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**Abstracts
and
Conference Materials
for the**
**18th European Conference on
e-Learning**
**Aalborg University
Copenhagen, Denmark**



7-8 November 2019

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**Abstracts of Papers
Presented at the**

**18th European Conference on e-Learning
ECEL 2019**

**Hosted By
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Copenhagen, Denmark**

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Preface

ECEL Preface

These proceedings represent the work of contributors to 18th European Conference on e-Learning (ECEL 2019), hosted by Aalborg University, Copenhagen, Denmark on 7-8 November 2019. The Conference Co-Chairs are Rikke Ørngreen, Mie Buhl and Bente Meyer, and, all from Aalborg University, Copenhagen, Denmark.

ECEL is now a well-established event on the academic research calendar and now in its 18th year the key aim remains the opportunity for participants to share ideas and meet the people who hold them. The scope of papers will ensure an interesting two days. The subjects covered illustrate the wide range of topics that fall into this important and ever-growing area of research.

The opening keynote presentation is given by *Anthony “Skip” Baisel*, from the Queen Mary University of London on the topic of *Higher Education Pedagogy using Game Design*. The second day of the conference will open with interactive collaborative keynote by *Mie Buhl, Bente Meyer, Rikke Ørngreen*, on the topic of *Does IT work? Investigating factors at play in e-learning research*.

With an initial submission of 181 abstracts, after the double blind, peer review process there are 76 Academic research papers, 3 PhD research papers, and 26 work-in-progress papers published in these Conference Proceedings. These papers represent research from Austria, Belgium, Bhutan, Canada, Chile, China, Cyprus, Czech Republic, Denmark, France, Germany, Ghana, Greece, Greenland, Hong Kong, Ireland, Italy, Japan, Norway, Poland, Portugal, Russia, South Africa, Sweden, Taiwan, Thailand, The Netherlands, Turkey, UAE, UK and USA.

We hope you enjoy the conference.

Rikke Ørngreen, Mie Buhl and Bente Meyer

Aalborg University
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Dr Anthony 'Skip' Basiel is an eLearning research and development thought-leader with over twenty years of experience in UK Higher Education and over 55 international publications. His Doctorate in Learning Technology Design explored ePedagogy for virtual learning environments while providing a methodology and toolkit to support the eLearning profile for blended curriculum. This visualisation provides

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Keynote Outlines

Keynote Outlines

The following are outlines for the Keynote Speeches which will take place at ECEL 2019.

Higher Education Pedagogy using Game Design

Anthony “Skip” Baisel, Queen Mary University of London

This presentation takes an interactive exploration of higher education (HE) pedagogy using game design features and technologies. This requires the use of smartphones with QR code readers. Participants will have a pre-event ice-breaker tasks. The use of an innovative webinar design as a future blended learning solution is critically reviewed. We conclude with an introduction to a 360* Immersive Fishbowl Webinar learning solution that applies the theory and technology discussed. A toolkit to inform the application of possible next generation blended learning curriculum is provided to readers who want to apply their knowledge acquired from this unique learning event.

Does IT work? Investigating factors at play in e-learning research

Mie Buhl, Bente Meyer, Rikke Ørngreen, Aalborg University

E-learning has been a part of the educational picture for decades. New digital devices, platforms or services are often seen as the drivers for the changing of perspectives on learning designs and practices. E-learning is a domain that takes on a multitude of approaches to find solutions in a complex field of diverse teaching subjects and disciplines, a variety of professional arenas and local institutions with different institutional pre-requisites and learning cultures. How and when do we know if e-learning works? Can these questions be answered by following the logics of technology, to administer baseline, pre- and post-tests, or rely on data collected by an Artificial Intelligence. This may be useful for researching some aspects. However, we also see that these perspectives often focus more on retention than on theory-practice dimensions or more on user experience with the technology, than on the participants learning. How do we set criteria of research for successful digital learning processes? In this Keynote, three researchers from Aalborg University's LAB: ICT and Learning Design (ILD-lab) provide a dialogic presentation of issues related to doing research in a domain that is broad and diverse. Based on years of experience with designing for and doing research on e-learning they take on the stance that matters of 'learning' comes first. And that new digital solutions emerge from the identification of real-life problems in

connection with the identification of the target group preconditions and the contextualisation of learning objectives.

Research Paper Abstracts

EFL Blended Learning Course: Implementing a Discussion Forum to Enhance Students' Self-Direction

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Abstract: The current paper reports on empirical research investigating undergraduate students' readiness to self-directed learning as a response to the use of online discussion forums in an English Foreign Language (EFL) blended learning course. It is known that the asynchronous interactions offered through an online discussion forum allows students to have time to process their thoughts and invites them to think critically (Ritchie and Black, 2012). This critical thinking skill facilitates students' metacognition which is required to develop their self-direction in learning. For that reason, it is hypothesized that the implementation of a discussion forum has a positive impact on students' self-direction. A pre and post-test questionnaire was used to confirm this aspect and the results have shown that only students of the experimental groups have developed their self-direction. This latter is represented by a significant improvement of students' level of readiness to a self-directed learning at the end of the course period.

Keywords: blended learning, discussion forum, self-direction, English foreign language learning

The Impact of m-Learning on Business Students' Performance

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Abstract: Recent developments in the field of technology have led to a renewed interest in classroom learning method. there has been a dramatic increase from the use of electronic lessons to the integration of mobile learning "M-learning" into the education which has

vastly been adopted by students. Despite its convenience, flexibility and portability. Lack of empirical evidence has appeared to drawback the effectiveness of mobile learning on students' academic performance and learning attitude. The purpose of this paper is to explore the impact of M-learning in the form of learning applications and social media platforms on teaching and learning commercial subjects in high school students and their performance in the kingdom of Bahrain. It is conducted to understand how M-learning affects the learning process, and in which way it affects the learner's' ability and how it facilitates the learner's' understanding of the different subject matter. This paper attempts to demonstrate the argument of using M-learning as a as a break from routine or if it does have a stronger more positive impact on students' performance. The importance of this research paper is to help raise student's grade point average and grades. Furthermore, eliminate any methods that are redundant and that have a poor impact on the learning process and affect students understanding of the subject material negatively.

Keywords: m-learning, education, e-learning, smart phones, smart boards, performance

Online Environments for Supporting Learning Analytics in the Flipped Classroom: A Scoping Review

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Abstract: The Flipped Classroom (FC) is an instruction method, where “events that have traditionally taken place inside the classroom now take place outside and vice versa”, which has known a significant surge of popularity in the past decade. In FCs, different types of activities may take place depending on the session type (pre-class, in-class, or after-class), the learning objectives to fulfil, the type and size of the class, the available infrastructure, the time available etc. In order to support the activities taking place in FCs, instructors can use various technological tools and online environment, especially to support the preparation of students before class. A marked recent trend in the FC is the increased use of Learning Analytics (LA) to support the development of the FC and students' reflexive learning. However, there has been no systematic investigation into combining LA and the FC, and it appeared that there was a lack of research on the issue. The aim of this paper is to investigate the literature on applications of LA in FCs, and to determine the best practices and needs for technological development supporting LA in the FC. In order to perform this study, we did a scoping review of literature in the subject to determine research trends in the use of LA in the FC. We conclude that there is great potential to use LA in the FC, and try to project where further research is heading.

Keywords: active learning, flipped classroom, learning analytics, virtual learning environment, MOOCs

Visual Representations Supporting Implementation of a K12 Programming Curriculum in Open and Democratic Educational Institutions

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Abstract: In this paper we explore the use of a visual representation to support the discussion of computational thinking and programming curriculums, for implementation in open and democratic education institutions. Several countries are implementing curricular elements from computer science in K12 education. There are several obvious challenges that this change needs to address (e.g. the lack of teachers with sufficient content knowledge). But at their root is a lack of clarity about and tradition for what needs to be learned. The process of forming these curricula can be challenged by 1) a lack of participation because inputs from many different people become overwhelming, 2) a lack of transparency, with respect to the decisions (such as demarcations and trade-offs) leading to the curriculum, and finally the 3) ambiguity surrounding the names and elements of the curriculum, leaving teachers with uncertainty about what specific labels and names involve, and complicating comparisons between curricula. In this paper, we take outset in a splitting of the process of creating curricula into two parts: 1) a mapping of possible/desirable competencies to be developed in a subject and, 2) decisions about which competencies to actually include in a curriculum. We use an existing map previously developed to show central programming, to discuss progression levels. Our work with negotiating learning progression suggests that this approach supports discussion among stakeholders as well as clear declaration of knowledge respecting the many relations between knowledge elements. We use this work to discuss how our division between mapping and curriculum design relates to and addresses challenges in the more well-known division between curriculum design and teacher decision making about what to prioritise.

Keywords: computational thinking, K12 education, programming curricula, progression, concept specialisation maps

The Impact of Cultural Familiarity on Students' Social Media Usage in Higher Education

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Abstract: Using social media (SM) in Higher education (HE) becomes unavoidable in the new teaching and learning pedagogy. The current generation of students creates their groups on SM for collaboration. However, SM can be a primary source of learning distraction due to its nature, which does not support structured learning. Hence, derived from the literature, this study proposes three learning customised system features, to be implemented on SM when used in Higher Education HE. Nevertheless, some psychological factors appear to have a stronger impact on students' adoption of SM in learning than the proposed features. A Quantitative survey was conducted at a university in Uzbekistan to collect 52 undergraduate students' perception of proposed SM learning customised features in Moodle. These features aim to provide localised, personalised, and privacy control self-management environment for collaboration in Moodle. These features could be significant in predicting students' engagement with SM in HE. The data analysis showed a majority of positive feedback towards the proposed learning customised SM. However, the surveyed students' engagement with these features was observed as minimal. The course leader initiated a semi-structured interview to investigate the reason. Although the students confirmed their acceptance of the learning customised features, their preferences to alternate SM, which is Telegram overridden their usage of the proposed learning customized SM, which is Twitter. The students avoided the Moodle integrated Twitter (which provided highly accepted features) and chose to use the Telegram as an external collaboration platform driven by their familiarity and social preferences with the Telegram since it is the popular SM in Uzbekistan. This study is part of an ongoing PhD research which involves deeper frame of learners' cognitive usage of the learning management system. However, this paper exclusively discusses the cultural familiarity impact of student's adoption of SM in HE.

Keywords: social learning, localised, personalized, privacy, SM, familiarization

Digital Literacy in Social Media: A Case Study

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Abstract: Digital literacy skills with respect to the safe use of social media are of prominent importance for adults today, given social media's high frequency of use and given statistics showing rising percentages of "digital immigrants" who, at the present time, use social media. Previous research was based on people's self-reports, focused on specific professional groups or students, and did not systematically measure social media literacy. The present case-study attempted to address this gap and answer three research questions: 1) To what extent are citizens literate with respect to social media use? 2) How does people's perceived competence with social media relate to their social media literacy? 3) What are some factors associated with social media literacy? The main data sources were a demographics questionnaire and a 20-question online-test measuring people's social media literacy. The emphasis of the test was on the safe use of social media. It included questions relevant to adjusting privacy settings, recognizing and rejecting potentially harmful posts, recognizing the permanency of posts, etc. The instruments were completed by 178 Greek-speaking social media users in the Republic of Cyprus with an average age of 28 years old ($SD=8.61$, $min=19$, $max=61$). Findings suggested that participants' average social media literacy performance was 83 out of 100 ($M=83.34$, $SD=9.67$), therefore relatively high. Factors that related to people's social media literacy included age, which was negatively correlated with social media literacy (Pearson's $r=-0.27$, $p<0.01$), experience with social media (measured in years), ($r=0.18$, $p<0.05$) and frequency of use of social media (measured in hours per day) ($r=0.26$, $p<0.01$), which were both positively correlated with social media literacy. People's perceived competence with social media did not correlate with their performance on the social media literacy test, which provides an indication that people may underestimate or overestimate their competence. Provided that people who overestimate their competence will most probably not actively seek training on staying safe when using social media and provided that the older a person is the lower her level of social media literacy, this case study argues in favor of designing e-learning training addressed to digital immigrants on the safe use of social media. Findings are of value to e-learning designers and e-learning trainers for adults.

Keywords: social media, digital literacy, digital immigrants, safe use of social media, e-learning

A Hybrid Fuzzy DEMATEL-AHP/VIKOR Method for LMS Selection

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Abstract: Academic institutions, organizations, as well as government agencies are increasingly using the Internet and information technologies to provide the targeted beneficiaries with informational content and educational resources. Learning management systems (LMS) are some of the frequently used software for this purpose. Adopting such systems in higher education has become a major focus of interest and several educational institutions are heavily investing in their development and deployment. Selecting the most appropriate LMS is a strategic decision to gain stakeholder's traction and to enable decision makers to avoid bad choices, make predictions and accordingly optimize LMS investment. With the growth of LMS market and the increasing number of LMS features, an effective LMS evaluation method is needed to deal with this diversity and help decision makers to select the most appropriate one. Indeed, selecting the most appropriate LMS can be considered as a Multi Criteria Decision Making (MCDM) problem with the objective to rank a set of LMS and select the best system that fits educational system stakeholder requirements and promote learning at the institution. In this paper, three different LMS categories are considered (i.e.; proprietary, open source and web-based LMS) with a set of criteria inspired from ISO 9126 model for selecting systems quality characteristics and sub-characteristics.

Keywords: learning management systems, multi-criteria decision making, Fuzzy DEMATEL, Fuzzy VIKOR, Fuzzy AHP, ISO 9126 model

Developing Creative Online Learning Communities: A Case Study of Student Perceptions

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Abstract: This paper is a qualitative case study measuring student perceptions of a pedagogical strategy for developing creative interactive online communities. The article reviews a teaching strategy for increasing student engagement through the use of creative and artistic expression. Using “Digital Moments” as a way to build inclusion in two synchronous graduate online courses, the author describes how the teaching strategy increased student participation, developed student ownership of learning, and encouraged collaborative processes between participants. This teaching strategy makes a significant contribution to digital pedagogy. Although the growth of online learning is quite substantial, our ability to develop online communities that inspire creative thinking has not kept pace. With online education becoming an integral part of academic institutions and corporations worldwide, support for such endeavors can be critical to the innovative and nimble approach required of organizations facing the fourth industrial revolution. This paper analyses and interprets the graduate students’ perceptions of the value of using “Digital Moments”. Specifically, the research methodology involved using a 12 question online survey, followed by semi-structured open-ended one on one interviews. Data were analysed using SPSS software and examined to reveal that overall student perceptions of the level of creativity in the online community were improved using this pedagogical approach. This also improved a sense of belonging and engagement in the class, and improved the learning environment by increasing connections between and among students and the instructor.

Keywords: creativity, online learning, communities

Situating Resilience, Grit and Growth Mindset as Constructs of Social Presence in the Fully Online Learning Community Model (FOLC)

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Abstract: Current research has indicated that resilience, grit and growth mindset are psychological characteristics beneficial to learning (Duckworth, Peterson, Matthews & Kelly, 2007; Kamtsios & Karagiannopoulou, 2012; Yeager & Dweck, 2012). This paper addresses a significant gap in the literature, that being that little research has connected the concepts of resilience, grit and growth mindset to online learners, and to elements specific to the online learning environment. Dweck (2008; 2015) discusses the difference between fixed and growth mindsets, and indicates how a growth mindset can help students persevere and develop grit in the face of challenge and adversity. She reveals that the difference between a fixed and growth perspective lies in whether the individual believes that his/her intellectual ability is static and fixed, or whether it can grow and change. The perspective held by the learner is a key factor and has “profound effects on their motivation, learning and school achievement” (Dweck, 2015, p. 49). The authors attest that this tenacity appears even more important for students in digital environments, and that the development of social presence, while allowing for self-directed and student-centred pedagogical approaches, can have a direct impact on academic success and attrition rates. Using a theoretical framework based on the Fully Online Learning Community Model (FOLC) (vanOostveen et al, 2016), the authors address how social presence, as evidenced by collaborative work in problem-based learning environments, can facilitate the development of resilience, grit and growth mindset in individuals and in communities. We argue that the factors contributing to the development of these learner characteristics emerge through social interaction, collaboration, and a strong social interactive presence amongst members of the community. As a result, the deliberate cultivation of an online learning space that allows for learners to fail within a socially supportive network, can begin to build resilience, grit and growth mindset, and also address issues of attrition in online learning situations. Hochanadel and Finamore (2015) indicate, “students must develop those psychological qualities of grit and tenacity and internalize a mindset that includes persevering, and universities are in a position to help” (p. 49). This paper provides an overview of the connections between, resilience, grit and growth mindset as they relate to online learning in the FOLC.

Keywords: resilience, grit, growth mindset, online learning

Soft-Digital Skills in Higher Education Curricula

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Abstract: This article arises from the proposal of a new approach regarding the inclusion of soft-digital skills training in higher education. The study carried out on several curricular units in different higher education courses in Portugal led us to reflect on a different educational model, which combines the development of soft skills in digital environments. Digitalization and the use of technologies since early ages in the educational process are raising interesting questions. This article intends to go deeper on the use of digital technologies, namely through the virtual environments imposed by higher education institutions as a form of study. The main question is how pedagogies and the use of technologies have a meeting point where it is possible to continue humanization in education through the utilization of virtual environments to support the teaching/learning process. The methodology used in this study has its support on questionnaires made to students of higher education in different areas of knowledge, such as medicine, nursing, engineering, management, arts and literature. The main conclusions of this study are the importance of creating and using digital platforms that not only support the study but also contemplate the use of a virtual reality where students can interact with others in the discussion and resolution of real life situations.

Keywords: education, digital environments, skills, study support, humanization

Traineeships in Jordan: Mutual Engagement, Joint Enterprise and Shared Repertoire Between Companies and Students

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Abstract: The number of students in Jordanian higher education has seen a strong increase since 2001. Despite this, higher education in Jordan faces a range of challenges. Middle Eastern education has been criticised for traditional teaching methods, including passive consumption of knowledge, and for failing to engage students in applying their skills and knowledge to situations outside of the educational institutions. It is argued that traditional and didactic teaching methods still influence higher education in large parts of the Arabic-speaking countries. These methods are teacher-centred rather than student-centred, which presents certain problems and shows a need for improvement. Studies also show that students report that higher education does not equip them for a labour market that is in constant transition. These studies report that students are not in contact with ‘real work life’ and do not have the opportunity to apply theory in practice. This paper presents the results from a study conducted as part of a EU project called the Modernization of Teaching Methodologies in Higher Education: EU Experience for Jordan and Palestinian Territory (METHODS). The primary purpose of the overall three-year project was to modernise teaching methods at universities in Jordan and Palestine and to support the creation of independent learners. This project was conducted with a focus on investigating the potential of and barriers to collaboration between industry and students in higher education in Jordan. It was conducted with students, faculty members and representatives from industries in Jordan. The study specifically focused on compulsory traineeships at universities in Jordan that involve a student staying a short period of time in a relevant workplace. The results of the study showed that there is great potential for future collaboration between university students and industries and organisations. However, the study also uncovered barriers for collaboration between universities and industries due to a lack of mutual engagement and joint enterprise.

