected machines and devices in a very heterogeneous environment. These systems have much longer lifecycles than the normal IT ecosystems we are used to in the enterprise. It is difficult to keep these systems secure for an extended period of time. While minor malfunctions may be acceptable, software bugs might lead to security problems, which cannot be ignored, since they will have consequences in the real world.

Today's method of keeping systems (like operating systems) secure is to patch them permanently to close all discovered bugs. The necessity to patch on a regular base combined with the long lifespan of the components creates serious interoperability issues. To handle these problems with acceptable effort while keeping a high level of security they must be addressed on different levels like operating system, network architecture, composition of services etc.

The key to a successful long-term perspective of such a system is a flexible architecture that allows maintenance and extensibility in a controlled environment that preserves the integrity of the system.

In this paper a flexible architecture is described that isolates critical components and allows the substitution of components without compromising the system in case of failure. It consists of clearly separated services with well-defined interfaces that can be enforced by the runtime system.

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Merrill Johnson

Professor, Colorado State University, USA

&

Richard Speaker

Retired Professor, University of New Orleans, USA

From Oculus Rift to Pokémon Go: Is Augmented Reality the Next Wave for Online Learning?

This paper investigates the potential uses of augmented reality in online learning by exploring the lessons learned during the development, use, and dissolution of a virtual island for university teaching. As Generation Z progresses towards college, their expectations of technology are forcing universities to strategize new methods of online learning, but is augmented reality a sustainable option? This paper explores that question by examining a research project involving Second Life (SL). It uses autobiographical, archival, survey, and interview methods to provide a portrait of one implementation of instruction in a virtual world and its eventual conclusion as a viable site. The virtual campus became a functioning instructional site for five semesters with 15 courses in five disciplines (Biology, Business, Education, English, and Spanish), supplementing text-based asynchronous learning in Bb and Moodle with synchronous voice and text-based activity, enhancing the interactions in DE settings.

In addition to regular class meetings, the virtual campus allowed faculty, staff, and students to meet for discussion groups, office hours, committees, and virtual academic conferences. In 2008, the virtual campus allowed for emergency communication among participants while the physical campus of the university was closed. Central components for operating virtual educational sites include training prospective instructors and students, dealing with appropriate presentations of self as avatar, tracking virtual activities and behaviours, choosing modes of communication for various purposes, and moving from lecture to discussion to immersive learning in media rich spaces. The challenges included the nature of the epistemological shift for engaging in learning in SL, the learning curve for “newbies”, technological issues with the SL browser and connections, platform performance stability, and lessons learned from various instructors. Throughout this paper, the key operation elements of the research project are built upon to form a working model for exploring augmented reality in university teaching.

Adam Hart

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Experiential Learning Technologies in the Modern Music Classroom

With the growing prevalence of touchscreen technology in the classroom and the emerging trend of bring-your-own-device in some schools, there is a need for new educational resources that reflect our modes of interaction with such technologies. This is especially true in expressive subjects such as music, for the manual actions and representations familiar to us through our use of interactive technology may facilitate creative expression as well as functionality, particularly for the digital residents of the modern classroom.

My research project, which is supported by the Arts & Humanities Research Council UK, aims to examine how interactive technologies can be effectively integrated with independent learning environments for the study of music. The central premise is that music should be an active and engaging subject for students of all ages, abilities and interests, and that interactive technology holds enormous potential for added value in teaching and learning. To investigate this, I am developing prototype software environments incorporating multimedia devices, and working with teachers to design lesson structures that employ these resources within a sequence of creative musical activities. The case study examination of this process focuses not just on the technologies themselves, but on how these function within a wider environment of group work, independent study, and teaching practice.

Currently, the project focuses on primary school children, aged 7-11, to construct audio-visual compositions with local or topical themes. This process involves various applications of media applications and new software tools to meet student-directed outcomes. The outputs of the project, along with a framework for interactive modern learning environments developed from this research, will be demonstrated via a practical activity, in which attendees will be invited to use some of the technologies utilized within the project.

Linda Hayden

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Mentoring the Next Generation of Science Gateway Developers and Users

The Science Gateway Institute (SGW-I) for the Democratization and Acceleration of Science was a SI2-SSE Collaborative Research conceptualization award funded by NSF in 2012. From 2012 through 2015, we engaged interested members of the science and engineering community in a planning process for a Science Gateway Community Institute (SGCI). Science Gateways provide Web interfaces to some of the most sophisticated cyberinfrastructure resources. They interact with remotely executing science applications on supercomputers, they connect to remote scientific data collections, instruments and sensor streams, and support large collaborations. Gateways allow scientists to concentrate on the most challenging science problems while underlying components such as computing architectures and interfaces to data collection changes. The goal of our institute was to provide coordinating activities across the National Science Foundation, eventually providing services more broadly to projects funded by other agencies.

SGW-I has succeeded in identifying two underrepresented communities of future gateway designers and users. The Association of Computer and Information Science/Engineering Departments at Minority Institutions (ADMI) was identified as a source of future gateway designers. The National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) was identified as a community of future science gateway users. SGW-I efforts to engage NOBCChE and ADMI faculty and students in SGW-I are now woven into the workforce development component of SGCI. SGCI (ScienceGateways.org) is a collaboration of six universities, led by San Diego Supercomputer Center. The workforce development component is led by Elizabeth City State University (ECSU). ECSU efforts focus is on: Produce a model of engagement; Integration of research into education; and Mentoring of students while aggressively addressing diversity.

This paper documents the outcome of the SGW-I conceptualization project and describes the extensive Workforce Development effort going forward into the 5-year SGCI project recently funded by NSF.

