

Danish University Colleges

E-learning- based Occupational Therapy Education Leads to Committed Students

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**Abstracts of Papers
Presented at the**

**16th European Conference on e-Learning
ECEL 2017**

**Hosted By
ISCAP
Polytechnic of Porto
Portugal**

26 - 27 October 2017

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Preface

These Proceedings represent the work of contributors to the 16th European Conference on e-Learning, ECEL 2017, hosted this year by the Porto Accounting and Business School (ISCAP), Polytechnic of Porto, Portugal on 26-27 October 2017. The Conference Co-Chairs are Dr Anabela Mesquita and Dr Paula Peres, both from ISCAP.

The conference will be opened with a keynote address by Dr. Rita Cadima, Vice-President and Director of the Distance Learning Unit at the Polytechnic Institute of Leiria, Portugal on the topic *Online learning: enhancing teachers and students skills in higher education*. On the second day the keynote will be delivered by Dr. Neuza Pedro, Coordinator of E-learning Lab of the University of Lisbon on the topic of *E-learning in Higher Education: analyzing organizational strategy and teachers professional development*.

ECEL is a well-established platform for individuals to present their research findings, display their work in progress and discuss conceptual advances in many different branches of e-Learning. At the same time, it provides an important opportunity for members of the e-Learning community to come together with peers, share knowledge and exchange ideas.

With an initial submission of 170 abstracts, after the double blind, peer review process there are 66 academic papers, 4 PhD Papers, and 3 Work in Progress papers in these Conference Proceedings. These papers reflect the truly global nature of research in the area with contributions from Australia, Austria, Belgium, Brazil, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Greece, India, Iran, Ireland, Italy, Japan, Morocco, Nigeria, Norway, Poland, Portugal, Singapore, South Africa, Spain, Sweden, Tunisia, UK and USA.

A selection of papers – those agreed by a panel of reviewers and the editors- will be considered for development and publication in the EJEL (Electronic Journal of e-Learning www.ejel.org).

We wish you a most interesting conference.

Anabela Mesquita and Paula Peres
October 2017

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Biographies

Conference and Programme Chairs



Dr Paula Peres has a post-PhD and a PhD in Education technologies area. She has a Masters in computer science and is a graduate in Computer Maths. Paula is Pro-President of Polytechnic of Porto (P.PORTO) and is currently teaching on the computer scientific science area in the School of Accounting and Administration of Porto / Polytechnic of Porto (ISCAP/P.PORTO).

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Professor Anabela Mesquita is Professor at ISCAP since 1990. She is Vice Dean, a member of the Agoritmi Center at the Universidade do Minho and the Director of CICE (research centre) (ISCAP). She gained her PhD at Universidade do Minho in Management Information Systems in 2002. Her research interests

include Knowledge and Innovation Management, Impact of Information Systems in Organizations, Life Long Learning at the Higher Education level, Social Media and e-Learning. She has been involved in several European and National research projects both as a researcher and as a coordinator. She has published numerous papers in various international journals and Conference Proceedings. She has been a member of the Programme Committee and Scientific Committee of several National and International Conferences. She serves as Member of the Editorial Board and referee for IGI Global. She also serves as AE of the IRMJ and is the Editor in Chief of the IJTHI. She serves as referee for the JCIT. She has also been evaluator and reviewer for European Commission projects.

Keynote Speakers



Dr. Rita Cadima is Vice-President and Director of the Distance Learning Unit Polytechnic Institute of Leiria, Portugal. She was born in Leiria in 1976, holds a PhD degree in Multimedia Engineering from Universitat Politècnica de Catalunya, Spain, and a master on Mathematics from OPorto University, Portugal. Her research interests include Computer-Supported Cooperative Work (CSCW), Computer-Supported Collaborative Learning (CSCL), Innovation and Knowledge Sharing in Learning Organizations, Social Network Analysis and Monitoring Systems, CSCL, CSCW, Quality Assessment and Assurance in E-learning, and Learning Mathematics.



Dr. Neuza Pedro is currently Coordinator of E-learning Lab of University of Lisbon- Portugal and a Professor at the Institute of Education- University of Lisbon. Neuza's PhD is in ICT in Education and she has a Masters in Educational Psychology. Her current research interests include College Pedagogy and teacher professional development, E-learning in Higher Education, Innovative teaching practices, 21st Century classrooms, Social network analysis and online communities.

Mini Track Chairs



Maggie Carson, a Lecturer at the University of Edinburgh and a Senior Fellow of the Higher Education Academy (HEA), teaches in the School of Health where she is the Undergraduate Programme Director. She designed and teaches an online Masters course in leadership for healthcare professionals. Maggie is currently a student on the University's MSc in Digital Education.



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Dr Marija Cubric is Reader in e-learning and a member of Information Systems and Project Management subject group at the University of Hertfordshire Business School. Since 2007, she has led several HEA- and JISC-supported UK projects on introducing and evaluating the use of technologies in Higher Education. Her work was presented at conferences, workshops and seminars in UK, Europe, US and Canada. In 2015 she co-chaired the 14th European Conference on e-Learning and was a member of the judging panel for the e-Learning Excellence Awards. Marija's research interests include development, implementation and evaluation of innovative learning designs supported by technologies.



Vitor Santos is an Assistant Professor at NOVA IMS - Universidade Nova de Lisboa and European University, teaching courses in Computer Science and Informatics Engineering Degrees. He integrates several international conferences scientific committees and has authored several academic publications. Vitor holds a BSc in Informatics Engineering from Cocite, a Postgraduate course in Computer Science from Science Faculty of Lisbon University, a M.Sc. in information Systems Science from UM, a DEA from UM, a Computer Specialist title from Polytechnic Institutes of Guarda, Castelo Branco and Viseu, and a PhD in Technology Information Systems Science from Minho University (UM). Vitor is currently working on a second PhD in Culture and Literature at FLUL.



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Dina Adinda is a Ph.D. candidate with particular interest in higher education, students' autonomy and the use of technology for teaching and learning. Worked as French teacher at Institut Français Indonesia and teaching assistant at Rectorat de l'Académie de Strasbourg, she graduated from Master Design Training and Technology at the University of Strasbourg.

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Dr Chun Meng Tang has actively conducted research in the area of business information systems. His major research areas include IS evaluation, strategic IS, and IS business alignment. He has received research grants, published journal papers, conference papers and book chapters, as well as edited various books.

Satu Tuomainen, PhD, works as a Senior Lecturer of English at the University of Eastern Finland. She teaches courses on academic English using a variety of methods through classroom, online and blended learning. Her current research interests include non-formal and informal learning, student perceptions of learning, and learning difficulties and anxiety in higher education.

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David Kofoed Wind is a PhD-student at The Technical University of Denmark. His research is within machine learning, data science and learning analytics. He is the co-founder and Chief Executive Officer of Peergrade, a web-based peer assessment platform.

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Keynote Outlines

Keynote Outlines

The following are outlines for the Keynote Speeches which will take place at ECEL 2017.

Online learning: enhancing teachers and students skills in higher education

Dr. Rita Cadima, Polytechnic Institute of Leiria, Portugal.

E-Learning strategies are becoming more essential in modern educational activities and higher education institutions must deal with a significant paradigm shift in the meaning and practice of education in this new era. e-Learning programmes and open online courses are a challenge for innovation and development, providing new ways of training for students, teachers and staff, and promote new means of knowledge transfer into society.

E-learning in Higher Education: analyzing two critical factors: organizational strategy and teachers professional development

Dr. Neuza Pedro, University of Lisbon, Portugal

Smartphones, apps, multitouch surfaces, wearable technology, IoT, big data, online learning communities, MOOCs, social networks, open badge systems are now widely spread in professional environments, but teaching practices and organizational models in universities remain unchanged. Innovation, in any organizational structure is a difficult process and the successful implementation of e-learning in most higher education institutions is no exception. All too often it takes too much time and effort to be adopted and as a result fails to prove its value and surpass its barriers. This presentation will consider two of these barriers: the lack of an organizational strategy for e-learning and the neglect of teachers' professional development.

Research Paper Abstracts

An Auto Grading Online Submission System: Case of Packet Tracer

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Abstract: Noting the nature of and the changing state of the knowledge economy, the King IV report on corporate governance has advocated the need for an information and technology concept, rather than just information technology. This emphasises the key importance of information that must be stored, processed, and transmitted across a network. However, it has been acknowledged that there is an increasing gap in and a global shortage of ICT networks skills. It then translates that skilful knowledge workers that must design and administer such an ICT network must be adequately trained. The Cisco Academy provides an environment and a platform for such cognitive and psychomotor training. It has come to the fore in a 2014 survey of Cisco's academy instructors that there is a pervasive challenge with cheating on questions and this is also fast encroaching to skills assessments carried out in the Packet Tracer network simulator (which is essentially a virtual learning environment). The question that then arose is that "can technology be deployed to determine authenticity of student assessments and/or can authenticity of assessments submitted online be assured?" To address this, we have developed an online submission system built with JAVA and PHP, which assures the authenticity of 'test of skills' assessments that can be submitted online. The uniqueness of our system (that derives from scoping literature survey and experimentation development), is seen in matching the identity of students submitting their completed assessment online to the inbuilt (embedded) users' profile of the Cisco Packet Tracer file. Robust functional testing has affirmed that the changing of file name by a student does not allow a student to evade the system (in that students cannot successfully receives marks from another student's work). Not only are submissions made, the system also automatically grades the submitted Packet Tracer based assessments and presents students with their marks and other pertinent information. The feedback is a great feature that could be explored further in assessment analytics and open education resources.

Keywords: ICT, Packet Tracer, authenticity, identity, grading, sustainable assessment

Social Media Trends and Collaborative Learning for Scholarly Research Among Postgraduate Students

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Abstract: The growth in information technology as embedded in Web 2.0, has redefined the way people communicate, interact and participate in the creation and re-use of contents among users. Web 2.0 or Library 2.0 tools are internet-based services which include interactive platforms such as Wikis, Web blogs, instant messaging, etc. This empirical study investigated the social media trends, interactive and collaborative learning for scholarly research among postgraduate (PG) students in a Nigerian university. The utilization of social media and networking tools is crucial to PG students and very helpful in the course of conducting scholarly research and is invariably a key to accomplishing scholarly targets. The descriptive survey research design was adopted. The sampling frames of 809 out of 1,361 of the postgraduate students in the Federal University of Agriculture, Abeokuta, Nigeria was used. The instrument for data collection was a structured questionnaire. Statistical Package for Social Science (SPSS) was used to interpret the data with frequency counts, percentages, mean, standard deviation and Pearson Moment Correlation Analysis. Results showed that the PG students had a strong preference for the use of Academia ($\bar{x}=1.94$, $SD=1.40$). Other social media sites used were Facebook, Twitter, Flickr and ResearchGate, etc. Knowledge contents were collaboratively shared by colleagues and used frequently for scholarly research. The results also revealed that social media has made a significant influence on respondents' research output ($\bar{x}=3.63$, $SD=0.62$). Challenges which hinder effective use of social media by PG students include poor internet connectivity, low level of ICT skills of the respondents etc. The study recommends that regular seminars and training be organized for PG students to attune with recent development in social media sites so that they can appreciate and maximally utilize the opportunities they offer. Regular overhauling of electronic devices is recommended.

Keywords: social media, social network sites, scholarly research, information resources use, PG students

DABAI: A Data Driven Project for e-Learning in Denmark

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Abstract: A new Big Data research team called DABAI have been launched in Denmark, which aims at integrating cutting edge computer science research from machine learning, algorithms and visualization into the education sector. The educational part of the DABAI project is a cooperation between Danish universities and multiple enterprises providing e-Learning solutions for the Danish market. The companies' services cover over 90% of the Danish schools, with more than one million students, who on a daily basis do millions of exercises and interactions using the involved companies' solutions. The study presented in this paper is an initial investigation of the needs of the three largest companies in e-Education in Denmark directly involved in DABAI, with the goal being to continue providing novel and high-demand features for their customers. The three companies are MaCom, Clio Online, and EduLab. Clio Online and EduLab provide an online platform for teaching material and exercises for the primary school level covering all subjects. MaCom provides a lecture management system used by most Danish high schools. Overall the study shows that the problems encountered at the different companies are varied, but can be categorized into three general sub categories: Student Profiling, Content Profiling, and Content Recommendation. Some problem types fall into multiple sub categories, and in general to accomplish the goal of providing e-Learning of the highest quality, research into all of them is necessary. This paper presents the fundamental problems these companies are facing in e-Learning. For each encountered problem, we describe its objectives and challenges in detail, followed by the current state of the art for solving it.

Keywords: e-Learning, e-Learning challenge categorization, Big Data

Learning Analytics in Higher Education: Assessing Learning Outcomes

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Abstract: Students' retention and dropout from degree courses before their completion continue to represent issues which challenge researchers, teachers and higher education institutions to seek solutions. Higher education institutions have been attempting different strategies to promote their students' success, among which we highlight the implementation and use of virtual learning environments (VLEs). Through the use of learning analytics in the analysis of data regarding the frequency of access to a VLE as well as the learning outcomes of a sample of 2,636 undergraduates, we aimed to identify indicators which contribute to the possible prediction of student retention and dropout situations. The methodology followed is essentially quantitative and the desk review was the main data collection tool. The data was treated by using the statistic software SPSS for the organisation and descriptive statistic presentation, as well as inferential statistics through appropriate statistic tests. The outcomes of this study resulted in contributions which enable the prediction of undergraduates' retention or dropout since we were able to prove that the lower the frequency of access to the institution's virtual learning environment, the lower the attendance to on-site lessons and the lower the number of course units in which students obtain a passing mark. Absenteeism and the lack of course units passed represent indicators of school dropout and retention. This research work reveals to be of great importance since, through a framework associated with learning analytics, it provides indicators supported by a large amount of recent and validated data, which enables us to rethink the connection between undergraduates' access to a virtual learning environment and its influence on educational attainment.

Keywords: learning analytics, virtual learning environment, learning outcomes, higher education, education

Assessment of the e-Learning System of Virtual University of Pakistan

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Abstract: The study deals with the online mode of education by the Virtual University of Pakistan (VUP), in its quality improvement and providing education at the doorstep. The paper covers rationales of Moodle-based learning management system to provide higher education to the students of VUP. The focus of e-learning is towards the working class, on-the-job work force training, deprived people and women in particular, who due to different reasons cannot afford to go to the universities often. It has the potential to empower women through overcoming their physical boundaries and provide them access to higher education. In VUP, students and instructors are physically detached; nevertheless, the e-learning system facilitates their learning / teaching process. This study provides the SWOT analysis of e-learning system which is a cost-effective solution in a developing country like Pakistan. It sheds light on the modernization of goals of higher education sector, tertiary education innovation, transformation, and enhancing educational services by providing unlimited access to knowledge. E-learning brings transformation in conventional universities and increased flexibility. The findings of the study would considerably help identify policy intervention by top leadership and donor agencies to ensure that deprived people, especially women, are empowered from e-learning. It reduces the gender divide and facilitate their access to the higher education.

Keywords: assessment, empower, SWOT analysis, VUP, Moodle

Using a Spreadsheet to Support e-Assessment

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Abstract: Some of the courses of the scientific area of Mathematics at ISCAP use multiple choice questions (MCQ) tests as a fundamental part of the assessment. The assessed topics include Differential and Integral Calculus, Algebra, Statistics, and Financial Mathematics. In the undergraduate programs of Accounting, Marketing and International Commerce, these courses are taught in theoretical-practical classes and their main objective is to provide the necessary support tools

to other courses of these programs. On the other hand, these undergraduate programs, in particular Accounting, have many classes and many students, so MCQ tests have been an indispensable tool for both continuous and final exam assessment. The open source MOODLE platform, used through a local network intended only for continuous assessment, has been the support software for MCQ tests. In order to integrate student classifications so as to be more easily retrieved by all teachers, and in order to obtain them more quickly, an MS Excel™ spreadsheet was developed. This allows us to automate the whole process from collecting the students' answers, to obtaining their final classification and calculating important statistics. This paper describes the development process of this tool, which has proved extremely important in the e-assessment method already implemented. Therefore, some of the results presented show: (i) the substantial reduction in the time elapsed between the moment the tests were carried out by the students and the moment of the publication of the grades; (ii) the existence of automatic control in case of duplication of tests by the same student, (iii) the action of complementing MOODLE in the treatment of negative grades of students; (iv) the possibility of performing several statistical analysis that can be organized by class, by subject, by attendance regime to classes (nocturnal versus diurnal), and include comparisons with previous years and tables of frequencies of grades.