Keywords: higher education, Middle East, collaboration industry and universities, traineeships and learning

Student Engagement, Mobile Technologies, and Changing Curriculum Delivery

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Abstract: This paper is a case study describing the roles of students in research implementing mobile technologies in acting, dance, and visual arts classrooms at a creative arts university in Southwest England. Students and staff worked with the researchers implementing mobile technologies in a variety of classroom settings, including demonstration and performance studios. Using notions of community, consumption, exchange, and division of labour from Engstrom's Activity Theory as the basis for our approach, we worked alongside students and staff in active settings, developing and then adapting implementation in a fluid exchange between the members of each classroom community. Students were involved in at least three ways: as classroom participants providing verbal feedback, as classroom participants utilising the tools, and as Student Fellows (SF). The methods for obtaining student feedback ranged from semi-structured verbal feedback (which was recorded on video), feedback obtained while the tools were being used, and post-session observations from the Student Fellows. Class activities were also recorded using a static video camera. The tools included: iPhones, iPads, Android tablets, projection devices (projectors and large-screen TV's), and the virtual learning environment. In this paper we explain the three primary phases of our research, then we examine the various ways in which we engaged students to further develop the implementation of the technologies, and lastly, ways in which we saw development of the delivery of the curriculum.

Keywords: mobile technologies, student engagement, activity theory, visual arts, performing arts

Supporting Blended Learning in ESP Courses: Switching Between “Online”, “Offline” and “Onstage”

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Abstract: The aim of the paper is to analyse the potential of the particular blended learning formats applied within the university courses of English for Specific Purposes (ESP) in the

Czech educational context. The theoretical background is thus represented by some of the current global learning trends, such as personal learning environments, gamification or social learning, with relevant references to the area of foreign language teaching methodology, namely to the issues of task-based learning. From this perspective, blended approach is used as a conceptual framework for designing the particular integrated learning tasks, directed towards the development of students' self-presentation skills in an online environment as well as in the classroom setting. Moreover, the task design options are considered in terms of their primary focus either on the area of general English or the field of ESP. The empirical part presents the results of our small-scale research, which was carried out in two specific areas of ESP, namely English for transport and English for health studies. The selected case study design draws on the potential of mixed methods approaches in social research. The quantitative data were collected via a structured questionnaire and analysed using the relevant statistical methods (chi-square, t-test, and correlational statistics). The qualitative part was focused on identifying the emerging categories through the content analysis of the students' authentic language production within the particular integrated blended assignment. The research outcomes offer a complex evaluation of three different blended task formats with various degrees of involvement of their "online" components in the LMS Moodle. Besides, each of the aforementioned blended assignments included the task of an oral classroom presentation as its "offline" component. The analysis also focuses on the students' perceptions of "onstage" aspects of those blended assignments which contained an online forum component. Our findings imply that performing an integrated blended assignment provides a very effective validation of the data previously collected in the category of the students' proclaimed preferences of the particular educational content (ESP vs general English).

Keywords: blended learning, ESP, LMS Moodle, integrated task

Computational Thinking Utilizing Visual Arts, or Maybe the Other way Around

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Abstract: This paper is a theoretical discussion about the extent to which school subjects can contribute to teaching students computational thinking. Or is it the other way around and, perhaps surprisingly, how computational thinking might transform existing school subjects? The discussion takes as its point of departure the national experimental project Technology Understanding, which is the Danish response to a worldwide interest in bringing digitalization to students in primary and secondary schools and the Danish governmental initiative regarding implementation of digital literacy as a new school subject and as an integrated part of existing school subjects in primary school (Ministry of Education 2018). Visual arts education is one of the subjects chosen for the integration of technology, and this

paper follows up on the ministry's intention by considering visual arts as the starting point for computational thinking. At issue is how visual art may be informed by computational thinking and how computational thinking may be informed by visual art. I argue that teaching students to understand algorithms and data processes can be inspired by practices from contemporary art and the ideas of new materialism (Barad 2008). Contemporary art may be characterized as conceptual, distributive, and interventional in life practices, and programming principles may illuminate how human activities and algorithms intertwine. I also argue that the teaching of contemporary art can be inspired by principles from programming and algorithms. These practices can illuminate how artistic concepts may be planned and designed for human interaction. However, programming for contemporary art requires openness regarding use, while programming for data processes requires the opposite. Thus, the integration of computational thinking into visual arts education is more than a means for understanding programming and algorithms; the dynamic also works in reverse. This paper will bring a wider societal perspective to bear on teaching computational thinking by bringing school subjects into the center of discussions and drawing on current discussions of STEAM education and contemporary art.

Keywords: visual arts education, technology understanding, computational thinking, STEAM

Plagiarism Tendencies and Contributing Factors in e-Learning Environments: Rwandan Higher Education Context

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Abstract: Plagiarism has been a critical concern to consider by universities and research institutes worldwide for ensuring academic integrity. Even with the internet revolution, this academic dishonesty became increasingly overwhelming more especially due to easy access and use of online resources without acknowledging the original authors. Prior research explored several perspectives of plagiarism such as culture, language, internet technology, and policies from different institutional settings. However, little is known about plagiarism in the online Rwandan higher education context. The aim of this study is twofold. First it

attempts to understand the tendencies of plagiarism through internet-based resources and then secondly to identify the contextual factors that contribute to plagiarism by students at University of Rwanda. Both undergraduate and master's dissertations were randomly collected and analysed to ascertain the frequency of plagiarism tendencies from the text-based similarity indexes. In addition, open-ended interviews were conducted to 15 teachers and 15 students from UR colleges. Similarity indexes from Turnitin's originality reports were used to determine the frequency of similarity indexes through computer-based text-matching process. Results indicated a highly critical rate of tendencies to plagiarism each referred type of plagiarism. Likewise, findings portrayed that for the sample of analysed documents, no thesis document is deemed genuine to fulfil the academic integrity. In addition, the frequency of similarity indexes of the texts matched from the analysed thesis documents and online databases is closely similar for both undergraduate and graduate students. Moreover, this study identified 17 factors contributing mostly to plagiarising through easy access to internet resources at this university. Among them, six reasons are related to social-cultural context, five to institutional context and the last six are attributed to individual factors. A holistic approach encompassing innovative, detective and preventive strategies is recommended in association with computer-supported tools to eradicate plagiarism at this institution. Further research can explore the adoption and use of computer-based text matching tools as an additional strategy for combating plagiarism in both public and private universities at national or regional level by comparing several institutions.

Keywords: plagiarism control, digital learning environment, tertiary education, online text-matching, academic integrity

Current Challenges in Gamification Identified in Empirical Studies

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Abstract: For about ten years gamification has been a buzzword in business, and for about 20 years a topic of research in academia. Despite much commercial interest in and a potentially huge market for successful products, for instance, in the areas of education and health, much excitement is still based on speculation, reception in parts of the academic community remains sceptical, and a pervasive application in many areas of everyday life is arguably yet to happen. It might be time to take stock: By collating observations from multiple empirical studies and meta-studies, this survey identifies, briefly presents and discusses definitions, aims, applications, strategies and specifically challenges of gamification. While gamification is far from being the first or the only notion to describe attempts to connect play with purposes beyond itself, this study is based on research that identifies itself as being focused on gamification. This study does not aim to exhaustively list experiences or results of gamification, or to carry out a systematic review of the field, but to

collect and highlight issues that need to be resolved or mitigated for gamification to progress. It finds problematic definitions, unclear strategies, a low number of empirical studies, methodological problems, mixed and partial results, non-uniform user behaviours, a predominant focus of studies on low-level behavioural effects and short-term effects, as well as undesirable side-effects of gamification.

Keywords: challenge, education, empirical survey, gamification, health

‘Breaking bad’: Overcoming Barriers Preventing Higher Education Faculty From Offering Quality Blended Learning Programs

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Abstract: Proponents of Blended Learning have been predicting for over a decade its transformative potential for higher education, both financial and pedagogical. Educators on the front lines who face the day-to-day challenges of promoting engagement in BL settings have remained particularly sceptical. Considerable scholarship has focussed on faculty reticence in adopting effective BL practices, yet offering few solutions. Results of our earlier 3-year longitudinal study at a private-for-profit university in Chile, shed light on complex circumstances that explain why many faculty have not embraced BL and the often-disappointing results of those who do. The findings provided insight into multi-level identity issues within our institution that influence teaching and learning in BL classrooms. In this paper, we report on a 6-month follow-up AR (AR) study we conducted to address those issues. Our aim was to provide collaborative and sustained expert e-learning pedagogical and IT support for a group of thirteen faculty, including a set of strategies to counteract the barriers preventing these educators and their 320 students from adopting effective BL practices. Framed by theories of identity and transformational change, in the study we co-constructed alternative ways of viewing and doing BL teaching and learning with this group of educators. Qualitative data collection tools involved: interviews, recorded field notes from online participant meetings and class blogs and an end-of-semester student Likert scale questionnaire. Findings indicate that when faculty are provided long-term institutionally-supported opportunities and collaborative guidance in how to assume agency and control in their BL teaching settings and are simultaneously encouraged to empower their students to do the same in their learning, the resulting identities they themselves mediate and in turn foster in their students have positive implications for learning outcomes - increased self-directedness, online engagement, community building and higher order thinking. We believe these results provide renewed and grounded hope for the future of BL.

Keywords: blended learning, higher education, faculty support, identity construction, sociocultural theory

Using VLEs to Offer Higher Education Students Choice and Differentiation in Learning Activities: Micro-Pathway Learning Design Implementation and Opportunities

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Abstract: Conventional models of distance e-learning course delivery are increasingly coming under pressure as designers struggle to reconcile the diversity of learner interests, abilities, prior learning, and study demands with needing to adhere to a single linear structure pitched at the average learner. However, course designers have an alternative and using technology can design and build differentiated paths, or learning micro-pathways, through sequences of learning materials and activities which have the effect of delivering a more personalised learning experience. One approach is to hide the personalisation decision-making from the student whilst a second – that explored in this paper - is to give the student agency by offering them a choice of differentiated learning pathway through a sequence of learning activities. This paper will present a small-scale pilot study intervention that spanned a week of learning activity in a postgraduate online module. This was achieved by using existing Moodle VLE functionalities associated with conditionality operators and the student options to create two, student selectable (and re-selectable) differentiated paths through part of a learning week. The design approach will be described in relation to twelve Design Goals and a focus on the following questions: (1) Does being offered a choice increase the learners' sense of control, engagement, and perception the course is meeting their needs? (2) What guidance do learner need to make effective decisions, and can visualisations of learning design support this? (3) Can differentiated learning be achieved within a VLE by individual teachers at an appreciably low effort and resource? (4) What design skills and conceptual competencies are required to do this? Feedback from repeated use of the intervention shows that learners responded positively, found the choice-making process clear, and would support use of the technique in other modules. Learners also suggested a range of potential teaching uses. This feedback will be discussed along with consideration of learning design challenges and opportunities.

Keywords: differentiation, personalisation, learning paths, learning maps, VLEs, learner agency

Experience of Using Project-Based Learning in the URFU Hypermethod e-Learning System

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Abstract: This paper covers use of project-based learning principles in the “Territorial Development and Realty Management” Master program using Hypermethod e-learning system of the Ural Federal University. The number of educational institutions using projects in their practice grows. Successful implementation of project-based learning can be attributed to practical nature of the projects, use of real cases, and involvement of industry professionals as experts that evaluate project results. The purpose of the work was to develop a project-based methodology for training master students of the “Territorial Development and Realty Management”, and assess its efficiency. The work included evaluation of the current master program supported by Hypermethod e-learning platform, and statistical analysis of electronic resources attendance by the students. Results include assessment The study reviews existing master program and is centered on e-learning Hypermethod platform. Statistics of student visits to the Hypermethod platform confirmed relevance of the resource. The work includes results of a survey of program students and practitioners involved in thesis examination. Suggestions on using project learning as a basis for practice-oriented education were provided. Results of the study can be used to substantiate implementation of interdisciplinary projects for training master students.

Keywords: project-based learning, URFU, Hypermethod ELMS, learning organization, practice-oriented approach

Effects of Blending Digital Games into Traditional Lecture-Based Learning on University Students' Programming Learning Achievement

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Abstract: Learning programming is a difficult course because the students need to remember the various type of program's syntax, create complicated commands, and solve

the errors that difficult to understand. Therefore using modern technology such as online learning, social media and educational games may support students to learn to programme. In this study, computer programming games, which are educational computer games simulating the compiler working with the scenarios of daily human life, were employed in the new approach called a blended learning digital game. The approach was designed by integrating traditional lecture-based learning model and the educational computer game. Quasi-experimental research was conducted to examine the effectiveness of the proposed approach by comparing to the traditional lecture-based learning approach. This research examined the learning achievement of male and female students who learn in different environments. This was based on the blended learning digital game approach and the traditional lecture-based learning approach. An analysis of 94 university students shows that using the game as a cognitive tool in part of the traditional lecture-based learning had significantly positive of C programming language achievement. While the new approach can support the students to learn C programming in both genders, it also supports the notion that students can achieve C programming language performance through the game, mainly when using the traditional lecture-based learning environment.

Keywords: programming learning, digital game, blended learning, higher education

Students' Learning Experience Within a Blended Learning Environment in a Higher Education Institution in Ghana

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Abstract: Advances in information, communication, technology (I.C.T) particularly the internet is driving universities worldwide into integrating technology into teaching and learning in the classrooms. Ready access to multimedia learning platforms are encouraging faculty members to move away from traditional print-based and face-to-face teaching approach into adopting blended learning. However, insufficient learner satisfaction has been noted as an obstacle in most universities. In view of this, this paper assesses the learning experience of students within a blended learning environment in a Higher Education Institution (HEIs) in Ghana Technology University College (GTUC). The driving force for this study is to enhance students' learning experience with the use of technology within a blended learning environment. The Learning Management System (LMS) adapted to engage students within the blended learning environment is Moodle. The study employed both qualitative and quantitative methods to measure the students' learning experience. A total

of 244 respondents from three different faculties and levels offering bachelors and master's degree were used. The study employed simple descriptive analysis and thematic analysis to measure the student's learning experience within the blended learning environment. The impression from the findings indicates that the online learning engagements enhanced the face-to-face teaching and learning and also increased retention and performance among the students. It was however noted that poor internet connectivity, reluctant of some lecturers, lack of orientation affected the effective implementation of the blended learning. More so, most of the learners affirmed that there is no clear-cut policy that enforces effective implementation of the blended learning approach in the university. The study affirmed that effective usage of blended learning approach enhances students' learning experience in HEIs.

Keywords: blended learning, learning experience, Moodle, higher education institution

Serious Digital Games to Further Human Rights Education

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Abstract: Human rights education has become more and more important within the last decades. That is why also serious games started to deal with topics about asylum seekers, migration, poverty and human right violations. As for all media, the question arises if digital games might be useful for teaching players or creating empathy. One key element of success is based on the underlying game design. Only if the designer's intended purpose is reflected in all game design elements, the game is perceived as consistent and enables to have an experience that might players encourage to think about situations or topics. The paper uses the Serious Game Design Assessment Framework (Mitgutsch und Alvarado 2012). By analysing the serious game Path Out which is about escape from Syria, it will be shown how the single elements of game design work together to create a game that is useful for teaching about refugees.

Keywords: human rights education, games for change, serious games, game-design, teaching, values

Flipped Classroom: A Renewal Opportunity or a Pedagogical Cul-De-Sac?

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Abstract: Flipped classroom (FC) has gained significant recognition in higher education as a way to fundamentally alter the course structure and revolutionize the teaching and learning experience. FC entails assigning digitally mediated instructional content as preparation before class, and thus free up class time to cultivate higher-order thinking skills, problem solving, threshold concepts and engage in collaborative learning. Despite a predominantly large interest in this educational innovation, there are a number of pedagogical challenges that need to be highlighted. This paper examines the educational implications of using FC in a higher education context, which emerged from my own experiences with the systematic use of FC in teaching a course in Change Management (CM). Based on recent literature within the use of FC, I discuss both the pedagogical rationale and the critical points that I have become aware of in my teaching. I thus extend the argument to question the adherence to any particular model or delivery modes, as in the case of FC, which risks reinforcing various content transmission paradigms. Rather, the attention should at all times be on the underlying pedagogy, focused on developing, delivering, and evaluating learning experiences that promote effective and significant improvements in student achievement. Using technology to enhance learning requires a more radical redesign of the teaching and learning experience, which takes advantage of the technological affordances for creating hybrid, flexible learning and enabling new ways of knowing, working and becoming within and across various disciplinary and professional fields. Based on recent literature regarding FC, I identify the pedagogical challenges that exist, despite the popularity of FC as educational innovation. I compare some of the critical points with my own experience with adopting FC in a course in Change Management (CM). I discuss the pros and cons with FC in the light of a written student evaluation of experienced learning from the CM-course as FC. The discussion will lean against research in university pedagogy and learning design.

Keywords: flipped classroom, learning design, technology enhanced learning, university pedagogy

Using Augmented Reality for Teaching Pupils With Special Educational Needs

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Abstract: Mobile touch devices enable enhanced reality applications. The concepts of virtual reality and augmented reality are often confused and have the same meaning until the beginning of the 21st century. Mobile technology has changed the importance of augmented reality. Its application in mainstream education is already sufficiently described. A great number of authors have tried to define augmented reality. The following is one of the first and widely accepted definitions: “Augmented reality is integration of 3D virtual objects into a 3D real environment in real time” (Azuma, 1997). Similarly, “augmented reality complements the real world with (computer generated) virtual objects so they seem to coexist in the same space as the real world” (Azuma et al., 2011). All the aforementioned definitions have one element in common: interconnecting virtual objects and integrating them into the real world. In contrast to virtual reality, where the generated objects are displayed on an imaging device, augmented reality contains a real-world environment. There are headsets which, on the one hand, are only imaging devices, but on the other create an impression of the real world (Yuen, Yaoyuneyong and Johnson, 2011). Such headsets, however, illustrate a major problem of augmented reality – displaying virtual objects and real-world environments. A mobile touch device is a tablet or a mobile phone with an operating system (Kostolanyova, Klubal, 2016). In a simplified model, a mobile touch device is a personal computer integrated into a single device which does not require any peripheries (a keyboard, mouse or monitor). The obvious advantage of mobile devices is their mobility and integration of more devices (from the augmented reality viewpoint, it is the presence of a video camera). Based on publications from the Web of Science database, a summary analysis by Fombona, Pascual-Sevillano, González-Videgaray (2017) describes the advantages of mobile devices with regard to augmented reality, examining the relationship between the terms augmented reality and m-learning. The analysis proves that the terms are mutually dependent. The paper deals with the specifics of the use of augmented reality in pupils with special educational needs. In particular, the monitoring showed a reduced burden on graphomotorism and a reduction in cognitive stress among these pupils. In this paper we describe the use of application HP Reveal to eliminate the deficit in the abstraction of things, concepts, and subject matter.