Susantha Herath

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&

Jayantha Herath

Saint Cloud State University, USA

Transforming Next Generation Minds and Lives: Interdisciplinary Cybersecurity for non-Computing Majors

The St. Cloud State University received two S-STEM grants for its computing and engineering programs in 2011 and 2014, and an SFS grant in 2015. These programs have been meeting the NSF program goals, in recruitment, retention, graduation and enhancing student support structures. Based on the lessons learned, this project proposes to attract non-computing majors to address the national need for cyber security professionals and transforming minds and lives of next generation. This talk presents our experiences and an interdisciplinary curriculum for non-computing majors who are interested in completing a BS degree in cyber security embedded Information Systems, and Information Assurance Master's degree (MSIA), and join the workforce to address the needs of protecting and defending nation's cyber infrastructure. The objectives are to a). Attract non-computing majors into cybersecurity through IS and complete a graduate degree towards cybersecurity (MSIA) b). Encourage 2-year college students to complete a 4-year degree and a master's degree in MSIA. This interdisciplinary collaboration involves six departments at SCSU and ten top feeder community colleges. Our target pool includes students from non-computing majors, veterans, 2-year transfer students from MN and five neighboring states. They can share the benefits of healthy job growth expected for next ten years with improved lifetime earnings and transform the historically agriculture based economy to an advanced high technology based one.

Sinela Jurkova

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Transcultural Competence as Transformative Learning that Fosters an Inclusive Society

The paper explores how adults acquire transcultural competence by participating in different learning activities and the extent to which it leads toward integrative and inclusive society. This study adopts a qualitative approach in an effort to answer the following questions: (1) How do immigrants and Canadian-born individuals understand their cultural competence as a learning process? (2) What kind of cultural activities and learning practices motivates such individuals to become more engaged and why? (3) When do transcultural competence learning practices and activities transform participants and foster immigrant integration and inclusion in society, and why?

Recognizing the global perspective, transnational flow and explosion of communication and information technologies open space for re-constructing the concept of intercultural competence. I propose transcultural competence as an educational commitment that will focus on examining and promoting paths for successful interaction and active participation in the global transnational environment. Transcultural competence as a learning activity can facilitate the economic, socio-cultural and political adaptation to the society for a vital and purposeful life.

The philosophical concept that informs the theoretical context of this research is transculturalism as a mode of being in 21 century. Transcultural concept as a new way of seeing the world, and thus, of understanding ourselves expands the interdisciplinary field of study as new cultural and ethnic boundaries have emerged in our era of globalization fostering transcultural attitudes, cultural interactions, meaning making, and power. Transculture can be perceived as encompassing and creating space for individual's transformative learning and for developing transculture competence – attitudes and abilities that facilitate open and ethical interaction with people across cultures. Interviewing two groups (immigrants and Canadian born), I explore the process of transcultural competence as a perspective transformation for both the newcomers and the host society. For immigrants, movements across social spaces are moments of intense learning and modifying the structure of meaning, the inherited frames of reference, adapting to new values and another type of social organization. Likewise, for mainstreams, this is a revision of frame of

reference - learning and developing awareness about unfamiliar cultural contexts, accepting and negotiating different values and behaviours in order to communicate and interact competently creating an inclusive environment.

The results and knowledge generated from this inquiry will contribute to the renewal of adult learning and teaching models of cultural competence as well as policy development that facilitate processes involved in immigrant integration and societal inclusion.

Richard Kitchen

Professor, University of Denver, USA

Is Computer-Assisted Instruction (CAI) Reliable to Promote Students' Mathematical Reasoning?

In this paper, five high school mathematics leaders who work in a highly diverse, urban school district in the United States (U.S.) share their views about computer-assisted instruction (CAI) with regards to its role to promote their students' mathematical reasoning. The research participants' views were analyzed to understand how CAI promotes or hinders the mathematics education of students who have historically been denied access to a high quality mathematics education in the U.S., low-income students and culturally and/or linguistically diverse students ("underserved students"). The research findings indicate that CAI was primarily being used in the participants' school district as a means for students to recover mathematics credits needed for graduation. Participants worried that students who used CAI for credit recovery were not learning mathematics for understanding. Teachers reported having limited opportunities to learn how to use CAI programs to promote mathematical reasoning through problem solving and discourse among their students. It is particularly important in schools attended primarily by underserved students that opportunities exist for students to work with others to examine their mathematical thinking and the ideas of others since these schools tend to move toward controlled forms of instruction in which students rarely work collaboratively.

Alfred Klampfer

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Virtual/Augmented Reality in Education: An Analysis of the Potential Applications in the Teaching / Learning Process

Mark Zuckerberg, founder and CEO of Facebook and owner of the virtual reality company Oculus, posted the following on Facebook on October 6, 2016:

“Here's the crazy virtual reality demo I did live on stage at Oculus Connect today. The idea is that virtual reality puts people first. It's all about who you're with. Once you're in there, you can do anything you want together -- travel to Mars, play games, fight with swords, watch movies or teleport home to see your family. You have an environment where you can experience anything.”

Virtual Reality has become hyped in recent years, thanks especially to new hardware and software packages. But this hype already existed in the 1990s and it was being speculated that Virtual Reality would soon enter the classroom. Aaron Walsh founded the Immersive Education Initiative (<http://immersiveeducation.org/>) at universities, the possibilities of VR were being investigated (e.g., Virtual Harlem at the University of Arizona). But the technology didn't manage to establish itself in the teaching / learning context. The Internet bandwidths were too low, the technical requirements for schools and university much too high. This has changed in recent years. The development of new, cheaper technologies as well as fast Internet connections have created the prerequisites for the use of virtual and augmented reality in the teaching / learning process.

