Abstracts of Papers Presented at the 10th International Conference on e-Learning

ICEL 2015

College of the Bahamas Nassau The Bahamas

25-26 June 2015

Edited by
Dr Carlton Watson

Papers submitted to this conference have been double-blind peer reviewed before final acceptance to the conference. Initially, paper abstracts were read and selected by the conference panel for submission as possible papers for the conference. Many thanks to the reviewers who helped ensure the quality of the full papers.

This Booklet of abstracts and other conference materials is provided to conference participants for use at the conference.

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Preface

These proceedings represent the work of researchers participating in the 10th International Conference on e-Learning (ICEL 2015) which is being hosted this year by the College of the Bahamas, Nassau on the 25-26 June 2015.

ICEL is a recognised event on the International research conferences calendar and provides a valuable platform for individuals to present their research findings, display their work in progress and discuss conceptual advances in the area of e-Learning. It provides an important opportunity for researchers and managers to come together with peers to share their experiences of using the varied and expanding range of e-Learning available to them.

With an initial submission of 91 abstracts, after the double blind, peer review process there are 41 academic Research papers and 2 PhD papers Research papers published in these Conference Proceedings. These papers come from some many different countries including: Australia, Belgium, Brazil, Canada, China, Germany, Greece, Hong Kong, Malaysia, Portugal, Republic of Macedonia, Romania, Slovakia, South Africa, Sweden, United Arab Emirates, UK and the USA.

A selection of the best papers – those agreed by a panel of reviewers and the editor will be published in a conference edition of EJEL (the Electronic Journal of e-Learning www.ejel.com). These will be chosen for their quality of writing and relevance to the Journal's objective of publishing papers that offer new insights or practical help into the application e-Learning.

We wish you a most interesting conference.

Dr Carlton Watson
College of The Bahamas
Programme Chair

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Biographies

Conference Chair

Dr Pandora Johnson is an Associate Professor in the Faculty of Social and Educational Studies serves as the Interim Vice President for Academic Affairs at The College of The Bahamas. A veteran educator, throughout her tenure at The College, Dr Johnson has served in several capacities including: Director of Research and Grants, Vice President for Research, Planning and Development and Vice President for Outreach. As a member of the national Commission for UNESCO, she assisted with organising and executing several conferences and seminars held in The Bahamas. Other community engagements included membership on such Boards as the Central Bank of The Bahamas and The Bank of The Bahamas.

Programme Chair

Dr Carlton Watson has been a member of faculty at The College of The Bahamas since August 2003. An Associate Professor in physics, he has served the institution as school chair and department head. An experimental condensed matter physicists by training, he conducts research in wide-ranging areas including semiconductors, nanofabrication, e-learning, and open and distance learning. He holds a Ph.D. in Physics from The University of Iowa and a BSc. in Physics with a minor in Mathematics from Prairie View A&M University.

Mini Track Chairs

Ian Brown has been involved in education for over 20 years. A fully qualified and experienced international educationalist with a strong background in education (training and eLearning), business development, and digital design, Ian has helped train people in many parts of the world including Afghanistan and Indonesia. Ian has been working at The Hong Kong Polytechnic University since January 2009 as a Learning Designer. Responsibilities include co-ordinator of eLearning Unit; the pedagogical leadership of the implementation phase of the LMS project; MOOC trainer; and team member of several mobile technology initiatives.

Dr. Jyothi Thalluri has extensive experience teaching Human Anatomy/physiology and pathology for over a couple of decades to various Allied Health Science programs. She has a strong interest in the learning dynamics associated with student academic, personal and cultural diversity. She has a strong belief that students need various learning options and appropriate support particularly while they are transitioning to University study particularly in their first year. She has demonstrated sustained commitment in the implementation of a number of innovative initiatives to engage, support and provide flexible and student centred learning options. She has used these to enhance learning outcomes to diverse students.

Biographies of Presenting Authors

Arinola Adefila is an educational researcher interested in innovative pedagogies, capability development and social justice. She has worked as a teacher and consultant and is now working at the Centre for Excellence in Learning Enhancement at Coventry University, UK. Her current research projects include the development of e-learning resources and the student experience in Higher Education.

Nabeel Al-Qirim is Associate Professor in the College of Information Technology in the United Arab Emirates University (UAEU). His research interests in Information systems are mostly related to studying the adoption and diffusion of different technologies such as Cloud Computing, Web Services, Health Information Systems and Telemedicine, E-Commerce, Electronic and smart Government, Mobile Commerce, Outsourcing, Supply Chain Management, education/learning technologies, and web 2.0.

Nuno Araújo has a degree in Management and a master degree in Economics, and is a PhD student in Technology Assessment. Presently, he is collaborating at the Technological Centre for the Metal Working Industry as financial director and is manager of European and national projects in training, R&D, and implementation of production technologies and methodologies in SMEs in the metal working industry sector.

Liz Bacon is Deputy Pro-Vice Chancellor, at the University of Greenwich, BCS (Chartered Institute for IT) Immediate Past President, Past Chair of the Council of Professors and Heads of Computing, Co-Director of the eCentre research group and has been involved in e-learning research for more than 10 years.

Zwelijongile Gaylard Baleni is currently acting as Deputy Director Continuous Professional Development at Walter Sisulu University, Mthatha, South Africa. He is registered for a PhD with the topic 'E-Assessment Discourse: Its impact to improve Feedback to Students at Walter Sisulu University'. His research interests are on assessment and e-learning strategies.

Steven Ball is currently working as a Senior Learning Technologist at the Centre for Excellence in Learning Enhancement (CELE) at Coventry University, England. Steven has a comprehensive background in multimedia and web development and over a decade of experience specialising in the area of eLearning and related technologies.

Dr. Wendy Barber is an Assistant Professor in the Faculty of Education at the University of Ontario Institute of Technology in Canada. Her research includes Health and Physical Education, and Developing Online Communities. Dr. Barber teaches pre-service teacher education, graduate courses in Authentic Assessment, Adult Education, as well as Psychological Foundations in Digital Technology.

Moses Basitere is a Lecturer at the Cape Peninsula University of Technology, Chemical Engineering Department, South Africa, where he lectures in Mathematics and Physics in the Extended Curriculum Program. His research focus area is in industrial wastewater treatment. He is also involved in educational research in promoting the use of emerging technology in teaching and learning in higher education.

Orlando Belo is Associate Professor, with Habilitation, in the Department of Informatics at University of Minho, Portugal. He is also a member of the ALGORITMI R&D Centre, at the same university, working in Business Intelligence, with particular emphasis in areas like Databases, Data Warehousing Systems, OLAP, Data Visualization, and Data Mining.

Vladlena Benson is Associate Professor at Kingston Business School, UK. Vladlena's research interests are in the area of information strategy, educational technology, information privacy and social networking. She publishes widely in such journals as International Journal of Human -Computer Studies, Information Technology and People, Computers in Human Behavior, and British Journal of Educational Technology.

Sheryl Buckley is an Associate Professor in the School of Computing at the University of South Africa. Her interests are Information Science, e-learning, business intelligence and communities of practice. She is committee member of a number

of international and local organizations and an active peer reviewer. She has presented and published papers locally and internationally.

Vanco Cabukovski is Full Professor of Software Engineering at Faculty of Natural Sciences and Mathematics, Sts. Cyril and Methodius University in Skopje, Republic of Maceddonia. His main research interests include intelligent systems, e-learning systems and information systems. He has published over 70 scientific papers and over 25 books in informatics and ICT.

Dr. Kevin Chan is a research assistant professor at the Department of Applied Social Sciences (APSS), Hong Kong Polytechnic University. Kevin is currently researching in the areas of learning and development in university students, community psychology and health promotion, scholarship of service learning, as well as acceptance and use of technology in learning and pedagogy.

Jackie Chetzron is a school librarian in Dallas, TX for seventeen years, and currently on a middle campus. Her focus in library service to students is information literacy instruction and reading promotion across the campus. As a doctoral student, her research interest includes utilizing instructional technology to create effective, efficient and ethical information users.

George Cheung pursued his undergraduate studies at the University of California, Los Angeles where he received his Bachelor's Degree in Psychology and Minor in Cognitive Science. He then furthered his education at the Hong Kong Polytechnic University as an M Phil. His research interests focus on employability, mobile learning and education.

Paulo Roberto Volpato Dias has worked as a physician for the Brazilian Ministry of Health and is an Associate Professor and Vice Rector at the Universidade do Estado do Rio de Janeiro. He is a member of the University Council, the Higher Education Council and the Board of Trustees at UERJ.

Dr Martina A. Doolan is a UK National Teaching Fellow and a Principal Lecturer in Computer Science at the University of Hertfordshire in the UK. Martina's research interests include social, collaborative/community learning, assessment-oriented learning and the use of technology. See madoolan.com, interested in working with me I welcome your email m.a.doolan@herts.ac.uk.

Valindawo M. Dwayi is director of teaching and learning development at Walter Sisulu University, South Africa. He is also an academic advisor to NUFFIC project with two Netherlands Universities, Erasmus University Rotterdam and Rijks Uni-

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Elza Ferreira is graduated in Dentistry, has Masters in Health Sciences and Specializations in Dental Radiology, Family Health Program, Management of Health Systems and Services, Distance Education and Management of Labor and Education in Health. Is currently a doctoral student of the Post-Graduate Program in Medical Sciences and is part of the Coordination of UNASUS/UFMA.

Olga Fragou is an Instructional Designer in Educational Content, Methodology and Technology Lab, at Hellenic Open University and is Head of the Learning Activities Team. During 2005-2008 she worked as a PhD researcher and instructional designer in ICT Courses in the Educational Technology Laboratory, University of Athens.

Hajar Ghaem Sigarchian received the MSc degree in Computer Science from Università della Svizzera italiana, Lugano, Switzerland in 2012. She is currently working as a researcher for the Multimedia Lab at Ghent University - iMinds (Belgium), contributing to the projects “Publisher of the Future”, “EduTab”, and “Adaptive Mobile Learning Platforms”.

Mmampho Gogela is the Acting Head of Department in the Centre for Learning and Teaching Development at the Buffalo City Campus of Walter Sisulu University. South Africa. Her diverse work experience includes working in multidisciplinary settings in teaching and learning, capacity development and employee wellness. Her research interests include blended learning among other topics.

Leila Goosen (PhD) is an Associate Professor in the School of Computing at the Science Campus (Johannesburg) of the University of South Africa. Prof. Goosen is the module leader and head designer of the fully online signature module for the College for Science, Engineering and Technology, rolled out to more than 70,000 students since 2013.

Dr Sue Greener is Principal Lecturer at the University of Brighton Business School teaching Learning & Development, HRM, Business Context and Research Methods and has received a Teaching Excellence award from the University. She researches, advises and supervises in the fields of e-learning strategy, Technology Enhanced Learning and reflective learning. She is Editor of the academic journal Interactive Learning Environments, published by Routledge.

Allison Hoff has a B.A. in Ancient Studies/World Religions, M.A. in Archaeology, and is an M.Sc. student in Geographical Information Science (GIS) within the Department of Geography and Geology of Eastern Michigan University. Her current research interests include the utilization of ArcGIS Online as instructional technology in classrooms and the integration of Geographical Information Science in curricula.

Paul Hurst is an executive experienced in all facets of insurance and financial services. Having been an adjunct professor at several colleges, his passion lies in illuminating academic concepts and practical applications for his students. He is a part-time student in the Doctor of Business Administration (DBA) program at Aston University in Birmingham, UK.

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Lujza Jurkovičová is engaged in the research of corporate governance processes and institutions, various forms of businesses with special focus on small and medium-sized enterprises, ethics and law enforcement in society and business, commodity trading, innovation trends and quality assurance in all those areas, and application of modernizing approaches in business and education.