Keywords: iPad, moderate mental retardation, special educational needs, HP Reveal

The use of Visualisations and Video Productions in Online Game-Based Learning

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Abstract: The paper investigates how the use of visualisations and video productions combined with peer-feedback sessions can create exploratory approaches to game design in online teaching. Thus, the paper aims to provide insights into the iterative learning processes of developing games in online game based learning. The empirical data is based on an explorative case study where master students from the international Nordic Visual Studies and Art Education (NoVA) design games as a part of an online game-based learning course. Throughout the course the students were situated at three different universities in Finland, Sweden and Denmark, collaborating cross-cultural across campuses. The purpose of the study was to explore how to establish an online space for joint design inquiry in the context of games for changes across cultural and professional barriers. The data used for analysis is teaching observations, videos of play sessions, students' reflection papers, written and oral evaluation with participants after completion of the course. The analysis is based on different PBL activities; lectures, video tutorials, presentation- and feedback sessions, reflexive exercises and students' self-directed design processes and learning in groups. Game theory and exercises were presented through videos and visuals to support the students' iterative processes of developing games. Analysis of the PBL activities show how teachers' video tutorials relating theoretical game concepts to the students' group work supported their entrance in the game field as well as their design processes. How to balance feedback-related video tutorials and teachers' time for preparation is identified as a relevant issue for further exploration in online game-based teaching. Findings show how the students' visualisations and video productions exemplifying game situations, created a visible reference point for further discussions in the feedback sessions across campuses, which guided the game development. Thus, the combination of inquiry approaches, critical game theory and design processes combined with students' visualisations and video productions indicates interesting connections for bridging gaps between professions, e.g. in art and games.

Keywords: online game-based learning, educational design, students as game designers, visualisations, video productions, higher education

Methodology for Developing Algorithmic Thinking in Pre-school Education

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Abstract: Pre-school age is the most crucial and sensitive period in a child's life, a period of their psychological development. It is at this age that a child's personality develops. And people who, both consciously and unconsciously, participate in their educational process play an important role in a child's formative years. Children at this age learn a lot on their own – by imitating, playing, exploring and simply by being curious. However, a tutor (a parent or a teacher) is still the one who should support and motivate children, helping them develop competencies they will need in school. Pre-school children learn a lot of new information, trying to develop key competencies such as learning, communication, civics, and problem-solving skills. Pre-school children see and understand the world differently than adults, they perceive facts in a specific way. That is why the teacher can help children develop the aforementioned competencies in a natural way. As far as developing the problem-solving competency is concerned, there are additional possibilities to do so. People face problems, which need to be solved quickly and effectively, every day (at work, in personal life). That is why the step-by-step approach to problem solving should be implemented into pre-school education. Therefore, it is extremely important to map children's thought process when solving a problem (finding new and non-standard solutions) and expand these findings using appropriate methods. Dividing a problem into smaller parts; proceeding step by step, trying to find the most effective solution – all that helps develop algorithmic thinking. The development of abstract and logical thinking, spatial orientation and pre-mathematic concepts is equally important. Digital technology – from interactive whiteboards to tablets to robotic toys – can be a useful didactic aid. The toy is in general meaning an object that supports basic childhood needs or activity – game. Robotic toy - Bee Bot - is a very simple robot that needs to be programmed. The program is created by pressing the basic buttons on the back of the toy and storing it in the robot's memory. The next command starts. The robot then executes a sequence of commands. Creating a program (for example, by tapping the free buttons with the intention of knowing what a toy can do) is different from creating an algorithm. Creating an algorithm is a sequence of commands that lead to a goal to solve a particular problem. To support the development of child's algorithmic skills, it is necessary to familiarize children with the types of tasks: problem situations that can be solved, for example, by creating a Bee-bot robot program. Problem-solving skills, logical thinking, creativity and originality are the most appreciated skills today. Therefore, starting to develop these skills as early as kindergarten is a logical conclusion.

Keywords: digital competencies, algorithmic thinking, activities, pre-school education, digital technology

Online Learning of Reflective Journal Writing in Tertiary Education

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Abstract: Reflective journal writing is an important genre of academic writing in which students are not only asked to think critically about any given experience, topic, or question, but also to be able to monitor their own development as learners. Here, we present and evaluate an English language micro-module for self-directed learning of reflective journal writing skills aimed specifically at students taking the compulsory General Education courses given to all students at CUHK. This micro-module is complementary to Chinese language versions and supports regular workshops. In the design of this platform, we have tried to reach multiple aims: for example, while we suggest a linear progress throughout the module, we also provide several points of entry in order to satisfy different learning needs and individual preferences. Furthermore, we provide multiple types of exercises and checkpoints generated from authentic student texts in order for the students to monitor their progress. In terms of content, we found it important not only to explain in detail the process of reflective thinking, but also to exemplify and practice the language features of reflective journal writing. Thus, we include detailed sections on how to analyse writing prompts, generate ideas and arguments, and finally outline and compose the writing. Therefore, we believe that core parts of this micro-module are also useful for learning and practicing general academic writing. During the academic year of 2018-19, student feedback questionnaires and pilot focus group studies have been used to evaluate the potential benefits from using the micro-module as a complement to regular workshops. To date, access rates and feedback response suggest that students find the online interface and content practical and meaningful. Furthermore, initial analyses of results indicate that the micro-module enables independent and mobile learning with increased and deeper content than a single workshop can provide.

Keywords: reflective thinking, reflective journal writing, online learning, mobile, micro-module

Using H5P Interactive Teaching Aids to Solve Problems

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Abstract: Students' key competencies are considered an important part of the 21st-century skill set. These competencies allow the student to succeed now as well as in the future, on both personal and professional levels. Students should be encouraged to develop their problem-solving skills. In order to master this competency, students need to use not only knowledge from different fields, but also their cognitive, analytical, decision-making and communication skills. Interactive teaching aids can be used for this purpose in all educational areas and different school types. Featuring interactivity and various multimedia elements, these aids allow students to engage multiple senses at the same time. That is what makes these innovative teaching aids effective and therefore popular. The H5P language allows for the creation of new interactive teaching aids. Moreover, thanks to the native display of multimedia content in the web environment, it also allows for the use of the original source. The paper is aimed at using H5P interactive tasks to help elementary school students develop their problem-solving skills. It includes practical examples of H5P tasks such as Branching Scenario or Drag and Drop which can encourage activity and curiosity, thus helping students find a way to solve a problem. It explains how each task can be used in instruction as well as what is required to create the particular task. Particular attention is paid to feedback, which consolidates knowledge. The tasks presented in the paper should be available to those who participate in education.

Keywords: H5P, problem-solving competence, problem-solving tasks, interactivity

On the Role of Unplugged Programming in K-12 Education

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Abstract: The integration of programming in K-12 setting is a global phenomenon with different implementations in different countries. In Sweden this is a rapid process where programming should be a part of K-12 mathematic and technology with an implementation during 2018 and 2019. The time frame has been narrowly defined, but there are few directives considering which types of programming that should be used. Three main programming types are textual programming, block programming and unplugged programming, this study has a focus on unplugged programming. The research question to answer was: Which are K-12 teachers attitudes on the role of unplugged programming in education? The research study has been a qualitative cross-sectional study with the aim to collect teachers' attitudes towards unplugged programming halfway through their introductory programming course. Cross-sectional study is an approach to capture snapshots of an ongoing process at a given point in time. Data were collected from discussions and online postings during a workshop in the above-mentioned programming course. Participants postings have been grouped into categories in a content analysis based on the frequency of occurrence and relevance for answering the research question. Findings show that most teachers see a benefit of unplugged programming as a means to learn the fundamental programming concepts in their teaching and learning activities. However, there are different opinions on when this unplugged introduction should occur. Some teachers also pointed out that unplugged programming could be used as an alternative to block programming and textual programming when the digital environment lacks or fails. Conclusions are that unplugged activities are a valuable complement to block programming and textual programming, but teachers have different opinions on the optimum age group for unplugged programming activities. The recommendations for K-12 teachers is to seriously consider the unplugged complement, both for pedagogical reasons and as a never-failing analogue backup.

Keywords: unplugged programming, block programming, textual programming, K-12 education, teacher professional development

A Comparative Study on Language Teachers' Perceptions of ICT Self-Efficacy

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Abstract: ICTs are vital both in our lives and in education. The effective integration of ICTs into education is thought to enable citizens and workers to acquire functional and critical thinking skills such as information literacy, media literacy, and ICT literacy in the 21st century (Partnership, 2015). Language teaching cannot be thought without considering the use of ICTs. Language teachers are required to make use of ICTs in language education to make learning enjoyable, colourful and more learner-centred. The aim of this study is to find out foreign language teachers' ICT self-efficacy perceptions. 35 language teachers who are teaching English, French, German and Russian in an intensive language learning program of a Turkish state university participated in the study. The data were collected via the "ICT Self-Efficacy Perception Scale" (ICTSEPS) developed by Ekici, Ekici and Kara (2012). English, French, German and Russian language teachers' perceptions of ICT Self-Efficacy were compared. The data of ICTSEPS were analysed on SPSS 22 packaged software using descriptive statistics finding means and standard deviations. Semi-structured interviews were also carried out with some volunteering language teachers. Interview data were analyzed to find emerging themes and these were categorized using Constant Comparison Method. The results showed that language teachers use ICTs in their lessons and in their lives and they have high ICT self-efficacy. However, English language teachers were found to have higher ICT self-efficacy compared to French, German and Russian language teachers. Based on the results, certain implications were drawn from the study in order to organize language teaching and learning programs that utilize ICTs.

Keywords: e-learning, language learning, ICTs in language teaching, ICT self-efficacy, ICT integration

e-Learning and Classroom Learning Activities

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Abstract: Systems for e-learning or blended learning support of teaching have become an integral part of teaching process from primary schools to universities. There is an enormous number of various LMS systems and educational programmes. Most available systems offer teaching and learning materials and provide feedback to the teacher – information on results achieved by their students. The paper introduces the Techambition system and its potential and opportunities it provides. The system was designed to support mathematics education

on upper secondary schools and has been developed by a British company of the same name. This system is used in mathematics education on dozens of upper secondary schools in the Czech Republic. The number of students who work with it exceeds 10,000. Last year Faculty of Education, Charles University signed a contract with the company Techambition. Academic staff of Faculty of Education are involved in development of educational content. Unlike other product, the Techambition system offers a brand new function – planning teaching activities. A system of artificial intelligence evaluates students' work and prepares a list of activities for them that the teacher should use in the next lesson. The plan includes both incentives for frontal teaching and proposals for collaborative learning. The system prepares for the teacher not only a set of tasks but also divides the students into groups. When dividing the students into groups, the system uses their characteristics (learning styles, knowledge of the topic, solving procedures used) with the aim of making the group work as effective as possible. Some activities are conducted on-line on computers and having evaluated the results new activities are proposed. The goal of the paper is to introduce the Techambition system as such, the method of designing individual activities as well as pupils' and teachers' experience with using the system. Results show that the use of AI in classroom management and lesson planning has a significant potential and deserves attention of further research.

Keywords: techambition system, collaborative learning, classroom learning activities, artificial intelligence, e-learning

Good Questions in e-Learning Environments

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Abstract: The paper focuses on good questions as originally developed by Clarke, Sullivan and their team for primary mathematics education. In accordance to their work, we understand a good question as an open question that asks for more than recollection of known facts. It has several answers that can all be accepted. When answering it, pupils learn something new and the teacher learns something about their pupils from their answers. Most publications focusing on good questions focus on their use in face-to-face teaching of mathematics. The use of good questions in the e-learning environment has not been studied yet. There are obvious differences between face-to-face and e-learning environments. The work in e-learning offers the access to resources, more time to think about possible answers etc. But are open questions used in the e-learning practice? If yes, to which extent? In the paper, an analysis of good questions from mathematics and natural sciences, developed for home schooling at the elementary school ZŠ Březová is presented. The e-learning materials of the 6th and 9th grades (309 pieces in total) were examined. We found 87 good questions in the materials. Usually, however, the educational potential of using good questions was not exploited. The analysis of good questions in the materials resulted in dividing them into categories. The categories are presented with examples, enabling the reader to grasp the

specificities of the categories better. Based on the research findings, the e-learning environment at the monitored school will be adjusted.

Keywords: communication, good question, open question, environment supporting discussion

Practical Application of MicroLearning in Education of Future Teachers

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Abstract: eLearning is a widely used concept when it comes to using information and communication technologies in the education of people of all ages. Since it was first used in the education process, eLearning has undergone a number of changes and innovations, in order to meet the latest technology requirements as well as the changing requirements of society. As a result, there are various forms of eLearning and it is entirely up to the teacher/tutor which one they decide to use (i.e. which one they consider to be the most effective). The following are some of the forms of eLearning: mobile learning, blended learning, adaptive eLearning or eLearning with gamification elements. Apart from these, the term microLearning is also becoming established. Even though it is not a completely new term, microLearning has yet to be described in detail (in research studies, methodologies and textbooks), despite its popularity with the majority of age groups. The greatest advantage of microLearning is that it is not dependent on the technology that the student is using. Dividing the curriculum into smaller units, microLearning allows the student to learn anytime and anywhere as well as plan their learning, regardless of whether they use a desktop computer, a laptop, a mobile phone or a tablet. The paper describes practical experience with using microLearning in education of future teachers at the Pedagogical Faculty. In order to be able to determine the potential of microLearning, pilot microLearning courses had been created, which were then compared with existing eLearning courses. This part of research was aimed at comparing the behavior of students in the microLearning course with those in the eLearning course. Both courses had the same content, were used in the instruction of students with the same specialization, and both were one semester long. Apart from describing students' way through the course, the paper also presents their opinions on the microLearning-based courses, the level of acquired knowledge and other factors that could prove crucial for the wider use of this eLearning concept in the future.

Keywords: eLearning, microLearning, learning management system, future teachers, Industry 4.0

Problem Based Learning: A Facilitator of Computational Thinking

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Abstract: This paper explores and analyses the potential of Problem Based Learning (PBL) as a pedagogical framework for Computational Thinking (CT) in educations. CT skills are increasingly recognized as a necessity to all lines of study, as they not only facilitate digital proficiency, but potentially also a sense of computational empowerment and an ability to take a critical and constructive approach to applying computers when solving complex problems. The distinct focus on higher education is routed in theoretical as well as empirically based challenges, as this particular group of learners for the vast majority have started their education in a mainly analogue learning setting, yet now face employments with a much stronger demand for digital competences. With this paper, we aim to highlight the immediate benefits of PBL as a means to develop CT-skills as part of a higher education.

Keywords: problem based learning, computational thinking, collaborative learning

Finding an Effective Data Mining Algorithm for Automatic Detection of Learning Styles

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Abstract: Students' learning styles are the differences in the methods used to acquire and process information. The main purpose of using learning styles is to adapt the content presentation to the learner, either within Adaptive Educational Hypermedia Systems or Learning Management Systems. More recently several approaches to the automatic detection of learning styles have been proposed, in contrast to the traditional way which has been through students' completion of a specific questionnaire. These approaches are based on the analysis of behaviour data that are gathered from the students' interaction with the system, such as his/her actions and their duration. Automatic detection approaches have a greater potential to be error-free as real data is used in order to detect students' learning styles. Automatic detection techniques can be divided into two subcategories: data-driven

and literature-based. Computer science researchers are more familiar with data-driven approaches, because they require the use of an artificial intelligence classification algorithm to automatically detect learning style preferences. This article investigates the precision attained by different data mining algorithms in an online Moodle course after the second and fourth weeks, and at the end of the course, to compare the detection results and check how fast each approach is. An evaluation study of a Moodle course was conducted in the context of an introductory programming course. The study was conducted over the first six weeks of the course, up to the mid-term exam. Students were asked to answer ILS questionnaire right after their first login to the course in order to obtain information regarding their learning style preference and use them to measure the precision of the algorithms. The aim of our analysis was to investigate whether the proposed automatic detection approach can be improved by using different data mining algorithms. Summarizing the findings of the study, we come to the conclusion that the proposed approach for automatic detection of learning styles can attain higher precision by using specific data mining algorithms even only after two weeks into the course.

Keywords: learning styles, automatic detection, educational data mining, user modelling

Formal Education as Lifelong Learning for Working Professionals: A Case Study

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Abstract: Compared to traditional work-based skills development programs, commissioned education is an attractive solution for working professionals to develop skills to better fit into their constantly reshaping job profiles while acquiring a higher educational qualification. Commissioned programs, on the other hand, typically require a high level of commitment, such as constant engagement in learning and rigorous assessment of knowledge. However, comparatively less light is shed on the designs and impacts of commissioned education than the other lifelong learning and professional development methods. This paper, therefore, presents a systematic empirical study on design, execution and evaluation of commissioned education based on a program at masters' level for middle and senior project managers offered for seven years at the Department of Computer and Systems Sciences, Stockholm University. The program is evaluated at the end of every academic year, and the reforms are duly implemented. Impact of these reforms is systematically evaluated based on perceptions of the teachers and students of the program. Blended form of courses offering was voted best in contrast of complete online and face-to-face forms, with a structure of classroom meetings in the beginning and the end of a course, and synchronised online meetings for formative assessments. Didactical indicators included problem-based learning approaches that tights the workplace problems into course assignments and formative discussions. Need

for pre-planning with adequate information about the course workload and deadlines, increased communication between stakeholders, flexibility and efficiency in the course offers are identified as essential success factors. Emotional support from the family is also recognized as an equally important factor in adult learning. A formal education qualification such as a master's degree is a difficult goal to achieve in one step, and should ideally be achieved by aggregating short term goals such as certifications of shorter durations, according to the outcome of the study.

Keywords: commissioned education, lifelong learning, professional development, program evaluation, pedagogy, blended learning, problem based learning

Towards an Agile-Based Process Model for Effective Teacher Training on LMS

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Abstract: Successful implementation of e-learning environments requires adequate teacher training. In this study, a solution is sought for how teacher training programmes on newly introduced Learning Management Systems (LMS) can be designed in such a way that they would be inclusive of different levels of digital competence, supportive of individual teacher development and flexible enough to be applied in different institutional environments. Following the soft design science research methodology, two co-creation and co-design sessions, as well as eight in-depth interviews, were used for designing and testing a model for the process of teacher training in using LMS. The outcome of the study indicated the need of an agile-based approach as well as two kinds of segmentation of the training process based on the level of competence and on the position of the training process on the timeline. Besides, the cascading of teacher training was found to be a key approach to make it cost- and time-efficient. Moreover, the introduction of agility to the recursive process of training was found to strengthen consistent knowledge building in teachers. This has been illustrated in the form of a spiral model of knowledge construction, with teachers beginning to learn the basics and incrementally progressing to acquire advanced skills. The proposed process model allows academic institutions to mobilize the teaching task force by equipping them with technological knowledge systematically. This way, the level of expertise in using LMS can be developed incrementally and in synergy with the Pyramid Model of Digital literacy. The level of knowledge acquisition by teachers would correspond to the levels in the pyramid, and thereby, it would be easy to see them “climb up” the pyramid as they progress.