Keywords: e–assessment, MS Excel™, multiple choice questions, mathematics, higher education

E-Learning-Based Occupational Therapy Education Leads to Committed Students

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Abstract: In Denmark, there is a political focus on educating people in rural areas, meaning educational institutions are aiming to reach potential students across the country. One way to do this is by providing e-learning. However, a review has shown that there is limited knowledge about students' commitment in e-learning-based professional bachelor education, such as in occupational therapy (OT). The research questions in this study are: Based on the OT students' experiences, how can learning activities be supported in a synchronous and virtual learning environment such as Adobe Connect? How do the OT e-learning students

experience their commitment to learning activities in Adobe Connect? Students find that a sense of belonging to both their fellow students and their education is crucial to their commitment in Adobe Connect activities. It is also important that their fellow students are committed and participate, which requires much self-discipline. This commitment and self-discipline is distinctive for e-learning students for whom these capacities are necessary. Furthermore, there is a significant difference between the students' experiences across semesters, which implies a need for a distinct approach to e-learning. This study presents the findings from interviews and modified memory-work. The interviews were traditional and semi-structured, and involved students from different semesters regarding their experiences of being an e-learning student in OT education. Based on the interviews, modified memory-work was conducted with two students from another semester, which involved writing down the memory of an activity in Adobe Connect. This study is the first to investigate the lessons learnt from e-learning students in OT education in Denmark. Providers of similar education programmes can use the results to form the design of e-learning/blended learning in their programmes in order to enhance students' commitment. The study also includes a modified, phenomenological way of using memory-work. Finally, this study is unique in its use of Adobe Connect in a practical education setting such as OT, and in the use of memory-work as a phenomenological approach. Furthermore, the findings are interesting, as the students experience how a meaningful and helpful online learning environment is based on self-regulated commitment.

Keywords: occupational therapy, e-learning, blended learning, Adobe Connect, commitment, participation, self-discipline, memory-work

Collaborating on a Shared Document: Vocational and Technical Students' Approaches and Experiences

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Abstract: In computer-supported collaborative learning (CSCL) environments, students often need to collaborate on a shared document while they are geographically separated. In this context, coordinating their group work and interacting with each other about the content of the task are prerequisites for successful collaboration. Therefore, the present study aims to gain insight in vocational and technical students' group work coordination and interaction strategies to jointly write a document. Four groups collaborated on a shared document during four weeks and communicated about their task through chat, e-

mail, and/or comments in the document. Two specific tools were implemented to stimulate the coordination of the group work: students were required to (a) collaboratively plan their work, and (b) self-assess their product using performance standards. The following research questions are addressed: (1) How do small groups of vocational and technical students coordinate their group work to collaborate on a shared document? How is this group work coordination strategy related to the use and perceived usefulness of the (1a) planning and (1b) self-assessment tools? And (2) how do these students interact with each other to compose the shared document? Data from multiple sources were collected: activities related to the production of the online document were logged through the revision history, interaction between students was captured, and students were interviewed to gain insight in how they experienced the collaboration and interaction process, as well as the planning and self-assessment tools. The results show that, first, all groups used a different strategy for group work coordination. In addition, despite the implementation of the planning tool, the majority of the groups did not decide upon a specific strategy to tackle the task in advance. Moreover, the self-assessment tool did not seem to stimulate the groups to reflect on their task and to reach consensus about the final product. Second, there was a low level of online interaction between students, and two groups decided to meet each other face-to-face. Finally, implications for further research aiming at providing optimal instructional support for vocational and technical students to enhance the collaboration and interaction processes in CSCL are discussed.

Keywords: group work coordination, online interaction, computer-supported collaborative learning, vocational and technical students, collaborative e-learning, educational technology

Digital Bildung in the Danish Higher Technical Examination Programme

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Abstract: This paper takes its point of departure in the educational reform of the Danish upper-secondary school, which emphasizes the use of technology in the educational sphere. The reform is based on the notion that technological development is a foundation for our society. The ambition is twofold; to compete on a global economic scene, Denmark is dependent on the youth's digital literacies, and in order to participate in the digital society the same competences are required. The teachers' technological and digital literacies are expected to

inform the students' digital Bildung and digital literacies. Through a qualitative study, interviews were conducted with teachers from a Danish Higher Technical Examination Programme (HTX). By applying a critical approach informed by Freire's generative themes and Feenberg's instrumentalization theory, limit-situations, limit-acts and perceptions of technology are investigated. The study finds that technologies at a societal level are perceived primarily as beneficial tools permeating society with minor consequences derived from a formal bias. At an educational level, technologies act as both empowering tools and as problematic disturbances. Digital Bildung is promoted by practical and reflective use of technology, but is centred around certain software which promotes a 'locked' skillset. However, digital Bildung can also be enhanced by removing the technology and reflect on the consequences of its absence. The metaphors used to describe technology suggest an understanding based in soft technological determinism.

Keywords: digital bildung, critical digital literacy, technological literacy, Freirean generative themes, instrumentalization theory

Personalisation of a Moodle Course From Student's Perspective

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Abstract: The aim of this paper is to provide an insight into an LMS Moodle environment, its key features, brief comparison with other learning management systems, but primarily into a course which has been subjected to a questionnaire survey from students' perspective. Students using e-learning as a supporting tool for their presences studies are often dissatisfied with the content and form of their e-learning courses. However, they have no possibility to adapt the course to their needs. The reasons can be that either this LMS platform does not allow any modification of the course (look, content, difficulty ...) or it is the creator of the course that sets the course the same for all students irrespective of their level of knowledge of the given subject matter, way of learning, speed of their possible progress through the course, etc. The previous lines have driven the authors of this paper to look at this problem not from the software creator's point of view, but from the software users' perspective, which is crucial for the success of its outcomes. Therefore, data collected from students has been used to identify key features that might be a subject of further personalisation, which would result in a more efficient and student-friendly learning environment. The final part of the

paper provides a real example of a course used in a university e-learning platform Moodle. The course has been chosen by students as a typical example of a Moodle course that is not of a very high standard concerning the educational content, for of the content, clear arrangement, etc. Based on the questionnaire survey containing ten questions carried among thirty students of a bachelor programme of applied informatics who passed the course called Algorithms and Data Structures 2, the final part of this paper also includes proposals how the course should be modified to be called personalised.

Keywords: LMS, personalisation, e-learning

Use of Neural Networks for Adaptive e-Learning: A Preliminary Study

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Abstract: Neural Computing, e.g. Artificial Neural Networks, is one of the most interesting and rapidly growing areas of research, attracting researchers from a wide variety of scientific disciplines. Starting from the basics, Neural Computing covers all the major approaches, putting each in perspective in terms of their capabilities, advantages, and disadvantages. Their use primarily focuses on predicting future behaviour of the given area, e.g. stock market. Adaptive system is able to react to changes from the outside aiming at minimizing the deviation from the required values that characterise the required state or behaviour of the system. Current adaptive systems take advantage of the use of expert systems. Unlike expert systems that use a predefined knowledge base of rules, neural networks learn from a set of examples thus creating their own unique configuration. The aim of this paper is to consider the use of neural networks in an existing e-learning system featuring adaptive characteristics based on a fuzzy expert system. Neural networks are used as a classifier, which generates personal study plans of students and are able to replace the previously used expert system. Nowadays, the experimental study of the whole proposed classifier is in a testing phase. Neural networks should then replace the fuzzy expert system with the goal to outperform it and to provide more accurate and suitable outputs. The final structure of the system should be simplified as the tool in the form of a series of neural networks. The proposed system should act as the only mediator between the tutor and the student in the process of creating a personalised study plan.

Keywords: neural networks, adaptivity, e-learning, fuzzy logic

Microlearning in Foreign Language Courses: A Threat or a Promise?

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Abstract: *Microlearning* represents a broad concept which has been emerging in recent debates on the nature of dealing with information by the new generations of learners, and besides, its potential is currently being widely discussed in the area of corporate learning and development. Although it is often presented as a completely new phenomenon which has been developing massively over the past few years mainly in the North America, the studies which were published in the European context over the last decade, such as Hug (2007) or Buchem, Hamelmann (2010), clearly demonstrate not only its global nature but also its long-term development, resulting in establishing its firm position in the current educational discourse. In the L&D Global Sentiment Survey 2016, *microlearning* was accented as one of the upcoming global trends predicted by the learning professionals across the globe and therefore, there is an urgent need for some empirical evidence illustrating the predictive validity of its implied potential. This paper attempts to address this particular issue and thus, its aim is to analyse some specific aspects of the phenomenon of *microlearning* within the field of English language learning in the area of higher education. The analysis is supported by means of providing empirical data on *microlearning*, used as an underlying principle of implementing some e-learning, mobile learning and blended learning strategies into the English language courses taught at the university level, such as the interactive platform Kahoot, the language learning app Duolingo and the social network Instagram. The quantitative analysis of the relevant data was conducted by means of a questionnaire survey which was carried out within the group of university students and focused on their attitudes towards the selected *microlearning* tools. These findings are complemented by the qualitative data representing the students' perceptions of the selected tools and by the categorisation of their Instagram posts according to the relevant criteria.

Keywords: microlearning, English language teaching, e-learning, m-learning

Students and Teachers as Developers of Visual Learning Designs With Augmented Reality for Visual Arts Education

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Abstract: This paper reports on a project in which communication and digital media students collaborated with visual arts teacher students and their teacher trainer to develop visual digital designs for learning that involved Augmented Reality (AR) technology. The project exemplified a design-based research (DBR) practice for visual learning design that utilised the competencies of diverse stakeholders throughout the design process. The project's pedagogical rationale for integrating digital technologies in the arts was that the visual digital designs should elicit different new art forms drawing on interactivity and social practices rather than replicate former art forms. Thus, the project participants explored the possibilities for developing a visual learning design based on digital communication technology and contemporary visual arts pedagogy. Furthermore, the project provided an exemplifying basis upon which to discuss the potential for reengineering the traditional role of the teacher/learning designer as the only supplier and the students as the receivers of digital learning designs in higher education. The discussion applies the actor-network theory and socio-material perspectives on education in order to enhance the meta-perspective of traditional teacher and student roles.

Keywords: visual learning design, augmented reality, teacher and student roles, actor-network theory

Design of a Distance Learning Pedagogical Model for the Continuous Training of Judges: Fully, Partially or Never-Online Approach?

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Abstract: E-learning is nowadays considered to be a recognized mean of education and training dissemination, representing a training approach that truly respond to the current challenges of teaching and learning. It has continuously gaining ground as a complement to the traditional systems of education.

Therefore, and bearing in mind the importance of this training regime for modernizing the existing training structures of different professional contexts, a study on this subject has been carried out, aiming to design a pedagogical model of distance training for the magistrates. Thus, our research project focuses on Portugal, in the period from 2014 to 2016, in a training establishment, with a very specific population, the Portuguese judges. This project has been organized around the following research questions: (i) what needs and interests are associated with the implementation of a distance training model in the field of continuing training for judges; ii) what characteristics must a pedagogical model of this nature have, and iii) what level of adequacy of the proposed model to the context and the target audience. This article focuses on a preliminary phase of this project where practices of the international institutions responsible for the training of magistrates were analysed, specifically for identifying the distance training models already used and therefore to develop of a state-of-the-art regarding this topic. Documentation from 17 international schools of magistrates was collected and document analysis procedures were conducted. Main results were used with the purpose of defining the best approach to be used on the development of a distance learning model for this professional group.

Keywords: blended-learning, distance learning, professional training, magistrates

Mixed Messages: Exploring the Experiences of Instructors in a Large-Scale Distance Language Learning Program

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Abstract: Participatory approaches, increasingly being emphasized in education, put a heavy burden on practitioners. Arguably, nowhere it seems are those demands more essential than in teacher guided Internet-based e-learning. The high stakes involved in learners' proactive and critical participation in knowledge building online as opposed to passive assimilation, are closely connected to successful learning and indeed are the lifeblood of highly effective and sustainable Virtual Learning Environment (VLE) programs. A proliferation of recent studies aimed at the complex issue of online participation has justifiably focused primarily on learners' perspectives. At the same time, there is a paucity of studies based on teachers' experiences in these programs. This oversight is surprising given the well-established connection between effective teachers and successful learning outcomes. The paper addresses the concern for uncovering teachers' voices. It builds on extensive quantitative and qualitative data

generated in a larger study that examined an innovative large-scale distance language-learning program offered across a network of private universities in South America. The aim of this follow-up inquiry was to uncover the perspectives of the group of instructors employed in this international distance program. Within the qualitative paradigm we adopted a case study methodology and used field notes, video-recorded and transcribed group and individual interviews and a numbers-based questionnaire in the data collection process. Our focus was on the experiences of instructors interacting with learners through social media on an interactive learning platform and in a web-conferencing classroom. The findings clearly indicate that even amongst such enthused and committed educators regarding online learning, complex and powerful forces within the program context prevented many of these professionals from resolving the issues they faced in engaging learners. Unraveling and understanding these forces seems essential in order to support the kinds of teacher identities that can influence learner investment in online social learning sites.

Keywords: virtual learning environments, distance learning, teacher identity, interactive learning, learner engagement

The Voice of the Students: Needs and Expectations From Learning Management Systems

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Abstract: Today, many education institutions are exploiting learning management systems (LMS) as part of the learning delivery process. The accessibility of the Internet and the ubiquity of digital devices has made the LMS a popular platform for online learning, blended learning, or face-to-face learning delivery among education institutions. As the LMS plays such a key role in the learning process of the students, it is essential to reflect on the issues students may have faced in their use of the LMS and to understand their needs and expectations from the LMS. Adopting the voice of the customer (VOC) process, which is used in new product or service design to determine customer requirements, this study attempts to investigate the issues, needs, and expectations of university students from the LMS by listening to their “voice.” Using a mixed-methods approach, this study first gathered LMS-related issues in a focus group from students who were studying in a blended-learning environment at a local university, followed by a large-scale questionnaire survey to collect data on students’ LMS needs. After ranking the students’ needs in order of importance to them, a follow-up focus

group study was then conducted to examine students' expectations for each need. Findings showed that seven needs were important in relation to students' use of the LMS. These seven needs, in order of importance, were: "LMS allows easy enrolment of subjects", "LMS allows easy access to learning materials"; "LMS provides fast access to learning materials"; "LMS allows download of multiple files all at one time"; "LMS operates normally most of the time"; "Learning materials are available on LMS one week before lectures"; and "LMS can be accessed from a mobile app." However, the students did not convey a strong need to have control over the types of notifications they receive from the LMS; to have a more attractive LMS design; to have a reasonable website response time; to have a live chat feature to interact with lecturers; and to have a uniform web interface across subjects. Findings from this study would help LMS developers to design the LMS better, and lecturers to use the LMS more effectively to meet the needs and expectations of university students.