Mah Ngee Lee is an assistant professor in the Department of Psychology and Counselling, Faculty of Arts and Social Science, University of Tunku Abdul Rahman, Kampar, Malaysia. Her research interests include positive psychology, youth's

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A Stocktake of the big Five Personality Traits of UAE University Students

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Abstract: This research investigates the learning strategies of UAE University (UAEU) students. This research introduces a theoretical pedagogical framework made of the Big Five (BF) personality traits and attempts to explain their importance on learning using a survey research. A random sample of UAEU students resulted in having 179 responses. This research has theoretical as well professional contributions and contentions. At the theoretical level, we have seen how the BF personality traits have assisted in identifying the cognitive and the behavioral learning capabilities of UAEU students. The findings suggested that agreeableness, extraversion, openness, and conscientiousness respectively were the most important strategies adopted by UAEU students. Neuroticism scored the lowest mean average and hence, UAEU students negated being of a highly neurotic nature. This could be attributed to personal as well as to cultural reasons as highlighted in this research. Many of the enhancements could be achieved by designing programs aiming at enhancing student's learning capabilities and strategies. However, it is the cultural aspects that are more difficult to unveil and to address. Cultural issues require the cooperation and collaboration of the university and the community that surrounds learning in general and the family more specifically. Thus, the research outcomes would be of great importance to researchers, professionals and policymakers interested in addressing learning strategies of students. For example, professionals could capitalize on many of the suggestions in this research (i.e., enriching the lives of students in campus, endorse liking and trusting of others, etc.) to design and offer training programs and workshops aimed at students in universities and elsewhere. Policymakers could consider many of the suggestion made in this research to devise effective policies to enhance student learning strategies.

Keywords: learning strategies, big five personality traits, UAE university students, culture, professional and theoretical contributions

Using Online Feedback: Time Investment/Quality?

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Abstract: Lecturers spend a lot of time assessing and marking students' work. They give written feedback on submitted work but students rarely use that feedback for future learning. Research shows that feedback on students' writings can greatly help students to learn, provided that the feedback is given in a timely manner, is sufficiently informative for the students and there are opportunities for students to act on the feedback. Of late, technology provides marking software like crocodoc which allows online marking and feedback. The practical and pedagogical benefits these tools offer include, easier assignment handling and storage of feedback, and more varied ways in which feedback on written student work can be constructed. Whilst, the rich potential for more effectiveness of lecturer's marking practices is starting to emerge, it is recognised that the real impact is yet to be illustrated, and that further evidence is required. This paper presents the results of a case study which took place in an Education course taken by 210 first-year Bachelor of Education students. Two lecturers provided first year students with online feedback on a series of written essays using Crocodoc marking software and a rubric. The purpose of the case study was to investigate whether the shift to an online marking process would help lecturers to develop a more efficient workflow, and consequently save time. Lecturers' and students' perceptions regarding effectiveness and feedback quality were obtained via online questionnaires and interviews with the programme coordinators. Results show that the use of Crocodoc did save time and improved record keeping of work according to majority of the lecturers. Particularly text-annotated feedback that is directly linked to the work of the students, combined with personal summarizing remarks, was perceived as quality-enhancing by students as well as lecturers. Rubrics proved to help in consistency of marking. Students found online feedback clear and motivational, and an excellent tool when improving their texts. Recommendations are that the implementation of an online feedback in large courses would benefit the institution.

Keywords: online feedback, reduction of lecturer time, feedback quality, large classes, implementation of feedback tool

MyShoes: An Immersive Simulation of Dementia

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Abstract: This paper presents preliminary findings from an immersive simulation of dementia. The myShoes project aims to promote health care professionals' affective empathy for people with dementia through exposure to an embodied experience. Simulation provides a safe and feasible means of exposing students to defined situations. However, immersive technologies go a step further by providing an embodied experience through which students can feel what it is like to be on the receiving end of care; in the patient's shoes. Simulated activities can trigger emotions, such as confusion and frustration caused by the inability to complete simple tasks, process sensory information or do certain tasks repeatedly. Coupling age related visual and auditory overlay filters with misdirection, misperception, object switching and sleight of hand, along with other techniques, can offer an experience not easily accomplished through standard role play. The project involved the development, testing and piloting of a prototype simulation using an Oculus Rift virtual reality headset. Three learning technologists worked closely with a specialist team consisting of a dementia care expert, a clinical psychologist, a mental health nurse, a physiotherapist and an educational researcher to develop an authentic experience using popular game development tools, including Unity, Blender and 3D assets. The 'think aloud technique' was used to gain feedback from a multi-professional cohort of student health and social care professionals during the user testing and pilot phases of the project. Pre and post-simulation questionnaires were administered to establish personality/emotional resilience and responses to the activities. Findings suggest that the project has been successful in simulating a range of aspects of dementia with which students can identify and its applicability in and beyond pre-registration training is being explored.

Keywords: Oculus Rift, virtual reality, simulation, dementia, experiential learning, embodiment

Building Community in Flipped Classrooms: A Narrative Exploration of Digital Moments in Online Learning

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Abstract: Online learning and flipped classroom models provide pedagogical challenges to instructors in developing a sense of community within digital learning environments. Although technology has made learning increasingly accessible, educators often struggle to find new and innovative teaching strategies to develop and sustain these flipped and blended digital communities. Flipped classes refer to providing students with work to do prior to the class session in order to familiarize them with the content, and then they are prepared to do collaborative work during class time. Following this preparation, the face to face classes enable students to work collectively to analyse and synthesize their understanding of the content. The development of meaningful collaborative learning environments in flipped, asynchronous and blended classes provides unique pedagogical challenges. Further to this, the term "online learning" has increasingly divergent interpretations, and may include MOOCs, synchronous, asynchronous and many other modalities. With the emphasis on Personalized Learning Environments, educators are challenged to create digital pedagogy that allows for individualized learning, while facing the very real possibility of isolation and alienation from a distance learning community. This paper is a qualitative analysis of the development of these flipped collaborative learning environments in four undergraduate courses. The courses are delivered using a blended model of three hours flipped video podcasts and one hour synchronous Adobe Connect sessions. Adobe Connect is a video web-based tool where students have virtual classes using webcams in synchronous real time tutorial sessions. This paper chronicles how students from a variety of backgrounds developed meaningful learning relationships with one another. Based on principles of problem-based learning, students were challenged to build professional and personal connections with colleagues using predominantly a flipped, asynchronous classroom. Flipped classroom models provide accommodation for anywhere, anytime learning, and also can provide a greater selection of high quality courses, as well as the emergence of more engaging learning management applications. This qualitative, narrative inquiry clearly demonstrates the powerful use of "Digital Moments" to inspire creativity, empowerment and a sense of community in digital learning environments.

Keywords: flipped classroom, online learning communities, student engagement

The Effects of *Wiley PLUS* Web-Based Homework System on Student Performance in the Chemical Engineering Extended Curriculum Program: Introductory Physics Course

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Abstract: The importance of providing students with feedback on their learning is well documented. However, providing feedback to individual students is often impossible and time consuming. To address the need for a more efficient and effective approach to giving individualized feedback to students, a *Wiley PLUS* web-based homework (WBH) system that provides automated grading to individual students was piloted in a physics class for this study. Thus, this paper presents results on the effects of the use of *Wiley PLUS* web-based automated grading homework system in a first year introductory Engineering Physics course. The study investigated how the *Wiley PLUS* web-based homework system impacted on the students' paper based tutorial mock test, mid-term-test and Final Integrated Summative Assessment (FISA) performance. The study was informed by *Laurilland's* educational media conversational framework for teaching and learning supporting the 'interactive activity' learning process using Web-based homework as an adaptive medium. Both quantitative and qualitative methods of collecting data were used in this study. A comparison between students' performance on the *Wiley PLUS* online web-based homework, paper based written tutorial mock test, mid-term test and FISA was done to evaluate if there was a correlation in students' performances. Additionally, during the final class of the semester, Chemical Engineering Extended Curriculum Program students who enrolled for the introductory Physics course responded to a survey and participated in focus group interviews to gauge their perceptions and experiences on the use of the *Wiley PLUS* web-based system. Quantitative data was analysed using descriptive statistics and inferential statistics, while qualitative data was analysed using an inductive strategy. Results indicated that the *Wiley PLUS* WBH system enhanced students' learning and collaboration among learners. There was a strong positive correlation between students' WBH marks and marks students' obtained in the tutorial mock test, mid-term test and the FISA.

Keywords: automated grading, descriptive statistics, online assessment, inferential statistics, web-based homework, *Wiley PLUS*

An Artificial Tutor for Teaching Portuguese Using the Method of João de Deus

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Abstract: Over the past few years we have been witnessing to an unprecedented integration of software applications in various domains. From simple applications in retail systems to highly sophisticated products installed on personal devices, we recognize the usefulness of these products in the daily lives of people, giving them support into their most mundane activities or providing simple means of entertainment and fun in their spare time. Similarly, numerous software products also invaded the education area, being so many and so diversified that fulfil almost the needs of a student. In a slightly more timid way, another type of software products has been appearing sporadically in some specific areas. In this strand, we included artificial tutors, which are very sophisticated programs that have the ability to behave like a conventional teacher. Other initiatives have included also artificial tutors technology in teaching activities, covering a very diverse range of degrees and levels of education. Younger students in preschool age were not forgotten in cases like these. Today, they can already select specific software products to help them in their education, assisting themselves studying or helping them in some particular topic. In this paper, we present an artificial tutor especially designed and developed for helping teaching the Portuguese language to children aged 4 to 5 years. Our basic goal was to provide to these very special students an intuitive way to learn to read and write Portuguese, following the method of 'João de Deus', through the use of a sophisticated computational tool. The tool intends to provide the most basic learning materials, as well the necessary knowledge and expertize that these students need to complement the education they receive when studying Portuguese, during a regular learning session in the school.

Keywords: e-learning systems, artificial tutors, software agents, mobile platforms, Portuguese teaching tools, the method of 'João de Deus', android systems

21st Century Learning – Community of Practice for Students in Higher Education

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Abstract: The sustainability of a new economy depends, among other factors, on the sharing of tacit knowledge in addition to creating new knowledge. This implies the existence of special relationships among people. Such relationships exist in communities of practice (CoPs) which as knowledge centers have started gaining ground over the last two decades. Since CoPs were conceived by Wenger (1998) they have evolved into essentially what could be termed, 'special schools', where voluntary participation aims at sharing and creating knowledge. This paper proposes a community of practice (CoP) as an alternative learning model to create tacit knowledge in addition to explicit knowledge. It focuses on how student learning in CoPs can be stimulated. It differs partially from existing praxis of CoPs in that its awareness is created, and students are educated on how to form CoPs, how they operate, and how to use them to their advantage. They, in actual fact, are not created by the students, but guided, in a voluntary manner, towards the creation of, and participation in, communities of practice. Student learning takes place through 'Edulink'; a web-based portal. This is the first phase of a project where it is accepted that if the 'ingredients', as suggested by Wenger (1998) and McDermott (1999), are absent, CoPs cannot exist, or cannot be classified as CoPs. The results were very encouraging, as it was established that most of the students were in favour of forming their own CoPs. The second phase of the research will investigate the effectiveness of student communities of practice in an online environment.