A more thorough evaluation of the model using different cases and a careful revision of its components are considered as further steps in this research.

Keywords: teacher training, learning management systems, LMS, e-learning, process model, agile process

Assessing Programming Concepts in the Visual Block-Based Programming Course for Primary School Students

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Abstract: The present study aimed to investigate primary school students' achievement in programming concepts after 6-month learning of Scratch programming and 6-month learning of App Inventor programming. A test of programming concepts was developed based on the evidence-centered approach to assess students' progression. Online tests were administered to 1678 grade-5 students in class with the help of teachers. Students were given 30 minutes for each test before and after the programming course. Based on partial matrix sampling method, three test forms were created with 5 common anchoring items to reduce students' burden of completing the full test form developed for this study. The unidimensional dichotomous Rasch model was therefore employed for calculating students' ability scores. Results suggested that the test is valid for measuring programming concepts according to the mean-square fit statistics and other fit indices. Paired sample t-test was conducted to evaluate students' progression based on the ability scores. Results of the study showed that the programming course is effective as students made significant improvement upon course completion. In addition, group differences in gender and perceived competence (low vs medium vs high) were further explored with independent sample t-test. Results showed no significant gender differences regarding students' progression. In other words, boys and girls had similar initial levels of programming ability scores and rates of improvement regarding programming concepts. Results further revealed some interesting group patterns that boys with medium levels of perceived competence and girls with low levels of perceived competence show the most rapid improvement, indicating the course influenced different groups of students to different extents. Findings of this study shed light on the importance of visual block-based programming as a means for fostering programming concepts among primary school students. Educational policymakers should refer to the findings and propose policies to support programming education so that students can establish a solid foundation of programming concepts for the development of computational thinking.

Keywords: app inventor programming, primary school students, programming concepts, programming education, Scratch programming, visual block-based programming

Investigating Participants' Collaborative Patterns in a MOOC for Teacher Professional Development

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Abstract: This paper reports on a teacher professional development MOOC, designed to prepare Greek language teachers in secondary education schools towards designing and implementing collaborative writing activities in their classroom. Using a hybrid mode, a new design framework for MOOCs is proposed, organised along three dimensions of teachers' learning activities: a) individual engagement, b) peer interaction and mutual support, and c) collaborative creation of educational artefacts. The pedagogical principles that determine the particular framework were authentic learning, case-study approach, peer-supported, collaborative and self-regulated learning. A mixed method of research data analysis was used regarding teachers' engagement and their learning presence in the collaborative learning activities. The analysis showed that the present MOOC achieved high completion rate (57.6%). In addition, the results provided supportive evidence that the design framework was effective towards promoting teachers' active engagement, peer interaction and support, as well as development of learning design abilities to integrate collaborative writing with Google Docs in their classroom.

Keywords: MOOCs, e-learning, teacher professional development, collaborative writing, Google Docs

Students Behavioural Patterns on the National Open Education Platform

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Abstract: Over the past decade, online learning technologies have become widespread in the non-formal education, higher education and additional vocational training sectors. The best Russian and foreign universities produce digital content and create online courses that are used not only by students of these universities, but also by other educational organizations for the implementation of their educational programs. Digital platforms that host online courses allow monitoring and logging of every step of learners and their achievements, while mastering a course and passing current tests and final exams. This creates the prerequisites for developing adaptive learning systems that adapt to each learner, determine their level of knowledge, track behavioral patterns, learning styles, and automatically organize content that enables achieving the best learning outcome. The study is aimed at analyzing the behavioural patterns of students while mastering massive open online courses. For this purpose, six online courses created by two universities were studied: Ural Federal University and National University of Science and Technology (MISIS). All the courses are hosted on the National Open Education Platform (Russia), which is based on edX open-source platform. To analyze the behaviour patterns, logs of students' activity on the platform were examined. Using the IP addresses the data was normalized by time zones. Different types of student interaction were explored with the content throughout the courses and the peculiarities of student's work with different components of the courses were described. During the study some typical temporal patterns of students' behaviour were revealed and analyzed in conjunction with their success rate. The findings of the research may be useful to the authors of the courses for improving the content, as well as to the tutors for supporting learners during training or education programmes.

Keywords: e-learning, massive open on-line courses, national platform, open education, big data, behavioural patterns, open edX

A Critique of Blended Learning: Examples From an Undergraduate Psychology Program

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Abstract: The adoption of technology to a University curriculum is challenging and requires a complex blend with pedagogical components. The aim of this study is to examine how digital learning tools could enhance first year modules supporting blended learning approaches. Two psychology modules are used as examples to discuss two different blended approaches and study student engagement with learning process by exploring their performance on online activities under the perspective of module design, students' engagement with formative and summative assessments, and digital literacy. The digital learning tools that supported the two blended learning approaches were wikis, blogs, online tests. This investigation was conducted for two subsequent years in a UK Psychology School in which a large number of students were enrolled. The total number of students who participated in this investigation for the 2016-2017 academic year was 407 and for the 2017-2018 academic year was 405. In the first example, an academic performance comparison was conducted between the students who have been engaged with online formative activities and those students who have attended the face-to-face classes only in a transferable skills module. In the second example, a compulsory online continuous assessment process was followed to support a first-year psychology module aiming to enhance student learning on biology topics. This article discusses how students might engage with online formative and summative activities in association with their performance and how different assessment types alongside with the use of different digital learning tools might enhance blended learning environments. Findings of this study suggest that teachers should connect formative with summative assessments in order to increase student performance and they should consider blended learning approaches under the perspective of pedagogical principles and continuous assessment in order to increase student engagement with their learning process.

Keywords: blended learning, formative assessment, module design, student engagement, summative assessment, academic performance

The Contribution of Social Media on Heritage Experience: A Case Study of Samchuk Community and Old Market District, Suphanburi

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Abstract: Alongside with their traditional roles in collecting, preserving and showcasing tangible and intangible cultures, heritage sites play a crucial role in both formal and informal education. Learning in heritage sites is often described as free-choice, informal and lifelong. Social media has significantly impacted cultural education due to its popularity and ability in engaging learners. It supports constructivist learning by promoting reciprocal learning by bringing together different people regardless of their background and their social skills. Also, the representation of the destination on the social media can potentially shape visitors' perceptions before visiting and influence their on site experience. This paper aims to investigate the current roles of social media in supporting constructivist-based museum learning by focusing on the pre-trip perception. Samchuk Community and Old Market District in Suphanburi, a historic Sino-Thai community that has been transformed into a nostalgia-themed attraction is used as a case study. In so doing, user-generated content (UGC) on the major social platforms were reviewed to investigate how social media can construct pre-trip knowledge by analysing the presentation style and the content. The contributions of the research are as follows. The paper marks an early attempt to understand social media as a tool for promoting constructivist learning experience in Thai cultural tourism. This is an understudied issue, despite Thailand being among the world's largest internet user community and the most visited destinations. Also, the suggestions provided in the paper can be insightful for practitioners to use social media as a tool to enhance museum learning experience.

Keywords: social media, heritage tourism, constructivist learning, museum learning, user-generated content

Strategic use of Social Media in e-Learning

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Abstract: The problem of using social media in e-learning has been widely discussed in the literature. Undoubtedly, they are now an integral part of e-learning courses, thus each course must incorporate them into their curriculum. These platforms allow communication between participants of the course and are mainly used for this purpose. Their role in the transfer of knowledge, however, seems to be a more important aspect. In this respect, their potential is often not fully exploited. To change this, a strategic approach should be incorporated. It requires determining appropriate goals and tools that will determine the types, scope and ways of using social media in a given e-learning course. It is necessary to develop a specific model illustrating various stages of planning, operation and control of the effectiveness of using social media in e-learning. As a result, these media can expand knowledge of the course participants, shape their skills and social competences, which can contribute to the educational goals of individual e-learning courses. The aim of the article is to present the strategic model of using social media in e-learning. As a research method the author used a survey addressed to students of the Pedagogical University of Krakow, who were participants in e-learning courses.

Keywords: social media, e-learning, social media strategy, social media in e-learning, new technologies in e-learning

The Role of Accessibility and Usability in e-Learning Websites for Students With Disabilities: Can Policies Help?

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Abstract: People with disabilities may still be excluded from some of the learning opportunities at tertiary institutions because of their disabilities. To create a society which respects all people irrespective of their abilities, digital and social divides should be discouraged. This exploratory study investigates the role of usability when people with specific disabilities interact with e-learning environments. The objective is making informed

decisions regarding the support presented by this institution's e-learning websites. If disability policies at higher education institutions fully address the needs of students with disabilities and are implemented accordingly, all students will be able to access and utilise all the learning opportunities and graduate competitively. The disability policies for students at tertiary institutions should address all their needs, including accessibility and usability of e-learning websites. The University of South Africa (Unisa) is the largest Open Distance electronic Learning (ODEL) institution in South African. In order to determine how students with disabilities interact with the e-learning website of Unisa, students were observed in the controlled usability laboratory. Students with mobility (limited hand function), visual and auditory disabilities were requested to attempt specific tasks using the Unisa websites. A total of twenty students, fifteen with above mentioned disabilities and five without disabilities, participated in this study to determine the usability of the Unisa's website. The results of this study are reported in this paper.

Keywords: accessibility, usability, design principles, digital divide, disabilities, disability policies, human-computer interaction, usability laboratory

Adding Narrative to Gamification and Educational Games With Generic Templates

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Abstract: Adding narrative, that is, a story, to gamification and educational games can boost students' motivation and engagement. This requires a narrative fitting the course in which it will be deployed to and a gameplay to which the narrative fits without seeming to be tacked on. In this article, a gamification template called Reification and an education game template called Synapses are introduced both aiming at relieving educators from having to find an appropriate game or gamification leaving them only the task of finding a fitting narrative. Reification is making something abstract concrete with the intention of making the represented concept more tangible. In case of the gamification mechanism Reification, a learner's progress in a course is made concrete through visualization: A student's progress is visualized as a landscape in which each object, such as a tree, makes concrete one of the student's accomplishments, such as a solved exercise. Reification aims to provide students with a tangible overview of their learning progress and allows them to compare their landscape to their peers'. Reification is illustrated in the article with a course on Egyptology. Synapses is a game which supports students in overcoming and preventing the development of misconceptions, which are commonly held incorrect beliefs by students about courses' contents. After each lecture, students are tasked to organize parts of the lecture's content in a concept map, or to revise their concept maps in reaction to mistakes made in exercises.

The game's narrative takes different turns depending on the percentage of students having a correct concept map. Synapses is illustrated in the article with a course on Logic. This article represents a work-in-progress: The concepts are grounded in theory with evaluations of the introduced implementations planned for future work.

Keywords: gamification, game-based learning, gameful design, motivation, learner's misconceptions, concept maps

Digital Literacy and Course Design

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Abstract: This paper presents a course planning model for lower and upper secondary schools in the fields of digital literacy and computational thinking. The examples in the paper are based on a Danish regional project entitled "crossingIT," in which about 35 unique courses were developed and conducted by local educators. Duration of the courses ranged from approximately two hours to four a week for fifteen weeks. The model highlights four perspectives in course planning: (1) a traditional planning perspective, with a focus on learning objectives, learning activities, practical organisation, evaluations, etc; (2) methods for teaching digital production such as iterative design cycles, pair programming pedagogy and video tutorials as well as textbooks; (3) the field of digital literacy including, for example, computational thinking skills, ethics, critical thinking and societal perspectives; and (4) Environment, including local company participation, career learning and cross-school teaching. The model can be used for both planning and analysing courses in the fields of digital literacy and computational thinking. The article offers specific examples of teaching methods and specific cases from practice. Teaching in this field does not have a long tradition in Denmark. The model provides specific advice for well-rounded didactic planning in the fields of computational thinking and digital literacy.

Keywords: digital literacy, computational thinking, teaching, learning, course design and didactics, coding and programming

Application of Digital Tools for the Development of Entrepreneurship Competencies

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Abstract: The article presents existing digital tools usable for forming entrepreneurship competencies. Entrepreneurship competencies combine creativity, a sense of initiative, problem-solving, an ability to marshal resources, and financial and technological knowledge. These competencies enable entrepreneurs and entrepreneurial employees to provoke and adapt to change. They can be developed through entrepreneurship education and training which focus on promoting an entrepreneurial mindset and behaviour. A perceived lack of capabilities remains one of the most frequently cited barriers for people to start a business. Formal education can play an important role in developing entrepreneurship competencies. Schools, vocational education and training institutions and higher education institutions are enriching their study programmes with dedicated courses on how to start a business, either as self-standing modules or embedded into curricula. Teachers need to be supported in their new roles of promoting entrepreneurship competencies. A common approach in entrepreneurship education is problem-based learning and learning by doing and the success of which depends on the overall teaching and learning environment. The current educational environment needs to be equipped with digital tools that are developing relatively quickly and form the Digital Learning Environment (DLE). If DLE is intended to be used for entrepreneurship education, we can call them Entrepreneurial Digital Learning Environment (EDLE). The set EDLE elements can be used individually or in groups as e-learning tools and as a part of non-formal and formal learning by students and adult participants. In formal education these elements, when integrated with face-to-face learning, will form a modern blended learning strategy. The article gives an overview of the basic EDLE components, which are primarily: web platforms, BIZMOOCs, e-Testing, webinars, e-books, video sequences, podcasts and social networks. Readers will gain a comprehensive overview of the potential of these tools for a specific educational area - entrepreneurship education - and may become their active users, both as teachers and as pupils. Enterprise and entrepreneurship spirit in everyday life has a universal character in the global world; therefore, concrete examples from individual EDLE components are selected from a larger number of countries and can be also useful in most countries.

Keywords: entrepreneurship competencies, entrepreneurial digital learning environment (EDLE), digital tools, BizMOOC, testing of entrepreneurship competencies, digital entrepreneurial platform

Gamification for Promoting Acceptance of an Online Learning Environment Among Teachers

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Abstract: This study examines the impact of a gamified approach on acceptance of an online learning environment among teachers. It uses two predictors of TAM3's Behavioural Intention, namely Perceived Usefulness and Perceived Ease of Use, in combination with a construct specifically related to gamification, i.e., Teacher's Gamification Competence. Thirty teachers attending an online teacher training path expressed their reaction to the course by completing surveys. The results of group comparison (players vs non-players) showed that teachers who completed the gamified activity had a higher level of Perceived Ease of Use and Perceived Usefulness than those who completed the control activity. From that analysis, however, insufficient evidence emerged to maintain that the gamified activity contributed in promoting greater acceptance of the Open Online Tool (OOT) in question than the non-gamified control activity did. The results of correlation analysis showed that Perceived Ease of Use was positively correlated to Perceived Usefulness; in addition, Teacher's Gamification Competence was positively correlated to Perceived Ease of Use.

Keywords: gamification, online technologies, technology acceptance model, perceived ease of use, perceived usefulness, teachers' professional development

Towards an ICT Enabler for Enhancing Non-Cognitive Skills in a Lifelong Learning Setting

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Abstract: Non-cognitive skills (NCS) such as critical thinking, creativity, reliability, problem-solving, self-management, decision-making, and communication are the keys to a successful life and career development in a knowledge society. In contrast to hard skills or cognitive ability, which are the mainstream of formal and informal education, NCS is yet to be recognised and measured in academic curriculums, despite that many studies have shown the importance of NCS in building the character of a person. The system requirements and design architecture for an ICT solution are sought in this study that can quantify and assess

NCS. A Design Science Approach (DSA) is followed in systematically eliciting the requirements and hence the functionalities and main modules of the ICT enabler. The resulting artefact includes the functionalities for a dashboard that the personal profile and skills of users can be visualised, and a matching system of NCS required for prospective occupations, together with a recommender system that can recommend courses to acquire NCS. The requirements were elicited and refined, starting in a co-creation session with project stakeholders from six European countries. The elicited requirements from the co-creation session were validated by pilots consisting of 190 participants from three European countries. Finally, the results were transformed into wireframes, and, ranked based on the perceptions of the end-user focus group participants, refined by the experts in the field. The discovered system features include visualisation of skills profiles of individual users, with an ability to upgrade the profile autonomously as they complete courses or assessment tests in the platform. The ICT enabler is designed under a project of European Commission Directorate General for Communications Networks, Content & Technology (DG CONNECT), named SkillsMatch.

Keywords: ICT enabler, soft skills, assessment, lifelong learning, non-cognitive skills

Technology-Based Education and Students' Performance: Literature Review

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Abstract: The present paper is dedicated for the process of reviewing the available literature about technology-based education and students' performance. Thus, this paper casts light on technology-based education; students' performance; the relationship between technology-based education; and education technology in Bahrain as it was presented from the point of view of other researchers. This paper contributes to establishing an adequate background about the topic for the readers. It also guides the researcher to pinpoint what exactly prior researchers came across from their studies. The theoretical framework and conceptual model for the research are designed in light of what the research concludes from her literature review process. Further to that, this paper aims to exhibit a clear understanding of the subject while comparing and contrasting various literatures from a number of previously published articles.

Keywords: technology-based education, e-learning, students' performance

e-Design Education Using a 3D Printer Based on Design Thinking at Primary School

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Abstract: In the field of business and education, “Design Thinking” has become popular over the last few decades. Design thinking is a methodology which seeks to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. In the case of business, it sets out to define how an enterprise creates, delivers and captures market value. The interrelationship between those three facets is a key to understanding how a business design model can be invented to define a new venture. In the case of education, on the other hand, design thinking helps learners develop a growth mindset and important problem solving, analytical and spatial thinking skills. In this paper, we introduce the concept of design thinking to a design class at primary school. Primary school students will be introduced to innovation skills such as creativity, critical thinking, problem solving, communication and collaboration through design thinking. According to the Stanford d.school, the design thinking process comprises five stages: empathize, define, ideate, prototype, and test. However, our design thinking process for primary school students comprises four stages: Definition, Ideation, Prototype, and Test. In the Definition stage, three to four students form a group in the class. Then, a tutor provides two tasks related to 3D modelling. Each group chooses one task. In the Ideation stage, each student draws his/her image for the task on rough papers. The drawings are compared among students, and several drawings are selected by argument. In the Prototype stage, selected drawings are designed by the CAD software Autodesk Fusion 360, which is easy to use for primary school students. The students do not need to add colour on Fusion 360 as it is not important. After the design of the drawings on Fusion 360, these drawings are realised by a 3D printer. Then, students paint their 3D objects using paint-box and then these objects are compared and discussed. As a result of the discussion, they come back to ‘Ideation’ or ‘Prototype’, and modify the objects.