The aim of this article, following a general description and overview, is to consider Virtual and Augmented Reality in the teaching and learning context of schools and universities.

Starting from the principles of learning and action theory according to Baumgartner / Kalz 2004, possible potential applications of VR / AR in the teaching / learning context are described and linked to the theoretical teaching / learning paradigm.

The article concludes with a short summary.

Philipp Kornreich

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Information Theory Model for the Analysis of Symbol Strings

Large strings of probabilistic data can be characterized by a small number of characteristic parameters. For example, the efficiency parameter of a language text such as English, German and Hebrew has values between about 0.84 and 0.86. The efficiency parameter of an encrypted text independent of the type of encryption has a value of 0.95 to 0.97. The efficiency of a completely random signal is equal to one. The efficiency parameter is the ratio of the information in the text divided by the maximum information that can be carried by the text. Information based models for analyzing a sequence of elements such as in strings of radio telescope data, texts, strings of DNA, strings of musical notes, recordings of dolphin sounds, or other data are discussed in this presentation. For example, Letters, numbers, spaces between words, periods, commas, etc. are symbols forming a text. Signals from space that contain patterns that repeat in the signal can be similarly analyzed. Here the patterns are treated as letters. The text or information string can be analyzed by various levels of Stochastic Information. The various Stochastic levels use conditional probabilities. Conditional probabilities can be the probability of a symbol occurring provided it is followed by a particular symbol, etc. The lowest level of analysis can be used to determine if a string has the form of a language, an encryption of a language or is just a random noise. The lowest level of analysis does not use conditional probabilities.

Alexis Koster

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The Transformative Impact of Internet Music Distribution

Internet music distribution has had a huge impact on the recording music industry. It has also affected many aspects of the economy and society: the phenomenal growth of some technological companies (for example Apple); the legal and political framework of music creation and performance in particular (and intellectual property in general); the contribution of the recorded music business to the circular economy model; and the way musical creation takes place.

Internet music distribution was enabled by two technological developments: the mp3 format and the advent of broadband Internet. A third technology, peer-to-peer software, also played a critical role, albeit a negative one.

Between 2000 and 2015, revenues from compact disks (CDs) declined in the USA from about 14 billion dollars to 2 billion, a drop of 85%. Partial figures for 2016 indicate that this trend continues. As a consequence, the retailers of CDs (such as Tower Records and Blockbuster) have gone out of business. The five major labels of 2000 have merged into three major labels.

Initially, digital music revenues compensated partly for the loss of CD revenues. Thanks to the steady growth of digital revenues, the recording music industry overall revenues have stopped decreasing. Digital revenues accounted in 2016 for 77% of all recorded music revenues (47% from streaming and 30% from downloads). Streaming is now days the main engine of growth of the recording music industry.

Several technological companies have benefitted from Internet music distribution. Thanks to a favorable agreement between Apple and the major labels in 2003, Apple made a huge profit from the sales of its iPod devices together with its iTunes service, which started its climb toward the number one company in the world (for a while). Streaming is provided by specialized companies such as Spotify, Deezer, and Pandora. Although their revenues have been growing steadily, they are not yet making a profit. Apple, Google, and other technology companies are also providing streaming services.

Internet music distribution started without the agreement of copyright holders through the use of peer-to-peer software. The labels took the software providers to court (including the Supreme Court) and usually won. The US Copyright Law was amended several times to clarify its application to the Internet. In France, the Hadopi Law of 2009

created an agency tasked to prevent Internet piracy. The court decisions in the USA and the Hadopi Law in France seem to have had only a small success at enforcing the copyright laws over the Internet. Political pressures and weakening of some existing laws by the courts have prevented a more efficient policing of the Internet.

Traditionally, the economy is based on a “linear” model: use of new raw materials to build a product (for example a car or a CD), purchase and consumption of the product by the customer, discard of the object after a while. The cost of this economic model is often measured by its carbon footprint. The “circular” economy proposes to reuse the object of consumption rather than to discard it. In some sort of sense, Internet music distribution is closer to the circular economic model. The carbon footprint decrease of switching from physical CD to the immaterial music file has been computed by Rachel Botsman, a proponent of collaborative consumption, which is part of the circular economy.

Streaming may be changing the type of music provided by artists. Under the CD model or the download model, the music listeners typically will stay with the type of music they are used to listen to because they have to pay for it and do not want to spend money on something they may not like. Under streaming, there is no cost or the cost is much less. The music listener is more willing to explore new types of music. As clicks on music streamed are easily counted, the musicians are aware of the number of times a specific song is streamed and are willing to produce more original music, based on the feedback they get.

Petr Kurka

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Bimodular Number Systems

Bimodular number systems were introduced in [1] and [2] as an extension of the binary number system in the context of Moebius number systems. The digits of the system represent Moebius transformations of the form $M(x) = (ax+b)/(cx+d)$. The bimodular number system has alphabet (the set of digits) $A=[0,1,2,3,4,5,6,7]$ and transformations $F_0(x)=x/(x+2)$, $F_1(x)=(x+1)/2$, $F_2(x)=2x/(x+1)$, $F_3(x)=2x+1$, $F_4(x)=2x-1$, $F_5(x)=2x/(1-x)$, $F_6(x)=(x-1)/2$, $F_7(x)=x/(2-x)$.