Keywords: blended learning, student expectations, learning management systems, student needs, voice of the students

Connecting eye to eye: The Challenge of Computer Supported Contact

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Abstract: Computer Supported Collaborative Learning (CSCL) is used a framework for supporting online and blended learning in educations. Online communication and collaboration are fostered by prior face-to-face social contact (Dau, 2015). Correspondingly, social collaboration is to a significant extent based on the establishment of direct eye contact (Khalid, Deska and Hugenberg, 2016), but direct eye contact is challenged by the position of the digital devices and thus CSCL. Lack of eye contact is the chief contributor to the negative effects of online disinhibition (Lapidot-Lefler and Barak, 2012) and the problem is the location of the web camera on the computer. Eye contact is challenged by the displacement between the senders' and receivers' focus on the screen picture and the camera's location at the top or bottom of screens on all digital devices. The aim of this paper is accordingly to investigate the influence of the displacement in eye contact using CSCL. The research question address the impact of the displacement

of eye contact in the collaborative problem-solving process and the consequences for the design of a CSCL environment. Based on the epistemology of social constructivism and the theory of communities of practice, the paper adds a theoretical framework for the investigation made. The research method is based on the principles of interaction design. Lecturers and students from graphic design technology, computer science, software development and web-development are included in the study. The study is part of the development of a cross-border digital commuting learning environment in the Baltic Sea Nordic countries. It is revealed that eye contact is essential for collaboration in the problem-solving process. Moreover, it is stressed that there is a need for adding new visual representations in computer supported collaboration. Based on the results, recommendations for prototyping and further research are suggested.

Keywords: CSCL, eye contact, online disinhibition, collaboration, problem-solving

Adoption of Micro and Mobile Learning in German Enterprises: A Quantitative Study

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Abstract: According to human resource experts, micro and mobile learning are possibilities for enterprises to provide self-regulated learning for employees. For example, these modern learning concepts can help to support work-integrated learning and lead to a stronger link between working and learning. But are micro and mobile learning already used in companies? Studies with large samples that examine the current use of these learning concepts in companies, are missing. Thus, the first objective of this article is to investigate the dissemination of micro and mobile learning within enterprises to get an overview of the current situation. As previous studies indicated that only a minor proportion of companies use the new learning concepts, our second objective is to identify influencing factors of the adoption of micro and mobile learning. Therefore, we conducted a quantitative study among 1000 companies in Germany to validate the results from a preceding qualitative interview study and a literature review. 100 companies participated in the survey. The results of the quantitative survey show that micro/mobile learning are currently used in 39%/33% of the surveyed companies. In addition, the participating enterprises also assessed concrete application scenarios for micro and mobile learning in enterprises and the suitability of these learning concepts for education and training of employees. Furthermore, the results highlight some reasons for and against the use of the

learning concepts within enterprises, which are summarized in a research model based on the Technology-Organization-Environment-Individual-(TOEI)-Framework. The influence of the reasons on the adoption is calculated using a regression analysis. This paper contributes to the knowledge base in a twofold way: First, the article draws researcher's attention to micro and mobile learning in organizational settings and demonstrates needs for future research. Second, important influencing factors for the adoption of micro and mobile learning are presented. These could be used by practitioners to integrate the learning concepts within their company.

Keywords: micro learning, mobile learning, enterprise, quantitative study, survey, TOEI-framework

Blended Learning: Concept, Emerging Practices and Future Prospects

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Abstract: The general aim of this paper is to review scholarship on blended learning (BL) as theory and practice and to critically examine directions, perspectives and results in programme implementation and research. The paper starts with an exploration of BL as a concept, reasons for adopting it and then presents an overview of implementation attempts and research studies in this emerging but expanding field. The issues arising from the overview are discussed to highlight emerging trends, models, and common practices in the hope of promoting a better understanding of BL. As an expanding approach to programmed instruction that mixes face-to-face (FtF) and online modes of delivery, it is important to discern the possible (inter)connections between learning aims, teaching goals, the deployment of technology and human interaction that make up the "right blend". The discussion leads to the assertion that BL has the potential of changing the face of e-learning on condition future BL programmes are informed by data-driven practice and pedagogically-oriented research which focuses on exploring the learning opportunities resulting from the specific BL activities, the technologies utilized and explaining how these choices impinge upon the evolving learning experiences in BL hybrid environments (Saltan, 2017). The paper ends with a discussion of possible research avenues likely to help build the necessary knowledge base for prospective researchers, educational leaders and practitioners.

Keywords: blended learning models/approaches, collaborative learning, mixed delivery modes, face-to-face instruction, hybrid spaces, e-learning environment, redesigning instruction

Educators' Pedagogical Concerns on Blending ICTs in Teaching

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Abstract: This paper presents the concerns of the higher education learning educators' concerns regarding the blending of Information and Communication Technologies (ICT) in teaching. Many studies have been conducted that discuss the benefits, implementation, success and failures, but little on the perspectives of educators regarding blended learning, a popular education strategy in the 21st century. This study investigated and uncovered the educators' concerns as well as suggestions for a successful blended learning approach. An educator cohort of fifteen educators voluntarily participated in the interview sessions with the semi-structured questions guided by the lens of the Technology Acceptance Model (TAM). Qualitative data were collected based on purposive sampling to ensure a larger representation of educators currently employed to lecture at one of the state universities in Zimbabwe, a developing country in Southern Africa. The research findings are of benefit to the ICT-enabled and pedagogy researchers as well as the higher learning institutions' administrators. The findings have indicated that while educators find the blended learning to be an added value in teaching and learning, several concerns also emerged, which are viewed as challenges of the successful implementation of the blended learning strategy. Such concerns requiring immediate redress included issues relating to infrastructure inadequacy, classroom setup not conducive to blended learning, lack of technical and management support as well as lack of motivation. Recommendations for improving these conditions included improved infrastructure, management support and incentives for motivating educators already involved in blended learning.

Keywords: blended learning, higher education institutions, concerns, educators

Inspiring Change in e-Training Sports Coaching: Lessons Learned From a Descriptive Study

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Abstract: This research focuses on the repercussions experienced when changing to an e-training model for skating coaches, within four skating specialties: speed skating, artistic skating, roller skating, and rollerblade skating. The sample was of 90 sports coaching students enrolled in their first training year. The methodology was mixed, which highlights the differences between the four sports specialties when it comes to the use of the online platform. To collect the information, an ad-hoc questionnaire was created, consisting of two parts: a) the first one with nine items, relating to personal characteristics of a quantitative nature; and b) the second part addressing qualitative aspects, also with four items, of the changes the new Technologies, the platform, and distance learning could offer trainees. The data was drawn from the SurveyMonkey[®] software for quantitative descriptive analysis. The analysis explored the qualitative methodology by means of the use of the QSR-10 Nvivo software for the open answers on the questionnaire. The quantitative results reveal the following distribution of sports coaching students: 11.95% rollerblade skating, 18.87% roller skating, 27.04% speed skating and 42.14% artistic skating. As to the question of previous experience in distance learning, the differences among them were shown to be: 42.1%, 40%, 60.5% and 34.3%, respectively. The qualitative analysis reveals a positive opinion concerning the benefits that the use of the platform represents for the sports coaching students, regardless their previous experience in such a new medium. The difficulties are attributable to two main causes: (a) use of the platform by the instructors; and, (b) the lack of use of the platform during the first days of training. From this analysis, we can conclude that the use of the platform requires improvements in the explanations of how it works, and an improved space management for the faculty (instructors) so that coaching students become familiar with the use of the platform more efficiently. This first conclusion should go hand in hand with reinforcements, and raising the level of e-training for the instructors themselves, so as to enable them to become more familiar with the potential that this platform has to make their courses more attractive.

Keywords: e-learning, sports coaches, skate modalities, empirical research, qualitative-quantitative research, moodle platform

Teachers' Role in Blended Learning: The Emperor's new Clothes?

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Abstract: From a theoretical perspective, this paper problematizes the future role of teachers in higher education, especially in the Swedish context, placing opportunities and raised challenges by blended learning in a historical context of distance education. Distance education was introduced in the late 19th century and has been offered by two main actors in Sweden: the correspondence school Hermods and universities. It has been viewed as a part of life-long learning, a concept introduced in the 1960s. The correspondence schools offered elementary education courses, and in-service training for various professions, while universities largely focused on higher education but also provided education or training commissioned by other organizations. Recently, the teaching requirements and role of the teacher in distance education have changed dramatically, from formulating exercises and commenting on students' work to giving videotaped lectures in English for an open audience. However, there is still a lack of appropriate guidance for teachers on effective pedagogical practice in the new settings. Specifically, there is an increasing need to support teachers in designing and creating effective videotaped lectures that are accessible for a dispersed audience. The TED talks seem to provide a role model for performance as a lecturer, but the average teacher hardly has time to both prepare regular face-to-face lectures and distance lectures, e.g. extensively rehearse before recording. The paper discusses how the challenges of future roles of teachers can be met when lecturing in front of a camera.

Keywords: distance education, correspondence school, blended-learning, recorded lectures

A Double-Loop Learning Model for User-Involved Implementation of Learning Platforms (LMS) in Schools

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Abstract: Given the rapid and ubiquitous adoption of learning platforms across educational systems, an urgent need for implementation strategies for the

platforms has arisen. This article proposes and examines a model for user-involved implementation that supports the development of innovative and situated learning designs subject to standardised technological constraints. By 2018, all public schools in Denmark are required to have implemented a digital learning platform that satisfies a requirements specification produced by Local Government Denmark, the association of municipalities in Denmark. The Danish Ministry of Higher Education and Science has launched a research project involving 14 public schools in order to generate knowledge on how to best support the implementation of the platform. The empirical data for this article stem from a sub-project addressing this effort. Methodologically, this sub-project takes its cue from Design-Based Research. An intervention has been designed that consists of so-called 'future workshops', design workshops and micro-tests in order to facilitate design experiments conducted by the participants from the public schools. Observations have been made on the overall intervention design and the testing of the experiments. Interviews have been conducted with the participating teachers and administrators before, during and after the experiments. The data have been analysed qualitatively, inspired by grounded theory. Using theory on the production and sharing of design knowledge in the form of 'design narratives', 'design patterns' and 'design scenarios', the article proposes a double-loop implementation model that integrates the participants' analyses of their existing experiences with technology with their proposals for the future use of the platform. In the article, we propose an answer to why a platform subject to specific, nationally standardised requirements are adopted differently across similar schools. Our answer hinges on the connection between technological constraints and the schools' different levels of access to design patterns for the meaningful use of the technology, various levels of technology literacy, the teachers' imaginative capacity for developing design scenarios, the existing discourses surrounding technology, and changes introduced into the school ecology.

Keywords: learning platforms, learning management system, user involvement, implementation, design knowledge, design-based research

Online Digital Mentorship: How Might a Digital Communication Tool Facilitate Informal Learning and Integration of Newly Arrived in Sweden

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Abstract: The arrival of large groups of refugees is one of the great challenges in Europe today. In Sweden around 100 000 new immigrants is expected to arrive from Syria only during 2017 and there are large groups from various countries already staying in Sweden that are not properly integrated. There are no quick and smart solution to solve the inclusion of the large number of new citizens and the idea should rather be a holistic approach combining several initiatives. Lack of language skills is one of the underlying reasons for new arrivals exclusion from the labour market and social networks. Online informal language learning and digital mentorship with two way communication between New Arrivals and established Swedes might be a way to facilitate the inclusion and integration process. The aim of the study was to examine to which extent a digital communication tool could act as a resource in order to make the integration process more effective for newly arrived immigrants and refugees. Research was carried out as a qualitative cross-sectional study with data gathered by semi-structured interviews. Five educators who are actively working with newly arrived immigrants and refugees were interviewed with use of the Skype tool. A thematic analysis was conducted to find patterns and to create themes and categories that could answer the main research question: *How might a digital communication tool be designed to facilitate the integration and inclusion of new arrived refugees in Sweden?* The answers could be structured according to two overall themes: “Usable” and “Flexible”. The theme “Usable” consisted of three sub-themes *Ease of Access*, *Improved language skills* and *Integrity Facilitation*, while the theme “Flexible” was divided into two subcategories *Adaptable* and *Educational content*. The findings confirm that a digital communication tool would support integration of new arrivals by facilitating personal dialogues with established Swedes. The recommendation is to create an online platform that supports language learning and enables multi-way digital mentorship in a social network with benefits for the established Swedes as well.

Keywords: newly arrived refugees, immigration, integration, inclusion, online communication, informal online learning, e-learning

LearningGlasses app: A Smart-Glasses-Based Learning System for Training Procedural Knowledge

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Abstract: Applying procedural knowledge is important in situations in which manual working tasks need to be executed. Exemplary activities exist in many enterprises (e.g. repairing machines) as well as in private life (e.g. do-it-yourself activities). However, procedural knowledge for manual working tasks is difficult to train using common learning tools like paper-based manuals or e-learning modules as learners are often not able to apply the learning content at the same time while learning. A possibility to improve the training is to provide learning content in situated learning contexts hands-free. One emerging technology that is able to do this is wearable computing (e.g. smart glasses). Thus, the main objective of this paper is to determine how a smart-glasses-based learning system can support learners to train manual working tasks. Therefore, we present the LearningGlasses App, which provides step-by-step guidance through working processes by displaying learning content in situated learning contexts via the head-mounted display of Google Glass. In this way, learners have the possibility to execute a working process simultaneously while it is displayed in their field of vision. To develop the learning system, we followed the design science research approach. Consequently, we started our research with a real-world problem, which we derived in a previous study using a literature review and expert interviews. Based on this, we present the subsequent design, implementation and evaluation phase of the LearningGlasses App in this paper: After designing the application, we implemented it as a proof-of-concept for Google Glass. Finally, we evaluated the application in a laboratory experiment. Using this methodology, we are able to provide design recommendations for smart-glasses-based learning systems for training procedural knowledge. The results of our research can contribute to both, research and practice: First, it contributes to the research knowledge base, as it may be used as starting point for further research projects (e.g. regarding technical or didactical aspects). Second, practitioners get insights about how to provide learners with the possibility to train manual working tasks using smart glasses in situated learning contexts. Furthermore, they can use the outlined design recommendations to implement learning applications for smart glasses in practice.

Keywords: wearable learning, smart glasses, wearable technology, procedural knowledge, design science research

Educational Networking Platforms Through the Eyes of Czech Primary School Students

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Abstract: Instruction with the use of new media is being discussed at all school levels. Networking platforms, which include terms such as Social Network Sites, Web-based Learning Networks, Educational Social Network Sites, etc., are one of the major tools that meet the demands placed on innovative instructional activities in the online environment. These Web 2.0 tools bring new possibilities to education not only at the didactic level, but also at the relationship level. Not only do they encourage cooperation, they also enable sharing and new forms of synchronous and asynchronous communication. As far as primary education is concerned, especially private networks are used to ensure the safety of students by limiting their access in cyberspace. This paper is a partial outcome of a complex research project aimed at the implementation of social media into the primary school environment. The authors present the existing results of an empirical research on upper primary school students in the Czech Republic, which were obtained through a questionnaire survey and an interview, respectively. The first part of the research is aimed at determining the level of the students' ICT skills, with an emphasis on their network and digital literacy, and the possibilities for the use of networking platforms in the education process. The second part of the research examines the stimuli that encourage interaction, i.e. sharing between two and more subjects in the network environment. The research aims to determine not only the students' motivation to actively participate in knowledge sharing, but also their willingness to share their knowledge in order to achieve the common goal (not only) in cooperative instruction. The acquired data should help clarify the students' patterns of behavior (i.e. their reasons for and what they expect from active participation) in a virtual educational environment, which will be crucial in designing the educational model of cooperative learning in the network environment.

Keywords: questionnaire survey, students' ICT skills, ICT in education, interview, educational social networks

Home Schooling and Computer-Based Collaborative Activities

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Abstract: The paper focuses on collaborative activities used in one form of distance learning, the so called home-schooling. As shown by several authors, collaborative activities play an important role in face-to-face education, regardless of their form. In the here presented study the focus is on collaborative activities used in online teaching and learning. The authors analyse what type of collaboration particular activities support and look at their advantages, disadvantages as well as their limits. Attention is also paid to their potential to get home-schoolers more involved in collaborative activities. The results were obtained through analysis of several online lessons and from interviews with a small number of pupils.

