

Increased emotional engagement in game-based learning – A machine learning approach on facial emotion detection data

It is often argued that game-based learning is particularly effective because of the emotionally engaging nature of games. We employed both automatic facial emotion detection as well as subjective ratings to evaluate emotional engagement of adult participants completing either a game-based numerical task or a non-game-based equivalent. Using a machine learning approach on facial emotion detection data we were able to predict whether individual participants were engaged in the game-based or non-game-based task with classification accuracy significantly above chance level. Moreover, facial emotion detection as well as subjective ratings consistently indicated increased positive as well as negative emotions during game-based learning. These results substantiate that the emotionally engaging nature of games facilitates learning.

General information

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MoE publication type: A1 Journal article-refereed

Organisations: Education, Computing Sciences, Leibniz-Institut für Wissensmedien, Eberhard-Karls University Tuebingen, University of Tübingen

Contributors: Ninaus, M., Greipl, S., Kiili, K., Lindstedt, A., Huber, S., Klein, E., Karnath, H. O., Moeller, K.

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An icon that everyone wants to click: How perceived aesthetic qualities predict app icon successfulness

Mobile app markets have been touted as fastest growing marketplaces in the world. Every day thousands of apps are published to join millions of others on app stores. The competition for top grossing apps and market visibility is fierce. The way an app is visually represented can greatly contribute to the amount of attention an icon receives and to its consequent commercial performance. Therefore, the icon of the app is of crucial importance as it is the first point of contact with the potential user/customer amidst the flood of information. Those apps that fail to arouse attention through their icons danger their commercial performance in the market where consumers browse past hundreds of icons daily. Using semantic differential scale (22 adjective pairs), we investigate the relationship between consumer perceptions of app icons and icon successfulness, measured by 1)overall evaluation of the icon, 2)willingness to click the icon, 3)willingness to download the imagined app and, 4)willingness to purchase the app. The study design was a vignette study with random participant (n = 569)assignment to evaluate 4 icons (n = 2276)from a total of pre-selected 68 game app icons across 4 categories (concrete, abstract, character and text). Results show that consumers are more likely to interact with app icons that are aesthetically pleasing and convey good quality. Particularly, app icons that are perceived unique, realistic and stimulating lead to more clicks, downloads and purchases.

General information

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MoE publication type: A1 Journal article-refereed

Organisations: Computing Sciences, Gamification Group, Tampere University, University of Turku

Contributors: Jylhä, H., Hamari, J.

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ASJC Scopus subject areas: Software, Human Factors and Ergonomics, Education, Engineering(all), Human-Computer Interaction, Hardware and Architecture

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Source: Scopus

Source ID: 85067993498

Research output: [Contribution to journal](#) > [Article](#) > [Scientific](#) > [peer-review](#)

Teacher's Perceptions and Readiness to Teach Coding Skills: A Comparative Study Between Finland, Mainland China, Singapore, Taiwan, and South Korea

Many education systems have recognized the importance of computational thinking and coding skills and are implementing curricular changes to introduce coding into formal school education. A necessary and critical success factor involves the preparation of and support for teachers to teach coding. Thus, understanding the perceptions of teachers towards coding is most important, together with knowing the kinds of support they received, and their readiness and challenges to teach. The purpose of the current study is to compare teachers' attitudes towards the importance of information and communications technologies (ICT) skills and coding skills in Finland, Mainland China, Singapore, Taiwan, and South Korea. The findings indicate that teachers in Finland, Singapore, Taiwan, and South Korea believe that coding is useful even if students will not work in ICT jobs while Mainland Chinese teachers are undecided. Mainland China, Singapore, Taiwan, and South Korea have more positive views towards how to prepare for future-ready learners.

General information

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MoE publication type: A1 Journal article-refereed

Organisations: Computing Sciences, National Institute of Education, Satakunta University of Applied Sciences, Chuncheon National University of Education, Taiwan Normal University

Contributors: Wu, L., Looi, C. K., Multisilta, J., How, M. L., Choi, H., Hsu, T. C., Tuomi, P.

Number of pages: 14

Publication date: 30 Sep 2019

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Bibliographical note

EXT="Multisilta, Jari"

Source: Scopus

Source ID: 85074064375

Research output: [Contribution to journal](#) > [Article](#) > [Scientific](#) > [peer-review](#)

Supporting the development of students' technological understanding in craft and technology education via the learning-by-doing approach

Many studies have shown how practical learning and the hands-on activities help students to conceptualize technological knowledge and develop their intellectual processes. Researchers have also pointed out that a variety of cognitive skills and higher-order thinking skills can be nurtured through their application to a practical context. Learning by doing and creating things using the hands have always been key elements in Finnish craft and technology education. The overall purpose of this study was to explore and produce knowledge about the pedagogical approach of learning-by-doing and making in the context of craft and technology education in Finland. The study focused on the learning processes when students were acting (doing and making) in craft lessons, but the aim was also to

develop a pedagogical tool for teachers to better observe and guide the development of their students' technological understanding. First, a qualitative theory-oriented content analysis was performed to examine the extent of the learning-by-doing approach in craft and technology education in the National Core Curriculum for Basic Education 2014 document. In the analysis, Roberts' (2012) descriptions of four philosophical tenets for pragmatism were utilised. To gain broader knowledge regarding the pedagogical approach of learning-by-doing in craft and technology educational practices a questionnaire for students who were studying craft and technology education was created. The questions were formulated on the basis of Roberts' (2012) four philosophical tenets so that each tenet was representative to provide knowledge on the phenomenon. This data were analyzed using the frequentist descriptive method by identifying students' descriptions of each category. The findings of this study support the argument that technology education has the potential to develop students' skills in many ways by providing pupils with opportunities to work in a practical way, accessing the domain of technological knowledge and working technologically. It was also evidenced that social interaction and learning from peers is a highly present component in craft and technology education lessons.

General information

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Contributors: Niiranen, S.
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ASJC Scopus subject areas: Education
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DOIs:
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URLs:
<http://urn.fi/URN:NBN:fi:tuni-201910254094>
Research output: Contribution to journal > Article > Scientific > peer-review

Comparing Three Methods to Capture Multidimensional Service Experience in Children's Health Care: Video Diaries, Narratives, and Semistructured Interviews

Interest in studying experiences has grown rapidly; however, little attention has been paid to the applicability of qualitative methods for capturing the service experience in children's health care. This study examined and compared three data collection methods to capture the multidimensional service experience of child patients and their families: video diaries with child patients, narrative interviews with parents of a child patient, and semistructured interviews with health-care professionals working with child patients. The methods were analyzed with respect to their benefits and limitations and their applicability for capturing the multidimensional service experience presented by service experience co-creation framework, including the temporal, factual, spatial, locus, control, and organizational dimensions. The key findings are as follows: (A) The video diary method has the potential to capture the temporally broad and spatially complex phenomenon of child patients' service experience and enables researchers to capture service experience created beyond the hospital setting (e.g., through hobbies or in school). (B) Narratives with parents have the potential to capture the temporal, spatial, locus, and organizational dimensions through stories and are well-suited for mapping children's experiences and the actors influencing them. (C) Semistructured interviews with health-care professionals have the potential to capture a generalized but temporally narrow view of the service experience of child patients, concentrating on experiences within hospital settings. This is beneficial for developing health-care service providers' actions. Structured analysis and comparison of methods guides researchers to select appropriate methods to take a complementary approach in the understanding of experiences in the context of children's health care.

General information

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Organisations: Industrial Engineering and Management, Aalto University
Contributors: Litovuo, L., Karisalmi, N., Aarikka-Stenroos, L., Kaipio, J.
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How do academics experience use of recorded audio feedback in higher education? A thematic analysis

Our Work in Progress Paper in Research to Practice Category focuses on use of recorded audio feedback (RAF) in higher education. RAF is one method for providing feedback that is becoming increasingly popular, especially in e-education. According to previous studies, most learners have an overall positive attitude towards RAF. However, many of the studies have been carried out from learners' point of view. To complement RAF research, we study how academics experience use of RAF as a feedback method. We adopted a qualitative content analysis approach, applying thematic network analysis to the data received from four case academics. This approach proposes graphical networks as an aid for analyzing and synthesizing qualitative data into basic, organizing and global themes. The thematic network analysis produced two global, nine organizational and 45 basic themes. The two global themes were named 'Dialogue diversification' and 'Load reduction'. Based on our analysis, academics can, by using RAF, provide learners more relaxed and dialogic feedback and reduce their own workload both mentally and physically.

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Organisations: Computing Sciences, Jyväskylän yliopisto
Contributors: Heimburger, A., Isomottonen, V., Nieminen, P., Keto, H.
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Bibliographical note

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Source ID: 85063507477
Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

An exploration of longitudinal studies of digital learning

Background: The importance of digital technologies for enhancing learning in formal education settings has been widely acknowledged. In the light of this expectation, it is important to investigate the effects of these technologies on students' learning and development. **Purpose:** This study explores longitudinal empirical research on digital learning in the context of primary and secondary education. By focusing on a small selection of the peer-reviewed literature, the aim is to examine the kinds of longitudinal study published on this topic during the period 2012–2017 and, through categorisation, to bring together insights about the reported influences of digital technology use on students' learning. **Design and methods:** The databases searched for the purposes of this review were Scopus and Web of Science. Of 1,989 articles, 13 were finally included in the review. Using qualitative content analysis, these were analysed, coded and categorised. **Results:** The reviewed studies were found to have approached digital learning in different ways: they varied, for example, in terms of research methods and design and the digital technologies used. The studies addressed different aspects of learning, which we assigned to six categories: affection, attitude, and motivation; subject-specific knowledge and skills; transversal skills; learning experience; elements of the learning environment; and identity. We identified both positive and negative influences of technology on learning. **Conclusions:** This review offers a snapshot of the variety of research in this fast-moving area. The studies we explored were found to approach digital learning from several different perspectives, and no straightforward conclusions can be drawn about the influences of digital technology use on students' learning. We conclude that further longitudinal studies of digital learning are needed, and this study assists by highlighting gaps in the existing literature.

General information

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Organisations: Computing Sciences, University of Helsinki
Contributors: Harju, V., Koskinen, A., Pehkonen, L.
Publication date: 2019
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Source ID: 85071386320
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Code ABC hackathons: Teachers as tinkerers

Motto 'hands-on exercises are the most efficient means to learn coding' prevails the design of Code ABC hackathons. Hackathons are emergent and challenge-based ways to engage participants. The participants of this study comprise Finnish comprehensive schoolteachers that are willing to develop their coding skills. Perceiving hackathon participants as players grants employing the same motivation and engagement theories that game researchers and developers exploit in developing serious games. This paper represents two subsequent Code ABC hackathon iterations, the autumn of 2017 and the spring of 2018. The development of hackathon challenges was based on the previous semester-long Code ABC MOOC exercises field-tested since autumn 2015. As the data, we exploit the returned work from participants (multiple-choice questions, open-ended responses, programming exercises, N = 10, the first, N = 30, the second) and the instructors' reflections (N = 5). In particular, we address the topics considered challenging, engaging, and the lessons learned; the analysis utilizes mixed methods. Results show that the hackathons were almost too demanding yet engaging; however, their full potential was left unexploited.

General information

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Organisations: Computing Sciences, City of Tampere, City of Espoo, LifeLearn, Oulu City Hospital, Ylivieska City
Contributors: Niemelä, P., Partanen, T., Toivanen, T., Toikkanen, T., Kangas, V., Översti, M.
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Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Collaborative Writing and Knowledge Creation in a Social Media Online Community

This chapter deals with teaching and learning knowledge creation in higher-education institutions (HEI) via collaborative writing. The challenge of HEIs is that teaching should build capabilities that enable learners to make use of and advance academic knowledge while simultaneously developing skills relevant for the future work life. In practice, teaching at university is often disconnected from authentic work life and the tasks are far more simplified than those in the future jobs. Therefore, to address the challenge HEIs face, this chapter focusses on knowledge creation, expanding it from bounded-learning communities to online communities in social media. In online communities, it is intrinsic to act and think globally, as demanded by the new imperative. This chapter portrays the case of one knowledge management course at an HEI in which the syllabus included collaborative writing for both a bounded-learning community and the online community of Wikipedia. The student group was multidisciplinary and multicultural, with both classroom learning and distance learning options available. The research material, analysed with qualitative methods, consisted of pre-course and anonymous post-course feedback surveys, as well as learning diaries. The results show that although prior to the course many students held a prejudice and lacked knowledge about social media as part of knowledge management, they expressed they had had eye-opening learning experiences because of the expanded learning community from the traditional bounded to the online community. Based on the results of the study and the experience of teachers, recommendations are given for developing learning activities of knowledge creation in HEIs.

General information

Publication status: Published

MoE publication type: A3 Part of a book or another research book

Organisations: Industrial and Information Management, Research group: Business Ecosystems, Networks and Innovations, HAMK University of Applied Sciences

Contributors: Suominen, A., Jussila, J.

Number of pages: 15

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Editors: Visvizi, A., Lytras, M. D., Daniela, L.

ISBN (Print): 978-1-78756-556-2

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ASJC Scopus subject areas: Education, Human-Computer Interaction

Keywords: Collaborative writing, knowledge creation, online community, bounded-learning community, higher-education institutions, social media

URLs:

<https://www.emeraldinsight.com/doi/pdfplus/10.1108/978-1-78756-555-520181008>

Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

Compute mindlessly. Not! map consciously

This paper utilizes concept mapping as a tool for conscious and deliberate knowledge building in mathematics and its extension to algorithms. Currently, alleged defects in mathematics education are obvious: instead of conceptual elaboration, everyday praxis relies on routine computations that are likely to lead into alienated concepts with weak connections to prior knowledge. A concept map visualizes the existing conceptual structure, and whenever new

information is brought in, it will be placed in the map by clearly explicating its linkage to the previous concepts. In the Finnish mathematics education, such new knowledge is programming content that is integrated into elementary school mathematics in 2014 Finnish National Curriculum. This content is crystallized as the requirements of computational and algorithmic thinking, the utilization of respective data structures, and adequate amount of hands-on practice to internalize good coding conventions. This study examines secondary (N = 19) and higher education students (N = 10) and their conceptual knowledge of mathematics concentrating on the domain of algorithms in particular. The concept maps drawn by the students are evaluated using the SOLO taxonomy. To conclude, a consensus map of algorithms is represented and linked to the elementary mathematics syllabus.