Real numbers are represented by infinite sequences of digits from a subshift. Here we consider the circular subshift C which consists of infinite sequences of digits not containing forbidden words

$$D = [02,03,04,05,06, 13,14,15,16,17, 20,24,25,26,27, \\ 30,31,35,36,37,40,41,42,46,47, \dots, 71,72,73,74,75].$$

As shown in [1], some arithmetical algorithms run faster in bimodular number systems than in the standard binary signed system. Here we show that in the bimodular system with the circular subshift, rational numbers have eventually periodic expansions.

[1] P.Kurka, M.Delacourt: The unary arithmetical algorithm in bimodular number systems, 2013 IEEE 21st Symposium on Computer Arithmetic ARITH-21, IEEE Computer Society, pp. 127--134, 2013.

[2] P.Kurka: Dynamics of Number Systems Computation with Arbitrary Precision, Studies in Systems, Decision and Control vol. 59, Springer International Publishing AG, Switzerland 2016.

Celeste Lawson

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Engaging Online and Distance Students in Teamwork Assessment for Higher Education

Teamwork assessment features prominently in higher education institutions. Pedagogical advantages of team projects are well documented, however teamwork assessment of distance and online students is more challenging, and difficult to implement well. This presentation provides a mixed method longitudinal study of teamwork assessment in a distance and online undergraduate unit in a regional Australian university over a period of four years. Online student engagement was measured through participation with other students during the assessment; the rate of assessment submission; and student retention. A qualitative analysis of formal feedback at the conclusion of the unit was undertaken to gauge student attitudes to the assessment approach. It was found that distance (online) students disliked teamwork assessment for three main reasons: teamwork assessment was not authentic in the manner in which it was applied; students were not given guidance on how to work in teams, especially virtual teams for distance students; and the grading was inequitable to the amount of effort by individual team members.

A further finding was that engagement and participation in teamwork assessment improved when the assessment was adapted specifically for online projects, increasing student retention of distance students. This presentation explains why and how teamwork assessment was adapted and implemented over the four year period, incorporating the pedagogical concerns of teamwork assessment to aid student progression. The teamwork assessment approach is applicable across a number of disciplines, particularly in a virtual environment when students may be geographically and professionally isolated.

Carsten Lecon

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Rapid Learning Object Generating for Blended Learning Scenarios

In order to address the heterogeneity of the student's learning behaviour at universities, it is useful to offer additional electronic material for a better understanding or to deepen the learning content.

However, producing these materials is often a very time-consuming process, since often multiple views to the learning matter have to be considered and different learning trails should be available.

Therefore, we present an approach that allows a considerably 'easy' construction of 'mini courses' with learning objects (texts, figures, animations, videos, quizzes inclusively answers and hints, exercises, ...) and the relation between them: page layout, sequences or learning trails.

We have implemented a tool that allows creating an HTML website ('mini course') based on an XML file (by a graphical user interface). This document defines the structure (sections, subsections, hyperlinks ...), metadata (also pedagogical metadata) and content. In addition, learning trails can be specified for different paths through the learning matter; for example a 'visual trail' (only sites which contains figures), 'exercise trail' (sites which contain exercises or quizzes) or a 'summary-trail' (sites which summarizes the previous subject). The corresponding navigation structure will be generated automatically. Based on the metadata in the XML document, offline search functionality is integrated in the generated HTML course (full text, metadata and structure information). The underlying data structure uses an attributed context free grammar approach, for example in order to inherit XML attributes. A graphical sitemap on every page serves offers an overview and a quick navigation.

The generated of HTML files can be used online (in a learning management system), and offline (desktop PC or mobile devices). In addition, the tool allows generating LaTeX and PDF files, and new content can easily be added to an existing mini course.

Haruka Miyazawa

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Information, Computation, and Linguistic Systems

Since the advent of molecular biology, it has been said that cell is a kind of 'machine', which stores its specification inside itself. Although the perspective of systems biology derived from this understanding well prevails, we still do not have a clue to address cellular system deductively, due to the lack of mathematical insights into the system.

Here, I propose a conceptual framework where it is possible to abstract the essential features of the system and project them onto the purely mathematical problem. The framework mainly includes the following three concepts; information, computation, and linguistic system. Each concept can be understood independently with explaining specific features inherent to biological system. Nonetheless, the intersection of these concepts can provide us with the fertile results to understand their relationship and hierarchy. In this framework, 4 bases (A, T, G, C) in biology correspond to symbols in information theory and it enables us to discuss probability of occurrence of each symbols, channel capacity and entropies. The DNA-protein interaction, which is one of the most important chemical reactions within cells, corresponds to computation in automata theory, which leads to the understanding of genome as formal languages. What the molecular interactions (cascades, pathways, protein complexes and so forth) correspond in the framework is linguistic system, which I introduce as a definitely new concept in order to explain the interaction between matured components. The apparent discrepancies among those three concepts can be solved by mathematical explanation. Long-standing questions like whether viruses are to be categorized into life or not will be shed light on by viewing them as a mere set of strings which do not have a function of computation.

In this paper, I aim at explaining biological system from the perspective, which is completely different from the previous ones.