Keywords: education, design thinking, 3D CAD, 3D printer, primary school

Interaction and Group Work in Blended Synchronous Higher Education: Exploring Effects on Learning Outcomes, Satisfaction and Retention

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Abstract: Technology enhanced learning is today a part of most university courses and pure traditional face-to-face courses are rare. Modern blended learning has evolved from an asynchronous design to involve a blend of technology enhanced synchronous activities. To address the identified problems with feelings of loneliness, confusion and low motivation blended learning must also be designed to support collaboration, rich teacher-student and student-student interaction. The aim of this study was to explore the relationship between collaborative learning, retention rates and learning outcomes in university courses given in blended synchronous mode. The important main research questions to answer were: “What is the relationship between student satisfaction, student interaction, learning outcomes and retention rates?”, and: “What kind of variables could be used to describe how group work is being conducted? The overall research strategy was a case study approach with data collected from multiple sources. Teachers from 37 courses in two bachelor programmes answered an online survey to investigate the relations between student collaboration, student interaction, pass rates and students’ overall impression of courses. Survey answers were analysed and compared to answers in course evaluations and results in national study documentation system. Findings indicate that there is a correlation between students’ overall impression of a course and the pass rate, where students’ overall impressions are based on the course evaluation. There is also a correlation between students’ interactions in a course and students’ overall impression of a course, where a high degree of student interactions results in a more positive overall impression. There were no correlations regarding student grades, and the various types of group work and the design differences between the two programmes require further analyses.

Keywords: collaborative learning, student retention, learning outcomes, blended synchronous learning, higher education

Using YouTube Analytics to Investigate Instructional Video Viewing Patterns

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Abstract: In recent years, there has been a growing interest in learning analytics and educational data mining in the higher education sector. Learning analytics data can be used to identify at-risk students and to help instructors identify how students are engaging with their online course materials. Despite the popularity of video-based instruction in higher education, there is limited research to-date on how instructors can use analytics data to investigate video viewing patterns, with a view to determining the efficacy of those videos. Analysing video-watching patterns provides a unique opportunity to appreciate how, and if, students learn more effectively via video. To that end, this case study explores the video viewing patterns of a cohort of 348 undergraduate business students taking a business-oriented IT module. The students had access to a series of 17 videos, spanning five practical Microsoft Excel topics, which were developed specifically for a module entitled 'Business Information Management'. Students attended two one-hour lectures per week and five one-hour computer labs over the semester. In addition to an end-of-term theory exam, there was also a one-hour end-of-term practical spreadsheet exam. This case study answers the following questions: To what extent do students use instructional videos as a tool for initial learning and revision for the end of term practical exam? Does the difficulty of the material affect video viewing patterns? How much [what proportion] of the videos are watched? Does the difficulty of the material affect how much [what proportion] of the videos are watched? To what extent do students watch a series of videos on a topic? The paper demonstrates the nature of data that can be freely obtained from YouTube analytics and how it can be further exploited to determine how instructional videos are being used (how many students access the videos, for how long, and when). The paper also highlights the importance of undertaking a deeper analysis of the data, as the initial summary data may be misleading.

Keywords: learning analytics, YouTube videos, video-based instruction, viewing patterns, videos

Dissemination of Distance Teaching Practice

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Abstract: The obligation for professional education is to understand and utilise connections between theory and practice. This continues to be a puzzling task. The topic for this paper is how teacher students bring learning from their education to their subsequent everyday practice as school teachers. The paper presents results from an action research project, which follows the dissemination of distance teaching practices from the teacher education to teaching in schools, in the subject crafting and design. The project was very successful in terms of providing teaching which fulfils learning goals in crafting and design. The action research showed distance teaching as very relevant for teaching crafting and design. The question for this paper is how qualifying a competent distance teacher took place. The teacher education in Greenland is exploring the didactical concept of students as didactical designers. The method is to invite teacher students to discuss what they experience in their education and to invite them to take part in planning and executing their own learning processes. This is expected to integrate didactical reflection and creativity ready to ignite when teaching in schools. A similar method relevant for exploration is demonstrating exemplary teaching practices in the teacher education. The method called modelling is intentionally to work with transmission of relevant tacit knowledge from student to professional life. Modelling and the role of students as didactical designers are concepts examined in this research project. Based on research on distance teaching in crafting and design the paper provides a discussion on transmission of competencies and skills for professional distance teaching in schools.

Keywords: teacher education, distance teaching, distance education, praxeology, didactical designers, crafting and design

Investigating the use of Moodle at a PBL University: Design Factors and Experiences

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Abstract: This paper presents an empirical study and the resulting design choices from a problem-based learning (PBL) development project at Aalborg University (AAU) entitled "Learner-Centred Moodle Course Design: Design Factors, Differences in Perceptions and Best Practices." In relation to this study, the following research questions are explored: What characterises the current use of Moodle at AAU? How can teachers use Moodle to support PBL activities? The empirical investigation took place in 2018 and was comprised of a literature review; a survey of 345 students' experiences of Moodle in conjunction with a nomination for the best Moodle course; an analysis of the 178 nominated courses; and interviews with four university teachers, about their use of Moodle. During the investigation, it was found that many existing activities at AAU focus more on sharing information and teaching materials and less on the students' PBL activities and projects. This finding is intriguing, as PBL comprise the pedagogical foundation of AAU, but use of Moodle does not reflect this. The investigation found several reasons for the lack of PBL in Moodle, and explore them in full in the paper.

Keywords: Moodle, problem-based learning, higher education, design, literature review, empirical findings

Meeting Online to Reduce Carbon Emissions and to Emphasise Values in Life and at Work

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Abstract: In today's media, we often read about how much energy digital services consume, with streaming services, such as Netflix, and social media hosting, such as Facebook, in the

spotlight. Though these are certainly serious issues that we as a society must address, there are also opportunities for using digital and online technologies to help organisations respond to the sustainability imperative by reducing their carbon footprints. For example, as researchers working with online leadership, collaboration and learning, we often hear organisations address the need for meeting online from a cost-effective perspective, such as reducing travelling costs, reducing time spent on meetings and reducing the necessary preparation time. Though we do not generally disagree with this practice, we find that a similar perspective regarding environmental issues could prove beneficial, shifting the focus from a time and cost-effective ideal to a new value-driven perspective on life and work. Thus, the questions become how can we use digital services, such as online video conferencing, to yield meaningful results for the organisation and the environment and how can we create organisational incentives to identify and apply these online alternatives to benefit the organisation and society at large. This may also provide a new set of dynamics for motivating employees, students and others to partake in such digitalisation strategies if they are associated with concern for the environment. In this paper, we address in more detail the arguments for a sustainability perspective to online leadership, collaboration and learning rooted in the literature and the daily news, and we discuss cases from our own settings to provide suggestions for working with the positively charged concept of Environmental Conversion Value; however, this remains a complex arena with multiple considerations and concerns.

Keywords: video conference, carbon emissions, online activities, environment, sustainability

Understanding the Urgency and Complexities of the Energy Transition Through Serious Gaming

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Abstract: To have sustainable societies, we need to accelerate the energy transition towards clean energy solutions, however, awareness and understanding of the process is still limited, especially among young people. In addition, the topic has mainly been approached from an engineering angle, ignoring the social challenges: lack of public support for solar farms and large wind turbines could stop the need to act. An optimal balance considering the point of view from all parties involved is out of sight without a focus on social structures and a dialogue among all parties. In this context, universities have a critical role to play: these institutions build capacity through the development of new knowledge, new understanding and new insights, and can therefore provide effective solutions to complex societal challenges. In search of innovative approaches to reach young people, whose communicative paradigm has become more interactive and participatory, the use of serious

gaming in formal education is gaining attention among scholars and practitioners: they can foster skills and abilities, contribute to content development of complex issues by integrating insights from different disciplines, and permit learning experiences that are not possible in real life. In this paper, we introduce “We-Energy Game”, which aims to create understanding on the urgency and complexities in the provision of affordable energy from renewable sources for an entire town. During the game, players negotiate, from their respective roles, which energy source they want to employ and on which location, with the goal to make a village or city energy neutral. Then, we present findings from a pre-test and post-test completed by a hundred university students in The Netherlands to analyze the effects of the game on players awareness and understanding. Results reveal positive outcomes on awareness, as well as understanding of the complexity of energy transition and the importance (and difficulty) of collaboration among stakeholders.

Keywords: serious games, education, youth, sustainability, energy transition

Using OneNote as an ePortfolio: Promoting Experiential Learning and Self-Regulation

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Abstract: The pedagogical role of ePortfolios has been established in numerous studies. It has been suggested that ePortfolios facilitate deep learning, as they allow students to achieve a contextual understanding of their own learning. Other pedagogical advantages of ePortfolios are: enabling students to build a more holistic sense of their learning journey, enhancing learning outcomes and making learning visible. This study draws on previous research and develops the pedagogical potential of ePortfolios further. It presents a learning ePortfolio based on OneNote, the Self-Regulatory ePortfolio, where the pedagogical functions are embedded. The OneNote ePortfolio has been designed around a learning cycle based on experiential and self-regulation learning consisting of the functions: identify /plan/ action / record / review. This design of ePortfolio is much more than a tool to allow or catalyse a learning process, it is directly guiding students through the learning process and training them in self-regulative learning. This paper reports on this new model of Self-Regulatory ePortfolio and explains its structure and features within OneNote. It presents how it has been used at the Open University to work in languages and education modules in relation to Personal Development Planning (PDP) and as a Languages Portfolio in the context of the ECML (European Centre for Modern Languages). It reports on the promising results of pilot studies and scholarship projects carried out to evaluate this Self-Regulatory ePortfolio. It discusses the main findings of the studies and in particular the relation to students’ experiences using it. This paper concludes by suggesting further ways to implement this learning ePortfolio in other contexts and platforms.

Keywords: self-regulatory ePortfolio, OneNote, personal development planning

Feasible Ways to Personal Meaning Mapping in Out-Of-School Contexts?

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Abstract: Though most teachers find formal learning activities an important part of a class visit to a science center, research shows that formal learning is seldom the outcome. Instead, school visits tend to become "soda visits" without preparation and learning goals, and are rarely with explicit connection to the subjects taught back in school. To accommodate these challenges at the science center Experimentarium, a partnership with University College Copenhagen was initiated in 2017. In collaboration, ten Flipped Learning based teaching materials were developed to assist visiting teachers in supporting students' learning - before, during, and after the visit. To evaluate this intervention, a tool was developed to assess students' learning outcomes using Personal Meaning Mapping (Falk, Moussouri and Coulson, 1998). This paper investigates and discusses this tool as an effective means for measuring 'actual learning' (Bundsgaard and Hansen, 2011) in contexts involving interventions aimed to integrate out-of-school visits with in-school activities. Specifically, a pre- and post-test setup was conducted in order to measure development in students conceptual understanding. Data from students' Personal Meaning Maps were analysed quantitatively using four defined dimensions for coding: extent, breadth, depth, and mastery. The empirical data were collected from 26 students in the same class, of which 12 provided full data sets. Two central results are presented 1) the data shows development in students learning when engaging in the learning material 2) extent and breadth seem to be able to predict depth and mastery, opening up for adjustments to research method. While Personal Meaning Mapping is rather resource-intensive, and although some of these learning outcomes will remain hidden using this method, we still find it a useful and powerful tool for gaining nuanced insights into the development of students' conceptual understanding. In conclusion, we offer some suggested modifications to the method to make it more feasible to integrate in out-of-school contexts focussing on formal learning.

Keywords: personal meaning mapping, flipped learning, museum, out-of-school, blended learning

Investigating the Voice of Customers for M-Learning Application Quality

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Abstract: E-learning has become a new option for learners to access the learning materials and enhance their learning experiences outside the classroom. The flexibility of the technology goes beyond the traditional way of learning and enable learners to use mobile devices as the mean to learn. The emerging of mobile learning (M-learning) provides tremendous advantages for both learners and teachers, while more and more mobile learning applications have been developed and introduced to the market. The current study aims to investigate the voice of customers who have downloaded and used the mobile application. The edX - Online Courses by Harvard, MIT, Microsoft mobile application in Android platform was used as a case study. The M-learning evaluation factors employed in this study are including functionality, security, performance, usability, support, communication, portability, and pedagogical. The main methodology of the study is qualitative approach using text mining to analyze users' reviews gathered from Google Play website in the past year. The total number of the reviews is 4,200 collected from January 2018 to April 2019. The reviews have been collected as the voice of customers by using web-crawler, and text mining were analyzed by using Nvivo 12 program. The attributes of the m-learning application were then compared with the findings from the reviews. The information that arose from the reviews were categorized into m-learning quality variables, users' satisfaction, preferences, constraints, and suggestions. The research findings confirm the prior factors essential for evaluating the m-learning application, while new notions have been discovered. The limitations of the study are the limited sample of the m-learning application, and only reviews in the English language were analyzed. The practical implication of the research will benefit the m-learning application developers and the recently discovered factors can be applied to the theoretical implication for future research. This exploratory study aims to investigate the m-learning application from the customers' point of view, while most of the previous study focused on application development. Moreover, the findings also revealed the constraints and potentially useful features that could benefit learners and application developers.

Keywords: mobile learning, application evaluation, online review, text mining

Learning Gains of Process Oriented Guided Inquiry Learning in an Online Course Setting

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Abstract: There is substantial evidence that student-centred learning activities foster the evolution of higher-order skills, such as critical thinking and problem-solving. Process Oriented Guided Inquiry Learning (POGIL) approach is one such student-centred instructional approach that is mainly focused on improving student's content mastery and learning skills such as information communication, critical thinking, problem-solving and metacognition. Currently, POGIL has been mostly implemented in traditional classroom settings, where all participants are physically present. However, advances in online learning technologies have increased the popularity of online courses. Our study aims to implement and evaluate the effectiveness of POGIL in improving the overall student performance in an online course setting. We also present a meta-analysis on POGIL implementation and its effectiveness in different course settings. We implemented a POGIL approach in two completely online courses from the Health Information Management (HIM) program, M200 (Database Design for HIM) and M220 (Health informatics for Decision Support). We integrated POGIL practices into the course redesign of these HIM courses considering the core philosophy of POGIL - students learn through the process of performing activities that aid in developing critical thinking skills - the teacher, in this method, does not instruct, but rather facilitates guided inquiry. The lecture slides and videos were updated with POGIL activities and updates to the educational content, by removing the introduction of new concepts, and replacing them by background information that was required to do the POGIL activities. The modified content was implemented in Summer and Fall semesters of 2018. To evaluate the effectiveness of the POGIL, we compared the student academic performance (grades in the course assessments) of HIM M-200 course before (all semesters of 2017 and spring of 2018) and after POGIL implementation (Summer and Fall semesters of 2018). We used the Wilcoxon rank sum test to compare the performance of the student's pre and post-implementation. The results of the analysis showed that there is a statistically significant difference (p -value = 0.03) in the academic performance of the students before and after implementation. These different implementation under two contexts have been discussed and evaluated under the results.

Keywords: process oriented guided inquiry learning, POGIL, online courses, student-centred, instructional approach

E-Learning and Learner Knowledge Sharing Quality: Ahlia University as a Case Study

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Abstract: E-learning is an emerging approach in universities where self- directed students and motivated learning increases the utilization and integration of knowledge sharing in e-learning. The learning virtual community is a domain where inquiries, interest or needs, are shared. Such circumstances lead to interactions that allows virtual participants to learn from each other. This study examines the impact of e-learning on learner knowledge sharing quality. To fulfill the requirement, a quantitative approach was used to measure the e-learning approach developed at Ahlia University in Bahrain, and whether it directs the students to the required knowledge sharing quality. A constructed questionnaire has been developed and a sample of 376 Ahlia University respondents generalizable over the College of Business and Finance. The study concluded that there's an impact of e-learning on learner knowledge sharing quality and this is due to the e-learning environments at Ahlia University that are composed of those technologies that aid in teaching and learning; such as Moodle, where students log-on to attain blended e-learning experiences. This study and its conclusion overcome the gap exists in which students expressed an influential role of self-directed and motivation for learning and knowledge sharing in e-learning environments.

Keywords: e-learning; knowledge management; knowledge sharing

Examining the Compatibility of Students in Distributed Pair Programming

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Abstract: Pair Programming (PP) has a long history both in the software industry and education. More recently, specially designed environments have made the application of Distributed Pair Programming (DPP) possible, which enables two programmers to work remotely. Through these collaborative activities, students produce better programs, improve their performance and programming skills, and increase their self-confidence. Student attitudes towards Distributed Pair Programming and the factors that affect them, remain largely unexplored, while some of the existing studies have yielded mixed results. One important aspect is to understand the underlying factors that contribute to a successful pairing formation, i.e., factors that make pairs very compatible. This paper focuses on the examination of possible factors which we felt had the potential to affect the compatibility of student pairs who worked remotely. The present study was conducted in the context of a 3rd semester undergraduate “Object-Oriented Programming” course. The OOP concepts were approached through hands-on exercises completed in the lab sessions. Students carried out projects in pairs using the educational DPP system SCEPPSys. The analyzed data were collected from a pre and post questionnaire distributed to students before and after the end of the course, respectively. Pair Compatibility was examined in relation to pair perceived skill level, pair actual skill level, and pair programming self-esteem. Besides this, we examined if students' perceptions on the factors they believe hinder collaboration differ on the basis of their compatibility. The findings indicated that the compatibility rating differed significantly based on the partner’s perceived technical competence. Also, students that rated their partners as very compatible had more similar actual skill level with their partners than those students who rated their partners as not-compatible or satisfactorily compatible. We did not find any relationship between compatibility and pair programming self-esteem. Lastly, very compatible pairs rated the following three factors as hindering collaboration less negatively than not-compatible or satisfactorily compatible pairs: a) coordination problems (collaboration time), b) unreliable partner, and c) lack of partner knowledge.

Keywords: distributed pair programming, pair compatibility, OOP course, programming skills

Towards Integration of Deep Gamification Into Formal Educational Settings

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Abstract: Gamification can be defined as application of game design elements on real-world processes. The term deep gamification is used when real-world processes are changed by gamification, i.e. users have options to tailor processes in parts due to their preferences. Compared to gamification, deep gamification is considered to have a higher impact on user motivation and engagement. So far, however, there is no systematic framework for integrating deep gamification into real-world processes. This article explores potential bases of such a framework for the application of deep gamification in formal educational settings. Two case studies, each with characteristics of deep gamification, form the starting point. Furthermore, two theory models are identified to provide a framework for the integration of deep gamification into formal educational settings. The Self-Determination Theory provides a theory model from a psychological point of view, while the game categories of Caillois incorporate the motivational effects of proven game design elements. Based on the theory models, corresponding gamification design elements in the case studies are identified. The theory models and characteristics of the case studies could be aligned. The theory models therefore could provide a theoretical foundation of a systematic framework for the integration of deep gamification design elements into formal educational settings.