General information

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MoE publication type: A1 Journal article-refereed

Organisations: Research area: Software engineering, Computing Sciences, Department of Education, Ideal Learning Oy

Contributors: Niemelä, P., Mikkolainen, V., Vuorinen, J.

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Research output: Contribution to journal > Article > Scientific > peer-review

Osaamisperustaisuuden arviointia tentillä

General information

Publication status: Published

MoE publication type: Not Eligible

Organisations: Automation and Hydraulic Engineering, Research group: Automation and Systems Theory

Contributors: Pyrhönen, V.

Number of pages: 1

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ASJC Scopus subject areas: Education

URLs:

<http://web.abo.fi/lc/pedaforum2018/abstracts.pdf>

Research output: Other conference contribution > Paper, poster or abstract > Professional

Designing serious games for special user groups-design for somebody approach

This paper presents the Design for Somebody (DfS) philosophy targeted to iterative, user-oriented development of solutions for special user groups. In this article, the DfS is discussed using a game development context. The paper gives concrete examples how the DfS can be used in developing motivating serious games. The paper presents three games which can be adjusted according to the user's abilities. The aim is to generate personalized means to enable and motivate physical, cognitive and social skill development. The development process of the three games is described in order to clarify the DfS approach and the features which are of key importance in game development for special user groups. Authentic user experiences are also presented and discussed. The user experiences and the suitability of the games were investigated through interviews and observations in game test events. The main findings in general indicated the usefulness of the DfS principles and the great interest and positive experiences in special user groups. The findings

encourage further research and development of serious games for these target groups.

General information

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Organisations: Industrial and Information Management, Satakunta University of Applied Sciences

Contributors: Merilampi, S., Koivisto, A., Sirkka, A.

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Keywords: Design for all, Games development, Mobile technology, Serious Games, Special needs

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Source ID: 85046659384

Research output: [Contribution to journal](#) > [Article](#) > [Scientific](#) > [peer-review](#)

Code notes: Designing a low-cost tangible coding tool for/with children

Programming has become an essential subject for today's education curriculum and as a result, the importance of creating the right environments to teach is increasing. For such environments, featuring tangible tools enhances creativity and collaboration. However, due to their high prices, current tangible tools are not reachable by most of the students. We developed Code Notes as a low-cost, attainable and tangible tool aimed to motivate children to support programming education. Code Notes is comprised of an Android app and code-cardboards to teach the basic concepts in programming. We continue to develop the platform with insights gained from children. This paper shares the design phases of Code Notes and observations from our two-month programming project. We also presented some future concepts of Code Notes that offer an active and embodied interaction with the teaching material.

General information

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MoE publication type: A4 Article in a conference publication

Organisations: Pervasive Computing, Koç University

Contributors: Sabuncuoğlu, A., Erkaya, M., Buruk, O. T., Göksun, T.

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Pages: 644-649

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ASJC Scopus subject areas: Developmental and Educational Psychology, Education, Software, Human-Computer Interaction

Keywords: Affordable systems for education, Collaborative learning environments, Mobile learning, Tangible blocks.

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Research output: [Chapter in Book/Report/Conference proceeding](#) > [Conference contribution](#) > [Scientific](#) > [peer-review](#)

Evaluating the effectiveness of a game-based rational number training - In-game metrics as learning indicators

It was argued recently that number line based training supports the development of conceptual rational number knowledge. To test this hypothesis, we evaluated training effects of a digital game based on the measurement interpretation of rational numbers. Ninety-five fourth graders were assigned to either a game-based training group (n = 54) who played a digital rational number game for five 30-min sessions or a control group (n = 41) who attended regular math curriculum. Conceptual rational number knowledge was assessed in a pre- and posttest session. Additionally, the game groups' playing behavior was evaluated. Results indicated that the game-based training group improved their conceptual rational number knowledge significantly more strongly than the control group. In particular, improvement of the game-based training group was driven by significant performance increases in number magnitude estimation and ordering tasks. Moreover, results revealed that in-game metrics, such as overall game performance and maximum level achieved provided valid information about students' conceptual rational number knowledge at posttest. Therefore, results of the current study not only suggest that aspects of conceptual rational number knowledge can be improved by a game-based training but also that in-game metrics provide crucial indicators for learning.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Pervasive Computing, Leibniz-Institut für Wissensmedien, Eberhard-Karls University Tuebingen

Contributors: Kiili, K., Moeller, K., Ninaus, M.

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ASJC Scopus subject areas: Computer Science(all), Education

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10.1016/j.compedu.2018.01.012

Source: Scopus

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Research output: Contribution to journal > Article > Scientific > peer-review

How to move away from the silos of business management education?

Business management education is criticized for being too theoretical and fractional. Despite the numerous efforts to build integrated and experiential business curricula, learning is still organized in disciplinary silos. The curriculum integration efforts are carried out in separate sections of the curriculum rather than the core. There are theoretical, holistic models, but a lack of concrete examples of holistic business curriculum implementations. The authors bring the separate sections together by developing a holistic core curriculum model with three perspectives: a structure to bring intellectual coherence, people organized in learning communities, and an enterprise resource planning-supported learning environment to bring the practical training ground. The authors present a concrete implementation in a case study with first-year undergraduate business students and present their lessons learned.

General information

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Organisations: Industrial and Information Management

Contributors: Nisula, K., Pekkola, S.

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ASJC Scopus subject areas: Education, Business, Management and Accounting (miscellaneous)

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Exploring the educational potential of a game-Based math competition

The main aim of this article was to investigate the educational potential of a game-based math game competition to engage students in training rational numbers. Finnish fourth ($n = 59$; $M_{age} = 10.36$) and sixth graders ($n = 105$; $M_{age} = 12.34$) participated in a math game competition relying on intra-classroom cooperation and inter-classroom competition. During a three-week period, the students were allowed to play a digital rational number game, which is founded on number line estimation task mechanics. The results indicated that students benefited significantly from participating in the competition and playing behaviour could be used to assess students rational number knowledge. Moreover, students were engaged in the competition and the results revealed that intrinsically motivating factors such as enjoyment and perceived learning gains predicted students' willingness to participate in math game competitions again. This article provides empirical support that educational game competition can be an effective, engaging, and a fair instructional approach.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Pervasive Computing, Leibniz-Institut für Wissensmedien, Eberhard-Karls University Tuebingen

Contributors: Kiili, K., Ojansuu, K., Lindstedt, A., Ninaus, M.

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Source ID: 85044019800

Research output: Contribution to journal > Article > Scientific > peer-review

Urbanisoituva yliopistokampus informaalin oppimisen mahdollistajana

Yliopistokampukset ovat monitoimijaisia ja alati muuttuvia opiskelu-, työ-, asuin- ja harrastusympäristöjä. Niiden muutosprosessi on sidoksissa yliopistojen yhteiskunnallisiin kytkentöihin sekä kaupungin laajenemiseen, tiivistymiseen ja urbanisoitumiseen. Artikkelissa nostetaan keskusteluun yliopistokampus osana ympäröivää kaupunkirakennetta ja julkisena urbaanina tilana, joka voi edistää informaalia oppimista. Esitämme, että on olemassa ainakin Suomessa yleinen yliopistokampustyyppe, jonka kaupungistumisprosessi on kaupunkirakenteellisessa ja toiminnallisessa mielessä vasta alkuvaiheessa. Kutsumme sitä urbanisoituvaksi yliopistokampukseksi. Sitä edustavat artikkelissa käsitellyt Joensuun, Jyväskylän, Tampereen, Turun ja Vaasan keskustojen kampukset. Ne sijaitsevat alueensa keskustaajamissa varsinkin keskeisellä paikalla kaupunkikeskustan ruutukaava-alueen tuntumassa, mutta silti niiden ongelmanna on toiminnan hiljeneminen opiskeluaikojen ulkopuolella. Urbanisoitumiseen kytkeytyvien ilmiöiden avulla on mahdollista elävöittää kampusalueen toimintoja ja ympäristöä ja samalla luoda edellytyksiä informaaliselle oppimiselle. Artikkelissa elävöittämistä pohditaan erityisesti kaupunkirakenteen tiivistymisen, kampusalueen käyttötarkoitusten monipuolistumisen ja puistomaisten viheralueiden kannalta.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed
Organisations: Architecture, Tampereen yliopisto
Contributors: Rajaniemi, J., Häkli, J., Rauhala, K., Sumkin, H.
Number of pages: 12
Pages: 18-29
Publication date: 27 Mar 2018
Peer-reviewed: Yes

Publication information

Journal: Aikuiskasvatus
Volume: 2018
Issue number: 1
ISSN (Print): 0358-6197
Original language: Finnish
ASJC Scopus subject areas: Education, Urban Studies
Electronic versions:
Urbanisoituva yliopistokampus_valmis
URLs:
<http://urn.fi/URN:NBN:fi:tuni-201911196075>
Research output: Contribution to journal > Article > Scientific > peer-review

An architect's perspective

General information

Publication status: Published
MoE publication type: D2 Article in professional manuals or guides or professional information systems or text book material
Organisations: Architecture, Research group: Urban Planning and Design
Contributors: Poutanen, J.
Number of pages: 15
Pages: 48-62
Publication date: 2018

Host publication information

Title of host publication: Exploring informal learning space in the university : A collaborative approach
Place of publication: London, New York
Publisher: Routledge
Editors: Walton, G., Matthews, G.
Article number: 4
ISBN (Print): 978-1-4724-8261-7
ISBN (Electronic): 978-1-315-58165-1
ASJC Scopus subject areas: Education
Keywords: Built environment, Planning, Architecture, Professional Practice
URLs:
<https://www.routledge.com/Exploring-Informal-Learning-Space-in-the-University-A-Collaborative-Approach/Walton-Matthews/p/book/9781472482617>
Research output: Chapter in Book/Report/Conference proceeding > Chapter > Professional

Design principles for simulation games for learning clinical reasoning: A design-based research approach

Background Nurses sometimes lack the competence needed for recognising deterioration in patient conditions and this is often due to poor clinical reasoning. There is a need to develop new possibilities for learning this crucial competence area. In addition, educators need to be future oriented; they need to be able to design and adopt new pedagogical innovations. The purpose of the study is to describe the development process and to generate principles for the design of nursing simulation games. Method A design-based research methodology is applied in this study. Iterative cycles of analysis, design, development, testing and refinement were conducted via collaboration among researchers, educators, students, and game designers. Results The study facilitated the generation of reusable design principles for simulation games to guide future designers when designing and developing simulation games for learning clinical reasoning. Conclusion This study makes a major contribution to research on simulation game development in the field of nursing education. The results of this study provide important insights into the significance of involving nurse educators in the design and development process of educational simulation games for the purpose of nursing education.

General information

Publication status: Published
MoE publication type: A1 Journal article-refereed

Organisations: Research group: TUT Game Lab, Pervasive Computing, Faculty of Behavioural Sciences, University of Helsinki, Helsinki Metropolia University of Applied Sciences, Turun Yliopisto/Turun Biomateriaalikeskus
Contributors: Koivisto, J. M., Haavisto, E., Niemi, H., Haho, P., Nylund, S., Multisilta, J.
Number of pages: 7
Pages: 114-120
Publication date: 2018
Peer-reviewed: Yes
Early online date: 24 Oct 2017

Publication information

Journal: Nurse Education Today
Volume: 60
ISSN (Print): 0260-6917
Ratings:

Scopus rating (2018): CiteScore 2.65 SJR 1.041 SNIP 1.638

Original language: English

ASJC Scopus subject areas: Nursing(all), Education

Keywords: Clinical reasoning, Design principles, Design-based research, Game design, Nursing education, Simulation game

DOIs:

10.1016/j.nedt.2017.10.002

Bibliographical note

EXT="Koivisto, J. M."

Source: Scopus

Source ID: 85032359904

Research output: Contribution to journal > Article > Scientific > peer-review

Elementary math to close the digital skills gap

All-encompassing digitalization and the digital skills gap pressure the current school system to change. Accordingly, to 'digi-jump', the Finnish National Curriculum 2014 (FNC-2014) adds programming to K-12 math. However, we claim that the anticipated addition remains too vague and subtle. Instead, we should take into account education recommendations set by computer science organizations, such as ACM, and define clear learning targets for programming. Correspondingly, the whole math syllabus should be critically viewed in the light of these changes and the feedback collected from SW professionals and educators. These findings reveal an imbalance between supply and demand, i.e., what is over-taught versus under-taught, from the point of view of professional requirements. Critics claim an unnecessary surplus of calculus and differential equations, i.e., continuous mathematics. In contrast, the emphasis should shift more towards algorithms and data structures, flexibility in handling multiple data representations, logic; in summary - discrete mathematics.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Pervasive Computing, Jyväskylän yliopisto

Contributors: Niemelä, P., Valmari, A.