Leila Nunes

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Improving the Performance of Multifunctional Resource Rooms Teachers in Using Alternative and Augmentative Communication (AAC) Resources

An in-service training program was implemented to prepare special education teachers who work at Multifunctional Resource Rooms to devise and use AAC resources and to adapt instructional materials and procedures to teach non-vocal students enrolled in regular classrooms. A 30 item - questionnaire was administered to 10 resource room teachers before and after the intervention that lasted nine months. The training program involved reading and discussing texts, lectures on language development and AAC resources, case studies, video presentations, planning adapted activities, constructing adapted instructional materials, demonstrating the use of software, and vocalizers. The data showed that after the training, the participants improved their competence in evaluating students' communicational needs and in matching the AAC low and high tech resources to these needs. There was also an increase in: (a) constructing and making available communication boards for helping students to communicate and to perform academic activities, (b) using software, especially the Boardmaker, to elaborate these AAC boards; (c) offering instructional software to the students; (d) proposing adapted instructional procedures and materials in reading, writing and math activities, and (e) elaborating adapted evaluations.

Bernardo Panerai Velloso

Executive, Bernardo Panerai Velloso MEI, Brazil

Maria de Lourdes de Souza

Professor, Universidade Federal de Santa Catarina, Brazil

&

Ovídio Felipe Pereira da Silva Junior

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Analytical Observatory: Management Information System on Psychoactive Substance Dependence

About 240 million people worldwide use illicit drugs, among them, 27 million are classified as addicts. This is conceived as a public health problem considering the impact that it causes to the social, economic and health development. A similar scenario happens in Santa Catarina, Brazil, namely, the large contingent of psychoactive drugs users. There is an ease in acquiring illicit substances due to the existence of drugs with low economic value, such as crack, highly addictive and used in all social classes. In this context arise technologies aimed to improve society by supporting the process of overcoming chemical dependency. Such as the Analytical Observatory, a Management Information System which has the function to generate reports out of the records on psychoactive substance dependence. Online Analytical Processing was used, in the manner of a data structure and processes with the capability to manipulate and analyze the available data. The Observatory is accessed through internet page, in the client-server model where the workload is distributed between the client applications (user application and/or browser) and server (Web site and data servers). MySQL is employed in the data structure, conditional to the technology already in place in the present records. MySQL is a free software that allows robust applications with functions and procedures necessary for the Observatory. Python runs on the server, a programming language that allows the creation of web sites with focus on performance and integration of various types of databases at a high level of abstraction between them and the rest of the application. HTML structures the web pages, part of the user interface along with JavaScript, a client-side interpreted programming language. Free JavaScript libraries named Google Charts and Charts JS are adopted for the specific task of generating visual graphics.

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&

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Performance Evaluation of Body-Centric Nano Communication at Terahertz Frequencies

There has been a dramatic increase in interest in nano-technology due to its wide range of application in all aspects of life. In particular, nano-technology is establishing itself as a key player in medical diagnostics and treatment and is influencing many research fields including body-centric communication. The development of new materials like graphene, which is capable of working at Terahertz (THz) frequencies, opens up a new area of applicability of nano-devices inside the human body. The THz frequency holds great potential for medical technologies because of its non-ionization nature in biological tissues [1]. In literature, body-centric communication has been studied from meter to millimeter wave frequencies [2]; however the requirement for further size reduction makes nano-scale technologies an attractive choice for future applications of body-centric communication. In the past, much research has been dedicated to the characterization of on-body, in-body, and off-body communication using single and multiple antennas at various frequencies and the benefits of multiple-antenna techniques for body-centric communication for narrow-band systems have been thoroughly investigated [3,4]. This paper presents novel research that has yet to be investigated in the literature. In particular, this paper explores the achievable capacity gain when multiple antennas at the THz frequency level are implemented inside the human body. This scenario is studied under two different power schemes, namely, equal-power and waterfilling power allocation.

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&

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Quality Prediction on Die Cast Sensor Data

Die-casting forms complex metal shapes in a rapid production process. The downside is a not completely controlled process. As a result, the scrap rate is in a range from 10% to 25%. The cast work pieces are usually subject to various additional treatments before a defect is identified. This leads to significant additional costs. A thorough quality control directly after the casting is time and cost intensive. In practice only a quick visual inspection, for obvious flaws on the surface, takes place.

We aquired data from temperature, pressure, metal-contact, vacuum, air-volume, moisture and ffc sensors with a resolution of 4kHz for more than 400 casts. For those casts the density was measured as an objective quality feature.

We trained different machine learning algorithms on the data for three classes. Class 1: high density - high probability of a good part. Class 2: medium density - unconfident in quality/suggestion for measurement. Class 3: low density - high probability of a low quality.

Artificial neural networks have a slightly higher accuracy but need a multiple of the computation time of other machine learning algorithms and don't allow an inference on the impact of the features. Decision trees and their advanced variants with boosting yield good outcomes and show which features are responsible for the part quality.

On this foundation, we developed a system to archive all the sensor data of a live production die-casting machine and a real-time prediction of the part quality. With a prediction accuracy of ca. 80% we can support the decision of the machine operator and help to reduce the cost for scrap.

Lydia Rose

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Rethinking the “Live” Component of Online Courses: Advantages and Disadvantages of the Polished Canned Course

The role of the teacher/professor in the university online classroom can vary substantially. The plethora of online delivery formats available can widely differ subverting the role of teacher. The role of the teacher can be as an extremely passive facilitator of the course that merely keeps score on a limited number of assignments that are not scored automatically. On the a whole other level, the online teacher can be immersed into an online community that can easily overtake ones time in interacting with online students with emails, chats, discussion forums, real-time conferencing, and lecturing. A significant number of online programs provide the “live” component of the course simulating the traditional classroom where students all attend at a synchronized time. The disadvantages of the synchronized, online lecture is typically related to geography, time zones, work schedules, family demands, and technology issues. This paper is an attempt to seek out questions and answers regarding the advantages and disadvantages of placing the “live” component of a course at the forefront of the online class. This is to be contrast with the advantages and disadvantages of the well-polished, well-rehearsed, well-edited taped video.