Keywords: gamification, deep gamification, SDT, Caillois, formal education, motivational design

Policies to Implement Smart Learning in Higher Education

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Abstract: This article aims to analyze the smart technologies and contexts that can potentiate digital learning in Higher Education. First of all, the research will focus on the definition of the concepts of digital learning, smart learning technologies, and smart learning contexts. Digital learning is all learning activity that uses, in a significant way, information, and communication technologies. It is interactive learning in which the learning content is available online. To operationalize this research, it was applied a Delphi methodology, in order to discuss with a set of experts the environments where smart learning and which technologies could potentiate the learning process in Higher Education (HEI) Contexts. The lines of analysis of this investigation were oriented according to the following research questions: What types of digital learning can be used to potentiate the learning process of students of higher education? What are the leading smart technologies used in the digital learning process? Which are the smart contexts that can potentiate the learning process? The main findings of the learning process will be the identification of smart learning types, technologies, and contexts. The articles will intent to define some lines of orientation for the definition of public policies to promote the learning process in Higher Education.

Keywords: smart learning, technologies, digital, contexts of learning, Delphi methodology, HEI

A Teaching-Learning Blended-Course Model Support Tracking Student Behaviour

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Abstract: This paper introduces an empirical study of applying the blended learning approach for teaching in the subject - Principles of Programming Languages, a course for high education students in Computer Science major. The course is designed by including online self-learning, face-to-face teaching, lab practising, online quiz, and traditional assessments where course contents, materials, and tools are available online. A teaching-

learning model and support technology based on the blended learning approach are presented. Also, some requirements for tracking student behaviour are discussed, for example, to track their engagement, self-responsibility, learning progress, test assessment, and learning style. The measurement methods to measure the learning performance of the individual and class are discussed. Also, some opinions of the students towards the blended learning approach are investigated. With the proposed teaching-learning blended-course model, it is foreseeable that the blended learning approach is a suitable and flexible teaching method in the digital learning context where tracking supports monitoring students' learning progress and especially for teaching the subject related programming courses.

Keywords: blended-learning, blended-course, tracking, student behaviour

Automated Scaffolding and Feedback for Proof Construction: A Case Study

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Abstract: Beginners are often unaccustomed to the abstract and formal thinking required in tertiary computer science education. This can be alleviated through close support provided by an experienced person, like a teacher. Nowadays, such support is hardly possible because, in computer science, instructors face classes of a few ten to a few hundred students. This article shows how scaffolding and feedback needed by computer science beginners can be provided by software. The particularly difficult case of building logical proofs is considered so as to demonstrate the effectiveness of the approach. The approach to computer-provided scaffolding and feedback presented in this article is based on specifically designed proof editors that relieve learners from some choices and tasks – scaffolding – and provide immediate feedback on those tasks left to the learners. Building logical proofs is especially challenging – not only for beginners – because it includes various challenges: Understanding definitions, building a syntactically correct proof, and correctly applying complex proof building rules. This article introduces two specialized editors that support students in learning the proof methods Resolution and Natural Deduction. The editors make it possible for learners to focus on the correct order of rule application – the most challenging part of proof building –, by relieving them of the other aspects of proof building, and providing immediate feedback on the correctness of proof construction tasks performed by the learners. The contributions of this article are twofold: First, the conception and implementation of two original graphical proof editors, and second, a report on an evaluation of the editors and the feedback and scaffolding they provide pointing to the educational approach's effectiveness.

Keywords: scaffolding, interactive learning environment, problem-solving learning environments, STEM education

A Study of Investigating Pre-Service Teachers' Attitudes Towards Using e-Learning Resources

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Abstract: Electronic resources have become a more accessible and convenient method for teaching. However, the rate of using e-learning resources and materials between different education levels is not equal. Many kindergarten teachers think that hard copies of picture books are preferable to electronic picture books. Most people assume that early childhood education teachers have lower rates of utilization of electronic materials. This study investigated the usage of e-learning resources and materials of the pre-service teacher, and the survey research design was used to carry out the study. Two hundred and eighty-five pre-service teachers from eight universities offering teacher education programs in Taiwan completed the web-based survey. We developed a scale called The Computer Attitudes Test for Pre-service Teacher as our survey instrument. The Computer Attitudes Test for Preservice Teacher consists of thirty-six items, and the format of the response to each item was five-point Likert type scale. Three components of attitudes towards computers, namely, cognitive, affective, and behavioral components, construct these survey tools. The internal consistency was calculated using Cronbach's Alpha for each of the three components, and the correlations were also calculated for the scores between each o components and the total score. Coefficients indicate a high level of internal consistency for each attitude component. Confirmatory factor analysis was conducted and supported the construct validity of the three factors model. The results revealed that the respondents who enrolled in public schools, studied in technical universities, major in natural science, and with disadvantaged status were more favorable toward using electronic learning resources than those who enrolled in private schools, studied in tertiary universities, major in humanity or social science, and without disadvantaged status. The differences did not exist when their gender was taken into account. According to our result, some limitation and suggestion to the future study were discussed.

Keywords: pre-service teachers, teacher education, attitude, e-learning, e-resources

Structures for Mapping Learning Content

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Abstract: Our research group is interested in different attempts at systematically mapping learning objects within a subject matter. We believe this will help in designing different curricula targeted for specific groups using specific resources, as well as for designing adaptive learning systems. What constitutes a learning object is left open, but can be of the following types; competencies, skills, knowledge, approaches and more. Of special interest is overviewing the different attempts at visuospatially or structurally arranging learning objects in relation to each other. To achieve this, we have conducted a systematic qualitative literature review. This has involved a highly iterative development of a query for use in various research databases (ProQuest, ERIC, Web of Science and EbscoHost). Here the emphasis has been on not excluding work that uses very different phrases to describe structure and types of learning objects, while attempting to eliminate work that uses these otherwise common phrases without describing a concrete notation for mapping learning objects in relation to each other. The full reading of 50 works allowed us to identify a number of structuring mechanisms: lists, tables and multiple types of directed graphs. Furthermore, the semantics of identified objects and the relations between the objects are considered. Representative examples are used to illustrate these variations and the strengths, weaknesses and trade-offs of these different approaches are reflected on. Of particular interest is a trade-off between structures that are flexible enough to express complex relations between learning objects and structures that are simple enough to provide simple overviews of the subject matter.

Keywords: literature review, learning objectives, competencies mapping, structuring principles

Effects of Personalized Learning With Preferred Digital Media Types on Learning Motivation

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Abstract: In recent years, the developments on online learning have grown in leaps and bounds. In addition, the growth has expanded in various aspects including learning materials which are essential as they affect students' learning. With the advancement of learning

materials, corresponding students prefer online learning support systems which also have been rapidly developed. Many developing learning systems have been improved based on single digital media types such as a game, web-based, or Computer-Aided Instruction (CAI) of personalized learning, while the preferred digital media types are usually disregarded. Hence, this developed system is created and designed for individual digital media types which students prefer to learn. This paper proposes to develop such personalized learning with three digital learning materials to individual students on preferred technology types in SQL topic. This study recruited forty-one university students to participate in digital learning materials which they prefer to learn. The materials empirically evaluated the effectiveness of personalized learning in each preferred digital media types, and the experiment was based on a pre-test and post-test design. The results of the experiments show that the assistance of the preferred learning material, and personalized learning materials demonstrated good performance learning achievement. Moreover, there are differences between the correlation of learning motivations and personalize learning in digital media types.

Keywords: personalized learning, digital media types, learning materials, computer science education, higher education, preferred digital media

Effects of Digital Learning on Students' Learning Achievement in Learning Computer Programming

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Abstract: Computer programming is one of the major courses that students in the department of Modern Management and Information Technology learn. Learning to program in any language such as PHP is not an easy task, and programming lecturers are aware of the numerous problems that arise during a class. Therefore, in this study, digital learning is proposed for helping students to reduce their anxiety and improve their learning achievements in learning programming. To evaluate the learning achievement of the proposed approach, an experiment was conducted on a second-year undergraduate student in a web programming course. The students were divided into an experimental group (n=27) and control group (n=27). The students in both groups started by taking a pre-test to measure their prior knowledge of PHP programming, followed by a questionnaire about their computer profile. The students in the control group participated in a conventional learning support system, whereas those in the experimental group learned with the newly suggested system. After finishing the learning activities, the students were evaluated in their learning achievement and then participated in a questionnaire. The results of the experiment showed that the proposed digital learning effectively increased the students' learning achievement and promoted positive perception towards the system.

Keywords: digital learning, learning achievement, computer programming, PHP, computer education

Collaborative Online International Learning: A Pedagogical Intervention to Enrich Students' Learning

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Abstract: Against the changing global higher education environment, the Collaborative Online International Learning (COIL) project has emerged. This project aims to create team-taught coursework that links university classes in different countries, while providing students from different disciplines and from different cultural environments with opportunities to develop cross-cultural awareness, knowledge in discipline, skills in communication, and teamwork. The Durban University of Technology (DUT) in South Africa recently implemented a COIL project that enabled Dental Technology students to collaborate internationally. The collaboration involved Business Management students from Nassau Community College (NCC) in New York to understand the business applications in developing a prototype that reduces material wastage in dental laboratories. This paper aims to elicit students' opinions on COIL as a pedagogical intervention in enhancing their learning. A cross-sectional research design within a quantitative framework, which followed a positivist paradigm, was used. The participants involved were the second year Dental Technology students (n=14) from DUT and the Business Management students (n=21) from NCCC. Data was collected by means of an anonymised questionnaire, which was analysed using descriptive and inferential statistics ($p < 0.05$). Results measured positively within five categories, namely: project introduction and preparation; cultural and diversity competence; impacts on personal behaviour; quality of learning; and overall experience and course quality. The COIL project facilitated the epistemological development of students by providing them with an opportunity to learn collaboratively with partners possessing cultural and professional perspectives different from their own. Overall, the salient features of this paper foregrounds how students engaged globally to acquire discipline-specific knowledge using different technology mediated tools, enhanced their abilities to make informed decisions, and learned to think critically and to problem-solve.

Keywords: dental technology, business administration, voice thread, cultural competence, and diversity

Threshold Concepts in Online Music Education: Transforming Conservatoire Training

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Abstract: In 2016, Trinity Laban Conservatoire of Music and Dance launched the Certificate in the Practice of Music Making (CPMM), a one-year distance-learning course developed in partnership with the Open University. The CPMM uses reflective learning to enable musicians of any adult age and from any musical genre or tradition to develop a better understanding of their personal culture and practice of music making in relation to others. Through asynchronous interactions in a virtual learning environment, students are encouraged to observe each other's differences of approach, leading to a heightened awareness of their own musical identity and culture in return. On this course, educational technologies enable musicians, who may never normally meet due to barriers of distance and culture, to work together and synthesize their learning experiences into new and original musical interpretations at a residential learning week that takes place near the end of the course. As part of a continued commitment to improving the student experience, the CPMM course team conducted a qualitative research study in which concept maps were employed to assess the learning that had taken place. A number of students completed concept maps near the beginning and the end of their studies; this process captured changes in their perceptions of the role that practical music making played in their identity formation as musicians while studying on the course. Qualitative and quantitative data extracted from the concept maps enabled the course team to evaluate the effectiveness of teaching delivery, as well as the extent to which learning outcomes were achieved. This paper reports on that study, the results of which inform methods whereby established pedagogical practices can be adapted to provide an inclusive and engaging online learning environment that facilitates embodied learning in Higher Education performing arts programmes.

Keywords: pedagogy, online learning, music, performing arts

Assessments Used in an Open Distance e-Learning Environment to Promote Self-Directed Learning

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Abstract: The low throughput rates for computer programming courses worldwide, especially at the first-year level, have been researched for many years. This has led to research being published on different methods in terms of teaching and/or pedagogy, e-learning, as well as testing and assessments, which can be used for such programming courses. However, implementing these suggested methods in an Open and Distance e-Learning (ODEL) environment poses challenges. The relevance to the themes of this conference and value-added contribution to academic debate of this paper, as well as potential impact on galvanising Open and Distance e-Learning research, will lie in discussing the combination of testing and assessment methods implemented via the Learning Management Systems (LMSs) in a first-year programming course to promote Self-Directed Learning (SDL), in an attempt to improve the throughput rate. The research will further show that the testing and assessments utilised reliably measured the essential theoretical, practical and communicational skills of first-year programming students. Apart from those mentioned otherwise, sub-themes related to researching technology-supported trends in ODEL and stimulating capacity for ODEL research through digital literacy were also considered. In terms of the appropriateness of the research/study method, research paradigm and educational research methodologies used in the ODEL environment, the research was quantitative in nature, and an approach focussing on data analysis was followed. The results in this paper will show what impact the implementation of online teaching, e-learning and these testing and assessment methods had on students' self-directed learning. Experiences and outcomes shared in this paper offer opportunities towards supporting and motivating e-learning teachers and the e-learning community, in general, as well as an opportunity to make decisions on the extent to which they can use the teaching, e-learning and testing and assessment strategies employed in this research in their own settings at their Higher Education Institutions (HEIs). This paper finally represents an effort towards capacity development and capacity-building with regard to mentoring a young and emergent scholar.

Keywords: testing and assessment, computer programming, open distance e-learning, self-directed learning

How can Flipped Classroom Activities Support Teacher Motivation?

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Abstract: This paper proposes an alternative way of engaging the students. Instead of written assignments, the students are to hand in Podcasts or recordings of a selected topic in groups of up to 3 persons. The podcasts and recordings will be available to the class after a process of feedback from a peer group and the lecturer. In this way, it is possible to utilize the curriculum to co-create in groups, to share knowledge and to support critical thinking and critical reflection. There will be rules as to what the peer group is to comment on and the way they will offer their comments. As the course in question is an e-learning course in “Digital Work Forms in Organizations” at the Inland Norway University of Applied Sciences, the digitalization of the assignment is regarded as appropriate. The peer evaluation will support the teacher in the way that it will prepare the work for the teacher and thus contribute to reduce the workload, as well as the finished assignment is a shared product that will support and enhance the course content. The students will also benefit from this as they are provided with an opportunity of meta learning from the assignment and peer-reviewing. Another important aspect to support the teacher motivation is to have time to reflect and this will provide the teacher with a tool for continuous improvement of the curriculum. This will also represent an opportunity for the teacher to get different aspects and thus learn from the students. It will require establishing a culture for knowledge sharing amongst students and amongst students and teacher(s). Hence, the teacher’s role will be to empower students to reflect and think critically, and to support continuous learning for the students and the teacher(s).

Keywords: content co-creation, motivation, e-learning, teacher motivation, critical reflection

Cross-Location and Cross-Disciplinary Collaborative Prototyping Using Virtual Reality in Higher Education

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Abstract: The integration of virtual reality (VR) in education, particularly for collaborative activities and feedback, is recently trending with the continuous development of technologies. So, this paper reports a pilot study as part of an ongoing E-learning project to address the questions: 1. how can tertiary education design courses adopt VR systems in student projects in collaboration with external organizations, and 2. what are the perceptions of the students and external organization regarding the use of VR systems for cross-discipline and cross-location collaborative prototyping? The process of VR use for the learning activities are grouped into four categories: 1) introduction of basic features of VR tools (two hours), 2) self-learning/experiencing the tools — HTC Vive headsets with Masterpiece VR, SculptVR, Google Blocks, and Sketchbox (15-20 hours), 3) co-creating design objects by adopting the selected VR tools — ScuptrVR and Google Blocks (two to four hours), and 4) presentation and get feedback in live VR space — Sketchbox with import models (2X30 min). The students responded that, for the collaborated project with a company based in another city, the VR setup is a great tool for demonstrating 3D models of the designed objects. It shows the detailed view of a product or a concept, it creates useful space for creativity, and it saves time. On the contrary, the technology is still in the early phase for the modelling purpose, still too cartoonish, lacks functions for engineering design, and gives a dizzy feeling. This study involved collocated student teams of engineers and future study should include students of different study programs and campuses working for the same client as part their respective courses.

Keywords: virtual reality, blended learning, prototyping, collaborative learning, designs for movement

PHD Research Papers

A Thematic and Grounded Theory Understanding of Faculty Adoption of Blended Learning in Higher Education

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Abstract: This paper assesses the teaching and learning experiences of faculty understanding of blending learning in a Higher Education Institutions (HEIs) in Ghana. The driving force for this paper is the transformational agenda of most HEIs to integrate technology with teaching and learning. The study posits that the adoption of blended learning for teaching and learning by faculty members in HEIs interplay with external and internal factors within and without the universities. Nonetheless, blended learning approaches in teaching boils down to motivation as the core concern around which these afore mentioned factors revolve. The experiences of fifteen faculty members using blended learning at the Ghana Technology University College was analysed using Thematic Analysis and Grounded Theory to develop a BL model. The paper describes the faculty blended learning adoption model and explains the model constructs and their relationships. The study indicated that staff motivation is at the core of the emergent theory of faculty adoption and presents institutional readiness, faculty technology affinity, student disposition to adopt blended learning and pedagogy fitness as constructs within and without the blended learning environment which positively influences faculty to adopt blended learning for teaching and learning.

Keywords: blended learning, thematic analysis, grounded theory, faculty adoption, higher education institutions

Estimating Student Workload During the Learning Design of Online Courses: Creating a Student Workload Calculator

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Abstract: UK university students are expected to undertake 10 hours of work for each Credit Accumulation and Transfer Scheme (CATS) credit. With face-to-face learning, this is relatively easy to quantify as x hours of contact time and the remainder made up of independent study. For online and distance learning, this is more complex. Study materials are provided for students to work through independently, but unlike face-to-face where the class ends after an hour or two, online students could continue working indefinitely. Some students will inevitably take longer than others to complete tasks, and it is therefore more difficult to ensure student workload in online courses is proportionate to the credits awarded. This paper provides a means to calculate student workload in online courses via a workload calculator, derived from a review of the literature and available at <http://bit.ly/postgradworkload>. It uses Laurillard's (2009, 2013) conversational framework activity types to categorise online course materials into task types, and provides a means of estimating the time it would take an average student to complete each task, for use in informing the design of online courses. For those task types that cannot be accurately estimated it is recommended to provide guidance on how long a student should spend on the task within the learning materials.

Keywords: student workload, online learning, distance learning, learning design

Experts' Insights About Blended Learning Implementation: What Teacher Attributes are Relevant?