Number of pages: 12

Pages: 154-165

Publication date: 2018

Host publication information

Title of host publication: CSEDU 2018 - Proceedings of the 10th International Conference on Computer Supported Education

Volume: 2

Publisher: SCITEPRESS

ISBN (Electronic): 9789897582912

ASJC Scopus subject areas: Computer Science Applications, Information Systems, Education

Keywords: Computing in math syllabus, Continuous vs. discrete math, Digital skills gap, Effectiveness of education, K-12 computer science education, Professional development of software professionals

DOIs:

10.5220/0006800201540165

Bibliographical note

EXT="Valmari, Antti"

Source: Scopus

Source ID: 85047771637

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Gamification, quantified-self or social networking? Matching users' goals with motivational technology

Systems and services we employ in our daily life have increasingly been augmented with motivational designs which fall under the classes of (1) gamification, (2) quantified-self and (3) social networking features that aim to help users reach their goals via motivational enforcement. However, users differ in terms of their orientation and focus toward goals and in terms of the attributes of their goals. Therefore, different classes of motivational design may have a differential fit for users. Being able to distinguish the goal profiles of users, motivational design could be better tailored. Therefore, in this study we investigate how different goal foci (outcome and focus), goals orientation (mastery, proving, and avoiding), and goal attributes (specificity and difficulty) are associated with perceived importance of gamification, social networking and quantified-self features. We employ survey data ((Formula presented.)) from users of HeiaHeia; a popular exercise encouragement app. Results indicate that goal-setting related factors of users and attributes of goals are connected with users' preference over motivational design classes. In particular, the results reveal that being outcome-focused is associated with positive evaluations of gamification and quantified-self design classes. Users with higher proving-orientation perceived gamification and social networking design classes as more important, users with lower goal avoidance-orientation perceived social networking design as more important, whereas users with higher mastery-orientation perceived quantified-self design more important. Users with difficult goals were less likely to perceive gamification and social networking design important, whereas for users with high goal specificity quantified-self features were important. The findings provide insights for the automatic adaptation of motivational designs to users' goals. However, more research is naturally needed to further investigate generalizability of the results.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Pervasive Computing, Swedish School of Economics and Business Administration, Aalto University

Contributors: Hamari, J., Hassan, L., Dias, A.

Number of pages: 40

Pages: 35–74

Publication date: 2018

Peer-reviewed: Yes

Early online date: 24 Jan 2018

Publication information

Journal: User Modeling and User-Adapted Interaction

Volume: 28

Issue number: 1

ISSN (Print): 0924-1868

Ratings:

Scopus rating (2018): CiteScore 5.45 SJR 0.907 SNIP 3.137

Original language: English

ASJC Scopus subject areas: Education, Human-Computer Interaction, Computer Science Applications

Keywords: Gamification, Goal orientation, Goal-setting, Motivational information system, Quantified-self, Social networking
DOIs:

10.1007/s11257-018-9200-2

Source: Scopus

Source ID: 85040920827

Research output: Contribution to journal › Article › Scientific › peer-review

Gamified crowdsourcing: Conceptualization, literature review, and future agenda

Two parallel phenomena are gaining attention in human–computer interaction research: gamification and crowdsourcing. Because crowdsourcing's success depends on a mass of motivated crowdsourcees, crowdsourcing platforms have increasingly been imbued with motivational design features borrowed from games; a practice often called gamification. While the body of literature and knowledge of the phenomenon have begun to accumulate, we still lack a comprehensive and systematic understanding of conceptual foundations, knowledge of how gamification is used in crowdsourcing, and whether it is effective. We first provide a conceptual framework for gamified crowdsourcing systems in order to understand and conceptualize the key aspects of the phenomenon. The paper's main contributions are derived through a systematic literature review that investigates how gamification has been examined in different types of crowdsourcing in a variety of domains. This meticulous mapping, which focuses on all aspects in our framework, enables us to infer what kinds of gamification efforts are effective in different crowdsourcing approaches as well as to point to a number of research gaps and lay out future research directions for gamified crowdsourcing systems. Overall, the results indicate that gamification has been an effective approach for increasing crowdsourcing participation and the quality of the crowdsourced work; however, differences exist between different types of crowdsourcing: the research conducted in the context of crowdsourcing of homogenous tasks has most commonly used simple gamification implementations, such as points and leaderboards, whereas crowdsourcing implementations that seek diverse and creative contributions employ gamification with a richer set of mechanics.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Research group: TUT Game Lab, Pervasive Computing, Robert Bosch GmbH, Karlsruhe Institute of Technology, Institute for Technical Physics, Germany, Gamification Group

Contributors: Morschheuser, B., Hamari, J., Koivisto, J., Maedche, A.

Number of pages: 18

Pages: 26-43

Publication date: 1 Oct 2017

Peer-reviewed: Yes

Publication information

Journal: International Journal of Human-Computer Studies

Volume: 106

ISSN (Print): 1071-5819

Ratings:

Scopus rating (2017): CiteScore 3.38 SJR 0.605 SNIP 2.01

Original language: English

ASJC Scopus subject areas: Human Factors and Ergonomics, Software, Education, Engineering(all), Human-Computer Interaction, Hardware and Architecture

Keywords: Crowdsourcing, Gamification, Human computation, Literature review, Persuasive technology, Research agenda

DOIs:

10.1016/j.ijhcs.2017.04.005

Source: Scopus

Source ID: 85019568466

Research output: [Contribution to journal](#) > [Article](#) > [Scientific](#) > [peer-review](#)

Vygotsky's Zone of Proximal Development in Connection with Technology-Enhanced Learning Environments

Technology-enhanced learning environments (TELEs) that support social interaction between teachers and learners are common in engineering higher education institutes. TELEs are often equipped with professional hardware and software, which not only enable learners to gain access to variety of learning instruments, but also allow learners to practice with authentic equipment and design tools. Furthermore, teachers can use TELEs and scaffolding principles to organize teaching in several ways that are beyond traditional classrooms. This paper discusses the potential of TELEs to shape the zone of proximal development (ZPD) of learners such that they could do harder learning activities than would otherwise be possible in less conducive environments. In addition, an example of a conducive TELE is presented that might have enlarged ZPD of learners, and, as such, may partly explain good learning outcomes obtained. The illustrations in this paper may help teachers to gain better understanding of the benefits of environment creation as well as to organize learning episodes that are suitable for ZPD-based thinking.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Automation and Hydraulic Engineering, Research area: Information Systems in Automation, Research area: Dynamic Systems, Research area: Information Systems in Automation

Contributors: Pyrhönen, V.

Number of pages: 8

Pages: 1206-1213

Publication date: 18 Sep 2017

Host publication information

Title of host publication: Proceedings of the 45th SEFI Annual Conference

Publisher: European Society for Engineering Education SEFI

Editors: Quadrado, J., Bernardino, J., Rocha, J.

ISBN (Electronic): 978-989-98875-7-2

ASJC Scopus subject areas: Education

Keywords: Zone of Proximal Development, Scaffolding, Technology-Enhanced Learning Environments, Engineering Education

Bibliographical note

JUF0ID=8743

Research output: [Chapter in Book/Report/Conference proceeding](#) > [Conference contribution](#) > [Scientific](#) > [peer-review](#)

Comparison of time metrics in programming

Research on the indicators of student performance in introductory programming courses has traditionally focused on individual metrics and specific behaviors. These metrics include the amount of time and the quantity of steps such as code compilations, the number of completed assignments, and metrics that one cannot acquire from a programming environment. However, the differences in the predictive powers of different metrics and the cross-metric correlations are unclear, and thus there is no generally preferred metric of choice for examining time on task or effort in programming. In this work, we contribute to the stream of research on student time on task indicators through the analysis of a multi-source dataset that contains information about students' use of a programming environment, their use of the learning material as well as self-reported data on the amount of time that the students invested in the course and per-Assignment perceptions on workload, educational value and difficulty. We compare and contrast metrics from the dataset with course performance. Our results indicate that traditionally used metrics from the same data source tend to form clusters that are highly correlated with each other, but correlate poorly with metrics from other data sources. Thus, researchers should utilize multiple data sources to gain a more accurate picture of students' learning.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Pervasive Computing, Research area: Software engineering, University of Helsinki

Contributors: Leinonen, J., Leppänen, L., Ihanntola, P., Hellas, A.

Number of pages: 9

Pages: 200-208

Publication date: 14 Aug 2017

Host publication information

Title of host publication: ICER 2017 - Proceedings of the 2017 ACM Conference on International Computing Education Research

Publisher: ACM

ISBN (Electronic): 9781450349680

ASJC Scopus subject areas: Computational Theory and Mathematics, Computer Science Applications, Software, Education

DOIs:

10.1145/3105726.3106181

Source: Scopus

Source ID: 85030162903

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Using and collecting fine-grained usage data to improve online learning materials

As educators seek to create better learning materials, knowledge about how students actually use the materials is priceless. The advent of online learning materials has allowed tracking of student movement on levels not previously possible with on-paper materials: Server logs can be parsed for details on when students opened certain pages. But such data is extremely coarse and only allows for rudimentary usage analysis. How do students move within the course pages? What do they read in detail and what do they glance over? Traditionally, answering such questions has required complex setups with eye tracking labs. In this paper we investigate how fine-grained data about student movement within an online learning material can be used to improve said material in an informed fashion. Our data is collected by a JavaScript-component that tracks which elements of the online learning material are visible on the student's browser window as they study. The data is collected in situ, and no software needs to be installed on the student's computer. We further investigate how such data can be combined with data from a separate learning environment in which students work on course assignments and if the types of movements made by the students are correlated with student self-regulation metrics or course outcomes. Our results indicate that the use of rather simple and non-invasive tracking of students' movements in course materials allows material creators to quickly see major problem-areas in their materials and to highlight sections that students keep returning to. In addition, when the tracking data is combined with student course assignment data, inferring meaningful assignment-specific areas within the course material becomes possible. Finally, we determine that high-level statistics of user movements are not correlated with course outcomes or certain self-regulation related metrics.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Pervasive Computing, Research area: Software engineering, University of Helsinki

Contributors: Leppänen, L., Leinonen, J., Ihanntola, P., Hellas, A.

Number of pages: 9

Pages: 4-12

Publication date: 29 Jun 2017

Host publication information

Title of host publication: Proceedings - 2017 IEEE/ACM 39th International Conference on Software Engineering: Software Engineering and Education Track, ICSE-SEET 2017

Publisher: IEEE

ISBN (Electronic): 9781538626719

ASJC Scopus subject areas: Computer Science Applications, Software, Education

Keywords: course material usage, e-learning, heat map, learning material evaluation, student behavior, visualization

DOIs:

10.1109/ICSE-SEET.2017.12

Source: Scopus

Source ID: 85026769227

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Plagiarism in take-home exams: Help-seeking, collaboration, and systematic cheating

Due to the increased enrollments in Computer Science education programs, institutions have sought ways to automate and streamline parts of course assessment in order to be able to invest more time in guiding students' work. This article presents a study of plagiarism behavior in an introductory programming course, where a traditional pen-and-paper exam was replaced with multiple take-home exams. The students who took the take-home exam enabled a software plugin that recorded their programming process. During an analysis of the students' submissions, potential plagiarism cases were highlighted, and students were invited to interviews. The interviews with the candidates for plagiarism highlighted three types of plagiarism behaviors: help-seeking, collaboration, and systematic cheating. Analysis of programming process traces indicates that parts of such behavior are detectable directly from programming process data.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Pervasive Computing, Research area: Software engineering, University of Helsinki

Contributors: Hellas, A., Leinonen, J., Ihantola, P.

Number of pages: 6

Pages: 238-243

Publication date: 28 Jun 2017

Host publication information

Title of host publication: ITiCSE 2017 - Proceedings of the 2017 ACM Conference on Innovation and Technology in Computer Science Education

Publisher: ACM

ISBN (Electronic): 9781450347044

ASJC Scopus subject areas: Management of Technology and Innovation, Education

Keywords: Educational data mining, Plagiarism, Programming process data

DOIs:

10.1145/3059009.3059065

Source: Scopus

Source ID: 85029535971

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Children designing videos: Tools, pedagogical models, and best practices for digital storytelling and media-making in the classroom

Although video sharing is common among youth, schools are only beginning to apply digital videos and digital storytelling to formal learning. This paper presents pedagogical models, examples, best practices, and outcomes that illustrate how teachers and students design and use digital stories in knowledge creation in cross-cultural settings. The results are based on the empirical data and findings from several international pilot studies. On the one hand, working with digital video stories drove engagement. However, on the other hand, technical issues significantly lowered engagement. In addition, the video inquiry pedagogy supported inquiry learning. Students began to pose scientifically oriented questions and seek answers together.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Research group: TUT Game Lab, Pervasive Computing, University of Helsinki, Pepperdine University

Contributors: Multisilta, J., Niemi, H., Hamilton, E.

Number of pages: 4

Pages: 693-696

Publication date: 27 Jun 2017

Host publication information

Title of host publication: IDC 2017 - Proceedings of the 2017 ACM Conference on Interaction Design and Children

Publisher: ACM

ISBN (Electronic): 9781450349215

ASJC Scopus subject areas: Software, Education, Human-Computer Interaction, Developmental and Educational Psychology

Keywords: Children, Media-making, Pedagogical models, STEM, Storytelling, Video

DOIs:

10.1145/3078072.3091982

Source: Scopus

Source ID: 85026309191

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Preventing keystroke based identification in open data sets

Large-scale courses such as Massive Online Open Courses (MOOCs) can be a great data source for researchers. Ideally, the data gathered on such courses should be openly available to all researchers. Studies could be easily replicated and novel studies on existing data could be conducted. However, very fine-grained data such as source code snapshots can contain hidden identifiers. For example, distinct typing patterns that identify individuals can be extracted from such data. Hence, simply removing explicit identifiers such as names and student numbers is not sufficient to protect the privacy of the users who have supplied the data. At the same time, removing all keystroke information would decrease the value of the shared data significantly. In this work, we study how keystroke data from a programming context could be modified to prevent keystroke latency based identification whilst still retaining information that can be used to e.g. infer programming experience. We investigate the degree of anonymization required to render identification of students based on their typing patterns unreliable. Then, we study whether the modified keystroke data can still be used to infer the programming experience of the students as a case study of whether the anonymized typing patterns have retained at least some informative value. We show that it is possible to modify data so that keystroke latency based identification is no longer accurate, but the programming experience of the students can still be inferred, i.e. the data still has value to researchers. In a broader context, our results indicate that information and anonymity are not necessarily mutually exclusive.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Pervasive Computing, Research area: Software engineering, University of Helsinki

Contributors: Leinonen, J., Ihantola, P., Hellas, A.