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&

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Personal Learning Environments as a Strategy to Promote the Use of Digital Technologies in Education

Ongoing studies involving digital technologies in education indicate the possibilities of enhancing educational processes based on the concept of personal learning environments (PLE). The PLE is not a technology but an approach, a way through which we can use the digital technology, especially web tools, to teach and to learn. This study aims to analyse different possibilities of boosting the PLE of undergraduate students who are enrolled in a teacher formation course and to understand how this is reflected in educational practices in the context of basic education. This study, with a qualitative approach, was developed based on the cartographic method. Results point out the importance of promoting experiences that enable the students to use new technologies in order to expand their PLE, as well as to create opportunities for reflection on the possibilities and limitations of web tools in the educational context. Furthermore, we understand that the student involvement in educational practices during the teacher formation process can enhance pedagogical practice with the use of digital technologies.

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In Vino Veritas: The Game

The paper describes the design, organization and development of the application In Vino Veritas (IVV). The main objective is to understand the potential of the hybridity, multimodality, pervasiveness and the ubiquity, combined with the games and gamification as enablers of knowledge experiences. The proposal includes historical heritage of the city and countryside of Bento Gonçalves in Southern Brazil, as integrators of learning spaces, defined as elements for the development of culture and citizenship. In this context, the following problem arises: How this perspective may help to think of the new educational designs?

This exploratory research used a combined qualitative-quantitative approach," including the intervention-research cartographic method. Other instruments used were participant observation, photo, audio, text and video records, and interviews. The data was analyzed and interpreted within the theoretical framework. We used this reframing to address learning gap and educational design in the context of a learning environment composed of hybrid, multimodal, pervasive and ubiquitous coexisting spaces. The IVV is a game that can be collaborative, when the players socializing the knowledge built in the own game, in the Facebook group - "In Vino Veritas - The Game." Then this knowledge is assessed for expert and has the possibility of integrate the game, in this case the players becoming authors. The game uses mobile devices, mixed and an augmented reality and works to enlarge the learning spaces for the city and the countryside of Bento Gonçalves.

The IVV include areas like: History, Enology, Gastronomy and Chemistry, and is developed from a narrative in three acts: Mythology; Italian Immigration and Immigrants in Bento Gonçalves, represented by three 3D characters: God Bacchus, grandmother Francesca and Italian Giuseppe. These characters could encourage players to accomplish missions, interacting with the local community and the city and countryside spaces in building a web of knowledge, where informational layers are related to personal and collective memories

about immigration, aroused by the senses, engaging the subjects in the world of sensations and cultural discovery.

Franz-Josef Schmitt

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Christian Schroeder

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Marcus Moldenhauer

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&

Thomas Friedrich

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Student Centred Teaching in Laboratories Supported by Online Components in the Orientation Program MINTgruen

Student centered teaching and research-based learning motivate students to identify with their subjects. The orientation program MINT^{grün} at Technische Universität Berlin offers two study semesters for open choices of subjects and a series of specially designed laboratories covering topics like robotics, construction, environmental research, programming, mathematics, gender studies and chemistry. The online project laboratory in chemistry (OPLChem) follows the concept of learning by research and allows for a free choice of an experiment drafted by the students themselves after participating impulse talks that report on former experiments conducted by the students of the preceding semester. In the OPLChem the students were highly motivated and chose experiments often related to sustainability.

However such student centered and research based teaching concepts are often time consuming. Therefore we developed a series of online components to support the teaching process in the practical courses. Videos show basic experiments in chemistry and they explain how to handle the experimental setups correctly. Such videos were identified as helpful tools to reduce the effort for supervision during the internships while the quality of the experimental work of the students was clearly rising. The online materials explain important aspects of the theory, chemicals, the preparation of samples, the configuration of complex setups, safety instructions and handling of computer programs for the correct data evaluation. All materials are provided on the moodle based content management system of Technische Universität Berlin that allows for monitoring student skills, spreading tasks to the students, exchange documents, work collaboratively on documents, communicate in the forum or solve short online tests.

The concept of the OPLChem motivated the students to produce own videos publishing their experimental results to support their written protocols. In that way a growing pool of new videos of various experiments was established and some students published these videos, their protocols and additional materials on own blogs for the public. This approach opened the laboratory for the public and turned out to be an interesting concept to support collaborations. For example the project of oil spill detoxification was in focus of the government of Berlin and finally lead to a cooperation with the office for urban development. The whole teaching concept of the OPLChem and the development of selected teaching videos for a targeted inversion of the practical courses were awarded by the Joachim Herz foundation with two Fellowships for excellent teaching for Thomas Friedrich and Franz-Josef Schmitt, respectively.

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**Exploring Open Distance Learning at a South African dual
Mode University: A Case Study**

Due to the need for higher education in South Africa, the country experiences a rapid growth in open distance learning, especially in rural areas. The Unit for Open Distance Learning (UODL) at the North-West University (NWU), South Africa was established in 2013 with its main function to deliver open distance learning programmes to approximately 30 000 students enrolled in the Faculties of Education Sciences, Health Sciences, Theology and Arts and Culture. The UODL is responsible for the operational and administrative side of the offered ODL programmes at the NWU. Using interactive whiteboards, the NWU and the UODL are now able to deliver lectures to students concurrently at 65 regional open learning centres across South Africa, as well to an unlimited number of individuals with Internet access world-wide. This paper will explore the implementation of open distance learning in terms of its successes and challenges over the last couple of years at the institution. An important reason for the successful implementation of ODL at the NWU was the ongoing support for students and use of technology. The successes of ODL at the university will further be illustrated by the throughput rate and graduation numbers over the last 4 years. The paper will also look at the challenges that the institution face with regard to the migration to online learning in a developing country.