Keywords: communities of practice, tacit knowledge, graduation rates, learning, university, education, online learning, knowledge

An Additional Content Development Methodology in an Adaptive Agent Based e-Learning Environment

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Abstract: Emerging technologies of communication and information influence the society. Media based educational systems are becoming more popular today and vast student population rely on this for learning. In the technologically emerging education, it is necessary to have an e-learning system which can understand the learner's preferences and make attempts to deliver content accordingly. In this paper a model of an intelligent agent based university information system is presented and particularly the Adaptive e-Learning System (AeLS) which is an essential part of it, is presented in detail. It is an integrated intelligent e-learning environment in a provision of multi-agent infrastructure, agent based e-learning concepts, adaptive interaction and adaptive content/course delivery. A methodology for additional content development in an adaptive agent based e-learning environment is also described in this paper. This methodology will help faculties and universities successfully to use additional contents as a supplement to regular learning materials. During one semester, in the course Object-Oriented and Visual Programming at the Faculty of Natural Sciences and Mathematics, Ss. Cyril and Methodius University, Skopje, Republic of Macedonia, the students were offered additional digital contents (video materials) in which through examples the material was elaborated which is necessary to finish the homework assignments and successfully pass the mid-term exams. In a research conducted, we showed that additional contents can be created and can be supplied to the students at a low-cost. We have proved that using additional low-cost digital content increases the students' overall knowledge gained in a given course, which on the other hand increases and improves level of experience that the student has at the end. The results of our research will encourage teaching staff to use additional contents in their courses. This will encourage faculties and universities to use additional contents as a supplement to regular learning materials.

Keywords: integrated university information system, intelligent agents, adaptive e-learning system, low-budget additional content

Synthesizing Technology Adoption and Learners' Approaches Towards Active Learning in Higher Education

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Abstract: In understanding how active and blended learning approaches with learning technologies engagement in undergraduate education, current research models tend to undermine the effect of learners' variations, particularly regarding their styles and approaches to learning, on intention and use of learning technologies. This study contributes to further examine a working model for learning outcomes in higher education with the Unified Theory of Acceptance and Use of Technology (UTAUT) on SRS adoption attitude, and the Study Process Questionnaire (SPQ) on students' approach to learning. Adopting a cross-section observational design, the current study featured an online survey incorporating items UTAUT and SPQ. The survey was administered to 1627 undergraduate students at a large comprehensive university in Hong Kong. Relationships between SRS adoption attitude, learning approaches, and learning outcomes in higher-order thinking & learning and collaborative learning were analyzed with a structural equation model (SEM). A total of 3 latent factors, including four factors from UTAUT in Performance Expectancy, Effort Expectancy, and Deep Learning Approach from the SPQ, were identified in the structural model on students' intention to adopt SRS in classes. Current results suggested that a model of active learning outcomes comprising both UTAUT constructs and deep learning approach. Model presented in the present study supported the UTAUT in predicting both behavioral intention and in adopting SRS in large classes of undergraduate education. Specifically, positive attitudes towards SRS use measured with the UTAUT, via a learning approach towards deep learning, accounted for variation on high-impact learning including higher-order thinking and collaborative learning. Results demonstrated that the process of technology adoption should be conceptualized in conjunction with learners' diversity for explaining variation in adoption of technologies in the higher education context.

Keywords: technology adoption, learning approaches, students response system (SRS), higher education

Understanding the Adoption of a Student Response System From an Integrated Approach

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Abstract: The purpose of this study is to explore teacher usage and student attitude on student response system with emphasis on integration of information and communication technology (ICT) with pedagogy and subject content. Most research explains the intentions to adopt new information technologies in higher education settings with the vocabulary of technology acceptance, such as ease of use and usefulness of an innovation (Davis, 1989; Marchewka and Kostiwa, 2014; Lin, Lu and Liu, 2013), but not many employ an integrated approach incorporating other important parameters of education. This study investigates the relationships among technological-pedagogical-content knowledge (TPACK) (Mishra & Koehler, 2006; Koehler & Mishra, 2009), teacher usage and student attitude on SRS. TPACK, a term first coined by Mishra and Koehler (2006), is a framework underscoring the interaction of technology, pedagogy and content knowledge in education. Previous study demonstrated there is a significant difference between technological-pedagogical knowledge competencies and usage level of ICT (Yurdakul, 2011). Adopting the TPACK framework, the current study determines the parameters of technological-pedagogical-content knowledge that contribute to the successful integration of SRS in tertiary education. The participants of the current study consist of 18 teachers and 553 students from various disciplines at the Hong Kong Polytechnic University. The 34 items on competencies of technological-pedagogical-content knowledge were adapted from the TPACK survey developed by Schmidt et al. (2009). Teacher usage on SRS were obtained from the session files of SRS implementation, whereas student behavioral intention on using SRS were collected and summarized from the self-report student survey launched on the Learning Management System (LMS). Pearson's correlation analysis reveals that technological knowledge was positively correlated with the actual usage of SRS. Teachers who were more competent in technology adopted SRS more frequently in their classes. Furthermore, findings supported the hypothesis on the associations among technological-pedagogical-content knowledge and student attitude of using SRS. Results of the independent sample t-test suggested that students in classes of teachers with high levels of technological-pedagogical-content knowledge would like to use SRS more. Findings in the current study suggested that to promote SRS in university settings, besides enhancing technological knowledge of teachers, various aspects of technological-pedagogical-content

knowledge need to be determined. The competencies of integrating technology, pedagogy and subject contents are all important components for the successful implementation of SRS in university.

Keywords: TPACK, student response system, clickers, Hong Kong, TAM, technology in education

Towards a Novel Methodology for Adopting Blended Collaborative Learning Solutions

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Abstract: This paper focuses on a subset of a wider international project between the University of Hertfordshire in the United Kingdom and Universidad Autonoma de Baja California (UABC) in Mexico. The focus of the project is on the practice of blended learning using *the dialogic shamrock* framework which combines the concepts of learner centric, socio cultural and dialogic perspectives on collaborative learning and technology, in meeting the needs of learners in the 21st Century. In this context blended learning is defined as the use of technology to supplement campus based learning with a view to enhancing the learning and teaching experience. The methodologies implemented by the facilitator during a series of workshops to enable teachers to lead and embed change for the successful adoption of blended learning solutions in collaborative learning is presented with a discussion of the effectiveness of these methodologies. Teachers were invited to attend a presentation and participate in one of a series of workshops. Participants at the workshop were from different disciplines from across UABC and teachers from local institutions with experience of a range of technological and pedagogical practices and school cultures. Examples of blended learning solutions using the *dialogic shamrock* framework were presented to the teachers. They were invited to work in interdisciplinary groups during the workshop and to design a blended learning solution to support collaborative learning for implementation within their own practice. Furthermore, teachers were encouraged to engage in a blended learning *knowledge exchange* activity where participants were invited to highlight the knowledge and support needed and offer knowledge and support to colleagues. The effectiveness of the workshop methodologies is supported by outcomes from the workshops in the form of examples of blended learning solu-

tions designed by the teachers. Furthermore photographs and other artefact produced during the workshops present visual confirmation of the blended learning design processes adopted by the teachers. Moreover, there are some interesting findings from the blended learning knowledge exchange activity which provides valuable insights into the teachers existing knowledge and skills. Also the necessary training for teachers wanting to embed blended learning solutions into their practice is presented, as well as the technologies that they use and the technological and pedagogical support necessary to implement blended learning solutions with a view to, enhancing the learning and teaching experience.

Keywords: blended learning, collaborative learning, pedagogy, change, technology enhanced learning, dialogic shamrock

Empowering Teachers in TVET Colleges-Foregrounding the Pedagogy of ICTs by Means of a Professional Excellence Programme

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Abstract: This paper reports on the evaluative study of a professional development initiative which targeted information, communication and technology (ICT) lecturers in technology and vocational education and technology (TVET) Colleges in a university in South Africa. The study revolves around the main argument that, in such a developmental context as the South African educational environment, curriculum innovations that seek to bridge the gap between a university and the college sector become the developmental imperative. The integration of ICT in teaching and learning presents a unique opportunity for such innovation whereby ICT lecturers should be empowered to have the requisite skills, appropriate knowledge and relevant attributes in giving the pedagogic value of ICT and thus frame the use of ICTs in the critical and humanistic perspective instead of the technical and reductionist orientations. To advance the argument, the paper draws from the professional practice theories to prime transformative practices and reflexivity in the development of ICT. A partnership programme was initiated between the Centre for Learning and Teaching Development and the School of Computing Science to deliver the knowledge hub and at least 9 trained and supported TVET ICT Lecturers in 7 Colleges in two underdeveloped provinces in South Africa. Trained TVET ICT lecturers had to be able to demonstrate that they ac-

quired the eSkills and the teaching and learning skills to deliver the NCV: ICT Course successfully, and that they would have fostered eSkills and ICT knowledge in a range of students who can also show demonstrable evidence of improvement through improved levels of attainment after assessment. Three years after project initiation, this paper shares the results of the project with a specific reference to the pedagogy of the ICT. Research data was collected from documented sources, focus group interviews and indirect observations. Research findings indicate that, despite the limited culture of ICT according to the study context, the initiative made a very positive impact in priming the pedagogy of ICTs. Some pertinent project sustainability issues, which demand the adoption of a more empowering and action oriented approach in ICT empowering strategies, for example the importance of ICT practice with theory, are discussed in the paper. The value of the study is in terms of how a university can achieve social responsiveness in general and how the integration of pedagogic practices, in particular, can help advance the adoption of ICT in the emerging and developmental context.

Keywords: transformative practice, reflexivity, pedagogy, curriculum innovations

Using Conceptual Understanding to Develop Communities of Instructional Practice Through Boundary Objects' Formation

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Abstract: Institutions of Higher Education explore practices and processes that promote professional development. Hence, the current focus is on applying a continuing process of assessment, analysis, action and review. This paper addresses the use of Hellenic Open University Tutors' conceptual understanding on their subject domain as an organisational modality to reveal problems in educational material used and as a means of constructing Communities of Instructional Practice. Learning Design techniques have been used to construct the implementation framework of the research scheme: under design epistemology the work of recreating knowledge-work practices to better serve systemic functions, becomes a new notion of basic research. HOU Tutors have been interviewed and contributed in a participatory design process, producing new structures and artefacts in their subject domain: semantic organisation maps as blue prints of analytical domain ontologies. These artefacts have been used as boundary objects so as to enable

the creation of knowledge –work economy and play the role of inquiry specification developing communication between SMEs (Subject Matter Experts), domains and epistemologies. The work is still in progress.

Keywords: learning design, boundary objects, semantic organisation tools, concept maps, communities of practice, open and distance learning

Students' Digital Story Reflections and its Implications for Higher Education Pedagogy

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Abstract: Over the last number of years South Africa has embarked on a transformative process that aims at widening access to higher education. While this is a commendable move, it is a known fact that the mere provision of access to higher education is no guarantee to success. It is also common knowledge that the use of technology in teaching and learning in higher education institutions is no longer a debate but has become a fundamental principle. In an attempt to support students and to enhance learning, in 2004 e-learning was introduced as one of the university's teaching and learning strategies. The latter has been applied in various learning programmes across the institution. As part of blended learning, digital storytelling was piloted as a teaching and learning tool in some of the Extended Curricular Programmes (ECP) with the view to address gaps in students' academic skills. Simply put, the term blended learning refers to the fusion of face-to-face teaching and learning with online content and other media while digital storytelling, an e-learning tool, is a modern expression of the ancient art of storytelling that requires the use of digital multimedia in narrating a particular story. First year students taking the Lifestyle Management course were exposed to digital storytelling and were asked to create their own digital stories. Evaluation was subsequently conducted to assess the effectiveness of this technique. The objective of this paper is three-fold:1) to share students' experiences of using digital storytelling, 2) to demonstrate how the practice can be utilized to advance learning in higher education, 3) to reflect on the effectiveness of digital storytelling as a teaching and learning tool. The application of digital storytelling as a teaching and learning tool revealed that although initially challenging and time consuming, digital storytelling can be an exciting and effective teaching and learning tool. Students felt that it was an exciting and empowering tool. Although some

challenges were experienced, it can be concluded that the practice is highly effective for academics in catering for different learning styles when teaching, and it advances a multitude of digital literacies, a prerequisite for graduates in the 21st century.