Number of pages: 9

Pages: 101-109

Publication date: 12 Apr 2017

Host publication information

Title of host publication: L@S 2017 - Proceedings of the 4th (2017) ACM Conference on Learning at Scale

Publisher: ACM

ISBN (Electronic): 9781450344500

ASJC Scopus subject areas: Computer Networks and Communications, Education, Software, Computer Science Applications

Keywords: Data anonymization, Data privacy, Keystroke dynamics, Programming experience inference, Source code snapshots

DOIs:

10.1145/3051457.3051458

Source: Scopus

Source ID: 85018432742

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

A teacher? A mentor? A friend? - Teacher mentoring experience at Tampere University of Technology

In this paper, we research a recently set up engineering students' teacher mentoring programme with special interest on teacher mentors' expectations and experiences from the point of view of self-efficacy and motivation. We aim to have an insight in the teacher mentors' met and non-met expectations and see if this has effect on the teacher mentors' motivation and expectations of the outcomes of the mentoring programme. We also examine how beneficial the teacher mentors consider the programme to be to the students and how this is linked to their motivation.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Teaching and Learning Services, Industrial and Information Management

Contributors: Niemi, T., Kalliomäki, H., Pajarre, E.

Number of pages: 10

Pages: 1352-1361

Publication date: 2017

Host publication information

Title of host publication: Proceedings of the 45th SEFI Annual Conference 2017 - Education Excellence for Sustainability, SEFI 2017

Publisher: European Society for Engineering Education SEFI

ISBN (Electronic): 9789899887572

ASJC Scopus subject areas: Engineering(all), Education

Keywords: Student Teacher relationship, Teacher mentoring, Teacher role, Transition to University

URLs:

https://www.sefi.be/wp-content/uploads/SEFI_2017_PROCEEDINGS.pdf

Bibliographical note

INT=otu,"Kalliomäki, H."

Source: Scopus

Source ID: 85034792591

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

From theories to game mechanics: Developing a game for training rational numbers

The paper reports the results from an ongoing project that aims to develop an engaging and effective digital game for training conceptual rational number knowledge. The overall research approach is design science. In the paper we report the results of an iteration in which we studied how students used a Semideus School game prototype and how they experienced the core mechanics of the game. 20 fourth graders and 32 sixth graders played Semideus School game for approximately 2.5 hours. Students were allowed to freely play the game with their iPads. Playing experience was studied with a digital questionnaire that included items about flow experience (Flow Short Scale), perceived playability, and acceptance of game-based math training. Additionally, a researcher observed the playing sessions and discussed with the students about the implementation of the game. Students experienced reasonable high flow experience while playing the game. The results revealed that 4th graders would be more willing to study rational numbers with a game and they also appreciated the playability of the game more than sixth graders. Moreover, sixth graders demanded more complex game mechanics, but 4th graders were happy with the core mechanics. We redesigned the game mechanics based on the findings. The paper describes the new mechanics and the theoretical basis of the new design.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Pervasive Computing

Contributors: Kiili, K.

Number of pages: 7

Pages: 328-334

Publication date: 2017

Host publication information

Title of host publication: Proceedings of the 11th European Conference on Games Based Learning, ECGBL 2017

Publisher: Academic Conferences and Publishing International Limited

ISBN (Electronic): 9781911218562

ASJC Scopus subject areas: Software, Computer Graphics and Computer-Aided Design, Computer Networks and Communications, Artificial Intelligence, Human-Computer Interaction, Control and Systems Engineering, Education

Keywords: Game design, Game mechanic, Game-based learning, Mathematics, Playing experience, Rational numbers

Source: Scopus

Source ID: 85036471818

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Hobbyists as a super group of user-centred innovation - Case CreamSound guitar amplifier

The purpose of this research was to recognise the advantages and disadvantages of hobbyist-centred innovation. Another aim was to find out how a hobbyist innovator innovates and create new knowledge. The research was implemented as a qualitative case study of CreamSound guitar amplifier innovation. According to the study, the benefits of hobbyist-centred innovation are passion for the work, placing oneself in the user's role, curiosity, seeing one's own handwork, and simpler decision making. The downsides of hobbyist innovation are resource limitations, difficulty in receiving funding, and the lack of social interaction when working alone. Hobbyist-centred innovation process seems to be very experimental. New knowledge is created by iterative experiments. Novelty of this study is that it provides profound understanding about hobbyist-centred innovation. The practical value consists of recognised means to support hobbyist-centred innovation in the future.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Industrial and Information Management, Lappeenranta University of Technology, VTT Technical Research Centre of Finland

Contributors: Salmela, E., Häkkinen, K., Rantala, J.
Number of pages: 23
Pages: 223-245
Publication date: 2017
Peer-reviewed: Yes

Publication information

Journal: International Journal of Innovation and Learning
Volume: 21
Issue number: 2
ISSN (Print): 1471-8197
Ratings:

Scopus rating (2017): CiteScore 0.69 SJR 0.26 SNIP 0.642

Original language: English

ASJC Scopus subject areas: Education, Management of Technology and Innovation

Keywords: Experimental innovation, Hobbyist innovators, Innovation adoption, User data, User understanding, User-centred innovation, User-driven innovation

DOIs:

10.1504/IJIL.2017.081946

Source: Scopus

Source ID: 85011914088

Research output: Contribution to journal › Article › Scientific › peer-review

Internet of Things: Opportunities for vocational education and training: Presentation of the pilot project

In the Internet of Things (IoT), machines and devices are equipped with sensors and Internet connections that makes it possible to collect data and store this data to cloud services. In vocational education and training, the stored data can be used to improve decision-making processes. With the help of this data, a teacher can also get a more accurate picture of the current state of the education environment than before. IoT should be integrated into vocational education and training because IoT will help to achieve important educational objectives. IoT is able to promote students' preparation for working life, the safety of education environment, self-directed learning, and effective learning. It can also improve the efficient use of educational resources. In addition, IoT based solutions should be introduced so that students would have a vision of new types of IoT skill requirements before they enter the labour market. In this paper, we presents IoT related aspects that enable to meet the above-mentioned educational objectives. By implementing a pilot project, we aim to concretise IoT's possibilities in the education sector.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Research group: Software Engineering and Intelligent Systems, Pervasive Computing, Facilities and Infrastructure

Contributors: Vihervaara, J., Alapaholuoma, T.

Number of pages: 5

Pages: 476-480

Publication date: 2017

Host publication information

Title of host publication: CSEDU 2017 - Proceedings of the 9th International Conference on Computer Supported Education

Publisher: SCITEPRESS

ISBN (Electronic): 9789897582394

ASJC Scopus subject areas: Education, Computer Science Applications, Information Systems

Keywords: Internet of Things, Pilot, Vocational education

DOIs:

10.5220/0006353204760480

Source: Scopus

Source ID: 85023781608

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Vygotsky's zone of proximal development in connection with technology-enhanced learning environments

Technology-enhanced learning environments (TELEs) that support social interaction between teachers and learners are common in engineering higher education institutes. TELEs are often equipped with professional hardware and software, which not only enable learners to gain access to variety of learning instruments, but also allow learners to practice with authentic equipment and design tools. Furthermore, teachers can use TELEs and scaffolding principles to organize teaching in several ways that are beyond traditional classrooms. This paper discusses the potential of TELEs to shape the zone of proximal development (ZPD) of learners such that they could do harder learning activities than would otherwise be

possible in less conducive environments. In addition, an example of a conducive TELE is presented that might have enlarged ZPD of learners, and, as such, may partly explain good learning outcomes obtained. The illustrations in this paper may help teachers to gain better understanding of the benefits of environment creation as well as to organize learning episodes that are suitable for ZPD-based thinking.

General information

Publication status: Published
MoE publication type: A4 Article in a conference publication
Organisations: Automation and Hydraulic Engineering
Contributors: Pyrhönen, V. P.
Number of pages: 8
Pages: 1206-1213
Publication date: 2017

Host publication information

Title of host publication: Proceedings of the 45th SEFI Annual Conference 2017 - Education Excellence for Sustainability, SEFI 2017
Publisher: European Society for Engineering Education SEFI
ISBN (Electronic): 9789899887572
ASJC Scopus subject areas: Engineering(all), Education
Keywords: Engineering education, Scaffolding, Technology-enhanced learning environments, Zone of proximal development
URLs:
https://www.sefi.be/wp-content/uploads/SEFI_2017_PROCEEDINGS.pdf
Source: Scopus
Source ID: 85034736437
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Learning by playing: A cross-sectional descriptive study of nursing students' experiences of learning clinical reasoning

Background Clinical reasoning is viewed as a problem-solving activity; in games, players solve problems. To provide excellent patient care, nursing students must gain competence in clinical reasoning. Utilising gaming elements and virtual simulations may enhance learning of clinical reasoning. Objectives To investigate nursing students' experiences of learning clinical reasoning process by playing a 3D simulation game. Design Cross-sectional descriptive study. Setting Thirteen gaming sessions at two universities of applied sciences in Finland. The prototype of the simulation game used in this study was single-player in format. The game mechanics were built around the clinical reasoning process. Participants Nursing students from the surgical nursing course of autumn 2014 (N = 166). Methods Data were collected by means of an online questionnaire. Results In terms of the clinical reasoning process, students learned how to take action and collect information but were less successful in learning to establish goals for patient care or to evaluate the effectiveness of interventions. Learning of the different phases of clinical reasoning process was strongly positively correlated. The students described that they learned mainly to apply theoretical knowledge while playing. The results show that those who played digital games daily or occasionally felt that they learned clinical reasoning by playing the game more than those who did not play at all. Conclusion Nursing students' experiences of learning the clinical reasoning process by playing a 3D simulation game showed that such games can be used successfully for learning. To ensure that students follow a systematic approach, the game mechanics need to be built around the clinical reasoning process.

General information

Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Pori Department
Contributors: Koivisto, J. M., Multisilta, J., Niemi, H., Katajisto, J., Eriksson, E.
Number of pages: 7
Pages: 22-28
Publication date: 1 Oct 2016
Peer-reviewed: Yes

Publication information

Journal: Nurse Education Today
Volume: 45
ISSN (Print): 0260-6917
Ratings:
Scopus rating (2016): CiteScore 2.19 SJR 1.103 SNIP 1.644
Original language: English
ASJC Scopus subject areas: Nursing(all), Education
Keywords: 3D simulation game, Clinical reasoning, Game mechanics, Learning, Nursing students, Playing
DOIs:

10.1016/j.nedt.2016.06.009

Source: Scopus

Source ID: 84976298009

Research output: Contribution to journal > Article > Scientific > peer-review

Affective experiences and student engagement in higher education

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Information Management and Logistics, Research group: Novi, Language Centre, Managing digital industrial transformation (mDIT), Tampere University of Applied Science

Contributors: Helander, N., Boedeker, M., Hellsten, P., Jussila, J., Myllärniemi, J., Tukiainen, M.

Publication date: 13 Sep 2016

Host publication information

Title of host publication: 44th Annual Conference Of The European Society For Engineering Education : 12-15 September 2016, Tampere, Finland

Place of publication: Tampere

ISBN (Print): 9782873520144

ASJC Scopus subject areas: Education

Keywords: Affective experience, Higher Education

URLs:

http://www.sefi.be/conference-2016/papers/Engineering_Skills/helander-affective-experiences-and-student-engagement-in-higher-education-178_a.pdf

URLs:

<http://www.tut.fi/en/sefi-annual-conference-2016/index.htm>

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Students as mystery shoppers: lowering knowledge sharing barriers in higher education

This empirical research paper focuses on discussing potential knowledge sharing barriers volunteering students as mystery shoppers perceived in the context of higher education. More specifically, the focus is on students' ideas on finding solutions to lowering individual knowledge sharing barriers, i.e. improving the quality of their instruction.

Mystery shopping is a method of observing service performance from the user, or customer, perspective and it has been widely used to evaluate the overall service quality within service businesses. Using empirical data from students volunteering as mystery shoppers appears not as a widely used research and development tool.

Moreover, there is little context-specific research on learning and teaching in such a knowledge intensive community like a university from the perspective of knowledge management (KM). KM offers thus a useful approach for analysing learning and teaching, as well as improving the processes of knowledge creation.

A Finnish technical university and its student union organised a mystery shopping project with 45 student participants.

They observed their learning experiences for six weeks in order to complement data from other sources. The students kept a casual theme-based diary on four larger topics: teaching staff and teaching (including pedagogical competence and teaching culture, instruction and guidance, course arrangements), students and the learning culture, student services and learning environment. The initial goal of the project was to add a student voice on the processes of developing learning and teaching in higher education.

The research approach represents qualitative content analysis in which knowledge-sharing barriers were first recognised from the qualitative mystery shopper data. Next those instances where the students offered their solution to lowering that barrier were selected for further analysis. The results identify learner suggestions that may contribute to lowering knowledge sharing barriers. Result also indicate that individual knowledge sharing barriers as described in the literature appear to be valid in a higher education setting.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Language Centre

Contributors: Tukiainen, M. O.