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&

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Blogging and Online Book Clubs: Pre-service Teachers' Experiences and Perceptions

Though technological advances are rapidly creating new educational opportunities, research on blogging and participation in online book clubs is virtually nonexistent. In this study, researchers explored pre-service teachers' experiences with blogging combined with participation in online book clubs. The purpose of this research was to identify participants' reading habits and online practices, examine their perceptions of blogging as a pedagogical tool when coupled with online book clubs, and ascertain how they intend to incorporate this digital pairing into their future educational practice. Participants in the study were 18 pre-service teachers enrolled in required literacy methods courses for teacher education certification. Initially, a 15-question, Likert-scale survey was administered to participants to determine their experiences with blogging and participation in online book clubs. Results of the survey revealed that the majority of students had no prior experience with either blogging or online book clubs. Participants were then presented with a selection of texts from which they could choose to read and participate in an online book club experience. Six-member book clubs were formed based on pre-service teachers' text selections. Next, participants created individual blogs, which they used to engage in online dialogue over the course of four weeks. Participants had complete autonomy within book clubs to organize a schedule and protocol for members' online discussions. Upon completion of the blogging and online book club experience, participants provided reflective responses relating their perceptions of their engagement in the process as well as how they viewed blogging as a pedagogical tool. Though this study was narrow in scope and results were limited, it provides a foundation and rationale for future research in an area that is still emerging.

Sonia Tiwari

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Design and Evaluation of Character-Driven Applications for Elementary Education

This paper discusses development and evaluation of interactive web and mobile applications that use character-driven storytelling for Elementary Education. From educational apps using popular Television characters such as 'Dora the Explorer', 'Curious George' and 'Cat in the Hat' to mascots of educational websites such as 'ABCmouse.com' and popular educational games like 'Carmen San Diego' - Characters have been strong anchors of educational stories regarding environment, science, math, technology, language and many more subjects!

This paper is presented in four sections

- A) Brief history of popular characters in educational applications
- B) Evaluation of the role 'characters' play in a child's learning experience while interacting with educational apps, through subjective interviews and objective questionnaires answered by 150 teachers, parents and students across India and US
- C) Draw a recommended list of features for future educational apps based on feedback and suggestions from elementary school teachers and students, aimed at educational app developers
- D) Present the prototype of an original Game designed based on the feedback from this research

In a complicated world of education where a lot is expected from children at an early age, and the increasing amount of products, services and research into "How to make education more fun?" - strong character design and storytelling through visuals remain an important factor to establish a sense of familiarity and warmth for children, as they delve into new and challenging study material. From the early days of educational technology for children where Seymour Papert co-designed the 'turtle' in Logo Programming Language (1956) to the 'Dash & Dot' robots that help kids learn programming (2013), characters have proven to play an essential role in simplifying even some of the most (perceived as) complicated topics like programming.

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&

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Virtual Reality Head-Mounted Display Used in Online & Distance Education

In recent years, online education has become an enhancement to traditional methods, allowing people to learn at a distance. Internet web applications, 3D digital environments and virtual reality devices give new opportunities in teaching-learning processes. Starting from this consideration, the Department of Humanities, Philosophy and Education of the University of Salerno and The Virtual Archaeological Museum of Herculaneum signed a scientific cooperation agreement oriented to develop and implement methods, tools and inclusive educational technologies. In particular, virtual reality spaces have been designed to create educational settings in line with the Universal Design for Learning approach. Using the Unity3D game development platform and state-of-the-art graphics, which are comparable to contemporary video games, a 3D model of Villa of the Papyri in Herculaneum was recreated. The next phases of the project include the development of an edugame in this 3D model, which can be used in online and distance modes. Through virtual reality and head-mounted display (Oculus©) device, students will be able to learn history, philosophy and architecture of ancient Romans. In addition, having the ability to download or play this online edugame, students have the opportunity to learn at a distance, visit places far away in space and in history, which may now have disappeared. Besides, students can use these virtual reality media anytime anywhere, with the convenience and cost effectiveness of distance learning.

Janice Tsang

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**Struggles of Independent Intellectuals in Hong Kong:
A Case of Hong Kong Reader Bookstore and the
Intercommon Institute**

This presentation shares experience and struggles of a group of 'independent' intellectuals in Hong Kong, who are not affiliated to Universities or the authorities: from one of the city's most important independent bookstores, HK Reader, to its extended community-based academic collective, the Intercommon Institute, a network of public intellectuals in Hong Kong that offer short courses, with a focus on political and socio-cultural, aiming to promote public knowledge and to bring academic rigour to the public learning sphere. As the editor of a forthcoming journal initiated by members of the Intercommon Institute, I hope to share in this paper what it means to work as an "independent" academic in Hong Kong.

I begin with HK Reader, a small bookstore located at an old building in the middle of the hectic city centre Mongkok, which was established by a group of young Philosophy majors ten years ago. Initially the owners were inspired by their learning experience through book clubs and discussion forums in university, and they hoped to demystify 'scholarly books' and, in longer terms, to help cultivate a more informed and committed civic society. They believe that academic discussions, scholarly research and tertiary-level teaching should take place not only within the ivory tower, but also among the general public - being both for and by the people. Unlike chain bookstores, operating HK Reader is very different in terms of its goal and target readership. Apart from its predominant Humanities book choices, it also serves as a platform for emerging writers and academics. Business aside, the owners and the staff of HK Reader pay closer attention to potential customers' book taste and interests, and they believe that building a community of visitors and readers is more important. This passion in encouraging conversations, as well as the urge to provide an 'intellectual' exit from the growing political instability, becomes the motivation to set up a non-institutional research collective: the Intercommon Institute.