Keywords: collaborative learning, computer-based collaborative activities, home schooling, interaction teacher-pupil, interaction pupil-pupil

PLE as a Tool for the Development of the Learning to Learn Competence

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Abstract: The meaningful, complex and effective use of information and communication technologies (ICT) in education has been a widely discussed topic for a number of years. With new technologies come new ways of their use. Our research focused on the contribution of ICT to the education process. The paper introduces the results of an empirical research aimed at the development of the key learning to learn competence through the Personal Learning Environment (PLE). This competence was selected due to its impact on lifelong learning. Despite its importance, the teachers tend to overlook this competence. A four-step model – E-R-R-A (Planning and evocation, Contact with sources, Reflection and Aggregation of knowledge) – was designed to carry out implementation of the aforementioned environment and the related information and communication technologies into the education process. Not only does the model enable the controlled and systematic use of the PLE in both humanities and science courses, it can also be used to build any instructional unit. The research

was designed as a pedagogical experiment. Upper primary school students participated in the experiment. The PLE was represented by a web application designed specifically for this purpose. Respecting the fundamental principles of the PLE, the application features a number of tools and services which students could use during instruction. The paper presents the results of a data analysis obtained through evaluation of projective tests. This type of test was used to determine the current level of the key learning to learn competence. The students took the tests twice (six months apart and following the PLE-based instruction). The presented results not only reveal a new method for developing the key learning to learn competence, but also introduce new ways of using modern information and communication technologies in the education process (especially tablets and cellular phones). Moreover, projective tests have proved to be an effective method for measuring the level of mastery of key competences. Furthermore, the paper introduces research areas which the authors would like to explore in the near future.

Keywords: personal learning environment, key learning to learn competence, E-R-R-A model, mobile technologies and devices, projective test, web application

Trialling Online Proctoring for e-Assessments: Early Outcomes from the Erasmus+ OP4RE Project

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Abstract: This paper describes the initial research discussions and outcomes from the first year of the Erasmus+ Online Proctoring for Remote Examinations project (OP4RE). This three year project is a partnership of eight contributors and received confirmation of funding in July 2016. It is now reporting on the activities of its first year's work. The partners are committed to developing a set of research-based protocols and guidelines for ensuring that the use of live remote proctoring/invigilation can provide a secure and private means for online assessments taken by students located away from their university's physical campus, when compared with assessments taken in a traditional examination hall with local invigilators. Students may opt to take assessments remotely for several different reasons: some are following a complete online distance learning programme and may be located anywhere in the world with internet access. Other students may be based locally to their institution but choose online assessment for its convenience. This is particularly true for students who study

part-time and are in employment, or those who have child-care responsibilities. Other students are physically unable to attend their HEI because of disability or lack of reliable transport at a reasonable cost. The aim is for the remote proctored assessment to be of equal quality and security compare with a campus-based assessment. The student experience of sharing their identity and then 'being watched' by a remote proctor while taking an assessment is also researched. This project has the aim of showing how the student experience of being proctored online can be no more stressful for assessments when taken in their chosen personal environment. Multiple sources of evidence indicate that taking an assessment in a large examination hall can be a very stressful occasion for students. The paper highlights the lessons learned already from a pilot study into remote proctoring undertaken by one of the partners and the feedback received from this. It details outcomes from the activities and pilot studies undertaken during 2017 by the different academic partners and reports on the student feedback to date comparing preliminary research outcomes.

Keywords: remote proctoring, online invigilation, e-assessment, distance learning, student experience, OP4RE

The Students' Experiences With Live Video-Streamed Teaching Classes

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Abstract: The Bachelor's Degree Programme of Biomedical Laboratory Science at VIA Faculty of Health Sciences offers a combination of live video-streamed and traditional teaching. It is the student's individual choice whether to attend classes on-site or to attend classes from home via live video-stream. Our previous studies revealed that the live-streamed sessions compared to on-site teaching reduced interaction and dialogue between attendants, and that the main reasons were technological issues and the teacher's choice of teaching methods. One of our goals therefore became to develop methods and implement technology to facilitate interaction through increased technological transparency. In this paper,

we present and discuss organizational and educational designs as seen from the student's point of view. We do so by investigation of how students experience participation, interaction and technological transparency in the live video-streamed teaching sessions during a 5-year period of continuous development of technological and pedagogical solutions for live-streamed teaching. Data describing student's experiences were gathered in a longitudinal study of four sessions from 2012 to 2017 using a qualitative method inspired from mobile probes (Ørngreen & Jørgensen, n.d.). The research results document a continuous progress in technological transparency, as the live video-streamed classes increasingly support the student's flexibility in ways of attending and interacting in classes. The analysis shows that the students have different needs (as a learning space for individual concentration or a space for highly focused collaboration) and that the technology can meet these different needs. It also shows that there are challenges, similar to many other classrooms. In this live-stream classroom interaction is facilitated through teacher driven support, resulting in classes where students can interact and collaborate equally with on-site students. We therefore argue for a sociocultural understanding of learning as situated, mediated and distributed, which this e-learning-solution support.

Keywords: technological transparency, e-learning, live video-streamed classes, student's flexibility, student's interaction

On Linking Problem-Based Learning Activities and Students' Learning Styles in Personalised Learning

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Abstract: The paper is aimed to present an original method of identifying students preferring to actively use Problem-Based Learning (PBL) activities in personalised learning process. In the paper, the authors use an original learning personalisation approach based on identifying students' learning needs (namely, learning styles), suitability of learning components (e.g. learning activities) to learning styles, probabilistic indexes of learning components' suitability to particular students, and on applying intelligent technologies. Proposed method is aimed to personalise learning by applying Felder-Silverman learning styles model and intelligent technologies i.e. expert evaluation, ontologies and recommender system and thus to improve learning quality and effectiveness. Literature review presented in the paper revealed that PBL is a popular student-centred pedagogy in which students learn about a subject through the experience of solving open-

ended problems found in trigger material. The PBL process does not focus on problem solving with a defined solution, but it allows for the development of other desirable skills and attributes. This includes knowledge acquisition, enhanced group collaboration and communication. The method of identifying students preferring to actively use PBL activities is based on identifying those activities' indexes of probabilistic suitability to particular students according to their learning styles. Proposed method includes expert evaluation techniques and the method of identifying probabilistic suitability indexes to particular students. Thus, we could easily identify which students prefer to use PBL in their learning process mostly. After that, corresponding ontologies and recommender system should be created to propose the most suitable learning activities to particular students. These new elements make the given work distinct from all the other earlier works in the area.

Keywords: personalised learning, problem-based learning, learning activities, learning styles, expert evaluation, suitability indexes, ontologies

A Technique to Adapt Course Presentation in Moodle

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Abstract: Learning styles play a crucial role in students' success in a course. This article presents how a course can differ among learners with different learning styles regarding the position of the learning objects in the particular course. The proposed technique was implemented in Moodle so as to be used either for an e-learning course or for blended learning. Although this technique is implemented in Moodle it can be easily integrated in any other Learning Management System as long as it is able to provide the same types of learning objects. Two evaluation studies of a Moodle course were conducted in the context of an introductory programming course in order to examine the effectiveness of the proposed technique and students' feedback on it. In both studies, two groups were formed, namely the experimental and the control group. The adaptation technique described in this paper was applied for the experimental group, while the control group had access to the standard version of Moodle. The studies were conducted during the winter semester of the 2015/16 and the 2016/2017 academic year, respectively. Both studies were conducted over the first six weeks of the course, up to the mid-term exam. On completion of the respective course sections but prior to the mid-term exam, all students had to answer a questionnaire evaluating the attended course. The questionnaire consisted of five-point Likert type

questions evaluating the proposed adaptation technique, system usability and motivational appeal. The aim of our analysis was to investigate whether our adaptation technique helped students to improve their learning outcomes without increasing Moodle's complexity. Summarizing the findings of the study, we come to the conclusion that the implementation of the proposed technique into Moodle is positively evaluated by the experimental group, resulting in significantly higher grades on the mid-term exam comparatively to the control group.

Keywords: learning management system, learning styles, adaptivity, student modelling

Information Competencies as a key Factor of Teacher Education: The Polish Context

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Abstract: In modern society, information has become a measurable product. Every social activity is conditioned by information, which should be true and reliable. Internet technology – having become an infinite source of information - does not provide any credibility in terms of information reliability, so the individual is expected to independently take care of it. Essential to such conditions are information competencies, which determine the ability to define the information needs necessary to accomplish tasks, and the effective and responsible gathering of reliable information. The obvious challenge for modern education is therefore to shape and develop information literacy at all its levels. To make this possible, information literacy must become an absolutely indispensable attribute of each teacher. The presented text is empirical and is an attempt to answer the research question: To what extent do teachers' information competencies affect the adaptation of education to technologically conditioned social changes? The research was carried out at the Pedagogical University in Cracow. Students - candidates for the teaching profession, took part in the study.

Keywords: information competencies, teachers, information literacy, teacher training

Didactic Aspects of e-Learning Courses From a Joint Research Point of View

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Abstract: Under certain circumstances, e-learning can make learning a direct, individualized, interactive and interesting process integrated into the learner's everyday life. It reveals the potential of new forms of communication, be it communication between learners, or between learners and their tutors. In e-learning, students do not manage their learning process entirely by themselves. It is a process of regulation (tutor, learning guide, etc.) with the elements of self-management (choice of learning strategy). All of the above makes e-learning directed self-study. The learners have the main responsibility for the results. However, they should study in a favorable learning environment. Individualization and flexibility is only possible when the learner can choose from a variety of courses, the content of which can easily be modified. Individualization is based on adaptation of instruction to each learner according to their ability. Self-study is made possible by presenting the curriculum in small units. Each unit should be followed by collecting feedback from learners on whether they understood its contents and are able to apply what they have learned. This also allows for an individual learning pace, which is an enormous advantage over frontal instruction in a classroom. The presented curriculum should be didactically sound and should contain no logical gaps and/or redundant information. This paper introduces the results of a research aimed at implementation of ICT into university instruction, finding the didactic content of individual courses and the most frequently used LMS (Learning Management System) tools. The quantitative part of the research was aimed at determining the status of didactic processing of the content of individual courses and the diverse use of ICT resources to improve learners' motivation. The qualitative part was aimed at a particular way of using ICT resources in individual e-courses, implementation of ICT into instruction from a didactic viewpoint and how e-learning instruction is perceived at a university, especially in instruction of future teachers. Following the qualitative research, the quantitative analysis was conducted on e-courses in the Moodle LMS, focusing on the pedagogical-didactic level of those courses. Following an empirical joint research, a typology of teachers' theories on e-course instruction will be created.

Keywords: e-learning, educational environment, qualitative survey, quantitative survey, Moodle LMS

Designing MOOCs for Teacher Professional Development: Analysis of Participants' Engagement and Perceptions

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Abstract: Massive Open Online Courses (MOOCs) are widely recognized as a new form for on-line learning while they have recently attracted interest with regards to teacher professional development. This paper reports on a study concerning a MOOC designed to support secondary education teachers' development towards using Web 2.0 tools in language instruction. The principles that determined the particular MOOC design framework were directed by four dimensions of teachers' participation: a) engagement and creativity, b) peer interaction, c) mutual support and d) collaboration. A total of 589 language teachers from secondary education schools were enrolled in this MOOC, which achieved high completion rates (62.5%). We used a mixed method that combines the analysis of a) participants' engagement through platform records and b) teacher interviews' transcripts. The results provided supportive evidence that the design framework was effective towards promoting teachers' motivation, active engagement, peer interaction and support, and development of learning design abilities to integrate Web 2.0 in their classroom. In addition, the findings revealed teachers' satisfaction with regards to the perceived value of this particular MOOC and their willingness to adopt MOOCs as an effective method for their professional development.

Keywords: MOOCs, e-learning, teacher professional development, learning design

Significance of Technology Integration in Higher Education Classes: How do Kinesiology/Sport Science Students Rate Technology use in Gym-Based and Classroom-Based Courses?

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Abstract: Technology integration in regular higher education classes seems to be pretty much standard in contemporary study programs on the college/university level. However, some particular subjects may adopt, apply, or even reject up-to-date technology-enhanced teaching strategies slower or faster than others, due to subject content, tradition, or other various reasons. This study focuses on one of these subjects, namely Kinesiology/Sport Science, and emphasizes the students' perspective. To investigate how Kinesiology/Sport Science students rate their classes regarding technology use, all classes of a regular semester term (n=60) hosted by a German University's Department of Kinesiology/Sport Science were surveyed using a validated student ratings questionnaire (HILVE-II) that was adapted according to technology integration (n=713). In addition, students' media literacy and media behaviour was also assessed via questionnaire (n=154). As the "signature feature" of Kinesiology/Sport Science programs is the mandatory inclusion of gym-based (GB) courses that require students to learn and perform certain sports or physical activity tasks, this study's interest lies in a possible distinction of students' ratings regarding technology use between these GB courses and "normal" classroom-based (CB) courses. Results showed that students tend to acknowledge the positive significance of technology integration within their study program, although GB courses implement less technology-enhanced course designs. Cross-referencing diverse instructional media (e.g., book, projector, etc.) with GB courses and CB courses revealed that some media was rated less or more important for the respective course type. For instance, books and projectors were assessed less important for GB courses in comparison to CB courses. Linear regression showed that students' technology-use experience gathered from study program classes accounted for 21.7% of the variance in their technology-use significance-ratings for GB courses, whereas technology-use experience gathered from study program classes accounted for 24.5% of the variance in students' technology-use significance-ratings for CB courses. Conclusively, future study-program designs and tweaks may consider implementing and improving technology-enhanced course designs for both GB courses and CB courses to increase students' ratings in regard to technology-integration significance.

Keywords: technology integration, higher education, student attitudes, technology uses in education, kinesiology/sport science

Factors Affecting Student Attendance at Online Tutorials in TU100 my Digital Life

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Abstract: The information Superhighway has opened up opportunities for people to learn at an advanced level without having to attend a higher education institution. There are a number of tools such as Blackboard which are used to provide online content and to allow students to collaborate both asynchronously and synchronously with their peers and with their Tutor. The Open University (OU) in the United Kingdom (UK) has a track record of utilising technology to allow students to participate in learning without formally attending classes in the traditional way. It has been possible for a number of years to utilise products such as Blackboard Collaborate to provide an online alternative to a traditional tutorial or seminar. The authors experience has shown that students are reluctant to utilise technology to collaborate in online activities as alternatives to the traditional tutorial or seminar. The motivational factor of using technology as part of the E-Learning experience does not appear to be working with low participation rates at on line tutorials from those who attend. This paper seeks to explore student attitudes to participating in online Tutorials on the Open University Course TU100 My Digital life through the use of a questionnaire based survey undertaken with the 2016-2017 module cohort. The paper attempts to interpret the empirical research in order to identify factors which are either encouraging or discouraging students from participating in online Tutorials on the TU100 course my Digital Life.