Publication date: 13 Sep 2016

Host publication information

Title of host publication: 44th Annual Conference Of The European Society For Engineering Education : 12-15 September 2016, Tampere, Finland

Place of publication: Tampere

ISBN (Electronic): 978-2-87352-012-0

ASJC Scopus subject areas: Education

URLs:

[http://www.sefi.be/conference-](http://www.sefi.be/conference-2016/papers/Continuing_Engineering_Education_and_Lifelong_Learning__Engineering_Education_Research/tukiainen-students-as-mystery-shoppers-168_a.pdf)

[2016/papers/Continuing_Engineering_Education_and_Lifelong_Learning__Engineering_Education_Research/tukiainen-students-as-mystery-shoppers-168_a.pdf](http://www.sefi.be/conference-2016/papers/Continuing_Engineering_Education_and_Lifelong_Learning__Engineering_Education_Research/tukiainen-students-as-mystery-shoppers-168_a.pdf)

URLs:

<http://www.tut.fi/fi/tietoa-yliopistosta/uutiset-ja-tapahtumat/tapahtumat/sefi2016-44th-annual-conference-of-the-european-society-for-engineering-education-x111754>

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Dynamic software updating techniques in practice and Educator's guides: A review

Patching a program during its execution without restarting is called dynamic software updating (DSU). DSU is well acknowledged in research, but rarely applied in practice as witnessed by constant need for reboots and restarts of both applications as well as operating systems. This raises the question of how well DSU related techniques are supported in education. In this paper, we review how the major software engineering and education guides acknowledge dynamic software updating techniques. Our analysis indicates that although DSU is not explicitly mentioned in the guides, the need is already well motivated and many DSU concepts are implicitly supported. Based on this, we argue that DSU could be introduced as an optional topic in software engineering studies.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Pervasive Computing, Research area: Software engineering

Contributors: Ilvonen, V., Ihantola, P., Mikkonen, T.

Number of pages: 5

Pages: 86-90

Publication date: 19 May 2016

Host publication information

Title of host publication: 2016 IEEE 29th International Conference on Software Engineering Education and Training (CSEET)

Publisher: IEEE

ISBN (Print): 978-1-5090-0765-3

ASJC Scopus subject areas: Software, Education

Keywords: Dynamic software updating, SEEK, Software engineering body of knowledge, Software engineering education knowledge, SWEBOK

DOIs:

10.1109/CSEET.2016.16

Bibliographical note

JUF0ID=67349

Source: Scopus

Source ID: 84974628254

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

First-principles data set of 45,892 isolated and cation-coordinated conformers of 20 proteinogenic amino acids

We present a structural data set of the 20 proteinogenic amino acids and their amino-methylated and acetylated (capped) dipeptides. Different protonation states of the backbone (uncharged and zwitterionic) were considered for the amino acids as well as varied side chain protonation states. Furthermore, we studied amino acids and dipeptides in complex with divalent cations (Ca^{2+} , Ba^{2+} , Sr^{2+} , Cd^{2+} , Pb^{2+} , and Hg^{2+}). The database covers the conformational hierarchies of 280 systems in a wide relative energy range of up to 4 eV (390 kJ/mol), summing up to a total of 45,892 stationary points on the respective potential-energy surfaces. All systems were calculated on equal first-principles footing, applying density-functional theory in the generalized gradient approximation corrected for long-range van der Waals interactions. We show good agreement to available experimental data for gas-phase ion affinities. Our curated data can be utilized, for example, for a wide comparison across chemical space of the building blocks of life, for the parametrization of protein force fields, and for the calculation of reference spectra for biophysical applications.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Department of Physics, Fritz Haber Institute of the Max Planck Society, COMP Centre of Excellence, Department of Applied Physics, Aalto University, Aalto University, Duke University

Contributors: Ropo, M., Schneider, M., Baldauf, C., Blum, V.

Publication date: 16 Feb 2016

Peer-reviewed: Yes

Publication information

Journal: Scientific Data

Volume: 3

Article number: 160009

ISSN (Print): 2052-4463

Ratings:

Scopus rating (2016): CiteScore 4.8 SJR 3.261 SNIP 2.124

Original language: English

ASJC Scopus subject areas: Education, Library and Information Sciences, Computer Science Applications, Information Systems, Statistics, Probability and Uncertainty, Statistics and Probability

Electronic versions:

ropo et al - First-principles data set

DOIs:

10.1038/sdata.2016.9

URLs:

<http://urn.fi/URN:NBN:fi:ty-201607294339>

Source: Scopus

Source ID: 84961184519

Research output: Contribution to journal › Article › Scientific › peer-review

Computer-supported collaborative learning: Praxes in new cell-oriented configurable PC-classroom

Currently, technology-enhanced learning environments are a research hotspot in engineering education. Universities invest in modern environments equipped with the newest audiovisual hardware, computers and web-technologies. These environments support learner-centred model of education, which highlights active role of learners, learning-by-doing, and collaborative learner autonomy in a democratic atmosphere. Therefore, traditional teacher-led classrooms can be transformed to more diverse and more creative environments in which teachers and learners have relatively different roles compared with the traditional classroom.

In this paper, we present layout, construction and hardware of our newly developed technology-mediated, configurable, and cell-oriented PC-classroom, which play a key role in our teaching development. We exemplify how the classroom has helped us to improve our automation science and control engineering education. To be more specific, we have adopted the well-known concept of computer-supported collaborative learning (CSCL), which concerns how students can learn together with the help of computers. We also demonstrate how redefining and redesigning the nature of activities occurring in modern learning environments can improve the effectiveness of contact teaching, and hence, allow learning episodes to be more impactful compared with the traditional teacher-led classroom. We would like to pinpoint that redefinition and redesign have allowed us, as teachers, to take the position of a facilitating guide, or mentor, which work in close cooperation with students, and thereby, is able to strengthen the knowledge level of students through intellectual face-to-face discussion as well as through technology-supported communication.

Furthermore, our new classroom has enabled hands-on, competitive, cyber-physical attack-defence events to be conducted, which improve our automation security training. The events have invited participants from industry and academia, but most importantly, they have involved students. During the events, we have offered opportunities for students to make demonstration-of-skills to the participants from business. As a consequence, the new environment has enabled acts of openings for university-business cooperation in terms of education and recruit, free of charge. To our experience and according to student feedback, our redefined ways of conducting teaching has improved student motivation as well as increased their timely investment towards learning activities, which has eventually translated to better grades and overall satisfaction.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Automation Science and Engineering, Research area: Information Systems in Automation

Contributors: Pyrhönen, V., Seppälä, J., Salmenperä, M.

Number of pages: 9

Publication date: 2016

Host publication information

Title of host publication: SEFI conference 2016 : Engineering Education on Top of the World: Industry University Cooperation

ISBN (Electronic): 9782873520144

ASJC Scopus subject areas: Education

Keywords: Computer-Supported Collaborative Learning, Learner-Centred Learning, Learning Environment, Teaching Technology

URLs:

http://www.sefi.be/conference-2016/papers/Engineering_Skills/pyrhone-computer-supported-collaborative-learning--praxes-223.pdf

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Digital storytelling promoting twenty-first century skills and student engagement

This article presents results on how students became engaged and motivated when using digital storytelling in knowledge creation in Finland, Greece and California. The theoretical framework is based on sociocultural theories. Learning is seen as a result of dialogical interactions between people, substances and artefacts. This approach has been used in the creation of the Global Sharing Pedagogy (GSP) model for the empirical study of student levels of engagement in learning twenty-first century skills. This model presents a set of conceptual mediators for student-driven knowledge creation, collaboration, networking and digital literacy. Data from 319 students were collected using follow-up questionnaires after the digital storytelling project. Descriptive statistical methods, correlations, analysis of variance and regression analysis were used. The mediators of the GSP model strongly predicted student motivation and enthusiasm as well as their learning outcomes. The digital storytelling project, using the technological platform Mobile Video Experience (MoViE), was very successful in teaching twenty-first century skills.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Pori Department, University of Helsinki

Contributors: Niemi, H., Multisilta, J.

Pages: 451-468

Publication date: 2016

Peer-reviewed: Yes

Publication information

Journal: Technology, Pedagogy and Education

Volume: 25

Issue number: 4

ISSN (Print): 1475-939X

Ratings:

Scopus rating (2016): CiteScore 1.4 SJR 0.906 SNIP 1.554

Original language: English

ASJC Scopus subject areas: Education, Communication, Computer Science Applications, Information Systems

Keywords: engagement, learning, motivation, twenty-first century skills

DOIs:

10.1080/1475939X.2015.1074610

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<http://www.scopus.com/inward/record.url?scp=84939476760&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84939476760

Research output: Contribution to journal › Article › Scientific › peer-review

Enhancing old laboratory experiment using flipped learning: Towards self-regulating collaborative groups in blended learning environment

This paper demonstrates how learning outcome of a traditional student laboratory has been improved using blended and flipped learnings in a cost-effective way. The innovation process was based on four important elements: the subject matter, educational theory, redefinition of the roles of teacher and students, and technology-driven utilities intended for education. Also, prelab activities were refurbished in order to better prepare students for the actual experiments. Teaching and learning relationship was redesigned to support learner-centred model of education, and on-site activities occurring in the laboratory room were reformulated to advance self-regulation and learner autonomy. As a consequence, the role of teacher is steered towards mentor-like activity, and hence, a teacher-mentor can use his own expertise to strengthen the knowledge level of students via on-site professional facilitation.

To be more specific, prelab activities were delivered using a virtual laboratory and a teaser video. The main role of the teaser video is to allow a remote visit to the physical laboratory room before students actually enter there. The teaser video delivers interesting visual information of the laboratory equipment when it is fully operational, and hence, students can identify causal connections of all devices affecting the physical system from anyplace at any time. The virtual laboratory, on the other hand, enables students to observe several physical quantities and their curvatures which cannot be observed nor displayed by the physical devices in the laboratory room. Furthermore, the open-ended nature of the virtual laboratory also enables students to use it as a subject for their own active research. The teaser video and virtual laboratory help students to develop intuition, and they also strengthen students' preparation in a timely fashion manner. As a result, more time is released for active on-site student collaboration and teacher facilitated intellectual discussion. Interestingly, the virtual laboratory is key to establish highly collaborative and activity-based learning environment inside

the laboratory room. Finally, it is shown that the new implementation of the laboratory work significantly reduces implementation costs.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Automation Science and Engineering, Research area: Information Systems in Automation, Research area: Dynamic Systems

Contributors: Pyrhönen, V.

Number of pages: 9

Publication date: 2016

Host publication information

Title of host publication: SEFI conference 2016 : Engineering Education on Top of the World: Industry University Cooperation

ISBN (Electronic): 9782873520144

ASJC Scopus subject areas: Education

Keywords: Blended Learning, Cost Reduction, Flipped Learning, Laboratory

URLs:

http://www.sefi.be/conference-2016/papers/Sustainability_and_Engineering_Education/pyrhonen-enhancing-old-laboratory-experiment-using-flipped-learning--towards-self-regulating-collaborative-.pdf

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

How to benefit from learning logs in engineering education?

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Mechanical Engineering and Industrial Systems, Research area: Design, Development and LCM, MEI Laboratory, Ita-Suomen yliopisto

Contributors: Juuti, T., Kopra, M. J., Rättyä, K., Lehtonen, T.

Publication date: 2016

Host publication information

Title of host publication: 44th Annual Conference of the European Society for Engineering Education - Engineering Education on Top of the World: Industry-University Cooperation, SEFI 2016

Publisher: European Society for Engineering Education SEFI

ISBN (Electronic): 9782873520144

ASJC Scopus subject areas: Engineering(all), Education

URLs:

http://www.sefi.be/conference-2016/papers/Engineering_Education_Research__Engineering_Skills/juuti-learning-logs-and-reflecting-in-engineering-education-39_a.pdf

URLs:

<http://www.scopus.com/inward/record.url?scp=85014063424&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 85014063424

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Leadership instead of grading - The new goals of assessment

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Mechanical Engineering and Industrial Systems, Research area: Design, Development and LCM, MEI Laboratory, Ita-Suomen yliopisto

Contributors: Lehtonen, T., Juuti, T., Vanhatalo, M., Kopra, M. J., Rättyä, K.

Number of pages: 8

Publication date: 2016

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Publisher: European Society for Engineering Education SEFI

ISBN (Electronic): 9782873520144

ASJC Scopus subject areas: Engineering(all), Education
Keywords: Assessment, Lifelong learning, Situational leadership
URLs:

http://www.sefi.be/conference-2016/papers/Sustainability_and_Engineering_Education/lehtonen-from-grading-towards-leadership---new-goals-for-assessment-55_a.pdf

Source: Scopus

Source ID: 85014096858

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Learning logs in product development education

In this paper, we analyse engineering students' learning logs on a basic course on Product design and development (4 credit points) for second year students. Our purpose is to improve the engineering education by focusing on the learning logs. We want to explore the possibilities of using a reflective assessment tool like a learning log in our courses. For the research strategy, we chose educational design research. Our research focuses on how we can benefit from learning logs in product development education. The learning logs with only a few log entries were lists of activities performed during the course. The most comprehensive learning logs with dozens of log entries demonstrated abilities of a reflective practitioner and knowledge of a variety of tools, and they provided proof of the creation of a design toolbox for future use. The reports discussed the knowledge of key concepts in product design and development and procedural issues. The separation of divergent and convergent problem solving phases and understanding the conceiving process was well demonstrated. The learning logs also revealed metacognitive aspects, such as an awareness of personal product design and development skills and potential mental blocks in creativity. The learning logs are useful for the teacher, as the teacher receives feedback on the course, the tasks, instructions etc. The learning logs also reveal what the students think and why. This enables the teacher to evaluate the students' skill levels and to plan the scaffolding activities to be used with the groups.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Mechanical Engineering and Industrial Systems, Research area: Design, Development and LCM, Ita-Suomen yliopisto

Contributors: Juuti, T., Rättyä, K., Lehtonen, T.