Keywords: blended learning, digital storytelling, higher education, digital natives, digital immigrants, teaching and learning, reflective practice

Excellence in e-Learning Module Design?

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Abstract: The topic of this paper and research question addressed concerns the author's experiences in designing and teaching an entry-level Information and Communication Technology for Development Open Education e-Learning module. The paper introduces the module design, which included additional learner support instruments, such as mixed media, e-tutors and extended use of the functions on the institutional virtual learning en5vironment, *my*UNISA. The literature review section presents aspects relating to the pedagogy adopted by academic staff and e-Learning teachers in this module, as well as how the module design process followed the team approach, including criteria in terms of the planning process, online development, curriculum design and applicable quality assurance. It also documents concepts related to what was done to ensure that the module was creative, relevant and of high impact for e-Learners. This included cutting-edge content in terms of e.g. open educational resources in the form of e-books and simulations, which was used in conjunction with innovative learning technologies. The following section describes how the empirical research was undertaken and the research method regarding the research design used. It also outlines the especially quantitative data that had been collected in a learner module evaluation, which included mechanisms for feedback and improvement. A discussion of the results starts with demographic details in terms of the e-Learner characteristics for the sample of 1571 participants from fifteen countries. The author then provides a look at learners' evaluation of e.g. the use of e-tutors, extended use of *my*UNISA e-Learning technologies, and to what extent the latter had been used as additional learner support instruments. Details are provided on, for example, how learners communicated with their e-Learning tutors, the extent to which the textbook and/or prescribed material for the module was relevant, and what learners' overall experience of the module as a whole had been like. This paper discusses issues and lessons learned from designing and teaching an e-

Learning module to almost 80,000 learners to date, which had been prepared in a learner-friendly style, used a range of engagement tools and thus created a rich e-Learning environment.

Keywords: e-Learning, excellence, module design

e-Learning Management System Technologies for Teaching Programming at a Distance

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Abstract: The performance outcomes of first-year programming learners across the world are of great concern, whether they are being taught in a face-to-face context or via distance education. In the face-to-face context, it is, however, somewhat easier to teach and support learners than it is in a distance education context. The face-to-face teacher can more easily gauge the level of understanding and participation of learners and implement interventions to address issues, which may arise. With the inroads that Web 2.0 and Web 3.0 technologies are making, the world of e-learning and teaching are rapidly expanding, bringing about technologies, which allows for similar interactions between e-learning teachers and their learners, as those available to their face-to-face counterparts. The e-Learning Management System (e-LMS) at this institution is deployed in a SAKAI integrated learning and educational environment. The topic of the study that this paper reports on involves an investigation into research questions around the e-learning technologies implemented in teaching a first-year programming subject, together with an evaluation of how these had been adopted for e-learning by teachers to support whole communities of learners, and individuals in their quest for anytime/anywhere e-learning in an Open Education context. An introduction is presented on aspects relating to what the pedagogy underlying this subject was, and how the subject was adapted for a blended e-learning approach. The literature review investigates issues in e-learning research and concepts related to e-LMS technologies, including announcements, blogs, self-assessments and online meetings. It also explains how discussion forums are used in terms of asynchronous interaction, and the advanced use of multimedia regarding additional resources. A section follows describing how the empirical research was undertaken, the research method in terms of the design used, as well as the mainly quantitative data, enabled by information that had been col-

lected in an online, computer aided learner assessment. A discussion of the findings starts with some demographic details in terms of the e-learner characteristics for the sample of 107 respondents from three different countries. We also provide an evaluation of the usability of e-learning technologies found on the e-LMS, and to what extent the e-LMS had been used to support this subject.

Keywords: e-Learning management system technologies, programming, distance education

e-Learners, Teachers and Managers at e-Schools in South Africa

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Abstract: The topic of the study that this paper reports on is an investigation into research questions around e-Learning in schools in a specific district of South Africa (SA). The study is located within a relevant conceptual framework that clarifies issues around Information and Communication Technology (ICT), what it means to be ICT capable, e-Learning and e-schools. The study will draw on the latest, most relevant research results available, in a literature review covering applicable aspects related to especially SA contexts; pertinent perspectives from further afield will, however, also be considered. The literature study will firstly investigate e-schools in terms of implementation progress made with regard to achieving the policy goal of the White Paper on e-Learning in SA. The policy goal, together with strategic objectives to structure the implementation thereof will be presented, before challenges with regard to the implementation of the policy goal will be explored. Main arguments in terms of teacher support through human resource development in using e-Learning at these schools will also be considered. This is followed by a section that describes how the empirical research was undertaken: the general research methodology that was used is described, including consideration of issues related to reliability and validity for quantitative designs, and attention to the importance of dependability and interpretation issues for the qualitative part of the research design. A discussion of the results starts with some demographic details in terms of the characteristics for the sample of 43 participants from the applicable district. The author then specifically provides details on the extent to which sample schools are characterised as institutions that exhibit: e-Learner characteristics with regard to utilising ICTs to enhance so-

cial and collaborative e-Learning; the adoption of e-Learning by qualified and competent teachers who use ICTs to enhance their teaching; and qualified and competent managers using ICTs for the planning, management and administration of integrated e-Learning in their educational environments. The value of the results provided in this research study is illustrated in terms of filling gaps identified in literature to make a contribution to academic debate relevant to the themes of this conference. These results could therefore be of use to e-Learning teachers and managers at e-schools across SA, the rest of the continent and even further afield. Finally, a concise summary of the results concludes the paper.

Keywords: e-Learning, e-Schools, ICT capable

Flipped or Blended? What's the Difference and Does it Make a Difference to Learning in HE?

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Abstract: This paper discusses a critical evaluation of recent literature on the development and application of the "flipped classroom", defined as offering pre-class materials online and using classroom time for interactive, constructivist learning, looking at distinctions between this and "blended learning", the definition of which is diverse but which here is taken to mean any combination of online and face to face learning. The main focus is not to explore blended learning in detail, but to consider flipped learning as a subset of blended learning. The context in which this is explored is undergraduate Higher Education. Questions this research explored included: What kind of evidence does the literature offer for the effectiveness of the flipped classroom model? What range of versions is currently found in flipped classroom case studies? What learning/educational theories underpin the flipped classroom approach? What does the flipped classroom model offer to university teachers and students which cannot be achieved in other blended formats?

Keywords: flipped learning, blended learning, constructivist learning, problem based learning

Investigation Into Students' Perceptions Towards WiSeUp an e-Learning System at Walter Sisulu University

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Abstract: The success of E-learning in any institution depends on how well Information and Communication Technologies (ICTs) are utilized and the standard of quality design and content of E-learning meet the needs of students. The benefits and challenges of E-learning have been discussed in a variety of studies globally, hence understanding students' attitudes and perceptions towards E-learning is a critical issue for improving the value and use of E-learning systems in tertiary education. All registered courses at Walter Sisulu University (WSU) have been uploaded on the WiSeUp which is the Learning Management System formerly known as Blackboard. Lecturers and students have been trained in using the system, however most of them are not fully utilizing the system hence refresher courses, one-on-one consultations and grassroots events have been rendered to staff to encourage maximum participation. Faculty of Science, Engineering and Technology (FSET) in Butterworth was a pilot group which has embarked on training workshops to equip staff and students on E-learning and has be used to conduct this research. The main challenge is to improve the current pass rates at WSU; hence it is the researcher's interest to investigate students' attitudes and perceptions of using WiSeUp system at WSU in Butterworth site. This is an action research and according to our monitoring tool Blackboard Analytical Tool (BBAT), there are about 586 active courses being utilized by students for the academic purposes. For data collection questionnaires were distributed to all active 1st year students registered for the pilot whereby their perceptions, experiences, challenges and benefits of the system were identified. It is envisaged that the use of the Learning Management System could improve the standard of students' pass rate; hence understanding their perceptions towards using E-learning is significant for improving E-learning usage at WSU. However I recommend that all students be trained on using WiSeUp at the beginning of the year to ensure and encourage students' participation.

Keywords: e-learning, ICT, students, perceptions, WiSeUp and BBAT

The use of Facebook in Preparing Graduates for the World of Work

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Abstract: Since the inception of democratic government in South Africa in 1994, Higher Education institutions in South Africa have seen a steady increase in student numbers. While the increase in student enrollment is good in terms of increasing access to education, the sector is faced with poor student success rates. Furthermore, employers claim that most graduates emanating from Higher Education institutions in South Africa are functionally illiterate and lack most skills required in the 21st century workplace. Informed by the concept of employability and the skills required in the 21 Century workplace, this study investigated how Facebook was being used at a University of Technology, South Africa, to prepare graduates for the world of work. The focus of the paper is on how the Department of Biodiversity and Conservation Management at the Cape Peninsula University of Technology utilized Facebook to prepare students for the world of work. We employed a qualitative research approach to understand and investigate the issue under study. Data were gathered using an in-depth interview and document analysis. An in-depth interview was carried out with the lecturer who used Facebook in his/her teaching and learning of the students and students Facebook posts were analysed. The interview was tape recorded following consent from the participant, and the recorded interview was transcribed verbatim. Data were analysed using inductive strategy. Findings of the study show that the use of Facebook facilitated the learning of the subject matter through lecturer and students interactions, student-content interaction, and student-student support, leading to deep understanding of the subject matter. Deep understanding of the subject matter is vital gaining employment, but not sufficient to guarantee one a job. Hence, Facebook also enabled students to acquire the skill of working in teams or as a community through the collaboration supported by the tool. Furthermore, Facebook facilitated acquisition of communications skills, taking initiative and self-directed and problem solving skills: key skills needed in the 21st Century workplace. We hope that insights and ideas generated in this study will shed light on how Facebook can be used to prepare students for the world of work. The study will also contribute literature in this field which is largely under-researched.

Keywords: social media, higher education. learning and teaching, student engagement, employability, skills required in the 21 Century workplace, functionally illiterate, inductive strategy

E-Learning in Augmented Reality Utilizing iBeacon Technology

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Abstract: Development of electronic technologies shows a general tendency towards miniaturization manifested subsequently in mobility and ability to process larger amounts of information. It is mostly mobile technologies and devices interlinked by internet (internet of things), which contribute to an exponential growth of electronic information and its use. A similar trend is noticeable within in education with growing utilization of electronic forms. In that area we may discern further development of e-learning by means of mobile applications where new opportunities for dynamic presentation of study content and adaptation to the mobility of stakeholders of the educational process keep opening up. Multiple modern technologies and methods improving the flexibility of education have already been employed in e-learning. The use of augmented reality, enabling mobile access to information, belongs among the most advanced technologies in the area of e-learning, promising to shape its future. Extensive amount of information about objects surrounding us presents the main benefit of such technology. Information is obtained by means of adequate tools that are, due to mobile devices proliferating among both students and teachers, frequent enough. They include smart phones, tablets etc., possessing a kind of "intellect", i.e. they are capable of processing information and contain mobile internet connection. Communication by means of iBeacon low-energy Bluetooth transmitters distributed at various educational interest points belongs among those interesting technologies which facilitate augmented reality. In our research, we investigated and subsequently tested the possibility of spreading e-learning by its means, and assessed its potential to reach the target audience more effectively within the augmented reality. Our findings show that the character of distributed knowledge differs from the traditional e-learning in dynamic perception of information which is divided into particular interest points, using iBeacon devices. Another advantage is the flexible use of that technology while teaching outside, in a laboratory etc. In the proposed paper we developed, based on the results of our research, a model of an interesting e-learning study method describing the implementation of iBeacon technology. The use of the technology is proposed not only from the perspective of its implementation in suitable study courses but also involving the communication methods between lecturers and students. The proposed model is supported by a

description of a student sample group completing an e-learning course on Product and Quality by means of that new technology.