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Abstract: Higher education already values blended learning as an alternative way of teaching and learning for various reasons. Nonetheless, the implementation of blended learning remains a challenging and difficult process. Many (f)actors play a role, ranging from policies and organizational culture (e.g. ICT policy plan, professionalization strategies, leadership style) to different personal teacher aspects such as ICT literacy, teaching style, openness to change or personal motivation. In any case, the teacher remains crucial in processes of educational change. This qualitative study therefore focuses on the teacher perspective by investigating and identifying teacher attributes that play an important role when implementing blended learning. Since experts have deep insights in aggregated and specific knowledge, a research approach of expert interviews was chosen. Twelve experts on blended learning in Flemish higher education were interviewed in order to identify what they perceive as relevant teacher attributes. Four attributes, rooted in intrinsic teacher motivation, emerge from the preliminary analyses: (1) a genuine concern with the quality of their teaching practice; (2) realizing a pedagogical need for change; (3) being able to critically reflect on their teaching practice; and (4) having a sense of pedagogical curiosity and creativity to explore technology in relation to learning processes. Additionally, the experts raised a number of cognitive teacher biases that hinder the uptake of blended learning. In particular a confirmation, vividness and omission bias towards the concept of blended learning were denominated by the experts. Insights from this study informs practitioners concerned with implementation and deliberate application of blended learning in higher education. Finally, recommendations for research and practice will be presented and discussed.

Keywords: blended learning, cognitive biases, expert interviews, teacher attributes, teacher change

Work in Progress Papers

Incarcerated Students' Support Services in Open Distance e-Learning: A Mixed Methods Protocol

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Abstract: Support for students is crucial for them to excel in their studies; even more so for those who are studying via distance education institutions because they do not have the on-campus support that students in traditional institutions have. As students of the University of South Africa (UNISA) who are isolated from the general population of distance education students and society, incarcerated students experience unique challenges which constitute a threat to their education. This ongoing study focuses on the experiences of institutional support by incarcerated UNISA students to understand their challenges and to offer recommendations on how to overcome them. It is hoped that this study will not only increase the throughput rate among the incarcerated distance learners under study, but also reduce their chances of recidivism upon re-entry into society as education has been shown to positively influence recidivism.

Keywords: open distance learning, student support, incarcerated students, distance education

Challenges in Designing e-Learning for Educators With Limited Time and Access

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Abstract: This project aims to develop three e-learning courses, each containing six modules concerning early childhood education and care (ECEC). Each of the modules is designed to be completed in small gaps of time by educators, who have limited access to computers in their daily practice. This is one of the challenges in designing materials for educators in this area. Another challenge that also needs to be addressed when developing a learning design framework and producing modules is the diversity of educational provision across countries. Preliminary findings have revealed challenges in the academic process of condensing and re-mediating theoretical work on Child-centeredness in ECEC settings into meaningful online modules for practitioners. Difficulties can also arise when attempting to ensure coherence and progression between online modules that have been created by different partners. This

presentation will emphasize how the project is developing manageable online courses for ECEC educators, which can be, completed in short spaces of time in their daily practice. Based on the experiences of re-mediating theoretical texts in multimodal formats, this paper and poster seek to encourage interest in the design process of online courses.

Keywords: learning design, online learning, practice development, skills development, early childhood education

Digital Literacy in a Sociomaterial Perspective

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Abstract: This paper is based on qualitative research in a Danish Year 6 classroom during a multimodal literacy workshop where I observed students working with paper, computer, scissors, pencils and printers. Situated in sociomaterial theory the aim is to rethink writing and writing research. Through the concepts of intra-activity, enacted agency, and writing as translingual assemblage, I put to work data on students making a fashion magazine to demonstrate how dominant perspectives in literacy education are not adequate when conceptualizing literacy as intra-active and translingual assemblage. I demonstrate analysis and discuss how a posthuman approach can capture and understand how bodies, languages, materials, technologies, ideas, time, and space are all intra-actively producing literacies.

Keywords: sociomateriality, intra-activity, literacy, assemblage, enacted agency, writer identity

Meaningful Communication and Active Learning in Online Courses

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Abstract: Many educators in higher education today are moving from an in-person, face to face setting towards an online learning environment because of benefits and advantages that online instruction provides, for example, saving time and money on traveling to campus and allowing students to learn at their convenience and pace. In order to help students to be successful, instructors must be willing to allocate the time needed for the creation and facilitation of a Web-Based Learning Community. One major component of the Web-Based Learning Community is Computer Mediated Communication that traditionally takes place

through a text-based discussion board. Modern technology like real time videoconferencing enhances communication by adding social cues transmitted via video and audio. Through a variety of media, students are expected to interact with the content, their peers, and their instructor. Such interaction and communication facilitate the students' understanding and learning. In this paper, the authors first present literature relevant to online communication and learning communities. Then the authors share instructional strategies employed in their online courses. Instructional strategies include, but are not limited to, ice-breaking, moderating strategies, peer critique, peer review, peer evaluation, and the use of the video conferencing system Zoom.

Keywords: web-based learning communities, active learning, computer mediated communication, online learning, e-learning

The Climb to the Blended Learning Peak

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Abstract: In response to the common but often overlooked challenges faced by many teaching professionals when having to move from a face-to-face model of teaching and learning to blended learning (BL), the purpose of this paper is to present a series of research-based and practical guidelines to support educators facing this transition. Some of the key issues discussed are the need for an openness-to-change mindset, the importance of a meaningful integration between face-to-face and online elements and the need for a conscious choice of technology.

Keywords: blended learning, curriculum design, constructive alignment, technology, SAMR model, teaching presence

Developing an Implementation Framework for Adaptive Learning: A Case Study Approach

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Abstract: Although the interest in using adaptive learning in online teaching is steadily growing, its broad implementation remains low. This is despite positive attitudes of institutional leaders towards its adoption and learning promising results of early studies on its empirical impact, for example, on students' learning outcomes and course dropouts.

Recent studies have identified and discussed the challenges that prevent higher education institutions from using adaptive learning for their teaching purposes. However, little empirical research has been done to clarify the interdependency or interplay of these challenges. Our work aims to close this gap by identifying the relationships between the different types of challenges of adaptive learning. From this, we then develop an implementation framework of adaptive learning to propose effective implementation strategies for adaptive concepts in higher education. A Delphi design was used to collect the data from two universities, the North West University of South Africa (NWU) and the Swiss Distance University of Applied Sciences (FFHS), as our two case studies. For the data analysis, the Grounded Theory Coding approach was applied. The proposed framework shows the five empirically identified dimensions, such as technology, teaching & learning, organization, law & regulations, and cultural & political conditions, and lays out a basic structure for challenges, prerequisites, and facilitators enabling the implementation of adaptive learning. Our findings suggest that multiple perspectives on the challenges of adaptive learning should be considered when implementing adaptive learning concepts in a higher education setting. The findings are valuable for institutions that seek to implement or already pilot adaptive learning in blended and online teaching.

Keywords: adaptive learning, implementation framework, challenges to adoption, Delphi technique

Breaking Sequentiality: An Interactive MOOC

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Abstract: One of the common weaknesses of Massive Online Open Courses (MOOCs) is their lack of interactivity with the learning materials. Where MOOCs do offer learning materials with a degree interactivity, this is usually limited to single content items. In any case, even interactive learning materials are generally constricted within a sequential order that is often subject to a strict schedule. Sequentiality and scheduling restrict the autonomy of the learner in choosing how and when to consult the learning materials and engage in the learning activities. Changing the sequential and scheduled approach of traditional MOOCs poses educational, methodological and technological challenges for designers, instructors and learners. This contribution proposes an Interactive MOOC (I-MOOC) prototype, based on hypervideo and learning activities that are not bound to a precise timing or a specific sequentiality. The purpose of the I-MOOC is to offer participants autonomy in deciding their schedules and customizing their own learning paths. The I-MOOC provides various levels of interactivity: with the learning materials through hypermedia; between peers; and with the instructors. This paper illustrates the e-learning model underpinning the design of the I-MOOC, its multi-platform architecture, and the reactions of the users who participated in an initial pilot evaluation.

Keywords: interactive MOOC, hypervideo, mixed e-learning

Choose Your own Adventure: Self-Directed Adult Learning and Assessment

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Abstract: Initiatives such as blended learning, experiential learning, and learning styles models have been applied in the face to face classroom and online classroom for decades. Not all of these strategies have been successful in identification of student motivation or showing student learning because the courses are predicative, and static. The courses become less desirable for both adults and young adults as they can learn topics in micro-learning platform, bite sized content from YouTube or other open learning platforms. Universities that utilize online learning as their primary mode of delivery need to explore opportunities for flexibility of content and student engagement. In 2018, a Walden University Doctor of Philosophy (PhD) program began a program update to address the issue of student flexibility and ways of improving assessment of learning. Taking a self-directed learning approach to complex topics within the program content courses allows the students to explore the content in a personal meaningful way, allows students to take control of their learning and find ways to improve their intrinsic learning capacity. By allowing flexibility in student learning, this can cause difficulties in assessing the student learning outcomes for the course and program. Students using a self-directed learning approach should be assessed utilizing controlled variables that are embedded with the curriculum, implementation of feedback received, and reflection of the student learning process. This paper and poster will outline a case study that provides context to why andragogy is critical at graduate level learning and inspiring student creativity and building skills that serve students as their work environments demand independence and critical thinking capacity. This work unique, innovative, and has the potential to support student development at all levels of learning. Given the generational differences and the desire for micro-learning, this case study encourages self-directed learning, intrinsic motivation, and new methods of assessment.

Keyword: self directed learning, assessment, andragogy, online learning, instructional model, peer feedback

YouTube as an Instrument of Learning in Higher Education: Opportunities and Challenges

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Abstract: Fashion for using video resources of the Internet and especially YouTube in the educational process is becoming more and more noticeable in universities and colleges around the world. Perhaps, there is nothing strange in this trend. Contemporary students are used to spending a lot of time on the Internet every day. Besides, it is true, that YouTube contains a significant amount of useful information for learning. This information is presented on various popular science and educational channels. So, using YouTube allows students to get through the learning process in a familiar and comfortable form. Therefore, the trend for using YouTube resources in the educational process is hardly surprising. But an understanding of the true opportunities of using YouTube in this area still needs clarification. Is there a real need to use YouTube in the education process? What are the specific opportunities of it's use in education? And what are the challenges of it's use in education? This paper is devoted to the description of the research, which was started by the authors for clarification of these complicated questions. The initial goal of the research is to clarify the specific opportunities and risks of using of YouTube as an instrument of learning in higher education. The authors focus their interest on the analysis of a particular case of using YouTube resources in the educational process at the Ural Federal University (Ekaterinburg, Russia) during one educational cycle in the 2019 academic year. The authors rely on several research methods: sociological survey, discourse-analysis and content-analysis. The authors not only describe specific examples of using video content from YouTube for solving educational tasks, but also to analyze in detail the students' reaction to the use of such content. The key hypothesis of the research is that the potential benefits of using YouTube resources in the educational process are significantly overvalued. YouTube is useful as an auxiliary and illustrative source, but its excessive use in the educational process does not match with the needs of students and leads to a decrease in the quality of education.

Keywords: YouTube, higher education, social media, sociological survey, Russia

Students From Central Asia in Russian Universities: The Social Media as a Tool for Adjustment

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Abstract: Globalization is internationalizing the educational environment. The number of international students is increasing in Russia and many other countries. Students from Central Asia now constitute a majority of the foreign students studying in Russian state universities. International students need to adjust not only to the educational process but also the culture of the country in which they are studying. We hypothesize that since the social media are often the main communication channel for contemporary youth, they constitute a tool of adjustment that helps foreign students learn to live in a new country. Our research is based on a case-study of students from Central Asia who are studying in Yekaterinburg. The aim of our research is to analyse how the universities of Yekaterinburg utilise the social media to help students from Central Asia to adjust. The study is based on (1) a set of interviews with the universities staff members who deal with students from Central Asia, and (2) content-analyses of students' accounts on Vkontakte – the most popular social network among Russian youth, where students can exchange textual and visual messages. In our study we found that the universities do not distinguish between students from Central Asia and other countries in social media communication. The content which the staff members develop for the social media is focused on announcements about extra-curricular activities while experts stress the need of students from Central Asia to be adjusted to the process of education, but not to life in Russia in general. Our findings point out that communication with students from Central Asia through the social media can be boosted in two ways: (1) by regular feedback, and (2) by posting more links on resources which could help students improve their level of competence in subjects necessary for successful studying at the universities.

Keywords: social media, international students, students from Central Asia, higher education in Russia

Utilisation of Open and Distance eLearning Students Support Services by Postgraduate Students in an Open and Distance eLearning Institution

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Abstract: *Background:* The purpose of student support services in Open and Distance eLearning Institutions is to cater for students' cognitive, emotional, social needs and to help them with their learning. These services serve as the interface between the institutions and the students because they compensate for the isolated "individual" by making the necessary basic facilities available, in the absence of "live support" from the teacher. *Objectives:* This study aims at investigating the Utilisation of Open and Distance eLearning students support services by Postgraduate students in an Open and Distance eLearning Institution. *Methods:* A quantitative, explorative, descriptive cross sectional and contextual design in a form of survey (online SurveyMonkey) research design will be used to investigate the Utilisation of Open and Distance eLearning students support services among 479 currently registered Postgraduate students in an Open and Distance eLearning Institution. The sample will be selected by means of convenience sampling technique and data will be analysed using SPSS 26.00. *Contribution:* The expected results of the study will be utilised to recommend the development of strategies to reinforce student support services as a vital component of Open and Distance eLearning; for further development and improvement of these services; to suggest some ways and innovative strategies to stimulate and encourage postgraduate students in the specific Department to utilise these services effectively and efficiently and deal with or address any challenges they may or might be experiencing due to ineffective and inefficient utilisation of these services. The results of the study may also inform policies and practice regarding Open and Distance eLearning students support services in the selected Institution.

Keywords: open and distance eLearning, student support services and postgraduate students

Future Challenges for Academic-Industry Value Co-Creation Through Lifelong Learning

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Abstract: The presented research aims to explore future context of e-learning, needs of professionals, and how higher education can respond to those needs. This is an empirical study with a qualitative approach. We interviewed teachers and students about their perceptions of e-learning. The interviews were semi-structured and allowed for reflections. All students interviewed were currently employed in industry and active e-learners. A web-based horizon scanning was made to identify trends in order to understand future context. The study is part of an academic development project with the intention of strengthening academic capacity and company knowledge to stay competitive in an international setting. In this paper, we present several cornerstones for creating courses that are suitable for professionals. Administrative routines and procedures need to be adjusted in order to meet challenges from other actors and the needs of stakeholders. A seamless experience would be preferred from a consumer-oriented perspective, where flexibility is a key factor. This flexibility is manifested by the need to control their own workload to adjust the work-education balance. Locus of learning needs to be problematized. Students do not identify themselves as co-creators. This is a challenge to overcome in order to design for the work-study situation. Previous studies on distance learning have mostly focused on full time students in today's context. This study involves foresight and the situation for students in employment. The findings will be relevant for teachers in the design phase of a course intended for any type of student who is not a traditional full-time student, and for university management building a strategy for the future of e-learning.

Keywords: foresight, e-learning, lifelong learning, professional education

Blended Learning Sessions to Improve job Interview Skills

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Abstract: This paper describes part of an ongoing study of pedagogies to help undergraduates improve their global and cultural competencies. With the need for students to find a job abroad, part-time or full-time, blended learning sessions to improve undergraduates' job interview skills in English were designed and developed. The sessions were implemented in four classes of an English as a foreign language course. Each session consisted of teacher-led face-to-face instruction, individual work, pair work using audioconferencing, and online training through videoconferencing. Participants were business and management majors, and they engaged in the training for six weeks.

Keywords: blended learning, videoconferencing, job interview skills, synchronous technologies, English as a foreign language

Abstracts Only

Using MOOCs at scale in India to deliver changes in teaching practice

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Abstract: The TESS-India programme is a multi-million pound award-winning programme that aims to strengthen and transform teaching practice and teacher professional development systems in India (www.tess-india.edu.in). A key achievement has been to develop almost 200 OERs in conjunction with mechanisms for supporting teacher educators in learning with and about these resources. To date, over 100,000 teachers and teacher educators have participated in the programme and a process of localisation has helped engage educators across seven states in the production of the teacher development units and videos of classroom practice in multiple-languages. The TESS-India MOOC has been one central mechanism by which the project has used e-learning at scale to raise awareness among practitioners and promote use of the OER resources. The affordances of the MOOC format were considered particularly appropriate and, building on the infrastructure the project had developed over seven states, hundreds of local groups organised face-to-face sessions or blended the course with existing teacher education programmes. One notable feature of the MOOC is that it was run in English (2016) and then in Hindi (2017). As a result, the challenge of writing for a target audience working in often low-resourced and poorly connected contexts, was compounded by that of delivering in a different language. An additional level of communication and sharing of design intent was required to achieve effective translation of the learning materials and train the Hindi-speaking facilitation team. Over 30,000 learners registered for the course and 51% completed – a rate significantly better than the average for MOOCs. The TESS-India Programme monitored participation in the MOOC across seven states in India - Madhya Pradesh, Odisha, Assam, Bihar, Karnataka, Uttar Pradesh and West Bengal – and conducted participant surveys and interviews. The poster will draw on multiple sources of data to explain key features which stimulated interest in the MOOC and give examples of success in challenging and varied contexts.

Keywords: MOOCs, TESS-India, teacher education, OERs, professional development

Flipping LARGE Classes With Video Case Studies and Novel Technology (Team Up!)

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Abstract: Students learn best when active learning approaches are used, but instructors who teach large classes (>1000 students) face several challenges when they attempt to incorporate these approaches into their courses. Challenges include: motivating students to complete pre-class work, ensuring that all students are engaged, and managing in-class assignment grading in a cost- and time-effective way. To specifically address these challenges, we created case study videos for students to watch in advance of face-to-face small group work in class. The videos were designed to be used in three biology courses: molecular and cellular biology, physiology and neuroscience. Here we focus on the results from flipping a lecture in our physiology course where we created a clinical case study video that followed a student actor with a head injury as he interacted with health-care professionals in a Toronto hospital. In class, students used an app, called Team Up! (developed at the University of Toronto). It allows students to both form groups and answer questions as a team. A key feature of Team Up! is immediate feedback assessment: students get full marks when they answer the question correctly on the first try and partial marks for subsequent answers. In class, teaching assistants and instructors circulated to facilitate group discussions. To assess the effectiveness of our approach, we administered a post-course student survey and compared how students performed on exam questions. In post-course survey, students reported that they appreciated the chance to interact with their fellow students and the real-world nature of the case study. There was almost unanimous agreement that the Team Up! worked well, although the internet speed was slow for some. The majority stated that the case study class “supported their learning”, with scores for lectures being only slightly higher (lectures: 5.54 +/- 1.36 vs case study 5.26 +/- 1.40, 5=agree and 6=strongly agree, n = 730). While analysis of exam results is ongoing, the overall favourable response suggests that we were successful in flipping a very large class with the use of an interesting case study video and novel classroom technology.