Keywords: e-learning, distance learning, synchronous communication

Blended Learning: How to Combine Different Ways to Interact Online

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Abstract: Adult students need to be activated and engaged to optimize a learning process (Knowles 1984, Rogers 2007). In online learning, it is challenging to obtain engagement and interactivity, even when combining asynchronous and synchronous communication. At The Inland Norway University of Applied Sciences, different takes on creating activity and engagement have been tried out. Projects using mandatory on-campus seminars, different types of media and live tutoring have shown that there is a need for blended learning. This paper presents different ways of utilizing both on-campus and online teaching. Our approach to collecting data is a combination of qualitative and quantitative research. We have observed and interviewed students, and on a particular group of students that both have online and on-campus lectures, we have collected data from a survey. Our respondents have been both students and lecturers. Our theoretical backdrop rests mainly on theory on blended learning approaches, adult learning and theory on co-creation of consumer value. Findings and results are a combination of Lervik's PhD work and Vold's PhD work. Preliminary results point towards a combination of online and on-campus teaching is preferred and provide an optimized learning outcome. Some students, e.g. full time employees, prefer the blend of online and fewer on-campus seminars as this provides them with the opportunity of studying whilst keeping a full time job. It also allows them to stay at home – most of the time – and not move in order to study. Some students may also have a family situation that makes going away to attend classes e.g. every week is difficult. Our results also show that to start the semesters with an introductory seminar that requires attendance provides the students and teachers with the possibility of being acquainted. This enables the development of trust that lays the ground for involvement and engagement, and also boosts communication between peers (students) and between student – teacher. Lowering the threshold for contacting fellow students allows colloquial groups or “communities” to form easier than for students that only have access to online learning. Learning from peers is important for the total learning outcome. Different learning styles also require different approaches. A blend of different learning approaches will thus support the individual's learning outcome.

Keywords: blended learning, communication, engagement, interactivity, asynchronous and synchronous communication

Teacher Practice and Pedagogical Competence Building in a Digitally Permeated Learning Environment

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Abstract: Teachers in Danish primary schools face new professional challenges because digital learning environments are changing the professional practices regarding pedagogy, classroom management and the agency, roles and relationships between students and teachers. This paper presents the results from a qualitative research and development study conducted as an action research-based case study. The study aimed to explore the impact on teachers' practice in a digitally permeated learning environment and to identify areas for their competence building. The research questions were as follows: 1) What options and constraints affect students' potential as active learners? 2) How do students perceive the learning objectives of the activities in question? 3) How do feedback and process-evaluation improve students' ability to actively contribute to their own learning process? The study took place over the course of one week in January 2016 at a large Danish provincial primary school. The learning design was student-centred and open, aiming to invite students to actively contribute and take responsibility for their own digital and multimodal productions within various subjects or interdisciplinary topics. As action research, the researcher and the teachers collaboratively discussed the emerging challenges regarding the students' ability to take on responsibility and agency, and explored new practices and methods. The anthropological data collection methods included observation and thick description, informal conversations, meetings, interviews, video documentation and the collection of various artefacts. The study identified three learner strategies. These emerged in relation to the combined digital learning environment as well as the open and student-centred learning design. The study found that teachers' awareness of and attitude toward the learners' strategies and their way of inquiring into the students' work and reasoning were more important teacher competences than digital skills when facilitating the students' learning in a digitally permeated learning environment. Based on the findings, the paper presents areas for further teacher competence building.

Keywords: digital learning environment, teacher competence building, learner strategies, tinkering, learning design

Brazil's Challenges Facing Didactics and the Curricular Stage for Distance Teacher Training

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Abstract: This research is one of the results of broader research that sought to analyze the process of implementation of the Open University of Brazil (Universidade Aberta do Brasil - UAB) in a public higher education institution. The objective of this research was to make a theoretical, bibliographic and documentary survey of the main challenges faced in distance courses in Brazil, mainly teacher training, in its didactic-pedagogical aspects that involve the teaching-learning process and the curricular internship. The research methodology sought to collect the data on the website of the Brazilian Association for Distance Education (Abed - research in all periods presented on the website), in the publications of the National Association of Postgraduate Studies and Research of Education (Anped) in the period 2012-2015. Information was also collected from the thesis and dissertation database of the Coordination for the Improvement of Higher Education Personnel (Capes) in the period 2012-2015, and from the Census of Higher Education of 2012 and in the data of the EAD.br Census 2015. The authors who analyzed the research data collected were: Belloni (2002); Alonso (2005); Farias et al. (2009); Moore (1997); Moore and Kearsley (2007); Peters (2009), Pimenta and Lima (2004), Simonson et al (2015). The data showed that there has been little research carried out within the scope of curriculum internship in the distance education modality in Brazil. It also revealed that challenges are similar to that of presential teaching and that organization is necessary for presential support and for the different personnel that deal with the students so that accompaniment, orientation and supervision can occur in a way that promote the construction of knowledge, research in the field, as well as the relation of theory and practice in a way that can better aid student development. Regarding didactic-pedagogical processes, there is research in the area but the results do not clearly advance the construction of specific characteristics for didactics in the modality of distance education. Research and studies are lacking in this area.

Keywords: distance education, online teaching-learning process, teacher training

Academic Staff Perceptions and Challenges in Technology Integration: A Case Study of Walter Sisulu University

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Abstract: Integration of technology in higher education institutions (HEIs) is a national priority and much work has been conducted and reported on the benefits derived from information and communication technology (ICT) integration. The focus in most universities, however has been on the provision of technology tools to students and lecturing staff, and not enough effort has been made in training and capacitating academic staff on ICT integration. Walter Sisulu University recently embarked on a mission to increase participation in teaching and learning with technology to 80% of its staff and students by 2020. As part of this strategy the university provided e-learning tools to both students and academic staff between 2014 and 2016 with the use of these tools being monitored by the Centre for Learning and Teaching Development (CLTD). This paper discusses the objectives and intended outcomes of the ICT integration strategy by the university. It further analyses data collected on academic staff perceptions, how lecturers integrated technology in their teaching as a way to enhance student learning as well as the challenges experienced in ICT integration by the university. Lecturer perceptions indicated a reluctance in using technology due to challenges in the university that currently hinder the practice; this was attributable to a lack of in depth training in ICT integration which led to misinformed presumptions by the lecturers. Capacitating academic staff on how technology use provides additional opportunities to support new ways of learning is a key component in the successful integration of technology. The paper concludes with recommendations for the university on the proposed planning and academic staff professional development initiatives for continued and effective success of ICT integration using the technology integration models. This will lead to enhanced teaching and learning thereby improving student success rates at the university.

Keywords: technology integration, higher education, learning and teaching with technology, educator perceptions, technology uses, professional development

On Predicting Student Performance Using Low-Rank Matrix Factorization Techniques

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Abstract. Predicting the score of a student is one of the important problems in educational data mining. The scores given by an individual student reflect how a student understands and applies the knowledge conveyed in class. A reliable performance prediction enables teachers to identify weak students that require remedial support, generate adaptive hints, and improve the learning of students. This work focuses on predicting the score of students in the quiz system of the Clio Online learning platform, the largest Danish supplier of online learning materials, covering 90% of Danish elementary schools and hundred of thousands of students. In particular, we formalize our prediction task as the *weighted* low-rank matrix factorization (LRMF) problem, a very attractive problem in machine learning community due to its extensive applications in collaborative filtering. We investigate the two variants of weighted LRMF including standard weighted LRMF and weighted non-negative LRMF, and apply the Expectation-Maximization (*EM*) procedure to solve them. We also study different Singular Value Decomposition (SVD)-based initialization methods for these variants since the *EM* method is sensitive to the initial values. Experimental results in the Clio Online data set confirm that the proposed initialization methods lead to very fast convergence. Regarding the prediction accuracy, surprisingly, the advanced *EM* method is just slightly better than the baseline approach based on the global mean score and student/quiz bias. In order to understand the behaviour of the algorithm, we extract a dense subset of the data set and visualize its eigenvalue spectrum. The highly skewed eigenvalue spectrum of such subset explains our interesting findings. We conclude that since the active students in the platform perform very similar and the current version of the data set is very sparse, the very low-rank approximation can capture enough information. This means that the simple baseline approach achieves similar performance compared to other advanced methods. In future work, we will restrict the quiz data set, e.g. only including quizzes with a time limit, considering several quiz types. We expect that students will behave differently and the advanced *EM* methods might improve the prediction accuracy.

Keywords: predicting student performance, collaborative filtering, matrix factorization

Staff Perceptions of Technology Enhanced Learning in Higher Education

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Abstract: This study looks at academics' perceptions of, and attitudes to, educational technologies in the context of the intrinsic and extrinsic barriers to adoption which confront them. Academic and support staff at a university in the south of England were surveyed, in part, to establish the reasons given by staff for non-engagement with Technology Enhanced Learning (TEL). What emerged was a mismatch between self-reported barriers and the reality of abilities demonstrated in other areas, for instance the personal use of social media. Our study findings were consistent with those such as, Reed (2014) and Bertolo, (2008), which have indicated that staff cited 'lack of time', 'lack of equipment' and a 'lack of skills' for the failure of educational technologies to act as the transformational tool that many educators believe them capable. Yet, those same staff, in other sections of the survey, indicated far greater technical competency than would be required for most TEL initiatives. While this dissonance resonates strongly with Ertmer's (1999) work on first- and second-order barriers to the adoption of new technology amongst practitioners, we also noted a more active resistance which appears to be linked to resentment of the perceived institutional imposition of new technology, combined with professional performance metrics which fail to reward innovation in learning and teaching. We also found evidence to support the idea of a Slow Revolution (Drucker, 1999) in technology enhanced learning, wherein technology is becoming embedded in teaching practice over a number of years, often long after the hype of its original introduction and expected overnight impact. In light of these findings we discuss ways in which institutions might embrace the Slow Revolution, while at the same time attempting to address the second order barriers which hinder progress.

Keywords: TEL, technology enhanced learning, pedagogy, attitudes

School as Digitally Competent Educational Organization: Specific Preparation for Work Positions and Educational Roles

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Abstract: The utilization rate of e-learning and e-assessment at all school levels goes hand in hand with the ICT (digital) competencies of teachers. Teachers can develop their ICT competencies in specialized courses, undergraduate preparation, further education and/or through informal learning. The development of ICT and its use in education has prompted schools to establish the position of ICT coordinator, which, in the majority of cases, is held by one of the teachers. Moreover, it has also been proven that the effectiveness of ICT is influenced by particular managerial activities of the school management. Based on an analysis of teacher's professional standards, teacher's digital competency standards and the European Framework for Digitally-Competent Educational Organization the article defines the subjects implementing and supporting the application of ICT in school using a model of digitally competent school agents. The model makes it possible to identify specific areas of preparation for ICT for each participant, taking into account their teaching subjects and the function executed at school. This study is outcome of IRNet project (*International Research Network for study and development of new tools and methods for advanced pedagogical science in the field of ICT instruments, e-learning and intercultural competences*), which is co-financed by the European Union in 7th Framework Programme for Research.

Keywords: professional competences of teachers, digitally-competent teacher, digitally-competent educational organization, digitally-competent school

On Using Learning Analytics to Personalise Learning in Virtual Learning Environments

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Abstract: The paper aims to analyse application of learning analytics (LA) to support learning personalisation in virtual learning environments, namely Moodle. In the paper, first of all, literature review was performed on LA methods and techniques used to personalise students' e-learning activities. Literature review has revealed that LA are known as the measurement, collection, analysis, and reporting of data about learners and their contexts to understand and optimise learning and environments in which it occurs. In the paper, an original methodology to personalise learning is presented. Second, existing Moodle-based learning activities and tools were interlinked with students' learning styles according to Felder-Silverman learning styles model using expert evaluation method. Third, a group of students was analysed to identify their individual learner profiles, and probabilistic suitability indexes were calculated for each analysed student and each Moodle-based learning activity to identify which learning activities or tools are the most suitable for particular student. The higher is suitability index the better learning activity or tool fits particular student's needs. Fourth, using appropriate LA methods and techniques, we could analyse what particular learning activities or tools were practically used by these students in Moodle, and to what extent. Fifth, the data on practical use of Moodle-based learning activities or tools should be compared with students' suitability indexes. In the case of any noticeable discrepancies, students' profiles and accompanied suitability indexes should be identified more precisely, and students' personal learning paths in Moodle should be corrected according to new identified data. Thus, using LA, we could noticeably enhance students' learning quality and effectiveness.

Keywords: learning analytics, e-learning, learning personalisation, learning styles, virtual learning environments, expert evaluation

Towards a Mobile Augmented Reality Prototype for Corporate Training

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Abstract: Maintenance and repair skills can be very complex. Traditional methods of training may not have potential to meet future trends in maintenance and repair. In the light of this, Augmented Reality (AR) is a very promising application of an emerging technology, combining virtual environment with the real world, to support procedural tasks in corporate training. Since AR-based training is directly linked to physical objects/devices of the training context, where some additional information are overlaid onto a real world context, maintenance and repair skills could benefit from the implementation of AR in training programs and users could take advantage by using this new technology while performing job tasks. In this paper, we present an ongoing research, concerning the application of Augmented Reality technology to e-learning system for corporate training purposes. The first step of our research consists of the development of an Augmented Reality Web App for maintenance and repair training purposes, which will be useful to aid the user in the execution of some procedural tasks. In order to achieve our goal, we engaged a worldwide elevators company: Sematic-Wittur, which is volunteer participating to some phased of the research. After the development of the Web App, hands-on and evaluating test sessions will involve a focus group of the company. Moreover, our research will go one step further by analysing the efficacy of AR in corporate training in comparison with the evaluation of other training methods in the same field. Finally, the collected data will be analysed quantitatively and qualitatively. Our ongoing research aims to figure out if corporate training would get a valuable help from the implementation of AR in training programs, seeking to explore the advantages of the use of this new technology in maintenance contexts' needs. In this paper, we begin from a theoretical framework on AR, we describe how we apply AR to training purposes and we explore the potential of AR, looking at the initial results of our ongoing research and at the work that is still to be done.

Keywords: mobile learning, augmented reality, corporate training

Student Activity in Blended Learning Environments: A Sociomaterial Perspective

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Abstract: This paper investigates uses of blended learning in teacher education where students participate through respectively webinars, seminars and self-directed group work to study literacy. Based on a recently implemented study activity model that aims to strengthen teacher students' academic activity, the paper asks how different patterns of relationships and spatial arrangements produce student activity in specific ways. How are forms of participation, learning and presence performed through webinars, seminars and group activities and in connections between these activities? How do technologies participate in and contribute to creating student activity, engagement and learning? The paper builds on research in a Danish teacher education college where a study activity model has been implemented as part of a joint model for activity in professional higher education. In this model learning is understood through forms of activity that are either student or teacher initiated. However, in practice not only students and lecturers participate in and produce these activities, technologies such as smartboards, pc's, online platforms and cloud based environments are also significantly involved in creating activities, engagements and learning opportunities. The research project investigates these relationships by studying the arrangements and practices of activities through observations of different activities and interviews with students. Preliminary results from these interviews suggest that arrangements of activities not only vary significantly, but also affect students' preferences and experienced potential for learning in different ways. Methodologically, the research is inspired by sociomaterial approaches to education that understand learning activities as entanglements created through dynamic relationships between human and material participants.

Keywords: teacher education, participation and student activity, webinars, sociomaterial perspective

Play-Based Learning for Programming Education in Primary School: The Östersund Model

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Abstract: Learning to program has been classified as problematic learning with high drop-out rates and low motivation at university level. Like the learning of a natural language the learning of syntax and basic techniques in a programming language is easier and more natural if started at a younger age. This study is based on an evaluation of a pilot project for students in a Primary school where computational thinking and programming concepts have been introduced as play-based learning. Students have learnt concepts such as ‘Bubble sort’ by playing the algorithm without any computer. Later the learnt concepts and algorithms have been implemented with Scratch and the Python programming language as main tools. The aim of the study is to describe and discuss a model for implementing computational thinking and programming for fifth grade students by play-based learning. As the overall research strategy the case study approach was used to evaluate this pilot project. Data has been collected in a combination of observations, interviews and group discussions during a 15 session pilot course and three workshops on teacher training. Findings have been analysed thematically and presented using the SWOT framework to identify and discuss strengths, weaknesses, opportunities and threats in the Östersund model. Learning outcomes of the pilot were promising but with individual variations in the student group. The idea of introducing programming and computational thinking as early as in primary school seems like a good idea, but the recommendation is to keep sessions play-based and with enjoyment as the key feature to engage primary school students. Conducted sessions in the pilot are worth replicating and so are the teacher training workshops. However, the challenge that remains is to create a sustainable and scalable implementation of the described model including primary school teachers’ professional development.