Number of pages: 6

Pages: 296-301

Publication date: 2016

Host publication information

Title of host publication: Proceedings of the 18th International Conference on Engineering and Product Design Education: Design Education: Collaboration and Cross-Disciplinarity, E and PDE 2016

Publisher: Institution of Engineering Designers, The Design Society

ISBN (Electronic): 9781904670780

ASJC Scopus subject areas: Industrial and Manufacturing Engineering, Education

Keywords: Feedback, Learning log, Metacognitive knowledge, Sustainable assessment

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Source: Scopus

Source ID: 84996527568

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Self-regulation and competence in work-based learning

This chapter discusses the connection between self-regulation and competence in both formal and informal contexts of vocational and professional education. The goal is to show that self-regulation has a theoretical linkage to a multifaceted and holistic approach to competence and that self-regulatory abilities play a role in the development of vocational competence. Different theoretical approaches to self-regulation and competence and the link between the two concepts are discussed. We argue that self-regulation plays an important role in the development of competence, as it is needed to acquire competencies, unified sets of knowledge, skills and views. Self-regulation acts as an indirect factor between competencies and direct formal, non-formal and informal learning processes (e.g. vocational studies, leisure time activities and work) aimed to develop them. In this chapter, we present results of empirical studies on self-regulation and competence to support this argumentation. Several studies with vocational skills competition competitors show that strong self-regulatory abilities are related to successful competition performances. Also results from a study with Finnish in-service air traffic controllers indicate a link between vocational excellence and self-regulative action. Our conclusion is that self-regulatory skills should be taught in addition to the vocation-specific skills in competence-based vocational and professional education.

General information

Publication status: Published

MoE publication type: A3 Part of a book or another research book

Organisations: Teaching and Learning Services, School of Education, University of Tampere

Contributors: Nokelainen, P., Kaisvuo, H., Pylväs, L.

Pages: 775-793

Publication date: 2016

Host publication information

Title of host publication: Competence-based Vocational and Professional Education. Bridging the Worlds of Work and Education : Bridging the Worlds of Work and Education

Publisher: Springer US

Editor: Mulder, M.

ISBN (Print): 978-3-319-41711-0

ISBN (Electronic): 978-3-319-41713-4

Publication series

Name: Technical and Vocational Education and Training: Issues, Concerns and Prospects

Volume: 23

ISSN (Print): 1871-3041

ASJC Scopus subject areas: Education

DOIs:

10.1007/978-3-319-41713-4_36

Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

STACK assignments in university mathematics education

Students' learning process can be assisted and diversified with the help of e-learning tools and virtual environments. In Tampere University of Technology, the aim is to utilize software that delivers assignments, checks students' answers and gives feedback to the students, in the mathematics courses. The software that has been used is called STACK, which can be integrated into Moodle. STACK assignments have been created as a part of the STEM education material bank Abacus.

Written feedback can be generated in STACK assignments as necessary. Feedback guides the students to identify their errors and revise them. It can also motivate the students to try again after giving a wrong answer.

This study concerns the use of STACK in TUT mathematics courses. Especially we are interested in

- how do the points gathered and the time of the last submission in STACK exercises correlate with the exam grades?
- when and for how long do the students solve the STACK assignments?
- how does the activity in STACK differ between honours and engineering mathematics students?

In STACK assignments, the students were able to give their answers in Moodle. For each lecture week, they had one week to solve and return the answers. All the student activity related to the STACK assignments was saved in the Moodle logs. Data was analysed with Matlab by the means of educational data mining.

We observed that the activity in STACK was the greatest near the deadline. We also found that, on average, the better the grade, the earlier the students gave their final answers in STACK. Additionally, the honours mathematics students made their submissions earlier: many of them considered STACK exercises as a good way to revise the subjects considered in the lectures, while engineering mathematics students mostly rehearsed with STACK near the deadline.

According to the survey polls, students found the STACK exercises as a nice and efficient way to rehearse and learn mathematics. Especially, the instant feedback was mostly appreciated. However, some of the students felt writing the answers with a computer unappealing, but generally this aspect was not considered a problem.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Mathematics, Research group: MAT Positioning

Contributors: Mäkelä, A., Ali-Löytty, S., Humaloja, J., Joutsenlahti, J., Kauhanen, J., Kaarakka, T.

Number of pages: 14

Publication date: 2016

Host publication information

Title of host publication: Proceedings of the 44th SEFI Conference, 12 - 15 September 2016, Tampere, Finland

Publisher: European Society for Engineering Education SEFI

ISBN (Print): 9782873520144

ASJC Scopus subject areas: Education

Keywords: STACK, web-assisted learning tools

URLs:

http://www.sefi.be/conference-2016/papers/Mathematics_and_Engineering_Education/makela-stack-assignments-in-university-mathematics-education-73_a.pdf

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

When teaching gets tough – Professional community inhibitors of teacher-targeted bullying and turnover intentions

Bullying in school has become an international concern in recent decades. Yet, we know surprisingly little about inhibitors of teacher-targeted bullying. The study focused on exploring the interrelation between the teacher–working environment fit, bullying, experienced exhaustion and turnover intentions. Altogether 2310 comprehensive school teachers completed the professional agency survey. The analysis was carried out using structural equation modelling (SEM). The results confirmed that the teacher–working environment fit, that is, receiving collegial support and acknowledgement, combined with a positive professional climate and ability to solve problems constructively, can function as inhibitors of both teacher-targeted bullying and exhaustion. Also, a modest reciprocal relationship between bullying and experienced exhaustion was detected. The study further showed exhaustion and bullying to be significant determinants of teacher turnover.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), Univ of Oulu, Ita-Suomen yliopisto

Contributors: Pyhältö, K., Pietarinen, J., Soini, T.

Number of pages: 14

Pages: 263-276

Publication date: 1 Nov 2015

Peer-reviewed: Yes

Publication information

Journal: IMPROVING SCHOOLS

Volume: 18

Issue number: 3

ISSN (Print): 1365-4802

Ratings:

Scopus rating (2015): CiteScore 0.75 SJR 0.399 SNIP 0.85

Original language: English

ASJC Scopus subject areas: Education

Keywords: Exhaustion, teacher turnover, teacher-targeted bullying, working environment fit

DOIs:

[10.1177/1365480215589663](https://doi.org/10.1177/1365480215589663)

URLs:

<http://www.scopus.com/inward/record.url?scp=84945129683&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84945129683

Research output: Contribution to journal › Article › Scientific › peer-review

Teachers professional agency and learning-from adaption to active modification in the teacher community

The aim of this study was to examine teacher learning in terms of teachers professional agency in the professional community of the school. Altogether 2310 Finnish comprehensive school teachers completed a survey. Results showed that teachers active efforts to learn in the professional community and to promote school development cannot be explained, and hence reduced, to a single behavioral attribute. The findings indicated that teacher learning in terms of professional agency in the professional community consists of several elements including: skills, efficacy beliefs, and motivational factors, which entail transforming ones teaching practices, experiencing collective efficacy, constructing positive interdependency, the appreciation of mutual agreements, and using active strategies of help-seeking. The investigation also suggests that the use of modifying strategies is characteristic of both the teachers professional agency as well as the strategies employed to reduce stress.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), University of Helsinki, Ita-Suomen yliopisto

Contributors: Pyhalto, K., Pietarinen, J., Soini, T.

Number of pages: 20

Pages: 811-830

Publication date: 3 Oct 2015

Peer-reviewed: Yes

Publication information

Journal: TEACHERS AND TEACHING: THEORY AND PRACTICE

Volume: 21

Issue number: 7

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Scopus rating (2015): CiteScore 1.39 SJR 1.186 SNIP 1.497

Original language: English

ASJC Scopus subject areas: Education, Arts and Humanities (miscellaneous)

Keywords: proactive strategies, professional agency, teacher community, Teacher learning, work stress

DOIs:

10.1080/13540602.2014.995483

URLs:

<http://www.scopus.com/inward/record.url?scp=84939777466&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84939777466

Research output: Contribution to journal › Article › Scientific › peer-review

Exploring co-learning behavior of conference participants with visual network analysis of Twitter data

Knowledge management has acknowledged organizational learning as a key factor for creating competitive advantage for companies already from early 1990. However, the studies of co-learning in this connection are in their infancy. This article contributes to an emerging field of 'smart data' research on Twitter by presenting a case study of how community managers in Finland used this social media platform to construct a co-learning environment around an annually organized conference. In this empirical study we explore the co-learning behavior in project contexts especially by analyzing and visualizing co-learning behavior from conference participants Twitter data.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Pori Department, Research group: Business Ecosystems, Networks and Innovations, Department of Information Management and Logistics, Research group: Novi, Department of Mathematics, Research group: MAT Intelligent Information Systems Laboratory, Managing digital industrial transformation (mDIT)

Contributors: Aramo-Immonen, H., Jussila, J., Huhtamäki, J.

Number of pages: 9

Pages: 1154–1162

Publication date: Oct 2015

Peer-reviewed: Yes

Publication information

Journal: Computers in Human Behavior

Volume: 51

Issue number: Part B

ISSN (Print): 0747-5632

Ratings:

Scopus rating (2015): CiteScore 4.22 SJR 1.583 SNIP 2.163

Original language: English

ASJC Scopus subject areas: Human-Computer Interaction, Psychology (miscellaneous), Education

Keywords: Learning, Co-learning, Memory aids, Communities of Practice, Social network analysis, Twitter

Electronic versions:

Exploring Co-Learning Behavior of Conference Participants with Visual Network Analysis of Twitter Data. Embargo ended:

1/11/17

DOIs:

10.1016/j.chb.2015.02.033

URLs:

<http://urn.fi/URN:NBN:fi:tty-201703291238>. Embargo ended: 1/11/17

Bibliographical note

ORG=pla,0.34

ORG=tlo,0.33

ORG=mat,0.33

Research output: Contribution to journal › Article › Scientific › peer-review

What contributes to first-year student teachers sense of professional agency in the classroom?

This study explores Finnish first-year primary teacher students (N = 244) sense of professional agency in the classroom. In addition, the interrelation between student teachers sense of professional agency and the perceptions of teacher education as a learning environment is explored. The sense of professional agency in the classroom simultaneously requires the motivation to learn, efficacy beliefs about learning and intentional acts for facilitating and managing new learning in the classroom. The results showed that these basic elements are embedded in the contextualised components of student teachers professional agency, entailing judgements of ones competence in teaching, transformative and collaborative practice, reflection in the classroom and modelling as a learning orientation. The results further suggested that teacher education provided an encouraging learning environment for student teachers. However, only peer relations in the learning environment were positively related to perceived professional agency.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), Ita-Suomen yliopisto, University of Helsinki

Contributors: Soini, T., Pietarinen, J., Toom, A., Pyhältö, K.

Number of pages: 19

Pages: 641-659

Publication date: 18 Aug 2015

Peer-reviewed: Yes

Publication information

Journal: TEACHERS AND TEACHING: THEORY AND PRACTICE

Volume: 21

Issue number: 6

ISSN (Print): 1354-0602

Ratings:

Scopus rating (2015): CiteScore 1.39 SJR 1.186 SNIP 1.497

Original language: English

ASJC Scopus subject areas: Education, Arts and Humanities (miscellaneous)

Keywords: Classroom, Professional agency, Student teacher learning, Student teachers, Teacher education

DOIs:

10.1080/13540602.2015.1044326

URLs:

<http://www.scopus.com/inward/record.url?scp=84931566080&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84931566080

Research output: Contribution to journal › Article › Scientific › peer-review

Enhancing the experience of online users of open education

The limited adoption of Open Educational Resources (OER) has kicked off the launch of several projects to search for possible solutions. One of these projects is "Open Educational Ideas and Innovations" (OEI2). The goal of this project is to find alternatives for increasing the uptake of OER and facilitating the collaborative development of OER. To enhance the experience of the users of open education, we interviewed twelve educators and researchers from different higher education institutions across Europe focusing on gathering insights about idea sharing experiences. In this paper, we present our key findings based on these interviews and outline some recommendations for our next open educational platform. One of the main principles of our proposal is providing an end-to-end platform that supports educators right from the very beginning to the very end, instead of focusing on the content delivery only. An open education initiative starts with a preliminary idea whose owner shares with the other interested educators who in turn collaborate altogether to sharpen the idea and generate the content so that it becomes suitable for an open educational course.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Managing digital industrial transformation (mDIT), ESCP Europe Business School (OEI2 Partner 2), Ruhr West University of Applied Sciences, Vytautas Magnus University, Jyväskylän yliopisto, Duale Hochschule Baden Württemberg (OEI2 Partner 5), NCSR, European Foundation for Quality in E-Learning (OEI2 Partner 6)

Contributors: AbuJarour, S., Bick, M., Pawlowski, J., Volungeviciene, A., Trepule, E., Bagucanskyte, M., Pirkkalainen, H., Ehlers, U. D., Hudak, R., Makropoulos, C., Pappa, D., Pitsilis, V., Vidalis, A., Tannhauser, A. C.

Publication date: 13 Jan 2015

Host publication information

Title of host publication: 2014 International Conference on Web and Open Access to Learning, ICWOAL 2014

Publisher: Institute of Electrical and Electronics Engineers Inc.