Keywords: e-learning, augmented reality, iBeacon technology, mobile technology

Students' Perspectives of the Effectiveness of Pedagogical use of Web 2.0 – A Mixed-Method Approach

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Abstract: In keeping with the growing trend of transforming global higher education, Malaysia placed emphasis on nurturing creativity and innovations among youth to equip them with new skills and knowledge to create a dynamic workforce to drive the country towards a high-income nation by the year 2020. The government expressed that all Institutions of Higher Learning (IHL) in the country should have their curricula conducted using blended learning which involves face-to-face learning and online means. The aim of the study was to assess the factors related to the effective pedagogical use of Web 2.0 among students from Universiti Tunku Abdul Rahman in Malaysia for teaching and learning. A preliminary study was conducted using mixed-method approach on 35 students in order to gain feedback toward the perception of using Web 2.0 in the Learning Management System (LMS) for teaching and learning. Quantitative results revealed that the main factor students perceived Web 2.0 was effective in teaching and learning was "convenient to use" while the second factor was "saves resources". There was no significant difference in gender in the five factors related to the effectiveness of Web 2.0 in education. Qualitative results revealed that the respondents were more likely to have active learning attitude by using Web 2.0. Themes such as students enjoyed using Web 2.0 for blogging, video conferencing, e-mailing, and social networking to communicate with the educators were uncovered. Implications drawn from this preliminary study was discussed.

Keywords: e-learning, online instruction, Web 2.0, higher education, Malaysia

The Move to Student-Centric Learning: Progress and Pitfalls

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Abstract: At ICEL 2014 in Valparaiso the authors presented a paper on the importance of developing metacognition in students, to support changes and developments in pedagogy and learning models. Following on from that paper, we now consider and present outcomes from three projects reflecting different stages of the learning continuum, with which we are engaged. Firstly, the Computing at Schools project in the UK has been running for over five years, and has been successful in gaining the support of the UK government for the introduction of Computer Science teaching in schools at both primary and secondary levels. Critical to the success of this project is a change in the pedagogic model adopted by the schools, moving from fairly standard instructivist models for teaching in the primary schools and in teaching coding and factual information to more constructivist approaches, using flip classrooms and other TEL (technology enhanced learning) tools and techniques to help pupils develop Computational Thinking skills. Within our own University, we have been working on a project called Greenwich Connect, which aims to provide our students with a comprehensive set of online services and facilities supporting all aspects of the student experience. As part of this project staff are encouraged to develop learning materials using TEL tools, and to adopt more constructivist and student-centric teaching approaches. Within the UK University context, we already have an excellent example of a strong constructivist, student centric teaching model in the PhD studentship. A PhD student is encouraged to investigate the body of knowledge, with appropriate advice and guidance from experienced and knowledgeable supervisors, and then to take control of their own learning process by identifying their research question, experimental model and analytical methodology. They then carry out and write up their research, with their supervisors now available as experts to be consulted at need, and produce an outcome, which, at the point of viva, proves them to be the current world expert in their field. The issues are in applying this model to large numbers of students at an earlier stage in their learning and the resourcing of the facilities required to support this. One potential approach to deal with the issues of resourcing a student-centric approach to online learning is being investigated in the dCCD-FLITE project, an EU funded project with 7 partners from 6 European countries. The project is developing learning materials on the subject of Entrepreneurship in the IT Industry, and aims to deliver these materials to students in

online courses that offer a constructivist, student-centric learning approach, with limited tutor resources and engagement. To achieve this, it allows students to self-select groups to work in, and then introduces two key learning frameworks to be used by the groups to organise and develop their learning - Concurrent Design Method, designed by NASA, and the Osterwalder Canvas.

Keywords: student-centric learning, computing at schools, MOOCs, concurrent design, Osterwalder Canvas

An Online Game-Based Learning System for STEM Knowledge and Role Models - the Masters of STEM Project

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Abstract: The Masters of STEM project seeks to excite young people about the positive impact of STEM (Science, Technology, Engineering & Mathematics) research and innovation, both throughout history and in the current day, and to introduce and reinforce positive role models from the STEM community. The purpose is to promote broader knowledge of STEM and the impact it has had on society, and to encourage more young people to undertake higher education and follow careers in STEM. The project already has partners in Europe, USA and Brazil, and continues to grow the partnership and funding base. At the core of the project is the development and deployment of an online game platform, supporting users playing short game scenarios developed by the project, and allowing them to develop their own scenarios utilising characters developed by the project to represent the role models we identify, the Masters of STEM. The game platform will support multi-lingual versioning, and role models will be identified and characterised for the scenarios at both global and local level. Rules and constraints will be applied at character level to ensure the scenarios developed by users are within acceptable limits of behaviour and activity. A number of types of scenarios will be developed, offering interest and engagement for users of all ages, from infant to adult, and this will permit the development of a user community generating their own content for the platform. The project will disseminate these outcomes widely throughout the world, particularly through the schools networks. To achieve this, websites will be developed by the project partners providing localised information on STEM activities, careers and opportunities in different regions. This will permit the development of region-specific linguistic and

cultural representation of information, and identification of role models, both real and media-generated. Information on these role models will feed through to the game platform, which will be linked to these websites to provide both general and region-specific scenarios. The project partners will also use online surveys to capture information on young peoples attitudes towards STEM, positive views on characters from the STEM community, and interest in games. Initial work on the games platform has already begun, based on the Unity games engine and existing work on the scenario-authoring tool from the Pandora+ platform. Contact has been established with a number of media groups to ascertain the potential to use media characters as STEM role models, e.g. Big Bang Theory & CSI characters, and, where possible, real individuals will be approached to give their permission for their images and stories to be used in the system. Historical characters should not require such permissions, but the project will ensure that all characters are treated with respect, and the system will not permit inappropriate scenarios to be generated. User evaluation of the system will be sought continuously through feedback surveys, frequency of use measures, and user ratings. Impact measures will be established by agreement with the wider community.

Keywords: game based learning, STEM role models, online scenario authoring, automated game generation, STEM student recruitment

CMtrain – Remote training in Coordinate Metrology

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Abstract: The authors will share new developments on an educational and training concept with a blended learning approach that takes account of the economical, technical and pedagogical vectors and which includes certification. The concept has been developed for coordinate metrology as a discipline with an important contribution to innovation related to modern manufacturing and its impact in national's economies. In this implementation, a combination of face-to-face training and practical experience is used as well as online learning for theory transfer using Internet's possibilities. This approach can be used to support certificated education and lifelong learning, largely independent on the learner´s geographical location and the infrastructures available. This work has been developed according to the case study approach methodology and grounded on the eLearning tuto-

rial model designed for “CMTrain Training for Coordinate Metrology”. This is a certified education, with three levels that are oriented to several personal profiles such as manufacturing companies staff, research and development professionals as well as university students at different levels, focused on experiencing engineering and promoting a formal self-learning in a flexible way, using different media channels to achieve the contents and interact with the tutors. The paper will be grounded on the collaboration’s experience of the Interstate University of Applied Sciences of Technology (NTB) and the Technological Centre for the Metal Working Industry (CATIM). Based on this experience as well on the feedback from participants, the further procedure for development of the training concept is discussed. New developments of the learning concept are pointed out with innovative ideas such as the use of new media channels for the distribution of learning and the use of new ways to present the learning material in a user-centred way. To do so, the needs of the participants using the approach of mobile learning were discussed. First results and feedback of a new way to perform workshops on the basis of remote access to devices are being presented.

Keywords: blended learning, coordinate measurement training, elearning, vocational training, remote training

Learning Programming Using Learning Objects

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Abstract: This paper summarizes the experience gathered in Technical University of Civil Engineering from European and trans-national e-Learning projects in the past couple of years. The main focus is on the development of learning objects (LO) in learning programming field. This paper present the implementation of the e-Learning tools to support the improvement of programming skills during academic education or/and in the additional education. The LOs are interactive visualizations of program code examples or programming tasks. The idea of the program visualization LOs is debugger like step-by-step program execution in both forward and backward directions. The program code is highlighted in each important step of the program execution and the run of the execution in code is also visualized by arrows when necessary. In each step of the program execution console is visible as well as the memory area. There are also areas for the conditions and for the short explanations of the current step. The memory part is the only one where the layout can be changed according to the subject as learning goal. These changes appear for example in case of arrays when the structure of the

array is visualized The LOs have been developed to help students to understand programming structures more easily, having the capacity and appropriate programming skills needed for their optimal integration according to the requirements of the Romanian and European curricula. A LO can cover any specific programming problem in any programming language. LO can also cover the problem-solving logic at the algorithmic level. In the end is presented a case of study organized on the same course in two years: In the first year students do not have the program visualization LOs as learning material available and in the second year they have the program visualization LOs available. The students study exactly the same course. The effects of the program visualization LOs on the results are then analyzed by the final course points, grades and activity of the students and also with a survey about all learning materials available held at the end of the course. Interactive LOs is an idea that many teachers welcome in their search for new methods and support for novice programming students. It is quite clear that students believe that LOs can be useful for them as novice programming students. But it is also sure that more introductions and better integration of LOs is needed to encourage students to use them more frequently as a normal part of their programming study.

Keywords: computer science education, learning programming, learning objects, learning theories, reusability

Inverted Classroom: From Experimental Usage to Curricular Anchorage

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Abstract: The article describes the evolutionary development of an inverted classroom concept for a higher education course in a computer science curriculum at a German university. By the increased use of new media, a key requirement for the development of university teaching is to improve the service offer for the students with regard to the teaching quality, possibility of individualization and flexibility of studying. Especially for large courses (i.e. more than 100 students) where direct communication and interaction is very limited, the new media can provide advantages. We report here on a *Inverted Classroom* (ICM) course concept, which combines various electronically supported teaching modules (video podcast, live coaching, online curriculum, internship, audience response systems, final exami-

nation) to provide as much individual support for students as possible and to encourage them to a continuous learning process. After a stepwise refinement over several semesters the ICM concept was anchored within the curriculum after thorough qualitative evaluation. Video lectures replaces the classical frontal lecture and are now an integral part of the course. Other electronic media support learners within their learning process. We share our several years of experience in the development of the concept, which was evaluated in a qualitative evaluation. We try to reflect added values and dangers of the concept in the context of other course and learning settings.

Keywords: inverted classroom, flipped classroom, implementation course concept

Visualisation and Gamification of e-Learning: Attitudes Among Course Participants

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Abstract: Courses in virtual learning environments can leave recently enrolled participants in a state of loneliness (Brown, 1996), confusion (Hara & Kling, 2000) and boredom (Huang, 2002). What course content is essential in the course, where can more information be found and which assignments are mandatory? Research has stated that learner control (Chou & Liu, 2005) and motivation (Keller & Suzuki, 2004) are crucial issues for successful online education. This paper presents and discusses visualisation as a channel to improve learner control, and gamification as a way to increase study motivation in virtual learning environments. Data has been collected by evaluation questionnaires and group discussions in two courses partly given in the Moodle virtual learning environment. One course is on Game based learning for Bachelor's programmes, the other is a course on e-learning for university teachers. Both the courses have used progress bars to visualise students' study paths and digital badges for gamification. Results have also been discussed with teachers and pedagogues at a department for computer and systems sciences. Findings indicate that visualisation by progress bars is a good way to improve course participants' overview in online environments with rich and multifaceted content. To what degree the visualisation facilitates the course completion is hard to estimate, and like students have different learning styles, they also seem to have different visualisation needs. Gamification by digital badges seems to have various motivational impacts in different study

groups and in traditional university programmes the traditional grades seem to be the main carrots.