Keywords: play-based learning, programming education, computational thinking, play-based learning, teacher training, NOOC

Constructing Knowledge Through Mobile Devices

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Abstract: Nowadays, it is generally accepted that digital technology has the potential to influence, or better yet transform the education process. Digital technology not only enables data collection (through measuring, process modelling, simulation, calculation, etc.) and data processing, but also helps present it in new contexts. The learners can construct their knowledge by solving appropriate tasks in the digital environment. One of the possibilities is to use mobile touch devices which, compared to desktop computers, feature various sensors and thus enable measuring, data collection and construction of new knowledge (during processing of results). The paper is aimed at the use of mobile touch devices in physics instruction. Noise measurement conducted in the vicinity of the school, on both busy and quiet streets, traffic observation, etc. not only enabled students to construct knowledge about sound and its properties, but also about the environment in the vicinity of the school. The instruction process was based on Gagné's nine levels of instruction and guiding principles of constructivism – experimenting and measuring provides specific experience that leads to construction of knowledge (terms) and further experiments.

Keywords: mobile device, Gagné's level of instruction, constructivism, sound

Relationship Between Student's Note Taking Activity and Their Reflections During a Blended Learning Course

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Abstract: In order to improve participant's learning behaviour, careful consideration should be given to the contribution of note taking activities to emotional aspects of learning. Surveys were conducted twice using a questionnaire which measured the degree of student's self-efficacy, note taking skills and fundamental characteristics. In addition, the contents of notes recorded by students during the course were evaluated lexically. The number of valid participants who presented their notes was 53. Changes in participant's responses during the course were observed in subsequent analyses. These results indicate

that note taking activities have a causal affect on emotional factors of learning. The further study of learning behaviour is also discussed in order to improve learning performance.

Keywords: note-taking, reflection, self-efficacy, causal analysis

Teaching Tutors to Train Online: Quality Assurance in a Blended Learning Setting

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Abstract: Increasing use of technology in higher education has come to support different forms of learning and teaching. For this reason, quality management and quality assurance in teaching and learning have emerged as important topics in higher education. Our aim was to contribute to the quality of teaching (within the context of e-learning) by addressing the way in which tutors are trained. This paper reports on a train-the-trainer program for online tutors as part of the quality management of a multimedia study program at a dual-mode university in Austria. Qualified teaching and teaching assistance staff are essential to the quality of teaching and learning. In our blended learning program, online tutors (advanced students) supervise online learners and support the teachers of online courses. Qualified online tutors affect the quality of student supervision and of online course design. The tutors responded very positively to the training program.

Keywords: train-the-trainer, online learning, quality management

Exploring Mindsight via Email Communication in Learning Environment

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Abstract: This paper explores mindsight in virtual communication, examining problems people face while communicating in virtual spaces with a focusing on email communication. Many have documented the problems encountered when they are communicating with others on email. Face to face communication includes facial and interpersonal clues that enhances interaction. Other problems people face include misunderstanding in communication and information overload. These problems disrupt workflow, and can cause stress among workers,

which in turn reduces job satisfaction and production. These problems are common in academic world, especially among people found in learning environment, who have to use email communicate continuously because of the nature of their job and activities. It is believed that every learning environment utilizes one form of email communication or the other on several levels and for different purposes. Scholars have put forward suggested technical solutions that are mainly software and policy inclined. This paper attempts to understand the human in-depth factors to the problem. Data collection for the study commenced by sending questionnaires to students to assess the levels of their communication in relation to their environment, personal tendencies, being understood and understanding others during email communication etc. Evidence in the data analysis suggested that most of the students found it difficult to retain attention while doing their emails and they were unable to understand how others felt. It was also discovered that people do not necessarily seek to be understood when they send email communication. Based on the findings, it was concluded, that an intervention, such as *mindsight*, might enable people to retain attention with some level of personal and environmental awareness that might enhance their ability to understand their feelings and that of others while communicating on email. Therefore, it is recommended that a more rigorous application of *mindsight* exercise should be explored by students who engage in virtual communication in learning environments.

Keywords: virtual communication, learning environment, email communication, *mindsight*, reflective practice

Awareness, Accessibility, Utilization of Continuous e-Education Programmes of Clinical Blood use: Policy Implications

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Abstract: Introduction – The clinical use of blood has shown to be the least developed part in the vein-to-vein transfusion chain. This global study was therefore carried out in order to investigate the level of awareness, accessibility and utilisation of continuous e-education and quality of blood use among blood prescribing clinicians and nurses. Approach - A descriptive '*ex-post facto*' survey design was used. Total number: 264 purposively selected blood prescribing clinicians and nurses from the 4 Human Development Index (HDI) groups of

countries (Low, Medium, High, and Very High) participated. Three research questions were answered, while seven null hypotheses were tested at .05 level of significance. Descriptive statistical tools (frequency counts and percentage) were used to analyse the demographic backgrounds, while inferential statistics - Pearson Product-Moment Correlation Coefficient (PPMC), Analysis of Variance (ANOVA), were used to analyse the hypotheses. Observations - Quality of clinical blood use was positively and significantly correlated with levels of awareness ($r = .137$; $p = .03$; $df = 262$) and accessibility ($r = .184$; $p = .01$; $df = 262$) to clinicians/nurses. There was significant difference in levels of awareness [$F(3,260) = 53.942$, $p = .01$], accessibility [$F(3,260) = 38.582$, $p = .01$], and utilisation [$F(3,260) = 24.858$, $p = .01$] of continuous e-education among clinicians/nurses based on HDI grouping, particularly between very high and low HDI. Furthermore, there was significant difference in levels of accessibility [$F(6,257) = 6.444$, $p = .01$] and utilisation [$F(6,257) = 13.704$, $p = .01$] of continuous e-education among clinicians based on clinical specialty/department and a significant difference in quality of clinical blood use based on clinical specialty/department [$F(6,257) = 9.677$, $p = .01$]. Conclusion - Continuous e-education is a *conditio sine qua non* to effective and quality clinical blood use. It is therefore recommended that clinicians should endeavour to update their knowledge and practice through continuous e-education.

Keywords: blood prescribing clinicians/nurses, e-continuous learning, awareness/accessibility/utilization, quality, clinical blood use

The Learning Potential of Video Sketching

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Abstract: This paper introduces a *video sketching* technique applied to learning settings and investigates what participants learn from creating and redesigning videos while sketching. This process links various sketching techniques and creative reflection processes to video productions. Traditionally, designers across various disciplines have used sketching as an integrative part of their everyday practice, and sketching has proven to have a multitude of purposes in professional design. The purpose of this paper is to explore what happens when an extra layer of video recording is added during the early sketching phases. Using empirical examples, this paper presents and discusses the video recording of sketching sessions. The empirical data is based on workshop sessions with researchers, students and teachers. Inspired by the work of Olofsson and Sjölin

(2007), the sketching sessions were organised into four different phases: investigative, exploratory, explanatory and persuasive. The findings show that adding video to investigative and explorative sketching sessions adds a different time and space dimension, allowing participants to identify and return to crucial moments, such as when one idea spawns a new one or another is rejected. Also, video can make participants very and even too self-aware, though in explanatory and persuasive sessions, this may support participants to use more precise and explicit language. Based on these experiments, four different steps of collaborative video sketching have been identified: shaping, recording, viewing and editing. Combined with the different modes, these steps constitute the basis of our *video sketching framework*. This framework has been used as a tool for redesigning learning activities. It suggests new scenarios to include in future research using the setups presented in the two cases in this paper. Thus, the *video sketching framework* is to be viewed as a dynamic framework that is open for further exploration.

Keywords: video sketching, learning, reflection, technologically enhanced learning, creativity

Challenges When Preparing and Implementing in e/b-Learning Courses: Lessons Learned

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Abstract: More and more educational institutions worldwide are adopting models related with e/b-learning to offer their courses. This means that more and more teachers are preparing and adapting their courses to a different approach, using technology to mediate the learning process and, most of the times, self-learning on how to do that. Evidence shows that this process may not be straightforward and that teachers, most of the times, use a trial and error approach to overcome fears and mistakes. We believe it is time to do a public reflection about the challenges these teachers are facing as well as to identify good practices that might be shared with others, allowing them to avoid the same mistakes already lived by their colleagues. In this paper, we present the results of this reflection and share some of the good practices related with the offer of e/b-learning courses, from the perspective of the teacher.

Keywords: e/b-learning, teachers, challenges, education

Through Assessment and ePortfolio Towards Self-Directed Learning

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Abstract: Assessment has always played a key role in education. In the world driven by external assessment it cannot be assumed that all adult learners have a full capacity for self-directed or autonomous learning. Moreover, every learner possesses different capabilities and exhibits distinctive preferences. Generally, we can distinguish two main approaches to assessment. These are assessment of learning also called summative assessment and assessment for learning, in other words formative assessment. Although they are very often contrasted they can be applied in a complementary manner. Along with the term standardized assessment we can increasingly encounter a concept of alternative or authentic assessment. ePortfolios and their assessment are often classified as authentic. Numerous universities have been recently introducing guidelines on how to make their assessment more authentic. In this article a theoretical research of the above mentioned ways of assessment placed in the context of recent approaches to assessment is presented. The review is furthermore supported by an analysis of single phases of a learning cycle which is a subject of a case study of a language course given at all three levels of tertiary education at the University of Pardubice, Czech Republic. The course is aimed at facilitation of autonomous language learning by means of combining consecutive stages of assessment, self-assessment, goal-setting, evidence-based learning ePortfolio, and finally by assessment for learning. The aim of the course is to guide students towards becoming more autonomous and active learners in order to increase their ownership of learning and self-direction skill which can be further adopted and applied in their future learning.

Keywords: assessment, self-assessment, self-directed learning, autonomous learning, ePortfolio, language learning

Designing Test Tasks in Adaptive Testing

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Abstract: A didactic test is a tool that informs the teacher of the level of students' knowledge. It is used at all levels of education, in the final assessment and/or university and high school entrance examination. It has become even more important with the emergence of eLearning. Electronic testing allows for automatic assessment and immediate feedback for students, storing results in a database and monitoring and comparison of results. Moreover, distance tests also play an important role in distance learning where oral examination is more difficult to carry out than in full-time education. The didactic test should provide the teacher with detailed feedback on each student, their successes and their future development. In the majority of cases, however, the didactic test and formulation of test tasks only take into account the students with average results. For the students at the opposite poles of the spectrum (excellent and weak students, respectively), such a test may be easy and boring or, on the other hand, extremely difficult. However, modification of the difficulty of test tasks, their division into individual levels of difficulty and the creation of additional study materials may benefit those students. The more levels of difficulty there is, the better and more accurately we can react to the student's answers. The additional study material may come in the form of different kinds of help, particular study material (in PDF format) or the entire problem-solving process, including the correct answer. Creating a test which would be able to adapt the formulation and difficulty of individual test tasks according to the student's answer would accomplish the following: the student's knowledge would be assessed more accurately; it would help improve their results and increase their motivation to study. This paper is aimed at the proposition and creation of test tasks with regard to the level of difficulty, their formulation and the creation of individual types of additional study materials.

Keywords: didactic test, test task, electronic testing, difficulty, adaptivity

Look Here! Are There Gender Differences in Learners' eye Movements While Using an e-Learning Platform?

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Abstract: The research field of eye tracking is double-minded upon the question whether differences in visual behaviour might emerge from gender. When looking at related work, there is evidence for both positions. Some studies show no differences whereas others claim that in specific contexts there are indeed differing visual perceptions of females and males. Existing studies almost do not cover the specific context of e-learning, so there is very little research in the field of e-learning for this research question. Therefore this paper tries to address this issue and is focusing on eye movements of female and male learners, who engage in an online test of an e-learning platform and interact with the graphical user interface (GUI) of the same. In total, 36 volunteers (18 females and 18 males) were eye tracked in order to gauge differences in their visual behaviour. This paper investigates eye movements of learners with respect to four layout areas of the GUI: instructions, visuals, selection as well as navigational items. For analysis, five traditional eye tracking metrics were examined separately for each of the four layout areas. Statistical analysis included one-way analysis of variance (ANOVA) as well as post-hoc tests including pairwise t-tests with pooled SD and Bonferroni correction. Moreover, gaze transition matrices were generated to further investigate the sequential patterns of eye movements of both groups. Doing so, visual shifts between the four layout areas could be investigated in detail. Results indicate that gender has no strong overall effect on eye movements during the use of an e-learning platform. However, three marginally significant effects were detected. First, female users' have a higher reading speed on instructions, second - female users tend to get a faster holistic overview of the GUI as well as third, male users tend to be more likely to focus on salient areas of visuals than female learners.

Keywords: eye tracking, eye movements, gender, differences, visual perception, e-learning

Supporting Critical Thinking Through Digital Learning and Teaching: A Portfolio Process

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Abstract: They are nothing new: portfolios have been around for many years and today the electronic portfolio is still proposed by many educators as a ‘storage space’ for artefacts. This paper presents evidence that ePortfolio is so much more as it is capable of being a digital learning space that assists in the development of critical thinking. Employers often note that new graduates have poor communication, critical thinking and problem solving skills. We explore reflexive approaches to building students’ critical thinking skills through use of the visual image and by encouraging educators to explore their own self-efficacy as a learner. By creating evidence of an individual’s professional or personal identity we demonstrate how a reflexive process to create a portfolio (as both a learning and teaching tool) can support improvements in critical thinking to support learning (and teaching), student outcomes and benefit life long learning. Conference participants were asked to take a photograph of something literal, metaphorical or symbolic that represented a facet of themselves before exploring how that photograph is representative of their professional or personal ‘self’. The process that followed demonstrated how students (the next generation of professionals) can be encouraged to reflect on the what, how, why and who of themselves. This element of the paper presentation provides a practical example of a critical thinking process associated with self-reflection and portfolio creation. Understanding how learner professional identity intersects with developing a learning portfolio, through the use of personal images, is valuable for those teaching with digital tools. Investigating the progressive ways portfolio processes and products can be used to develop a professional identity through encouraging students to reflect and connect themselves to multi faceted identities is the paper’s main outcome. Assisting students to develop a “sense of self” by aiming to improve one’s own critical thinking is how an ePortfolio can be effectively used to do more than just store work samples and resumes.

Keywords: ePortfolios, visual image, professional identity, higher education

A Reuse-Based Approach for the Development of OpenCourseWare in a Crowdsourcing Platform

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Abstract: On-line learning resources attract great interest from governments and educational institutions as they may be shared and reused, thus lowering production costs and fostering knowledge interchange among teachers and learners. These resources known as Open Educational Resources (OERs) include a wide variety of educational materials, among which are OpenCourseWare (OCW). The sustainable development of the education sector can be achieved by having available, accessible, multilingual, and high-quality OCW. However, currently there is a lack of educational content with these key features due to the fact that their creation and maintenance is tedious, time-consuming and expensive. One way of alleviating the labor-intensive work of creating and maintaining learning materials is by using a collaborative authoring platform such as the open-source SlideWiki platform 2.0 (<http://stable.slidewiki.org>) that allows users to create and maintain OCW (e.g. slide presentations and self-assessment tests) in a crowdsourcing and on-line fashion. In general, collaborative authoring has improved the efficiency, effectiveness, quality and timeliness of content creation; this has been proven in different domains such as text and software code. Therefore it is expected that in the educational domain, a crowdsourcing approach helps to increase the quantity and quality of OCW. Learning materials can be reused in two different ways: (1) learning materials used for different educational events and (2) learning materials used as components during the authoring process. This second perspective helps to reduce the production cost of new high-quality OCW with particular features such as accessibility and multilingualism. However, there is currently no systematic approach to reuse learning resources as ingredients in the educational content creation process. In this paper we present a novel approach for the creation of learning materials that is based on reusing educational content that may be presented in different languages, and on the crowdsourcing concept. The proposed approach uses the collaborative SlideWiki 2.0 authoring platform and is applied to a particular use case for the production of learning materials in the Semantic Web domain. The educational materials produced are used in undergraduate, graduate and open community courses and are enriched by groups of authors and course participants.