Article number: 7009217

ISBN (Electronic): 978-1-4799-5739-2

ASJC Scopus subject areas: Computer Science(all), Education, Media Technology

Keywords: Collaboration, OER, Open Education, Open Educational Resources

DOIs:

10.1109/ICWOAL.2014.7009217

URLs:

<http://www.scopus.com/inward/record.url?scp=84922615410&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84922615410

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Cultural influence on online community use: A cross-cultural study on online exercise diary users of three nationalities

This study investigates the influence of culture on the use of a website intended for tracking exercise activities. The data was collected using an online survey with 258 respondents from three national backgrounds: Germany, the USA and Spain. In the analysis, the focus was on determining whether users' cultural background impacts their use and perception of the site, especially as concerns social networking and the sharing of content. The Spanish were most interested in social networking, collaboration and sharing content with others, whereas the German participants were the least interested in these activities. The applicability of Hofstede's cultural theory in the explanation of differences between national cultures in online community use is discussed.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Department of Pervasive Computing, University of Tampere

Contributors: Malinen, S., Nurkka, P.

Number of pages: 17

Pages: 153-169

Publication date: 2015

Peer-reviewed: Yes

Publication information

Journal: International Journal of Web Based Communities

Volume: 11

Issue number: 2

ISSN (Print): 1477-8394

Ratings:

Scopus rating (2015): CiteScore 0.77 SJR 0.268 SNIP 0.399

Original language: English

ASJC Scopus subject areas: Computer Networks and Communications, Software, Education, Communication

Keywords: Cross-cultural research, Health and wellness applications, Online communities, SNSs, Social network sites

DOIs:

10.1504/IJWBC.2015.068539

URLs:

<http://www.scopus.com/inward/record.url?scp=84927129737&partnerID=8YFLogxK> (Link to publication in Scopus)

Bibliographical note

EXT="Malinen, Sanna"

Source: Scopus

Source ID: 84927129737

Research output: Contribution to journal › Article › Scientific › peer-review

Design principles for collaboration platforms for open education

Increasing the current low uptake of Open Education Resources (OER) is a key challenge for researchers and practitioners in the field. User studies have shown that collaboration is a main success factor for successful open educational activities. However, effective collaboration in open educational contexts requires well planned processes and platforms supporting collaboration, in particular in physically distributed settings. We have been investigating the value of such platforms, their main features and user requirements to enable collaboration from immature ideas to completed resources. We used quantitative and qualitative research methods to collect insights from potential users of such collaboration platforms to validate our approach. Based on these insights, we developed a collaboration platform for open education. We validated our platform using observation groups and focus groups to identify the key design principles of powerful collaboration platforms for Open Education. Examples are the need for a simple tool, use of a common terminology, and considering Intellectual Property Rights. In this paper, we present our findings from an initial validation of our collaboration platform and give recommendations towards powerful collaboration platforms for open educational contexts.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Managing digital industrial transformation (mDIT), Department of Business Information Systems, ESCP Europe, Jyväskylän yliopisto, Ruhr West University of Applied Sciences, Vytautas Magnus University, Duale Hochschule Baden Württemberg, NCSR

Contributors: AbuJarour, S., Pirkkalainen, H., Pawlowski, J., Bick, M., Bagucanskyte, M., Frankenberg, A., Hudak, R., Makropoulos, C., Pappa, D., Pitsilis, V., Tannhauser, A. C., Trepule, E., Vidalis, A., Volungeviciene, A.

Number of pages: 11

Pages: 349-359

Publication date: 2015

Host publication information

Title of host publication: CSEDU 2015 - 7th International Conference on Computer Supported Education, Proceedings

Volume: 1

Publisher: SCITEPRESS

ISBN (Electronic): 978-989758107-6

ASJC Scopus subject areas: Human-Computer Interaction, Education

Keywords: Collaboration, Collaboration platforms, OER, Open education, Open educational resources

URLs:

<http://www.scopus.com/inward/record.url?scp=84943397466&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84943397466

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Dynamic text presentation in print interpreting - An eye movement study of reading behaviour

Print interpreting supports people with a hearing disability by giving them access to spoken language. In print interpreting, the interpreter types the spoken text in real time for the hard-of-hearing client to read. This results in dynamic text presentation. An eye movement study was conducted to compare two types of dynamic text presentation formats in print interpreting: letter-by-letter and word-by-word. Gaze path analysis with 20 hearing participants showed different types of reading behaviour during reading of two pieces of text in these two presentation formats. Our analysis revealed that the text presentation format has a significant effect on reading behaviour. Rereading and regressions occurred significantly more often with the word-by-word format than with the letter-by-letter format. We also found a significant difference between the number of regressions starting at the words that end a sentence and that of regressions starting at all other words. The frequency of rereading was significantly higher for incorrectly typed or abbreviated words than for the other words. Analysis of the post-test questionnaire found almost equal acceptance of the word-by-word and letter-by-letter formats by the participants. A follow-up study with 18 hard-of-hearing participants showed a similar trend in results. The findings of this study highlight the importance of developing print interpreting tools that allow the interpreter and the client to choose the options that best facilitate the communication. They also bring up the need to develop new eye movement metrics for analysing the reading of dynamic text, and provide first results on a new dynamic presentation context.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Augmented Human Activities (AHA), School of Management (JKK)

Contributors: Sharmin, S., Špakov, O., Rähä, K. J.

Number of pages: 14

Pages: 17-30

Publication date: 2015

Peer-reviewed: Yes

Publication information

Journal: International Journal of Human-Computer Studies

Volume: 78

ISSN (Print): 1071-5819

Ratings:

Scopus rating (2015): CiteScore 2.73 SJR 0.666 SNIP 1.727

Original language: English

ASJC Scopus subject areas: Human Factors and Ergonomics, Software, Education, Engineering(all), Human-Computer Interaction, Hardware and Architecture

Keywords: Dynamic text presentation, Eye movements, Print interpreting, Reading, Regressions

DOIs:

[10.1016/j.ijhcs.2015.01.010](https://doi.org/10.1016/j.ijhcs.2015.01.010)

URLs:

<http://www.scopus.com/inward/record.url?scp=84923618729&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84923618729

Research output: Contribution to journal › Article › Scientific › peer-review

Preoperative simulation for the planning of microsurgical clipping of intracranial aneurysms

Introduction: The safety and success of intracranial aneurysm (IA) surgery could be improved through the dedicated application of simulation covering the procedure from the 3-dimensional (3D) description of the surgical scene to the visual representation of the clip application. We aimed in this study to validate the technical feasibility and clinical relevance of such a protocol. **Methods:** All patients preoperatively underwent 3D magnetic resonance imaging and 3D computed tomography angiography to build 3D reconstructions of the brain, cerebral arteries, and surrounding cranial bone. These 3D models were segmented and merged using Osirix, a DICOM image processing application. This provided the surgical scene that was subsequently imported into Blender, a modeling platform for 3D animation. Digitized clips and appliers could then be manipulated in the virtual operative environment, allowing the visual simulation of clipping. This simulation protocol was assessed in a series of 10 IAs by 2 neurosurgeons. **Results:** The protocol was feasible in all patients. The visual similarity between the surgical scene and the operative view was excellent in 100% of the cases, and the identification of the vascular structures was accurate in 90% of the cases. The neurosurgeons found the simulation helpful for planning the surgical approach (ie, the bone flap, cisternal opening, and arterial tree exposure) in 100% of the cases. The correct number of final clip(s) needed was predicted from the simulation in 90% of the cases. The preoperatively expected characteristics of the optimal clip(s) (ie, their number, shape, size, and orientation) were validated during surgery in 80% of the cases. **Conclusions:** This study confirmed that visual simulation of IA clipping based on the processing of high-resolution 3D imaging can be effective. This is a new and important step toward the development of a more sophisticated integrated simulation platform dedicated to cerebrovascular surgery.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Frontier Photonics, Lille University Hospital - CHRU, Division of Neurosurgery, Department of Neurosciences and Locomotive System, Univ Lille Nord de France, Clinique de Neurochirurgie

Contributors: Marinho, P., Vermandel, M., Bourgeois, P., Lejeune, J. P., Mordon, S., Thines, L.

Number of pages: 7

Pages: 370-376

Publication date: 20 Dec 2014

Peer-reviewed: Yes

Publication information

Journal: SIMULATION IN HEALTHCARE

Volume: 9

Issue number: 6

ISSN (Print): 1559-2332

Ratings:

Scopus rating (2014): CiteScore 1.69 SJR 0.986 SNIP 1.102

Original language: English

ASJC Scopus subject areas: Medicine (miscellaneous), Epidemiology, Education, Modelling and Simulation, Medicine(all)

Keywords: Cerebrovascular surgery, Image-guided surgery, Intracranial aneurysm, Minimally invasive surgery, Neurosurgical planning, Simulation

DOIs:

10.1097/SIH.0000000000000056

URLs:

<http://www.scopus.com/inward/record.url?scp=84919484527&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84919484527

Research output: Contribution to journal › Article › Scientific › peer-review

Analysis of source code snapshot granularity levels

Systems that record students' programming process have become increasingly popular during the last decade. The granularity of stored data varies across these systems and ranges from storing the final state, e.g. a solution, to storing fine-grained event streams, e.g. every key-press made while working on a task. Researchers that study such data make assumptions based on the granularity. If no fine-grained data exists, the baseline assumption is that a student proceeds in a linear fashion from one recorded state to the next. In this work, we analyze three different granularities of data; (1) submissions, (2) snapshots (i.e. save, compile, run, test events), and (3) keystroke-events. Our study provides insight on the quantity of lost data when storing data at a specific granularity and shows how the lost data varies depending on previous programming experience and the programming assignment type.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Regulation of learning and active learning methods (REALMEE), University of Helsinki, Department of Computer Science and Eng., Aalto University

Contributors: Vihavainen, A., Luukkainen, M., Ihantola, P.

Number of pages: 6

Pages: 21-26

Publication date: 14 Oct 2014

Host publication information

Title of host publication: SIGITE 2014 - Proceedings of the 15th Annual Conference on Information Technology Education

Publisher: Association for Computing Machinery, Inc

ISBN (Electronic): 9781450326865

ASJC Scopus subject areas: Computer Networks and Communications, Information Systems, Education

Keywords: Data collection, Fine-grained data analysis, Programming education, Programming process, Programming snapshots, Source code, Source code snapshots, Source code submissions

DOIs:

10.1145/2656450.2656473

URLs:

<http://www.scopus.com/inward/record.url?scp=84910019684&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84910019684

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Automatically detectable indicators of programming assignment difficulty

The difficulty of learning tasks is a major factor in learning, as is the feedback given to students. Even automatic feedback should ideally be influenced by student-dependent factors such as task difficulty. We report on a preliminary exploration of such indicators of programming assignment difficulty that can be automatically detected for each student from source code snapshots of the student's evolving code. Using a combination of different metrics emerged as a promising approach. In the future, our results may help provide students with personalized automatic feedback.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Regulation of learning and active learning methods (REALMEE), Department of Computer Science and Eng., Aalto University, University of Helsinki

Contributors: Ihantola, P., Sorva, J., Vihavainen, A.

Number of pages: 6

Pages: 33-38

Publication date: 14 Oct 2014

Host publication information

Title of host publication: SIGITE 2014 - Proceedings of the 15th Annual Conference on Information Technology Education

Publisher: Association for Computing Machinery, Inc

ISBN (Electronic): 9781450326865

ASJC Scopus subject areas: Computer Networks and Communications, Information Systems, Education

Keywords: Assignment difficulty, Automated assessment, Personalized feedback, Programming assignments

DOIs:

10.1145/2656450.2656476

URLs:

<http://www.scopus.com/inward/record.url?scp=84910019801&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84910019801

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Understanding social OER environments-A quantitative study on factors influencing the motivation to share and collaborate

Social software environments are increasingly used for open education: teachers and learners share and collaborate in these environments. While there are various possibilities for the inclusion of such social functionalities for OER, many organizational, individual and technological challenges can hinder the motivation of teachers to share and collaborate in these environments. Current research cannot explain what barriers teachers face in social OER environments and how those challenges influence their motivation to engage in such environments. An exploratory factor analysis was used in the context of schools and higher education institutions to investigate the possible barriers to engaging in social OER environments; a linear regression analysis was used to predict how the extracted factors influenced the motivation of teachers (N = 754) to share and collaborate. The findings allude to barriers within social OER environments; the main

challenges relate to the lack of organizational support, language and culture as well as quality concerns. The key results depict how teachers' motivation to share and collaborate in these environments decreases when they perceive higher language and cultural barriers. These findings can support OER providers as well as educational institutions in their efforts to minimize those barriers.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Managing digital industrial transformation (mDIT), Jyväskylän yliopisto

Contributors: Pirkkalainen, H., Jokinen, J. P. P., Pawlowski, J. M.

Number of pages: 13

Pages: 388-400

Publication date: 1 Oct 2014

Peer-reviewed: Yes

Publication information

Journal: IEEE Transactions on Learning Technologies

Volume: 7

Issue number: 4

Article number: 6823168

ISSN (Print): 1939-1382

Ratings:

Scopus rating (2014): CiteScore 2.42 SJR 0.768 SNIP 2.144

Original language: English

ASJC Scopus subject areas: Engineering(all), Computer Science Applications, Education

Keywords: knowledge management, knowledge sharing, Social technologies, user generated learning content

DOIs:

10.1109/TLT.2014.2323970

URLs:

<http://www.scopus.com/inward/record.url?scp=84919783368&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84919783368

Research output: Contribution to journal › Article › Scientific › peer-review

Challenges and instructors' intention to adopt and use open educational resources in higher education in tanzania

Higher education in Tanzania like in many other Sub-Saharan countries suffers from unavailability of quality teaching and learning resources due to lack of tradition, competence, and experience to develop such resources. Nevertheless, there are thousands of open educational resources (OER) freely available in the public domain that can potentially improve the quality of existing resources or help to develop new courses. The uptake and reuse of these resources in higher learning institutions (HLIs) in Tanzania has been very low. The study applied the unified theory of acceptance and use of technology (UTAUT) model to elicit instructors' intention to adopt and use OER in teaching. The paper also investigated challenges that hinder instructors to adopt and use OER. A sample of 104 instructors selected randomly from five HLIs was collected and tested against the research model using regression analysis. The study found effort expectancy had significant positive effect on instructors' intention to use OER while performance expectancy, facilitating conditions, and social influence did not have significant effect. Challenges that were found to hinder instructors to adopt and use OER are discussed. The findings of this study will help those who are involved in OER implementation to find strategies that will maximize OER adoption and usage in higher education in Tanzania.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Augmented Human Activities (AHA)

Contributors: Mtebe, J. S., Raisamo, R.