Keywords: visualisation, gamification, virtual learning environments, e-learning, blended learning

Transfer of Knowledge and Skills From Computer Gaming to Non-Digital Real World Contexts

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Abstract: The "N-generation" or the "digital natives" have now entered university programmes and their extensive use of computers and digital games is a fact (Spires 2008). Digital games and gamification are also proliferating in private, professional as well as in educational domains (Reinhardt & Sykes 2014). Phenomena as play, narration and gamification are classified as transmedial, i.e. they exist in digital as well as non-digital contexts (Dymek, 2010), but there is no consensus on learning transfer from digital gaming to real world contexts. While some researchers claim a strong learning potential (Gee, 2003; Reinhardt & Sykes, 2014), others have more sceptical standpoints (Hays 2005; Linderoth 2012). Would the opinions on learning transfer be different if the question is asked to the digital natives themselves? The aim of this paper is to analyse and discuss what students in the digital natives' generation might have learnt in gaming and if acquired skills and knowledge can be transferred to other contexts. A content analysis has been carried out on student essays submitted and discussed in a course on Games-based learning. Students' experiences from gaming and learning transfer have also been discussed in course examination seminars. Findings show that the digital natives definitely have strong gaming habits, and a majority of the students perceived that they had learnt meaningful things from gaming. Regarding knowledge and skill transfer, variations were noted among the various types of games. Furthermore, there are several examples from both educational games and commercial-off-the-shelf games where acquired skills and knowledge can be seen as transmedial and of use in non-digital contexts.

Keywords: game-based learning, GBL, knowledge transfer, digital games, learning by gaming

An Educational Game for Mobile Learning – Some Essential Design Factors

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Abstract: Programming is an important core subject in most Computer science programmes at university level but several studies show that students are facing difficulties both with theoretical understanding and practical code construction. At the department where this study was conducted around 50% of the students fail to complete their introductory programming courses. The use of mobile phones and ubiquitous gaming has increased in the 21st century. Might it be possible to get students to play educational games on their smart phones as an extra-curricular activity and what design aspects are important to get the students to play the game? The overall approach for this study is Design science in a setup with three phases where a mobile learning game prototype has been designed, developed and evaluated. For game design and appropriate game mechanics a literature study was conducted. The research question that the study aims to answer is: *Which are the key factors in the design and construction of a game for mobile platforms aiming to teach introductory programming?* Findings show that design, implementation and testing of an educational game are time consuming processes for the development of quality artefacts useful as extra resources on university courses. Interviewed students had in general a positive attitude towards the game but the students today have high demands when it comes to usability and gameplay. Essential key factors for the design of a mobile educational game found in this study are: simplicity, mobility, usability, playability and entertainment, gradually increasing game levels, practical and conceptual understanding, collaboration, competition, feedback and built-in documentation.

Keywords: educational games, game-based learning, GBL, mobile learning, programming education

Considering Student Communications Prior to MOOC Development

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Abstract: In recent years, massive open online courses (MOOC) is getting more and more popular in universities as a means to educate massive number of students. It can be served as an innovative platform to replace some components of traditional university class. The success of a MOOC subject depends not only on its contents. It is also important to consider student communication behaviours. It can indicate how they interact with teachers and their peers. This paper reports a survey on the electronic communication habits for different groups of students. It is observed that mainland China students preferred to use their personal email accounts than school email accounts. Also, they tended to use short message system (SMS) as a communication channel more. The survey result is helpful for us to design a MOOC subject with a better understanding of how to encourage student interactions.

Keywords: MOOC, student communication, eLearning

Visualization of Concepts and Algorithms in Programming Education: a Design Theoretic Multimodal Perspective

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Abstract: Programming is an important core subject in most Computer science programmes at university level but many students have difficulties to learn the necessary combination of knowledge and skills. Code concepts and algorithms are abstract and dynamic entities, where teachers face problems with the transfer of theoretical concepts as well as with the explanation of more practical programming techniques. Software visualization with the multimodal combination of graphical, audial and textual representations aims to facilitate learning and understanding of programming. Software visualization can further be divided into program visualization and algorithm visualization. This study presents a design theoretic multimodal approach where software visualization is introduced and

evaluated as an extra communication channel between teachers and students in programming courses. Two visualization prototypes have been designed and developed for evaluation in lectures for an experimental group. Data has been gathered by handing out questionnaires to students in the experimental group and to students in a control group. Both groups had attended the same lecture setup, with identical learning content but only the experimental group had access to the multimodal program visualization and algorithm visualization prototypes. 85% in the experimental group and 62% in the control group stated that they did understand where the focus of the code executing was all through the prototype for algorithm visualization. For the other prototype, visualizing object-oriented concepts, 60% in the experimental group and 54% in the control group stated that they understood where the focus of the code executing was all through the multimodal animation. Findings indicate that programming lecturing using multimodal explanations as additional learning tools is a promising path to enhance programming education in the 21st century. Guided by multimodal design theory, we can better understand how appropriate activities for novice student's learning of programming concepts should be implemented. A problem with the evaluated prototypes that was identified is focus overload during execution of object-oriented animations. One possible solution to address this issue might be to divide the object visualization into two parts, where one is dealing with concepts and the other is illustrating dynamics.

Keywords: software visualization, algorithm visualization, program visualization, programming education, multimodality

Competency-Based Education as a new Modality: The UW Flexible Option

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Abstract: Competency-based education (CBE) is gaining support in higher education in the United States. In January 2014 the University of Wisconsin (UW) System, the public state university system in the US state of Wisconsin, launched the UW Flexible Option (or Flex Option) on two of its university campuses based on CBE. The objectives of the Flex Option are to increase affordability of higher education, to reduce time to degree completion, and to increase number of college graduates in the workforce. The Flex Option offers self-paced learning that allows

students to progress towards a degree by demonstrating competency, that is, mastery, of knowledge and skills gained through previous coursework, military and on-the-job training, and self-directed study of curated course material. This case study of the Bachelor of Science of Information Science and Technology (BSIST) Flex Option at the University of Wisconsin-Milwaukee's School of Information Studies is structured as follows: first, we discuss what CBE and flexible delivery is. Next, we provide context of the IST degree and highlight the benefits, as well as the challenges of the CBE approach based on what we have learned during the first year after the IST Flex Option launch. We conclude with a discussion of the future opportunities and on-going challenges for a flexible CBE degree program in IT.

Keywords: competency-based education (CBE), flexible delivery, information technology, undergraduate degree, United States

Towards Making EPUB 3-Based e-TextBooks a First-Class Mobile Learning Environment

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Abstract: Students master courses by interacting with a multitude of learning objects. These interactions may include reading documents, watching explanatory videos, taking notes, completing assignments, and experimenting with physical objects. During these interactions, students often have to switch between different learning environments, including Web browsers, video players, textbooks, and workbooks. By integrating these different environments into a unified learning environment, we can save students' time. Moreover, thanks to an increasing adoption of tablets in schools and universities, we also have the opportunity to deploy this unified learning environment on a single mobile device, thus enabling anytime and anywhere learning. We refer to such a learning environment as a 'first-class' mobile learning environment. In this paper, we empirically investigate to what extent an EPUB 3-based e-TextBook can be used to facilitate a 'first-class' mobile learning environment. To that end, we created an EPUB 3-based prototype e-TextBook that has been enhanced in terms of both its presentation and representation, meeting requirements that are typically ascribed by the literature to mobile learning environments. Specifically, we integrated three interactive wid-

gets into our e-TextBook that are able to (1) exchange information with each other (inter-widget communication) and (2) that are able to semi-automatically create new content (that is, that are able to act as semi-automatic content providers): a report maker widget, a sine formula widget, and a corresponding interactive graph maker widget. In addition, we integrated different types of learning objects into our e-TextBook, including multimedia objects, objects with augmented reality features (i.e., digital objects that allow for interaction with physical objects), and objects that offer contextualized content. Both the widgets and the learning objects can be used within a unified learning environment. Furthermore, we semantically annotated the learning content in order to improve its discoverability. We find that our e-TextBook complies with the requirements found in the literature. Moreover, our e-TextBook makes it possible to provide visual feedback on student actions, thus having positive effects on the learning process. In addition, our e-TextBook mitigates distraction by providing a unified mobile learning environment. Furthermore, the use of EPUB 3 allows for interoperable packaging of semantically annotated learning content. Finally, the use of EPUB 3 paves the way for mobile usage of learning content, and thus for anytime and anywhere learning.

Keywords: e-TextBook, EPUB 3, mobile learning, widgets

Lessons Learned and Future Prospects for Online Program Creation and Delivery: A Case Study From Geography

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Abstract: Institutions of higher learning are increasingly embracing online education, and the number of students in online learning programs is growing across the United States, which in turn spurs the development of more online courses and degrees. The College of Humanities and Social Sciences at Kennesaw State University in the metro Atlanta area was proud to announce the birth of its new online B.A. in Geography in spring 2015. This program will be the first of its kind in the United States and perhaps in the world. But it didn't come into being overnight. Like anything amazing, it was years in the making. There are wide-ranging issues within any institution that must be addressed for innovative online pro-

grams to come to fruition and succeed. The university had to provide a structure to support this creation, including a technological infrastructure, faculty support services, and student support services to ensure that students had access to the same quality education and success resources whether online or face-to-face. Faculty needed support and resources as they created the courses and the program proposal, and the program still must receive necessary resources for success: further program development, marketing, support services for students, faculty development, and additional faculty. In order to illuminate these issues, the authors will describe how we designed and delivered this online Bachelors of Arts degree in Geography at a large state university in the U.S. The next steps in this process of developing the online geography degree program will be discussed, including assessment for the degree program and future research.

Keywords: online program development, geography B.A. online degree, online learning, resources needed for online degree development

Please Vote now! Evaluation of Audience Response Systems – First Results From a Flipped Classroom Setting

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Abstract: Many University lecturers in Germany face the challenge of teaching very large classes, sometimes including 1000 or even more students. They often have to cope with a very high level of noise, bad room conditions, an extremely low level of participation as well as interaction and feedback. Some lecturers therefore try to overcome these challenges by using technology in their classroom. Previous research has already focused on evaluating the use of audience response systems (ARS) in a traditional but very large engineering lecture. This sort of technology has proven to be an effective tool in order to e.g. increase student motivation, give them additional support in the learning process and on the other hand give the lecturer feedback about the students' learning progress as well as possible crucial points of the lecture. This paper, however, goes one step further. It analyzes the use of ARS in a flipped classroom setting of a large engi-

neering lecture for first-year-students. After having completed almost two thirds of the flipped classroom lecture, students were being questioned about their experiences and opinions about the use of ARS in this particular educational setting. The standardized questionnaire included questions issuing e.g. comprehension, motivation, frequency, enjoyment, interaction, involvement as well as usability aspects. First results show that e.g. the majority of the students feel that clicker questions foster their comprehension, motivate them to be attentive and increase the quality of the lecture. When comparing the results to findings from previous research in a traditional lecture, however, one thing becomes apparent: The evaluation of the use of ARS in the in a flipped classroom setting has turned out to be slightly less positive than that of the traditional lecture. This finding will be particularly discussed and may even call for further research in the designated field of interest. In a first step, the lecture itself will be described considering content, background and general settings. Subsequently, the survey instrument and methodology will be presented. In a third step, the results of the survey will be presented and discussed. Finally, further research fields will be identified.