Keywords: OpenCourseWare, reusable learning object, crowdsourcing, collaborative

Toward a Personalized Game-Based Learning Environment Using Personality Type Indicators

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Abstract: Previous Educational research indicate significant impact of game techniques on immersion and motivation of learners that leads to better learning outcomes; moreover, it has been recognized that adaptive learning enhances learning process; nevertheless, the adaptation based on learner's personality has not been well researched in games-based learning (GBL) literature. There are plenty of game elements that can be used in an educational game, but the effects of them may vary due to differences in personality types of learners. The purpose of this paper is to investigate the impact of various game elements on learning outcomes and behaviour of learners in an adaptive game-based learning environment. We have focused on analysing the effect of game elements based on various personality types aiming to improve the learning process. For the purpose of our study, an educational game has been developed which is an online vocabulary learning game and includes Myers-Briggs Type Indicator (MBTI) questionnaire as personality test. With the aim of comparing the effect of game-elements on each personality type, the game has been prepared with several adaptation modes which each of them consists of an assortment of game elements. Individuals based on their personality types have been assigned randomly to one of these modes. The results represented significant differences between engagement levels of participants in various modes. The sensitivity analysis of various personality dimensions relative to the game elements has been determined, and it has been statistically measured that which types of personality are significantly sensitive to the presence or absence of specific game elements. This paper presents the prominent and influential elements for each of personality types. The results of this research both directly and indirectly can be used in an educational setting. The direct usage is possible in integrated learning systems where it is possible to fill out a questionnaire; otherwise according to the obtained relations between personality types and behaviour of learners, the results can be used by implying the user's personality by tracking her/his behaviour based on existing research on this area.

Keywords: game-based learning, game-elements, personality, MBTI, engagement, learning outcome

Systematic Review of Challenges and Gaps in Flipped Classroom Implementation: Toward Future Model Enhancement

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Abstract: New forms of education reflect digital changes surrounding us. Blended learning becomes the essential part of the education process. Flipped classroom is a recently emerged hybrid classroom model, which engenders tremendous interest from teachers all over the world. It demonstrates the original education approach, which combine existing components in an innovative design. The core components of flipped classroom consist of transfer of knowledge part in a video form and in-class problem-based learning part through activities and group work. The combination of different teaching approaches, within one course, adjusts to different learning styles. Having taken out the lecturing part from the class, it is used for the face-to-face communication and activities. Hence, the student-teacher interaction increases, making the learning more individual, as well as, the communication in the class becomes more intensive. Most of flipped classroom experiments study their effectiveness, focusing on students' score and satisfaction. Authors describe the significantly increased students satisfaction and slightly increased score and other parameters, comparing with traditional classroom. At the same time, they highlight numerous number of challenge and gaps in design. This systematic review focus on reported gaps, drawbacks and challenges, derived from students' and faculty' feedback. The dataset is collected from Scopus. From 1256 selected articles, 49 were rigorously reviewed. The results describe the barriers for teachers and students, divided by categories. Teachers most frequently face lack of resources, lack of skills, design gaps and evaluation issues. It is worth mentioning, that limited time is a major problem. The categories of barriers for students include design issues, technical and resources. Here resources are not so important as soon as most of students have basic equipment. In addition to the barriers, results present most insightful guidelines and recommendations toward enhanced flipped classroom.

Keywords: blended learning, flipped classroom, barriers, improvements

How can I Help you to Assist me to Teach you?

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Abstract: Systems Analysis and Design is a second year subject offered as two modules over a year in the Information Technology course at the North-West University. Students struggle with the high volume of work and the fact that the subject is not relying on logical thought such as mathematics and programming. In 2015, it was decided to split the class; students doing the module for the first time and those repeating the module. This allowed instructional design according to the repeating group's needs. In the South African context students face many challenges in their endeavour to obtain a tertiary qualification. Any of these challenges may deter a diligent student in a way that it necessitates the repetition of a subject module. It is therefore accepted that repeating students already have a basic knowledge of the subject matter, which enables scaffolding of deeper knowledge. With this context in mind, all material, tools and support that are available to newcomer students are also available to repeating students. The material may be perceived as repetitive in nature, but aims to support different learning preferences. With this infrastructure, repeating students are left to decide how they need to utilize the material at their disposal to prepare for an interactive class. To support repeating students, but also interrogate the notion of providing material that addresses different learning preferences, it was decided to request the repeating group of students to complete a questionnaire to identify their learning preference. They report on this experience by compiling a learning contract. During the semester students are requested to learn more about their learning preference, and make suggestions for improvement regarding resources addressing their personal needs. This is done by means of an assignment. Later on, during the module following on the module in focus, their experience is interrogated by directing their reflection on the matter. An open-ended questionnaire is utilized in this intervention.

Keywords: learning preferences, action research, system change

A Model-Based Software Product Line for Differentiated Instruction in MOOC

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Abstract: In this paper, we propose a flexible and efficient approach that supports modeling of differentiated instruction within MOOC. The diversification of learners' needs is a fact, taking them into account is an abstraction. For such a need, the theoretical framework is based on differentiated instruction as regards the technical framework is covered by the Software Product Line engineering. The purpose is to identify learners' needs and their requirements beforehand; then take them into consideration when modeling to improve the quality of MOOC and reduce the cost and time of development.

Keywords: massive open online courses, differentiated instruction, software product line engineering, model-driven engineering, educational standards, variability

Comparison of Adaptive and Multimodal Education

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Abstract: This paper focuses on how the adaptation to sensory type of student affects the outcome of learning. The already conducted experiments found out that students reached better results using the adaptive learning. The article follows an outcome from English teaching, in which the content was adapted to the sensory type of student. It has been proven that the student's sensory type has a big influence on the results of his studying. That is why this paper focus on the adaptation to the sensory types. There are four sensory types; visual, verbal, auditory, and kinesthetic. In adaptive education the content of learning is adapted to the different characteristics of the individual student. Before the start of adaptive education, students have filled in a questionnaire that measures their sensory type. After that they filled in the pretest, then studied and then filled the posttest. The experiment was conducted on three types of school (high school, university and grammar school) where two kinds of study materials were used: online and offline. Online education was done in adaptive system Barborka4 where students were given one of the four variants of study material. The students were given the variant that best suited their sensory type. Offline

material was multimodal (all sensory types) pdf file that had all multimedia types together and students of all sensory types used it. All of the students studied one chapter from offline material and then from online adaptive system. The analysis of the outcome of learning shows, that the difference in student learning from different schools but on all schools students were learning better from study material in form of offline multimodal pdf.

Keywords: adaptive education, learning styles, questionnaire, sensory types, multimodal

Role of Reflection in Blended Learning Language Courses in Higher Education

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Abstract: Blended learning is a pedagogical model that combines face-to-face classroom instruction with the innovative use of online learning experiences. While the combination can be said to enhance pedagogical variety through numerous methodological possibilities for onsite and online learning, particularly the online components are at times criticized for the lack of deep, cognitive, meta-cognitive and social learning. The role of reflection is therefore significant in engaging students in blended learning and enhancing their behavioural, emotional and cognitive processes. This is particularly poignant when developing academic and field-specific language skills in an online environment. This paper presents the implementation and student perceptions of two blended learning university courses for English for academic purposes. In these blended learning language courses, students were provided the opportunity to develop their academic language skills through individual and collective reflection and were encouraged to engage in reflective and collaborative learning with online tools for the synthesis, evaluation and assessment of their own and their peers' learning. In both courses, the visible role of the lecturer was reduced and most of the discussion, reflection and commentary during the course was performed by the students as peer feedback or peer assessment. Asynchronous online tools were actively used throughout the courses to engage students to the reflective and collaborative learning process. In these courses the consistent and active use of weekly tasks, reflection and peer comments were considered by the students as essential to developing their academic English language and communication skills in a blended learning environment. Since blended learning allows students more time to reflect on their thoughts rather than participate in discussions instantaneously in the classroom, this was a systematic and positively received

part of the course progression. The results indicate that reflection is an integral part of online and blended learning to promote deep learning, self-awareness and the development of academic language and communication skills.

Keywords: blended learning, reflection, English for academic purposes, higher education

Flexible Study Pace, Mental Disabilities and e-Learning: Perceived Problems and Opportunities

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Abstract: Flexible study pace distant courses provide opportunities for students with disabilities to attend courses in higher educations as opposed to campus courses with fixed schedules. At least that is what we believe. This study investigates how mentally disabled students perceive taking distant courses with flexible pace and also how their teachers perceive opportunities and challenges. Flexible pace means here distant courses where students can start when they like and keep the pace they prefer. The courses in question are part of a two year program of eService Development at Dalarna University in Sweden. The program was launched in 2006 and admits ca 50-80 students each semester. Many of the students are unable to take campus courses of various reasons such as living far from universities, working daytime, etc. We sent out questionnaires to students with disabilities and to teachers asking them semi structured questions about perceived challenges and opportunities regarding the studies. The students had mental disabilities such as Dyslexia, ADHD, Asperger syndrome, Chronic Fatigue Syndrome, and Social Phobia. The answers have been analyzed qualitatively by categorizing the answers firstly in groups of challenges and opportunities and further on in sub categories. Our finding shows that the flexible aspect is especially important to students as it gives them the opportunity to adjust their studying practices to their disabilities. Our conclusions are that the flexible study pace approach (FreeStartFreePace) is suitable for students with non-linear work. It is also useful for students with mental disabilities who could have a problem adapting to schedules and conforming procedures.

Keywords: FreeStartFreePace, flexible learning, free pace learning, distance learning, mentally disabled students, challenges, opportunities

PhD Research Papers

Engagement Driven Massive and Open Online Learning Environment: A Heutagogy-Based MOOC (h-MOOC)

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Abstract. The current paper is aimed to present a PhD project proposal which final objective is to design a framework for a heutagogy-based MOOC (h-MOOC). Heutagogy (self-determined learning theory) has been proposed as a potentially effective approach to online learning since the self-determined learner is well equipped for succeeding in the online learning environment. Heutagogy has been applied with success in different online and offline contexts, however, never in a massive context. The project consists in applying heutagogical principals to a MOOC context and evaluating the viability of the approach. The project is divided into three phases: (Phase I) literature review and a framework proposal; (Phase II) implementation of a pilot h-MOOC based on the framework proposal and conduct of an empirical study; (Phase III) data reconciliation and final framework delivery. Taking a mixed methods approach for the empirical study, both quantitative and qualitative data will be collected and analysed from different sources: (1) welcome survey and analytics of the MOOC platform in order to understand the learners' background, context, objectives and motivations; (2) a pre- and post-course survey on learner autonomy, participatory- and digital literacy, self-efficacy, and capacity to self-reflection that will allow us to locate the participants in the PAH (Pedagogy-Andragogy-Heutagogy) continuum and to measure the self-progress; (3) reflective learning diaries that will give us a deeper understanding of the learners' perceptions and opinions. The preparatory and ongoing scoping literature review of the preparation phase (Phase 0) helped us map the existing literature, identify the key concepts, authors, and communities, identify problems, define the purpose, and establish an initial research question. The preliminary results show that (a) heutagogy is represented mainly within theoretical articles, thus there is a strong need for empirical studies; (b) MOOCs have become a consolidated area of research and have kept its topicality. Therefore, a study with the objective of creating a framework for an h-MOOC would contribute, on the one hand to the literature on heutagogy where research calls for confirmations and new findings, and on the other hand to the literature on MOOCs, one of today's hot topics in the educational research field.

Keywords: autonomy, digital literacy, heutagogy, massive education, MOOC, participatory literacy, self-determined learner

Mobile Touch Technology at a Special Primary School: Case Study

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Abstract: This paper is dedicated to the use of mobile touch devices for pupils with special educational needs. Design of the contribution consists of a case study of a student with moderate learning disabilities, who is educated at a special elementary school. The data obtained from the case study clearly demonstrates the benefits of mobile touch technologies in the teaching process, because the control of these technologies is easier than a classic computer control. This reduces the demands on the hand and eye coordination of the student. Pupils with special educational needs are able to fulfil the expected outputs of the school curriculum by using mobile touch technologies much more efficiently and easily. The conclusion of the case study contains recommendations for working with mobile touch technologies, and therefore, this work can provide meaningful results and recommendations.

Keywords: mobile touch technology, iPad, moderate mental disability, special educational needs, educational area of information and communication technologies, case study

Making MOOCs Matter in Formal Education Through a Federating Environment

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Abstract: With the emergence of open education and MOOCs, the opportunities and contribution of non-formal learning to the acquisition of knowledge and skills have increased. This type of learning, which has the advantage of being voluntary relying mainly on the learners' motivation, remains technically invisible to formal learning environments. Finding suggest that the formal learning becomes increasingly less adapted to the learners needs because it does not take into consideration the real learner's profile (knowledge, skills, etc.) updated by non-

formal learning. In order, to bridging formal and non-formal learning, we are aiming to personalize formal learning by recovering the learner's knowledge, abilities and skills which are acquired by non-formal learning (MOOCs). We propose in this paper, a federating environment for MOOCs hosted in different platforms such as (Coursera, open EdX...). The main objective of this environment is to provide to the formal learning environment a recommender system of MOOCs. The technical aspects of a federating environment of MOOCs (FEM) are presented. FEM is composed of an integration system and a recommender system of MOOCs. The integration system is responsible for integrating data emanating from different heterogeneous MOOCs platforms. The recommender system is based on the learners' profiles and on the pedagogical objectives set by the concerned establishment that integrates the federating environment FEM. FEM also enables establishments to adapt the formal learning through the enriched learners' profiles.

Keywords: e-learning, massive open online courses MOOC, formal learning, non-formal learning, recommender system

Optimal Allocation of Reviewers for Peer Feedback

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Abstract: Peer feedback is the act of letting students give feedback to each other on submitted work. There are multiple reasons to use peer feedback, including students getting more feedback, time saving for teachers and increased learning by letting students reflect on work by others. In order for peer feedback to be effective students should give and receive useful feedback. A key challenge in peer feedback is allocating the feedback givers in a good way. It is important that reviewers are allocated to submissions such that the feedback distribution is fair - meaning that all students receive good feedback. In this paper we present a novel way to intelligently allocate reviewers for peer feedback. We train a statistical model to infer the quality of feedback based on a dataset of feedback quality evaluations. This dataset contains more than 20,000 reviews where the receiver of the feedback has indicated the quality of the feedback. Using this model together with historical data we calculate the feedback-giving skill of each student and uses that as input to an allocation algorithm that assigns submissions to reviewers, in order to optimize the feedback quality for all students. We test the

performance of our allocation strategy using real data from over 600 peer feedback sessions and simulate the effects of different allocation strategies. By comparing our method with a random allocation algorithm and a “super-informed oracle” algorithm we demonstrate that we are able to allocate reviewers to submissions in such a way that all submissions receive feedback of similar quality and that we are able to significantly outperform simple random allocation of reviewers. Additionally we investigate the effect of pre-allocating reviews in comparison to allocating reviewers live during the review process and show that live-allocation leads to better results. Our method is robust to reviews not being completed and other real-life quirks and improves as more feedback data is collected.