Keywords: cases study, classroom response, active learning, technology, flipping the classroom

Maintaining and Promoting Student Agency in the era of Digital Textbooks

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Abstract: Student agency is the ability to manage one's learning. It means students can and should take ownership and responsibility for what they learn. Eighteen years ago the term "digital natives" was introduced by Marc Prensky in two seminal articles arguing for new pedagogical tools and methods. Independently, textbook affordability had always been a concern in the US higher education context. In 2009, Indiana University pioneered the concept of bulk purchasing course materials from textbook publishers to directly provide books in an electronic format on the first day of a course. This model was subsequently been adopted by Unizin, a 22-member consortium of higher education institutions in the US. Since then the availability and affordability of these electronic resources has only increased. Today digital textbooks boast impressive interaction features of navigation, usability, layout and interactivity. Beyond that, instructors (or, as Prensky calls them, the "digital immigrants") continue to need support in determining how to best facilitate a digital reading experience. We report on a dual study involving the use of two such media, quite distinct in design goals and delivery strategies, provided by VitalSource and ZyBooks in the Computer Science undergraduate classroom. It is our conclusion that the new medium requires a new awareness in how to best implement and measure student-centered learning practices. When students trust their teacher is going to allow them to move through their chosen path, they are more invested in their own growth and empowered to follow a path to mastery. However, digital textbooks do not eliminate student bottlenecks to learning, they just accelerate the process of finding them. The instructor still needs to build a relationship with the struggling student, create hope, build confidence and eventually guide the student's analytic reflection. It is important to understand that digital textbooks can't enforce accountability without the risk of a legitimate sense of alienation on the part of the students. To eliminate that risk we argue for the pro-active and sustained use in the classroom of a new set of teaching practices aimed at document learning so it becomes visible to both learners and teachers.

Keywords: visible learning, metacognition, learner-sighted practices, digital natives

Stimulating Engagement and Saving Face: Culturally Expedient app Development

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Abstract: This paper describes the development of a Python-based app in two versions designed to stimulate engagement with course material and render the student's learning experience personal and secluded and thereby specifically meet two cultural-based challenges of my teaching context, the United Arab Emirates (UAE). First, common student reluctance to assume responsibility for their learning due to the still robust tradition of rote-learning which means that students view the instructor as a purveyor of knowledge who imparts information to be committed to memory. The use of currently available softwares involves students memorizing material delivered via a different channel, hence serving little to increase proprietorship of their learning. The second culture-specific benefit is that the UAE is a highly collectivist society in which the preservation of "face" is crucial, and many students will choose not to perform or to plagiarize as alternatives to the risk of losing face. Our app renders the trial and error inherent in the learning process private and safe. The first version of the app requires the student to initially input the particular material he/she needs to acquire, and this encourages the student to consider course objectives and assume ownership of the learning process. The app is programmed so that, after the student-selected testing moment, the specific areas in which the student has not been successful are identified and further questions in these areas generated for successive testing sessions. This is similar to the technique Coursera MOOCs use to identify questions many students had difficulty with and thus facilitates appropriate course adjustment. However, in the case of our app, the information is derived from a single student and subsequent questions are custom-tailored for that particular individual. The second version involves linking up with instructors of particular courses for their permission to access their class material and previous exam questions. This dispenses with the need for students to input any material, hence requiring less individual effort and reassuring them that their learning is still instructor-led, which is culturally familiar to them. The benefit of providing a private testing context with individualized feedback is still available to the student.

Keywords: culturally diverse attitudes to education, cultural appropriateness, United Arab Emirates

How do Good Teachers Teach in a Virtual Classroom? A Review Study

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Abstract: The last decades there is an increasing demand and a growing supply of online education (Park & Choi, 2009). An emergent form of online education is synchronous online learning (SOL). In this interactive form of online learning the teacher and the learner interact with each other online at the same time through videoconference technology, which includes webcams, instant messaging, file transfer, a whiteboard, and audio functionalities (Guichon, 2010). It is obvious that as the learning environment changes, teaching requires other competences and the prioritization of roles that teachers have to fulfil are different (Gonzalez-Sanmamed, Munoz-Carril, & Sangra, 2014). Teachers who teach in a SOL environment have to manage a set of simultaneous complex tasks “in real time and in an environment that concentrates several communication tools into the limited space of a computer screen” (Guichon, 2010, p. 173). Although researchers state that there is a great need for research on this topic, studies are limited (Rehn, Maor, & McConney, 2018). A clear comprehensive framework about the competences that teachers need to teach in a SOL would reinforce teachers on the field to operationalize their teaching, facilitate teacher educators to focus on the competences that are needed for this growing innovative way of teaching, and inspire institutions to set up different professional development initiatives. Therefore, the main aim of this study is to identify the competences - which we conceptualize as a development-oriented cluster of knowledge, skills and attitudes - that teachers need to prepare, implement, and evaluate a lesson successfully in a SOL environment. We aim to fill this research gap by conducting a systematic literature review and offering a comprehensive concept map of the SOL competences that can be used for further research and the professional development of teachers who teach in a SOL. We therefore screened 1208 articles on ‘Web of Science’ that meets the search query, from which 14 articles were selected and analysed through the constant comparative method (Glaser, 1965) in NVivo12. The poster will provide a concept map of the results. Implications for professional development initiatives and further research about synchronous online learning are presented.

Keywords: synchronous online learning, teacher competences, professional development

ICT Pedagogical Design in Higher Education

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Abstract: As a consequence of the digitization of the society, Aalborg University (AAU) is focusing on the teaching in a digital age and how education can be reshaped by mediation of digital technologies. Since the university operates on a tradition of Problem and Project Based Learning (PBL), the study activities are all related to the PBL principles and values. In January 2019 Center for Digitally Supported Learning (CDUL) was established. CDUL is a shared resource for all teaching staff at AAU and contributes to the ongoing development of digitally supported learning at AAU. In addition to this, each Faculty has initiated projects to enhance teachers' digital competencies and support the use of technologies. Present project is about developing "Digital PBL" at the Humanities and runs from August 2019- December 2021

Keywords: ICT pedagogical design, problembased learning, higher education, digitalisation

ICT, Learning and Educational Change: Bricolage and the Science of the Concrete

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Abstract: Educational technologies are often associated with change and the transformation of schooling. However, educational research must rely on theory to identify and interpret ways in which technologies can contribute to changing educational practices. The paper addresses this need by focusing on the concept of bricolage as an approach to understanding change. Change is in this context associated with tinkering and ad hoc transformations of practices in which grounded and concrete uses of multiple tools structure and produce new ways of learning. The paper therefore explores how connections made in practice with educational technologies can be understood as ad hoc innovations that are informed by a science of the concrete. Theoretical approach Bricolage is a concept that originates from Lévi-Strauss' *The Savage Mind* (1962), and has been used extensively in for instance design thinking (Vallgård & Ferneus 2015), computational thinking (Turkle & Papert 1990) and educational studies (Sørensen 2009). In *The Savage Mind* the bricoleur is understood as a resourceful tinkerer, who uses whatever tools he has in his treasury to solve the task at hand. In this sense the bricoleur is resourceful but also grounded, as his heterogeneous treasury of available tools define his approach to building and problem solving. When applied to an understanding of classroom practices and learning styles, bricolage can contribute to

identifying ways in which change is informed by these concrete and material ways of problem solving and learning. As argued by Turkle and Papert (1990) discoveries are often made in concrete, ad hoc fashions, which underlines the significance of the science of the concrete associated with Lévi-Strauss' bricoleur. Data and methodology The paper draws on ethnographic classroom studies from two research projects in lower secondary schools in Denmark. The projects followed educational uses of tablets in these schools and ways in which tablets as handheld devices contribute to students' situated, ad hoc uses of technologies for learning. Preliminary results The research indicates that we need methodologies that can understand the complexities of technology uses in practice, and ways in which practices are (trans)formed by materials in use.

Keywords: ICT and educational change, methodology

Synchronous Online Group Work and Increased Assessment Improves Student Success

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Abstract: As hybrid and fully online learning becomes increasingly prevalent, instructors are looking for ways to incorporate evidence-based teaching strategies into course design. For example, active learning, together with frequent, low-stakes assessment are reported to improve student outcomes. Enhancing online instructor-student and student-student online interactions also have positive influences on student success in fully online courses. Using these strategies, a traditional lecture-based introductory cell and molecular biology course was re-designed in an online "flipped" format that required students to view lecture videos each week before passing a quiz and then participating in weekly webinar tutorials. In tutorials, students were given an opportunity to interact directly with the instructor, fellow students and the TA. Specifically, students joined virtual breakout rooms where they worked in small groups to solve problems using a web-based assessment tool called Team Up! Team Up! facilitates team-building, peer teaching, immediate feedback, and is integrated into the institution's learning management system. Team Up! is designed to enable multiple attempts to answer correctly, and awards marks for partial understanding. The overall goals of the required weekly webinar tutorials were to establish a social and teaching presence in the course, help students stay caught up with course materials, and provide students an opportunity to apply their knowledge in a low-stakes assessment situation where help was immediately available from their peers, TA, or instructor. After webinar tutorials, each student was required to submit written answers to a more challenging set of questions. To measure the effectiveness of our approach, we analyzed pass rates together with feedback from student surveys. Student pass rates improved from 70% in the face-to-face class in 2012 to consistently more than 90%. Across multiple years, more than 90% of students agreed or strongly agreed that Team Up! webinar activities were effective for their learning, motivated

them, and were a good way to increase interaction with other students. Students reported that they “liked this format where we had live tutorials and weekly assignments, because it helped discourage slacking off, and heightened motivation.” These results, together with increased demand for the course indicate that the approach has been successful.

Keywords: synchronous online learning, online course structure, teaching presence, social presence, online group work

A new e-Learning System for EFL Teacher Collaboration

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Abstract: This poster tries to show how a new module added to our e-learning system named iBELLEs promotes collaboration among EFL teachers who are working on common materials or trying to make more effective teaching materials. The iBELLEs (interactive Blended English Language Learning Enhancement system) is equipped with two basic functionalities that enable (1) EFL teachers to give pedagogical annotation to particular spots of a target material before class, and (2) EFL learners to give annotations to particular spots following their teacher’s instructions that aim to observe the learning process. In order to reduce their meta-cognitive burden, the learners’ annotation is designed to be given through simple mouse operation, i.e., highlighting particular parts with different colours. In other words, iBELLEs, based on corpus building and analysis technology, allows a dual annotation to the common teaching material both from EFL teachers and learners. By using iBELLEs, EFL teachers can (1) dynamically change or alter initial teaching plans through the real-time observation of learners’ highlighting and (2) compare their highlights as pedagogical annotation with learners’ highlights that reflect their learning process in order to find and bridge inevitable gaps between teachers and learners. The successor model of iBELLEs, iBELLEs Plus, implements an innovative module named ‘teacher circle’ which prompts a group of EFL teachers led by a circle administrator to collaborate with each other in order to achieve the following goals: (1) deciding more appropriate sets of annotations to the common material on which the circle members are working, (2) creating new teaching materials with more pedagogically significant annotations, and (3) designing more effective courses based on a quantitative and qualitative analysis of learners’ learning process. At the same time teachers with diverse backgrounds and aims can exchange their expertise with their colleagues within the circle, subsequently creating a better EFL teaching and learning environment. The functionalities of the circle and its expected outcomes are illustrated in detail.

Keywords: teacher collaboration, learning process, corpus building technology, annotation, teaching materials

Is Flipping Effective?

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Abstract: In today's world, with the rapid and continuous development of technology, educators try to take advantages of modern technological facilities and benefit from new teaching techniques. Teaching techniques have evolved through the past decades to change the way how the students learn. Flipped-classroom model in language teaching is one of these developing techniques. This model combines information and communication technology with instruction that changes the focus of the classroom instruction from one that is teacher-centred to one that is student-centred. The reduction of face-to-face didactic learning forces students to research and learn by other means such as collaborative work or peer instruction in the classroom (Gilmartin & Moore, 2010). At home, students are able to pause and rewind the lecture to go back, find unknown answers, and review confusing information (Bergmann & Sams, 2012). Therefore, this study aims to discover the perceptions of students studying English at School of Foreign Languages and also how effective the model is. In this study, the video in which some idioms are explained in context with examples are viewed by the students before the class. Time in the classroom is allocated for practice. The effectiveness of this model is assessed through a questionnaire and delayed mini test. The results of the study might shed light on the advantages of Flipped-classroom model. This study can also help instructors and administrators to make decisions regarding the implementation of this model into their syllabi.

Keywords: flipped classroom, foreign language, teaching English

A Pilot Virtual Classroom Africa Collaboration Project on Teaching Research Methods

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Abstract: This paper presents the work in progress on a virtual classroom project between two African Universities (Botswana and South Africa) within Humanities disciplines. This project is based on the Constructivist approach in collaboratively constructing knowledge and enhancing teaching and learning experiences of students. The project objectives include: establishing pedagogies that incorporate virtual learning in effective teaching and assessment of research methods; identifying strategies for facilitating, managing and evaluating virtual learning activities in teaching research methods and designing a relevant

virtual learning model that can be integrated within current curricula to enhance the quality and effectiveness in teaching research methods. A workshop was held by academics from both Universities who are involved in the project in order to establish common tools within their learning management systems that could be used to create a virtual classroom. Since both Universities have adopted Moodle as their learning management systems, it was agreed that such a platform will be more accessible and cost-effective. A virtual classroom technology (Bigbluebutton) was created as a synchronous component on the use of Moodle learning management system. It provided a cost-effective method to deliver live lectures that include text, audio and video. Various topics were covered in the virtual classroom on the theoretical aspects and practical use of research methods within the disciplines of Humanities. This virtual classroom created a dynamic environment that enhanced social presence thereby facilitating sharing of multiple perspectives on applying research methods to Humanities. Students shared real life experiences from their contexts in order to apply the research methods knowledge. These in-depth levels interaction enabled students to be creators of knowledge in their various fields of interest. Challenges included communication across the continent pertaining to length of time awaiting responses to emails and setting up common schedules for virtual meetings. Since this project is still on-going, evaluation thereof will take place towards the end of the year.

Keywords: virtual classroom, Africa, research methods

Teacher Motivation and Student Interaction in Online Courses

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Abstract: Many universities offer online learning or a combination of online and seminar based courses. Providing students with streaming video is one thing, being present on distance is some entirely different. In a classroom there are several activities one can undertake to make students active. Asking direct questions, organizing group work, discussion in pairs, etc. are all initiatives that makes the students talk and be active. This is one way of checking out if they have understood the gist of what you have communicated. This also provide the teacher with feedback. Looking at a screen where some people are busy on their computers, some are busy knitting, some are obviously talking with each other, most likely on other subjects than what you teach, and some are falling asleep, can be very discouraging. Are you not entertaining enough? Are you not engaging enough? Is it not interesting or do you fail at being interesting? Very fast, it becomes a job to just do and to try not to “take it personally” that they do not seem interested even if they did show up online. There are at least two issues arising around this: 1) How to be “entertaining” enough online? Or how to make them also show that they are paying attention? And 2) How is it possible to draw on other colleagues in order to not be discouraged and demotivated? In this paper, we have interviewed some of our colleagues in online teaching and also

contribute with our own experiences from being online teachers. The qualitative approach has made it possible to make colleagues reflect on their own practice and become interested in developing the online teaching skills.

Keywords: student interaction, online teaching, edutainment, motivation, reflective practitioners

Closing the Distance: Project on Creating Immersive Environments for Remote Learning

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Abstract: Current technological developments and possibilities in multimedia production have enabled educators to design immersive learning environments and experiences. While 360° videos have the potential to bring experiences to life that are difficult to convey with traditional teaching and learning materials, Augmented Reality and Virtual Reality can enrich the real environment digitally. Especially in distance learning, it is of major importance to carefully prepare multimedia (teaching and learning) content that facilitates learning among students and expands their perception and insights through creating different perspectives and experiences. The continuous development of smart phones and other mobile devices now allows learners to immerse themselves into a learning environment at any time, and any place. Therefore, it is key for educators to thoroughly investigate concepts and scenarios, as well as design appropriate learning environments for students to successfully manage their (remote) learning. A research and development project entitled “Immersive Learning – 360°, Augmented & Virtual Reality in Online Teaching” (translated from German), currently in progress at Austria’s only Distance-Learning University of Applied Sciences, will explore the possibilities for creating innovative immersive learning experiences with 360° videos as well as developing concepts for the implementation of AR/VR technology in different learning environments (e.g. negotiation and conflict resolution practice, and ambient-assisted-living (AAL) scenarios). The project evaluation includes a needs assessment as first step. In the course of the needs assessment two focus groups with students were conducted, in order to gauge their multimedia learning needs. Subsequently, a survey involving a larger number of students will be conducted. The results from the needs assessment will be presented in the paper.

Keywords: immersive learning environments, distance learning, 360° video, augmented reality, virtual reality, mobile learning

Additional Materials

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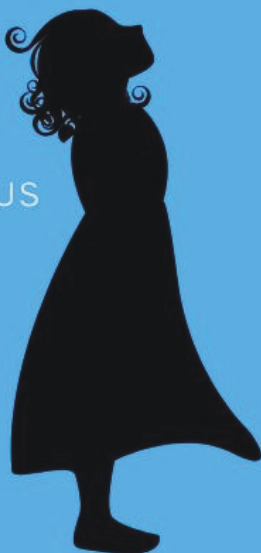


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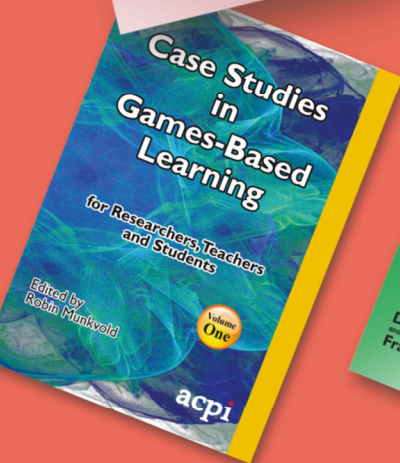
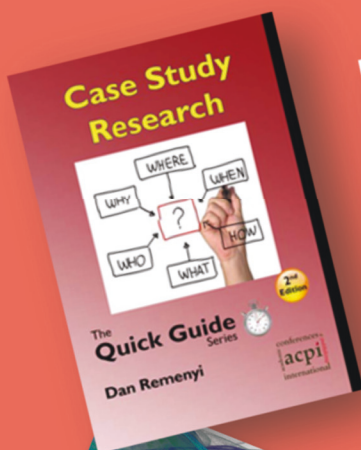


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