Keywords: large classes, clicker questions, flipped classroom

The Infusion of Emerging Technologies in Complex Higher Education Settings

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Abstract: In the context of an increasing reliance on, and integration of, Information and Communication Technologies (ICTs) into the Higher Education (HE) sector, innovative approaches are being sought in response to infrastructural and resource limits, and mounting pressures to increase participation and throughput rates. This is particularly evident in South Africa, given its history of exclusion and marginalisation. Here, the potential of eLearning has been recognised in expanding access to educational opportunities and in equipping university staff and students with the eSkills and ePedagogy needed to make full use of emerging technologies. At the University of the Western Cape, the Centre for Innovative Education and Communication Technologies (CIECT) was established in 2005 to champion the adoption of emerging technologies at that institution in support of teaching-and-learning practices, and to provide support and training to staff and stu-

dents in their use. After nearly a decade of experience and refinement, the Centre's activities are structured according to a systemic framework that drives the infusion of emerging technologies into its particular complex higher education setting. The framework encompasses the areas of Teaching-and-Learning, Research, Community Engagement, and Collaboration, and aligns all eLearning activities with institutional and national policy. The goal of this case study is to share these activities in a complex HE setting, since in order to successfully drive the adoption of emerging eLearning technologies, a systemic framework aligned to institutional and national policy goals is required.

Keywords: eLearning framework, higher education, infusing emerging technologies, eTools application, policy alignment

Good Practice Guidelines in Using Social Media for Learning and Teaching Sciences to Undergraduate Students

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Abstract: In 2013, Facebook was used in learning and teaching some aspects of a Pathology and a Clinical Sciences course delivered at a South Australian university. It involved first- and second-year Medical Radiation students and second-year Nursing students, who were learning problem-solving of clinical case scenarios pertinent to those courses. All participating students were invited to complete a questionnaire at the conclusion of the course. Of the 152 students enrolled in the Pathology course, there were 148 students who participated in the Facebook group. Of the 148 students, 61 (41%) completed the post-intervention questionnaire. At the same time, all 17 nursing students enrolled in a science course at the regional campus of the same university participated in the Facebook initiative, however, only 10 (59%) completed the post-intervention questionnaire. A good practice guidelines and checklist were developed from the post-intervention evaluations, which consisted of 25 Likert- and open-type questions. Both student cohorts found the use of Facebook beneficial for them in terms of providing an innovative way of learning; fostering greater interaction amongst co-students and staff; and effectively engaging them with the content of courses. Six good practice

principles were identified relating to: goals and objectives, expectations, communication, engagement with the course content, active participation, and learning environment.

Keywords: Facebook, social media, medical radiation, nursing, guidelines for good practice, engagement

Law Students' Perceptions of Online Self-Assessment Assignments in an Accounting Module

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Abstract: The low throughput of accounting students constitutes a major challenge at the University of South Africa (Unisa), a distance education institution, and in particular, to Law students who need to pass a basic introductory Accounting module as part of their Bachelor of Laws (LLB) degree. As this module normally involves these students' first encounter with accounting concepts, it was evident that a different learning approach was needed from that used for their Law subjects. In South Africa, where internet connectivity remains an obstacle for synchronous learning, distance-learning institutions are constantly being challenged to lessen the negative effect of distance on the students' learning experience. Therefore, asynchronous online student support is often used at Unisa to improve current distance-learning practices as such support also has the potential to enhance students' learning outcomes. To assist these LLB students, lecturers in the Accounting module incorporated various asynchronous online learning tools. By combining online self-assessment assignments, regular e-mail notifications and discussion forum communication, lecturers encouraged the students to work progressively through their study material and to do regular tasks. The instant feedback provided by the online self-assessment assignments assisted students in resolving problem areas before their work was formally assessed. As time issues and self-pacing play an important role in distance education courses, use was made of regular e-mail notifications and reminders on the module's discussion forum to aid the students with their time management and study planning. It was noted that students regularly engaged with the study material during the semester as well as by participating in the online discussions. This paper gives examples of the online self-assessment assignment questions used and reports on the students' perceptions and experiences of these. The qualitative data provided insight into

how the LLB students perceived the use of online learning tools to assist them in grasping the various accounting concepts and in guiding them through the syllabus. Based on the evidence provided, it was evident that these interventions supported the learning experience of these students.

Keywords: accounting, asynchronous student support, distance education, Law students, online self-assessments, transactional distance theory

Geographical Information Science and Technology Based STEM Education in e-Learning

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Abstract: The state of Science, Technology, Engineering and Math (STEM) education and learning in the United States are not meeting the demands of today's economy and the economy of the future. Roughly 75 percent of U.S. 8th graders are not proficient in mathematics when they complete 8th grade. U.S. students also lag behind the highest performing nations on international assessments. Moreover, there are significant gaps in achievement between different student population groups in the U.S. Under such tremendous pressure to improve STEM education in the U.S., the *Next Generation Science Standards* (NGSS) were released in 2013 to respond to these challenges. NGSS advocates a three-dimensional approach to science education throughout the K-12 years by integrating eight science and engineering practices, seven crosscutting concepts and a set of disciplinary core ideas. The integration of geographical information science and technology (GIS/T) tools in STEM education provides a perfect environment to create and implement three-dimensional learning opportunities. Instructionally, GIS/T has long been recognized as an interdisciplinary educational technology, supporting high-level thinking and spatial reasoning. Additionally, spatial reasoning and visualization have been demonstrated to be foundational to science, engineering, and mathematics. Technologically, GIS/T is moving into online and mobile arenas. Almost all enterprises are using the Internet to disseminate location-related (geographic) data in map forms using Web GIS. With the increasing popularity of global on-line mapping web applications (e.g. Google Maps, Microsoft Virtual Earth, Yahoo Maps, ArcGIS Online), Web GIS is part of "business exchange" and creating great opportunities for e-Learning. Three case studies based on ArcGIS Online will be analyzed in this paper to conceptually confirm the relationship between GIS/T and eight NGSS science and engineering practices, to

illustrate added values of GIS/T in STEM education, and to exemplify immense contributions of GIS/T to e-Learning.

Keywords: next generation science standards, science and engineering practices, three-dimensional learning environment, ArcGIS online

The Learner Stewardship Cycle in Practice-Oriented Asynchronous Online Continuing Education for Health Professionals

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Abstract: Online continuing education holds promise as an effective method for rapid dissemination of emerging evidence-based best practices in health care. Yet, practice-oriented online continuing education programming for health professionals has met with challenges. Health practitioners require an experiential approach to continuing education; how can online programs deliver higher-level practice competencies? Based in situated learning theory, seven factors have been identified as key to the creation, delivery, and improvement of engaging practice-oriented online educational programs. These "sticky" factors draw from theories of knowledge management (Nonaka, 1994; Szulanski, 2002) and adult education or andragogy (Knowles, 1970; 1984). And they are further factors are mapped to Moore et al (2009) higher level learning outcomes in healthcare continuing education. The proposed Learner Stewardship Cycle (LSC) is an iterative improvement process comprised of continuous, concurrent, and concordant micro-interventions to improve stickiness and learner engagement. Each intervention is based on patterns drawn from point-in-time learner data. The learner is "stewarded" not only through educational segments, but also through transitions between segments. The LSC begins the moment learners enroll online and ends with their successful program completion. The improved stickiness of each segment improves the whole. The LSC is translated into a real-world case study by the Center for Innovative Pharmacy Solutions (CIPS) Knowledge Enterprise™. The LSC is based on a theoretical framework for experiential educational programs. In addition to improved learner engagement outcomes, the LSC can abbreviate time

to program launch and compress development time. Findings suggest that e-Learning system capabilities as well as a dynamic, adaptive technology-instructional partnership are necessary to optimizing learner-practitioner programs.

Keywords: practice-oriented continuing education, situated online learning, learner engagement, continuous improvement, asynchronous online continuing education

PHD Research Papers

Developing Pragmatic Skills of Social Capital Investment: Review of the Role of Social Technologies in the Student Lifecycle

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Abstract: Social networking applications have become an integral part of university communication and learning technology strategies. Starting from the applicant recruitment to student support, to teaching and learning, social technologies have been assimilated in the technological fabric of Higher Education Institutions over recent years. Social networks are no longer a novel phenomenon, in technology terms the decade since the emergence of social networking services is an incredibly long timeframe. In this article, we present a review of extant research and scholarship in the area of social technologies and their applications throughout the student lifecycle at university and in life-long learning. We discuss key features and developments in the social technology arena, then present considerations for future research.

Keywords: learning technologies, social networking, digital age, student lifecycle, employability

Using Teaching Cells to Establish Effective Online Learning Environments

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Abstract: In China, researchers suggest education can be transformed from a drain to a driver of economic growth where "human capital is duly recognized and respected" (Glazebrook & Song 2013; Altbach 2013). Since the curriculum taught in kindergarten through twelfth grade in China is highly standardized throughout the entire country, online supplement to this education should be possible. China's online learning platform for public school students should support the learning of these students, and provide 1) a supplement to students outside of class, 2) guidance for tutors who support the students outside of class, and 3) it should even provide supplemental materials for public school teachers to use if they choose. Improving the Chinese online teaching system in this way would also

lower education costs while allowing learners to fully enjoy the equal rights of learning without regard to geographic location and ability to hire a tutor. Considering these factors, to improve China's implementation of online learning, a concept of modular "teaching cells" is proposed, which are basic units of curriculum. Specifically, each teaching cell will consist of the four components of educational resources described, and promote connectivist learning as well as a high-quality personal learning environment (PLE). Each teaching cell would cover two subjects and contain these four resource categories (teaching materials, courseware, case studies and examinations). The teaching cell will be able to continually develop and evolve in response to student input, and will be reusable. The teaching cell concept itself has four specific features which will be described: openness, evolutionary development, intellectuality, and micromation. The purpose of this paper is to introduce and propose the "teaching cell" approach in providing an online supplement to China's public school education system. This paper reviews the literature on the subject, then defines a teaching cell, and describes four main features of a teaching cell. Finally, this paper recommends future research design considerations for exploring the use of teaching cells in online learning.

Keywords: online instruction, pedagogy, teaching cells, China, teaching resources

Abstracts Only

Information Literacy Acquisition Through Embedded Library Instruction in Online Environments

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Abstract: With learning in online environments on the rise, school librarians should explore the opportunity to impact instruction and student learning through this venue. While online environments are commonly associated with higher education, online learning at the K-12 level, such as using content management systems, flipped learning, cloud computing, and mobile learning, is increasing. As online learning increases on school campuses, the risk of students decreasing their need to enter and visit the physical school library grows. To maintain relevance and a prevalence in student learning, school librarians should utilize these technologies and online environments to embed information literacy instruction, which should establish their instructional role and provide anytime, anywhere learning for students, as well as increase their information literacy skill acquisition and development. The research focus will be to examine an online environment created by a middle school librarian, and the impact on student learning and information literacy acquisition. The online environment will be created based on an established framework, and impact on student learning and skill acquisition will be measured through a created rubric and focus group reflections with both teachers and students. Embedded instruction will include, but not be limited to, online tutorial videos, interactive learning activities and practice, and pathfinders for personalization of learning directed to individual topics and information needs. Utilizing a framework for creating the embedded instruction should impact student acquisition and development of information literacy skills positively. The learning environment will be an electronic learning commons, and be placed where students may authentically access, thus becoming embedded instruction and learning. The author seeks to examine the amount of student utilization of the embedded instruction, as well as the measured differences in the perceived quality of student work before and after accessing the embedded instruction. This will be a theoretical paper, with a proposed qualitative method of study. It is of particular interest to school librarians, in-service teachers, school administrators and instructional designers and coaches. Related interest includes teacher education professors and technology specialists. There is emerging research on the topic of embedded librarianship at the higher education level, but minimal available for K-12. Thus, this is a unique topic, but one that has the po-

tential to become prevalent in the discussions tied to flipped learning and mobile technology integration.