Keywords: peer assessment, peer feedback, feedback, peer review, peer evaluation, peer grading, task assignment, reviewer allocation

Work in Progress Papers

Undergraduate Students' Failure in France: Mentoring Strategies to Enhance Self-direction in Learning

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Abstract: Several researchers have shown that self-direction in learning is necessary to succeed university studies (Coulon, 2005; Annoot, 2012). The aim of this research is to investigate lecturer-students relational landscape in blended learning and to identify the most efficient mentoring strategies that lecturers can adopt to enhance students' self-direction. Our findings will be used in *Tremplin Réussite* program, which is a complementary training program designed for students who have failed their first year at the University of Strasbourg and University of Haute-Alsace. To achieve the French government's higher education goals, and according to literatures which study blended learning and its benefits, some blended courses have been designed. Indeed, it has been highlighted that several aspects, such as communication tools, training modalities, including teaching approaches and lecturers' mentoring postures, can influence students' learning outcomes. Since students' failure rate remains high, it would be interesting to investigate the mentoring strategies adopted by lecturers in blended learning. Our main hypothesis is that students develop significantly their self-direction in learning when their lecturer adopts a student-centred teaching approach and conceives a learner-centred environment in which his/her mentoring posture is less directive. A French translation of the Approach to Teaching Inventory is used to identify lecturers' teaching approaches. Some observations of the lecturer's activities have also been performed to identify their mentoring roles. Students have been also asked to answer a questionnaire measuring their self-direction in learning before and after attending their course. Preliminary results have shown that lecturers are more likely to design their blended learning environment as teacher-centred. To analyse further results, other observations as well as questionnaires responses are expected.

Keyword: teachers' mentoring roles, teaching approaches, blended learning, self-direction, undergraduate students

Evaluation of Teacher Training Satisfaction: A Critical Factor for Technology Integration in Higher Education

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Abstract: In the present paper, we systematize the findings of a study related to the staff training and professional development in higher education. The integration of Information and Communication Technologies (ICT) in the pedagogical practice of higher education institutions has been a worldwide movement, as a reactive process to meet the needs of today's societies characterised by constantly growing levels of socio-economic competitiveness. Faced with this reality, universities have invested in the development of programs to expand professors' ICT skills as this is proved to be related to the modernization of graduate and postgraduate programs, to the adoption of more innovation teaching methodologies, and consequently to the improvement of students' training. With the purpose of encouraging the adoption of digital technologies and the use of online environments for teaching purposes, the E-Learning Lab of the University of Lisbon has been providing workshops since its constitution, in 2010. The core areas of the workshops are: (i) the use of learning management systems as a support of students' learning; (ii) the pedagogical models for e-learning, and (iii) the use of multimedia tools for developing digital educational resources. This study focuses on the data collected through an online questionnaire addressed to the total of the professors enrolled in these workshops. It aims to identify the factors that contribute to a high level of satisfaction with these staff professional development' initiatives. A quantitative methodological approach was adopted. Data was collected between 2014 and 2017 from the 19 workshops developed with approximately 170 participants and with a total number of 103 respondents. The results outlined the relevancy of factors associated with the relevancy of the workshops to professors teaching practices, the value attributed to the supporting materials, the balance between the technical and the pedagogical skills addressed in the workshop, the work dynamics, and the knowledge and competence of the training staff.

Keywords: critical success factor, faculty satisfaction, higher education, online teaching

An Approach to Creative Classrooms

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Abstract: This article reflects on 13 years of experience lecturing blended learning higher education courses, in the Polytechnic of Porto. The reflection presented in this paper focus on different learning experiences, special on gamification and how it can make learning and evaluation enjoyable. We implement a new learning environment on higher education. Instead of using the time in-class for lectures we gave online lectures to the students using videos, social network, webinars and interactive e-contents and use the time in-class to promote debates, synchronous communication with students from Portugal and Brazil and other interactive learning activities. In each class we also promote learning activities based on the gamification theory. In this article we present a learning model that we are using in our institution that combines face to face sessions and online sessions in a global higher education environment.

Keywords: higher education, blended-learning, pedagogical innovation, global education

Abstracts Only

A Combination of Active Methods with e-Learning Tools: Core Skills vs Labor Market

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Abstract: The existent concern to suppress all the identified gaps in the traditional approaches has led to the creation of a new way to be in Education. There are many innovative Models already in use in several Schools in Portugal in all kind of areas of study. Those are created individually- at schools - and remain in a closed environment. The solution lies on a balanced combination, and why not perfect, between the already existing innovative Models and the e-learning process using the active methods explained ahead. The World Economic Forum (2016) estimates that by 2020, more than a third of the core skills might consist on skills which are not known or regarded as essential now. Social skills like persuasion, teaching others and emotional intelligence will be in higher demand than technical skills of a narrow scope (WEF 2016. 10-23). In recent years, the learnability and transferability of soft skills has been under continuous discussion. Because of fourteen years of experience with a still “innovative” Model of Simulator of Business Environment (SBE) it’s my strong belief that the SBE combined with the active methods already in use in other European Universities, supported in e-learning tools will allow teachers, students and Schools to embrace the new challenges of Education: prepare students not just for today but essentially for tomorrow. There’s a need of a “wisdom” in the consciousness of those who rule Education so that they understand that this European network present different shapes and unfilled and forgotten spaces and that the European/Global network do not hurt the uniqueness of each school.

Keywords: Active Methods, Strong Combination; Simulators, E-Learning tools

Designing Instruction Using a Design Approach

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Abstract: Imagine conceptualizing Distance Education within a higher education institution in 2020. The institution has no history of distance education practices, so there is no legacy hardware or software to contend with. There is no instructional design department invested in particular ways of providing support for content development. The institution’s slate is blank; the research literature is

rich in history, existing best practices, and critiques of software platforms, instructional strategies, and other elements central the delivery of education at a distance. The higher education institution has invited you to consult, collaborate, provide professional learning for faculty and staff, and basically design their Distance Education (DE) strategy anew. • Where might you start? • What would underpin or inform your decision making? • What design principles would inform your work? . What are the global pressures impacting your institution's decision making? This chapter considers the literature, history and best practices in Distance Education and shares design principles used when one of the authors was invited to envision a DE approach with colleagues in a small university situated in a challenging context. We define challenging contexts as settings where the environmental, social, and technical impacts prevent or limit individuals from reaching their potential and participating in both formal and informal learning (Crichton & Onguko, 2013). We feel that by adding these impacts into the design, we can reduce the “noise” of emergent technologies and focus on the essential issues of learning and teaching at a distance. The authors present global pressures impacting higher education institutions and suggest ways in which a design thinking approach might help to mitigate them.

Keywords: instructional design, pressures, higher education

Revealing Comparative Engagement and Assessment Data: Can it Influence Behavioural Change in our Students?

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Abstract: Who All level 4 Business school module tutors (approx. 40) and a select group of 72 students participated in the study. Chosen study group identified as a result of a readiness assessment from JISC. Criteria for qualifying – Consistent Use of the VLE All marks are recorded electronically and consistently in the VLE Grade Centre Electronic Registers taken for all seminars What Early phase (start of semester 1 2016) – How are you doing? - Students were given access to a widget within the VLE that allowed them to tell their schools how they were doing using emoji icons. This gave students the ability to easily seek help and feel supported but also gave us some initial engagement data. Later phase (end of semester 1 2016) - the student Learning Analytics Dashboard showing: Student’s assessment scores in comparison with their cohort Student’s Attendance in comparison with their cohort Student’s time spent on the VLE in comparison with their cohort Student’s timeline of Happiness (generated by the ‘How are you doing? Why To

explore whether showing students this data influences a positive change in their behavior, ie. if their assessment scores and attendance are below average and we can predict a correlation between the data can this influence a behavioral change in our students? If their grades/performance are below average what behaviors does this create? Do they seek help? Strive to better achieve or does this have a negative impact. Can we predict the behaviors that make up a 'good' student and provide students with guidance that may help them better achieve? Early Findings Feedback and focus groups were held with the students 34 students participated in the feedback process. The students were asked the following questions. Early indicators indicate that students did adjust their behaviour as a result of viewing the data and our analysis has confirmed that good engagement is evidenced in the most successful students. Future developments Developing the data to help students understand the appropriate measures they can take to achieve a greater academic success. Improve the interface of the Learning Analytics data. Wider roll out of the tools.

Keywords: learning analytics, assessment, engagement, behaviour change

Engaging Students Through Online Activities

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Abstract: VIA University College has six flexible study programmes based on a variation of choices regarding educational use of internet technology and organisational structure. The six study programmes are organised as blended learning with a large percentage of students' activities designed to be carried out online and in collaboration among students. Completion rates in these flexible study programmes are lower than in traditionally organized study programmes. Therefore, we are interested in analyzing what keeps these students motivated and engaged. We know from earlier studies that flexibility and structure are both positive factors with regard to students' social and academic engagement. This work in progress aims to find and discuss answers to the following research question: How does the pedagogical design of study activities affect students' social and academic engagement in and connection to their study? Our research question includes the following areas of enquiry: How do students experience study activities in which they are expected to collaborate online, and how do the students interact during these study activities? Which design factors help students engage, and which are responsible for disengagement? Our aim is to discuss pedagogical designs and their potential role affecting the students' social and academic engagement, our data collection method is therefore designed to investigate students' points of view. The project will be based on selected study

activities from six different study programmes. We expect to present preliminary findings from an educational analysis of study activities, analysis of videos showing the student interaction in online communication, and findings from student focus group interviews. We expect to find elements in educational designs supporting students' collaboration and we expect to outline some propositions for educational designs in internet based flexible education, supporting the social and academic engagement of students.

Keywords: Blended learning; didactical design; students' collaboration; academic engagement

Impact of Combining Blended Learning and the Flipped Classroom on Student Engagement

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Abstract: The primary purpose of this paper is to explore the impact of combining Blended Learning and the Flipped Classroom on student engagement in an introductory 3rd level accounting module. Large class sizes and a diverse student cohort have resulted in challenges for academics in third level institutes both nationally and internationally. This is a result of widening participation rates and the drive to create a knowledge-based society. Evidence would suggest that many first year students following a 3rd level course have difficulties engaging with their course and/or subjects. In this study there were three separate but linked objectives of introducing Blended Learning and the Flipped Classroom. Firstly, to investigate if the students would engage with the Flipped Classroom concept, secondly to explore the use students made of the Blended Learning elements that were designed to support the Flipped Classroom and thirdly to investigate the impact of combining Blended Learning and the Flipped Classroom on Student Engagement. Currently, there is no single model for the Flipped Classroom. In this particular study, an approach called the "Active Learning Exercise" was introduced. In the Flipped Classroom/Active Learning Exercise approach students receive a Financial Accounting case study, on which they work in small groups, sharing ideas and helping each other. They can work with other groups but they cannot copy as each group has a unique set of financial information which has a unique solution. This Flipped Classroom/Active Learning Exercise was supported by on-line access to notes and video tutorials via Blackboard. In this study Mobile Apps were introduced to the students and incorporated into the delivery of the module. Towards the end of the semester students completed a detailed

questionnaire covering Blended Learning, the Flipped Classroom concept and Engagement. Results of the questionnaire are presented and discussed and opportunities for further research are suggested.

Key words: Blended Learning, Flipped Classroom, Student Engagement, Active Learning, Student

Factors of Best Practices of e-Learning by Undergraduate Students

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Abstract: A renewed focus should be on human aspects and change behaviour in the uptake of e-learning. Human characteristics, change action and innovation in the contexts of the users of e-learning are carrying the phenomenon beyond the poor integration of technology into learning or the teaching and learning of computers. Consequently, there was a need for more research on innovative e-practices, issues of post-adoption usage and continuance intention. The present study evaluated the e-learning practices of the students using the lens of innovation and creativity. Thus, the overriding purpose of the study was to provide a diagnostic insight into how different factors come into play in the context of best practices of e-learning. The insights from the study have the potential to guide, inform, create and improve an understanding of best e-learning practices using the lens of students. The research aimed to help build a robust approach to the phenomenon. A dominant quantitative and less dominant qualitative method using survey approach was adopted. The goal of the integration of a qualitative method was to focus on context-specific issues and add scope and breadth to the study. A total of 2,718 undergraduate students of the School of Social Sciences at two campuses of the University of KwaZulu-Natal, UKZN, South Africa participated in the survey. The theoretical framework adopted to underpin the research was the Unified Theory of Acceptance and Use of Technology Model (UTAUT). The findings identified the criticality of factors such as perceived ease of use, complexity, ease of use, attitude, subjective norm, social factors and image to best practices of e-learning in ways not previously reported. The significance of the study has the potential to impact on the policy, implementation and best practices of e-learning. Theoretically, the context of South Africa in contrast to early adopter countries was employed to advance the frontiers of global knowledge and improve an understanding of the UTAUT model to explain e-learning best practices.

Keywords: e-learning, best practices, educational innovation, UTAUT model, students, South Africa

Enhancing e-Learner Engagement by Using Narrative Fiction in Online Teaching

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Abstract: Instructional strategies rooted in the arts enhance e-learner engagement through increased interaction, social presence, and sense of community (Perry & Edwards, 2016). This study explores the effect of instructional strategies that employ narrative fiction (such as television drama, movies, and online videos based on imaginary scenarios) on learner engagement. Social presence is “the ability of online students and teachers to present themselves as 'real people'” (Anderson, Rourke, Garrison, & Archer, 2001). Interaction can occur among e-learners, and between e-learners and the instructor. A sense of community facilitates an online environment where participants feel safe enabling learning (Thormann & Fidalgo, 2014). In this exploratory descriptive study, qualitative data were collected from weblogs by online educators who use narrative fiction. A purposive convenience sample of 7 bloggers was selected. Inclusion criteria included non-commercial, English blogs by self-identified online post-secondary educators. Thematic analysis revealed that fictional narrative has positive effects on e-learner engagement by enhancing interaction, capturing learner attention, and motivating students to participate. Participation leads to discovering commonalities and differences, which stimulates further exchange of insights. As students share insights, their values, biases and personalities become apparent and social presence results. Evidence is found in the weblogs of the positive effect of using narrative fiction as an instructional medium on sense of community. It is possible that enhanced interaction, combined with the feeling that “real” people are learning together, facilitates this sense of community. These findings enhance understanding of how art-based instructional strategies (in this case narrative fiction) contributes to a positive e-learning environment.

Keywords: e-learning, art-based instructional strategies, narrative fiction, online teaching and learning

Design Thinking and Blended Learning in Seminar Conceptions: A Perfect fit?!

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Abstract: Facing the backdrop of accelerated processes of change in economy and society, as well as an increasingly broad range of products and services, their flexible and appropriate development is particularly important. Design Thinking is a method to create user-centric problem-solving and need-driven innovation through the creative collaboration of multidisciplinary teams. The approach is now also accepted in the field of higher education. Especially in problem-based learning scenarios, the method offers clearly defined steps for creative ideas and realization. The creative process can be supported by digital media, such as search engines and tools for the documentation of brainstorming, creation of mindmaps, project management, etc. These can be used both in presence events as well as in preparation and follow-up. The poster discusses the development of a seminar concept in which design thinking was combined with blended learning. Starting in September 2017, the concept will be realized and evaluated with students of information sciences. In the course of the seminar, the students will receive the design challenge to create a daylong session with der topic "games in media education" for the realization in public libraries - from planning and organization to the content of the whole event and the execution of specific program topics such as workshops. To deal with this problem the Design Thinking method is chosen in order to collaborative develop creative possibilities within the group of students. The work process is supported by blended learning elements, which serve both the preparation of the joint work in presence events (flipped classroom scenario) as well as the communication and collaboration of the students during the entire project work phase. For this purpose, learning materials are provided on a moodle-based learning platform as well as various tools that support the design thinking process as described above. Next to the seminar concept the poster also reflects the potentials and limitations of the selected strategy for the development of the seminar concept and reports first implementation experiences and results of the attendant evaluation. Finally, the question is (preliminary) answered whether design thinking and blended learning fit perfectly into the seminar concept.

Keywords: design thinking, blended learning, problem-based learning, development strategy, creativity

Additional Materials

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.

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Research Jotter

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