In the past decade, there is an overall rise of civic consciousness in Hongkongers, also because of the emergence of the Liberal Studies as a compulsory subject at high school and Hong Kong Studies as a field of research in scholarship and publication. From as early as the Article 23

controversy in 2003 to the Umbrella Revolution in 2014, Hong Kong's increasingly precarious political environment and the city's struggle with its "post-colonial" identity have motivated more locals to seek out books on Hong Kong history and politics, as well as to 'foster' Hong Kong's cultural roots by way of supporting 'home-grown' literary writing. With the help of social media and these independent avenues where artists and writers can come together, there is actually a renaissance of literary interests among the public. The Intercommon Institute offers courses, spanning from Leftist Thoughts to Social Design to "special topic" study groups introducing and discussion a particular book or thinker. These courses are charged, so as to pay the teachers, who have postgraduate qualifications but are not tied to any government-funded institution.

This commitment to 'make knowledge public' relies heavily on the passion of those who run the these independent bookstalls and research centres, and a steady and dedicated community to uphold its existence and to believe that this goal actually matters. It is very difficult without a strong source of funding, especially when some of these researches that critique and criticise existing policies, which makes the undertaking even more challenging, and at times frustrating, to actually see 'results'. From the very beginning, the Cantonese name of HK Reader, 'Jui-yin' (序言), literally means Preface, but it is also a pun that means 'gathering people of virtues'. I will conclude by the rise of these non-institutionalised forms of education and its role in participating in, and real-ising the transformative change in the Hong Kong community.

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Context-Aware Mobile Applications and Their Integration with Decision Support Systems

Context-aware applications have evolved significantly during the last decade. They assist users' everyday activities by adapting their behavior based on context information obtained from dynamic environment. A context-aware mobile applications can be beneficial in the time-critical situations where complex decisions are made under pressure, or the environment is dynamic or uncertain. A lot of examples exist in health-care sector (medical assistant, mobile medical expert, real-time emergency management), business applications (mobile banking and commerce), and location-based services (GPS-enabled applications).

This paper contributes to gaining a better understanding of the nature and requirements of context-aware mobile application, together with the roles of decision support systems. We analysed how a variety of contextual information, including device sensors (motion, environmental, position, etc.), communication preferences (including users' interaction, individual identification and personalization) and decision support system power help us to obtain, analyse and understand the user's context. All those components work in unison to continuously acquire and collect data, and eventually notify mobile users using decision support systems. Reliable automotive access to the most relevant information and efficiently processed dynamic data can significantly enhance decision support systems productivity and mobility of decision-makers on the move or where and when it is needed the most.

Approach presented in the study shows how context-aware applications has been used to collect data and analyze them with integration of decision making systems. In order to demonstrate this approach, a system prototype has been developed and tested, and a number of case studies are considered. Building and using this system has enabled us to identify the main challenges and limitations that need to be addressed for realizing the current objectives of a new era of mobile decision support systems.

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How to Promote New Practices using Alternative and Augmentative Communication with Especial Students

The study's aim was to promote the initial training of pedagogy students in the knowledge and use of alternative and augmentative communication (AAC) in regular and special context of teaching and also offer specialized services to students with disabilities and severe communication difficulties. The study was conducted in a classroom equipped with computers, communication devices, tablets, switches, app and software, communication boards and activity supports to adaptation of teaching materials. This purpose was conducted during four semesters, where the graduate students received theoretical and practical training in the specialized teaching of people with disabilities, included the use of AAC and the pedagogical activity adaptations. At the end of the study it was possible to check out a range of AAC features and strategies appropriateness of teaching materials and AAC resources that were created by the graduation students. They could learn that, for the development of a job with AAC, it is necessary that the teacher start through a well formulated evaluation. It is from the evaluation they obtained information about their students (their potential, skills and interests), also about on the communication and learning needs to use in a functional routine of a life. In practice, they might understand that the evaluation and the procedures must be planned and continuous for many weeks. In addition, it was developed the ability to report observations of students with disabilities, using the case studies and elaborate the specialized intervention plans, which enabled the development of appropriate strategies used with the special student in regular schools.

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Designing a Blended Synchronous Learning Environment for Graduate Students

In this study, a blended synchronous learning environment (BSLE) was designed for a group of master students who were taking an elective course at a teacher education institute at an Asian university. Twenty-four students were enrolled to the course in the semester when the study was carried out. They were all full-time school teachers, and could only attend the course in the evening.

In this study, the majority of the students attended the course face-to-face in the classroom and at the same time allowed the rest to join the class using video conferencing from different locations such as at homes. The purpose of the study was to find out how such a BSLE could be designed and implemented, and what learning experiences and perceptions the students had with regard to the design and implementation of the BSLE. Results showed that the BSLE could extend some features of the face-to-face classroom instruction to the online students and the students liked the flexibility and convenience of attending lessons via the two-way video conferencing. However, there were also many challenges in the process. This study found out that smooth communication between online students and the instructor and between the online students and the students in the classroom, the engagement of online students and redesign of instructional activities, a balanced attention to face-to-face and online students, and the quality of audio were crucial for the BSLE to be effective. Suggestions were recommended and future research was proposed.