Keywords: information literacy, embedded librarianship, flipped learning, K-12 libraries

Web 2.0 use in Knowledge Management - Measuring Increased Effectiveness of User-Driven Reference Tools

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Abstract: The research investigates the impact that Web 2.0 technology has in the workplace supporting organizational Knowledge Management processes, and how that ultimately improves financial and operational performance. A literature review analyzes how Web 2.0 transforms the implementation and use of Knowledge Management by enabling users to contribute and shape information. Users also are able to retrieve information on an as needed basis, thereby reducing the amount of tacit knowledge they need to keep in their head. They are able to retrieve, change and use reference information when and where it is needed for them to perform their job. The research is being conducted within a for-profit consulting firm in healthcare revenue cycle in the United States. Within the US healthcare revenue cycle there are many constituents. There are Government Payers (Medicare/Medicaid/Medical Assistance),Quasi-Government / Private payers (Medicare Managed Care), Commercial Payers (Insurers), Physicians and, of course, patients. With much regulation and negotiation between payers and providers, there is a great deal of room for error. The consulting firm works on behalf of the providers analyzing revenue / reimbursement against standard and negotiated rates to determine if the contracts have been administered correctly. When underpayment errors have been identified, the consultants recover the underpaid revenue from the payers. With contract negotiations, regulations and reimbursements changing frequently, it is critical for the consultants to maintain information about Payers, Laws, Providers, and projects. To this end, a Web 2.0 tool has been implemented as a central repository of information for Consultants to create, maintain and use information. That includes knowledge of clients, processes, vendors, and laws to say the least. It is critical to have the right knowledge at the right time to affect the right processes. The study uses a mixed method methodology. The quantitative portion of the study investigates the correlation between the use of the Web 2.0 system and the financial performance of

the clients / payers. The qualitative portion of this research consists of semi-structured interviews with the system users.

Keywords: knowledge, knowledge management, Web 2.0, organizational knowledge

Follow me – Perception and Evaluation of Higher Education in Twitter

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Abstract: Nowadays higher education is evaluated by university rankings on a national and international level. These standardized rankings operate on the basis of certain criteria focusing on teaching and learning at universities which often has already an evaluating character. University rankings discover a lot of criticism in terms of measurement accuracy, measurement of university as a whole institution and especially do not measure teaching and learning quality of universities. Particularly, statements and opinions from students and teachers of universities provide potential perceiving and evaluating teaching and learning quality of universities. In the age of digitalization, people share their opinions and perception of higher education even in Social Media. Social Media is increasingly used to analyze peoples' opinions and statements to different topics which present an increasing research field. A huge amount of sentiments of people are expressed on different topics every day in Social Media. Twitter is one of the most popular microblogging platforms and most opinion-rich resources. Because of the rapidly increasing number of Tweets, microblogs have become rich resources of data for "mining" opinions. Stimulated by that fact, ways to analyze Twitter for information about people's opinions and sentiments about different aspects are sought. The challenge in this context is to find a way to deal with all the collected qualitative data of the microblogging platform Twitter. In our research study, we have analyzed the opinions made in Twitter in terms of their positive, negative and neutral meaning concerning the perception and evaluation of higher education and compare them to official university rankings. For this purpose, we are collecting globally and automatically all Tweets concerning TU9 universities in Germany. Caused by the complex and heterogeneous mass of data, the manual analysis is not possible any more. Therefore a data-based Social Media Analysis is required which is often referred to as opinion mining or sentiment analysis. The

paper describes the process of designing the research basis on the subject and the preparations made in order to analyze Tweets. Further a research method based on the sentiment analysis is introduced which allows the extraction of opinions in Tweets and classify them in positive, negative and neutral ones. Based on the collected data the extent of correlation between the university's ranking and the findings of the sentiment analysis is being analyzed. The paper gives an outlook of the planned analysis and the application of the used research method in higher education for example to analyze students' statements in e-learning platforms.

Keywords: e-Learning, social media, sentiment analysis, higher education, data analytics, Twitter

Open Applications Developed for Distance Learning in the Dentistry Field in Brazil

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Abstract: In process of large and accelerated expansion, Distance Learning (DL) has enabled thousands of individuals to access educational content, with the support of Information and Communication Technologies (ICT), in self-instructional or monitored mode, thereby encouraging several educational institutions to develop projects within this modality. In Brazil, in order to boost the Permanent Education in Health (PEH) of professionals working in the public service, the government invested in the creation of the Open University of Brazilian National Health System (UNA-SUS), which operates over Brazilian extensive territory, offering postgraduate, updating and improvement courses, focused on public and community health. A challenge for the consolidation of this initiative is to achieve health professionals working in remote areas, being these groups precisely those who need the most to integrate PEH actions, since few institutions usually act in continuing education in these regions. To solve this problem, the UNA-SUS created, with the support of the Federal University of Maranh o (UFMA), applications for mobile devices (MD), which make available the educational content developed by the institution to be accessed in online and offline mode through different types of devices. Recognizing Dentistry as one of the primary health care components, UNA-SUS chose to develop the above mentioned applications covering important topics about the maternal and child oral health, in order to contribute to the training and updating process of hundreds, or even thousands of professionals

linked to Brazilian public health service. The content of these applications is multidisciplinary, presenting relevant information to the various professionals who provide primary care services in the health care network. Using this learning object, it is intended to make these professionals develop ever more confidence in the care they provide at SUS, elucidate questions related to the oral health of pregnant patients and thus, elect the most appropriate treatments for this specific group of patients. In this study will be exposed the production process of these applications, including the theoretical principles followed for the implementation of educational content in digital media, and the technical and technological aspects responsible for making this transposition possible. It is, therefore, an empirical work, of qualitative nature, which approach will be useful for distance learning developers and institutions interested in incorporating in their grid educational programs in DL modality. As a result, it is expected that this work could lead to an increased accessibility of distance education, contributing to its strengthening through the exploitation of open audiovisual resources for mobile devices, which operate in online and offline mode for easier access in regions with delivery problems of Internet services.

Keywords: distance learning, mobile application, maternal and child health, new technologies, learning object

e-Learning Tools in the Home Care Violence Approach Course Offered by UNA-SUS

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Abstract: The Open University of Brazilian National Health Care System (UNA-SUS) is a program created by the Ministry of Health of Brazil (MS) to promote the training of the Unified Health System (SUS) professionals through the Distance Education model. The program was designed to act on the shaft of continuing education in health throughout Brazil, offering the opportunity of qualification within the context of primary care. The institution has a team of content teachers, graphic design and communication technologies professionals that enable the production and provision of educational materials from various areas of health via the online platform "Moodle". On this platform the specific content of the course is available through online books, PDF files, video, audio and interactive materials such as

quizzes, activities, chat rooms and discussion forums. Such materials, designed specifically for each course, are then made available by other platforms of the institution for open access to the public. Given the importance of the evaluation of methods used in the distance education mode around the world, this study aims to examine the structure of production and application of the courses developed by UNA-SUS. The course in Home Care Violence Approach, created by the need to train professionals for the treatment of specific situations of violence, described by the World Health Organization (WHO) as "any behavior that within an intimate relationship causes physical injury, emotional or sexual" is an example of the application of different technological tools suggested by the institution in the educational environment. The work presented here describes the design of this course that intends to steer health professionals through specific cases in the approach to the topic in question, aiming the reduction of violence situations thus hosting and ensuring protection for victims and their families. This empirical research presents qualitative results of the tools implemented within the virtual environment and their relationship with students. The work aims to assess the educational measures applied during the training course, analyzing if the collected results demonstrate the effectiveness of the same. The importance of this research resides in reference to future projects and actions in the educational field, designed to improve the teaching distance mode.

Keywords: distance education, new technologies, continuing education, home care, violence

e-Experimentation in Laser Radar Atmospheric Studies

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Abstract: The research question addressed in this study was to assess implementation strategies for and student reactions to conducting actual experiments online using real (not virtual) modern scientific equipment. Laser Radar (Lidar) instrumentation was selected as the test application for scientific e-experimentation and e-data analysis. Results should be useful to educators seeking to broaden the laboratory experiences available to their students in a wide variety of scientific disciplines. Students in current scientific disciplines can benefit strongly from training on modern research-grade instrumentation. These instru-

ments are widely used by potential future employers, and students with actual experience on such equipment are expected to have a valuable edge in the future job market. Challenges for educators seeking to train students in experimental science on modern instrumentation include equipment cost, space, and the need for multiple pieces of the same equipment to allow students in a traditional laboratory to conduct experiments. Simulated experiments can address some of these challenges. However, there is strong value in actually conducting a real experiment in which things can (and do) go wrong, and in which environmental conditions and instrument artifacts can influence the results and require sophisticated analysis to arrive at a final scientific result. Thus this project seeks to investigate potential mechanisms for remote e-experimentation to allow students to actually conduct real experiments and analysis on modern instrumentation via the web. In this paper we discuss design strategies considered and strategies implemented for actual (not simulated) e-experimentation and web-based data analysis using a cutting-edge Laser Radar instrument called the Micro Pulse Lidar (MPL) system with an application to atmospheric studies. With support from the U.S. National Science Foundation (NSF), a course was piloted that allowed students to schedule time on the MPL instrument that was located at a different university, remotely control the instrument through a web browser and conduct laser light scattering experiments, store their experimental results, and analyze their data via a web interface that did not require them to download the data analysis software. Focus groups consisting primarily of upper level Physics and Computer Science students helped develop the implementation mechanisms. Student feedback indicated that this mode of instruction provided a viable alternative to traditional experimentation methods. It enhances possibilities for educational institutions of limited resources to offer training on expensive cutting-edge instrumentation. Educators at institutions where costs and space may prevent acquisition of desired research grade instrumentation to train students in a traditional laboratory setting can use this project as a model for institutional resource sharing. In our case, students from different universities could conduct experiments from their home institutions (or even their homes) using one single piece of high tech equipment located at a single university. This model may also be appropriate in institutions where students who are working or have other commitments need flexibility in timing of experimental work.

Keywords: e-learning, e-experimentation, resource sharing, remote experimentation, lidar, laser radar

The importance of paper citations and Google Scholar

As an academic researcher you will know the importance of having access to the work of other researchers in your field as well as making your own work available to others. In the area of academic publishing this is achieved through citation indexing. There are a number of bodies that undertake this task including Thompson ISI, Elsevier Scopus and Google Scholar – to name just a few.

At ACPI we do all we can to ensure that the conference proceedings and the journals that we publish are made available to the major citation bodies and you can see a list relevant to this conference on the home page of the conference website.

However, it is also important for you, the author, to make sure that you have made your work available for citation – particularly with organizations such as Google Scholar. We are providing you here with the simple steps you need to take to do this and we would ask you to take the time to upload your paper as soon as you can.

Step one: Extract your paper from the full proceedings that you have downloaded from the Dropbox link provided to you.

Step two: Upload your paper to your own website, e.g.,

www.university.edu/~professor/jpdr2009.pdf ; and add a link to it on your publications page, such as www.university.edu/~professor/publications.html.

Make sure that the full text of your paper is in a PDF file that ends with ".pdf",

The Google Scholar search robots should normally find your paper and include it in Google Scholar within several weeks. If this doesn't work, you could check if your local institutional repository is already configured for indexing in Google Scholar, and upload your papers there.

More information is available from
http://scholar.google.com.au/intl/en/scholar/inclusion.html

We will separately upload the proceedings to Google Books which is also searched – but evidence has shown that individual upload results in quicker indexing by Google Scholar.

Your own institution may also subscribe to an institutional repository such as
http://digitalcommons.bepress.com/ or
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Research Jotter

Research ideas can happen at any time – catch them in writing when they first occur