Number of pages: 23

Pages: 249-271

Publication date: 2014

Peer-reviewed: Yes

Publication information

Journal: INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Volume: 15

Issue number: 1

Original language: English

ASJC Scopus subject areas: Education

Keywords: Elearning, OER acceptance, Open educational resources, Utaut

URLs:

<http://www.scopus.com/inward/record.url?scp=84894584183&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84894584183

Research output: Contribution to journal › Article › Scientific › peer-review

Comprehensive school teachers' professional agency in large-scale educational change

This article explores how comprehensive school teachers' sense of professional agency changes in the context of large-scale national educational change in Finland. We analysed the premises on which teachers (n = 100) view themselves and their work in terms of developing their own school, catalysed by the large-scale national change. The study included theory-driven interventions in the case school communities, as well as pre- and post-test measurements. The results suggested that the learning of active professional agency was facilitated among teachers during the 2 years of development work. A significant number of teachers had adopted a more holistic orientation towards the reform. Moreover, the number of teachers who considered themselves as the subjects of the development work increased slightly. This increase suggests that teachers' intentional and responsible management of new learning proceeds from the interpersonal meaning-making process to the internal process that regulates the elements of a teacher's professional agency.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), University of Helsinki, Ita-Suomen yliopisto

Contributors: Pyhältö, K., Pietarinen, J., Soini, T.

Number of pages: 23

Pages: 303-325

Publication date: 2014

Peer-reviewed: Yes

Publication information

Journal: JOURNAL OF EDUCATIONAL CHANGE

Volume: 15

Issue number: 3

ISSN (Print): 1389-2843

Ratings:

Scopus rating (2014): CiteScore 1.02 SJR 0.807 SNIP 1.501

Original language: English

ASJC Scopus subject areas: Education

Keywords: Agency, Comprehensive school, Longitudinal design, School reform, Teacher learning

DOIs:

10.1007/s10833-013-9215-8

URLs:

<http://www.scopus.com/inward/record.url?scp=84903891539&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84903891539

Research output: Contribution to journal › Article › Scientific › peer-review

Eye tracking in computing education

The methodology of eye tracking has been gradually making its way into various fields of science, assisted by the diminishing cost of the associated technology. In an international collaboration to open up the prospect of eye movement research for programming educators, we present a case study on program comprehension and preliminary analyses together with some useful tools. The main contributions of this paper are (1) an introduction to eye tracking to study programmers; (2) an approach that can help elucidate how novices learn to read and understand programs and to identify improvements to teaching and tools; (3) a consideration of data analysis methods and challenges, along with tools to address them; and (4) some larger computing education questions that can be addressed (or revisited) in the context of eye tracking.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Regulation of learning and active learning methods (REALMEE), Freie Universität Berlin, Youngstown State University, University of Newcastle, Australia, Microsoft Research, Indiana University, Ita-Suomen yliopisto, Aalto University, JetBrains

Contributors: Busjahn, T., Schulte, C., Sharif, B., Simon, Begel, A., Hansen, M., Bednarik, R., Orlov, P., Ihantola, P., Shchekotova, G., Antropova, M.

Number of pages: 8
Pages: 3-10
Publication date: 2014

Host publication information

Title of host publication: ICER 2014 - Proceedings of the 10th Annual International Conference on International Computing Education Research

Publisher: Association for Computing Machinery

ISBN (Print): 9781450327558

ASJC Scopus subject areas: Computer Science (miscellaneous), Education

Keywords: Code reading, Computing education, CS Ed research, Empirical research, Eye tracking, Gaze analysis, Program comprehension, Programming education, Teaching programming

DOIs:

10.1145/2632320.2632344

URLs:

<http://www.scopus.com/inward/record.url?scp=84905841703&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84905841703

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Investigating perceived barriers to the use of open educational resources in higher education in tanzania

The past few years have seen increasingly rapid development and use of open educational resources (OER) in higher education institutions (HEIs) in developing countries. These resources are believed to be able to widen access, reduce the costs, and improve the quality of education. However, there exist several challenges that hinder the adoption and use of these resources. The majority of challenges mentioned in the literature do not have empirically grounded evidence and they assume Sub-Saharan countries face similar challenges. Nonetheless, despite commonalities that exist amongst these countries, there also exists considerable diversity, and they face different challenges. Accordingly, this study investigated the perceived barriers to the use of OER in 11 HEIs in Tanzania. The empirical data was generated through semi-structured interviews with a random sample of 92 instructors as well as a review of important documents. Findings revealed that lack of access to computers and the Internet, low Internet bandwidth, absence of policies, and lack of skills to create and/or use OER are the main barriers to the use of OER in HEIs in Tanzania. Contrary to findings elsewhere in Africa, the study revealed that lack of trust in others' resources, lack of interest in creating and/or using OER, and lack of time to find suitable materials were not considered to be barriers. These findings provide a new understanding of the barriers to the use of OER in HEIs and should therefore assist those who are involved in OER implementation to find mitigating strategies that will maximize their usage.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Augmented Human Activities (AHA)

Contributors: Mtebe, J. S., Raisamo, R.

Number of pages: 24

Pages: 43-66

Publication date: 2014

Peer-reviewed: Yes

Publication information

Journal: INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Volume: 15

Issue number: 2

Original language: English

ASJC Scopus subject areas: Education

Keywords: Elearning, Higher education, OER, OER in tanzania, Open educational resources, Sub-saharan africa, Tanzania

URLs:

<http://www.scopus.com/inward/record.url?scp=84900439574&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84900439574

Research output: Contribution to journal > Article > Scientific > peer-review

Overcoming cultural distance in social OER environments

Open educational resources (OERs) provide opportunities as enablers of societal development, but they also create new challenges. From the perspective of content providers and educational institutions, particularly, cultural and context-related challenges emerge. Even though barriers regarding large-scale adoption of OERs are widely discussed, empirical evidence for determining challenges in relation to particular contexts is still rare. Such context-specific barriers generally

can jeopardize the acceptance of OERs and, in particular, social OER environments. We conducted a large-scale (N = 855) cross-European investigation in the school context to determine how teachers and learners perceive cultural distance as a barrier against the use of social OER environments. The findings indicate how nationality and age of the respondents are strong predictors of cultural distance barrier. The study concludes with identification of context-sensitive interventions for overcoming the related barriers. These consequences are vital for OER initiatives and educational institutions for aligning their efforts on OER.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Managing digital industrial transformation (mDIT), Jyväskylän yliopisto, Ruhr West University of Applied Sciences, University of Duisburg-Essen

Contributors: Pirkkalainen, H., Jokinen, J. P. P., Pawlowski, J. M., Richter, T.

Number of pages: 10

Pages: 15-24

Publication date: 2014

Host publication information

Title of host publication: CSEDU 2014 - Proceedings of the 6th International Conference on Computer Supported Education

Volume: 1

Publisher: SCITEPRESS

ISBN (Print): 9789897580208

ASJC Scopus subject areas: Education

Keywords: Barriers, Cultural distance, Culture, OER, Social software, TEL

URLs:

<http://www.scopus.com/inward/record.url?scp=84902319353&partnerID=8YFLogXK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84902319353

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Professional knowledge, skills and competencies of the new graduates and the engineering professionals - Comparison of the importance in working-life

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Industrial Management, Policy Academic Engineers and Architects in Finland, TEK

Contributors: Hyötynen, P., Mursu, S., Teini, J.

Publication date: 2014

Host publication information

Title of host publication: SEFI Annual Conference 2014

Place of publication: Brussel

Publisher: European Society for Engineering Education SEFI

ISBN (Print): 978-2-87352-004-5

ASJC Scopus subject areas: Engineering(all), Education

URLs:

<http://www.scopus.com/inward/record.url?scp=84939191998&partnerID=8YFLogXK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84939191998

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Strategies for academic engagement perceived by Finnish sixth and eighth graders

This study explores strategies students use to construct their academic engagement in the social environment of school. The study is based on group interview data collected from 161 sixth (78) and eighth (83) grade students. Students reflected both engaging and disengaging episodes. Data were content analysed. The results show that students reported using only confirming strategies in teacher-student interaction. More diverse strategies were described in relation to peer interaction. The results indicated that simultaneously maintaining functional peer relations and engaging effectively in academic activities is a highly challenging task which requires strategic flexibility and self-regulative skills. In terms of the development of more engaging learning environments for students, our results suggest that more attention should be paid to creating positive opportunities to participate, in terms of both academic activities and peer interaction.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), University of Helsinki, Ita-Suomen yliopisto

Contributors: Ulmanen, S., Soini, T., Pyhältö, K., Pietarinen, J.

Number of pages: 19

Pages: 425-443

Publication date: 2014

Peer-reviewed: Yes

Publication information

Journal: CAMBRIDGE JOURNAL OF EDUCATION

Volume: 44

Issue number: 3

ISSN (Print): 0305-764X

Ratings:

Scopus rating (2014): CiteScore 1.19 SJR 0.767 SNIP 1.217

Original language: English

ASJC Scopus subject areas: Education

Keywords: academic engagement, peer interaction, social strategies, teacher-student interaction

DOIs:

10.1080/0305764X.2014.921281

URLs:

<http://www.scopus.com/inward/record.url?scp=84903785678&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84903785678

Research output: Contribution to journal › Article › Scientific › peer-review

Students' emotional and cognitive engagement as the determinants of well-being and achievement in school

This study aims to gain a better understanding of the interrelation between students' emotional and cognitive engagement that is mediated by experienced well-being in school. The main hypothesis was that perceived emotional engagement constructed in the peer group and in teacher-student interaction together with school-related well-being contributes to students' perceived cognitive engagement and, further, to their school achievement. A total of 170 students from three case study schools were surveyed, and the hypothesis was tested using structural equation modelling (SEM). The results showed that students' cognitive engagement was highly dependent both on the dynamic interplay between students and the school environment and, more broadly, on the daily pedagogical practices adopted in schools. Moreover, the students' experience of school-related well-being was a key mediator for emotional and cognitive engagement and, further, contributed to their school achievement. The detected interrelation between student learning and subjective school-related well-being has potentially significant implications for further studies attempting to understand the complexity of the experience of engagement in the multiple social contexts provided by schools. The findings further imply that the focus in developing school pedagogical practices should be the dynamics between students and their learning environment rather than solely the individual or the environment.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), Ita-Suomen yliopisto, School of Management (JKK), University of Helsinki

Contributors: Pietarinen, J., Soini, T., Pyhältö, K.

Number of pages: 12

Pages: 40-51

Publication date: 2014

Peer-reviewed: Yes

Publication information

Journal: INTERNATIONAL JOURNAL OF EDUCATIONAL RESEARCH

Volume: 67

ISSN (Print): 0883-0355

Ratings:

Scopus rating (2014): CiteScore 1.01 SJR 0.508 SNIP 1.01

Original language: English

ASJC Scopus subject areas: Education

Keywords: Emotional and cognitive engagement, Learning outcomes, Subjective well-being

DOIs:

10.1016/j.ijer.2014.05.001

URLs:

<http://www.scopus.com/inward/record.url?scp=84901643445&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84901643445

Research output: Contribution to journal › Article › Scientific › peer-review

Teachers' professional beliefs about their roles and the pupils' roles in the school

In recent decades, many educational reforms have been implemented that aim to effect a change in teachers' and pupils' roles by promoting meaningful learning. Yet, little is known about how teachers perceive these roles as a part of their professional belief system. In this study, 68 Finnish comprehensive school teachers were interviewed. The data were content analysed. The results showed that teachers recognised the importance of facilitating pupils' active role in learning, but still mostly considered pupils as passive in school practices. Moreover, teachers perceived pupils as active educational participants most often outside the classroom, in informal school settings. Correspondingly, teachers described themselves primarily as knowledge transmitters in pupils' learning. In their professional community, teachers perceived themselves mostly as reproducers of knowledge instead of facilitators of learning. There was also variation between the teachers as well as within a single teacher's beliefs.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), University of Helsinki, Ita-Suomen yliopisto

Contributors: Ahonen, E., Pyhältö, K., Pietarinen, J., Soini, T.

Number of pages: 21

Pages: 177-197

Publication date: 2014

Peer-reviewed: Yes

Publication information

Journal: TEACHER DEVELOPMENT

Volume: 18

Issue number: 2

ISSN (Print): 1366-4530

Ratings:

Scopus rating (2014): CiteScore 0.53 SJR 0.656 SNIP 0.658

Original language: English

ASJC Scopus subject areas: Education

Keywords: context-dependency, Finnish comprehensive school, teachers' and pupils' role, teachers' professional beliefs

DOIs:

10.1080/13664530.2014.900818

URLs:

<http://www.scopus.com/inward/record.url?scp=84901594893&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84901594893

Research output: Contribution to journal › Article › Scientific › peer-review

Reducing teacher burnout: A socio-contextual approach

The aim of this study was to examine the interrelation between teachers' proactive strategies and perceived teacher-working environment fit that would be mediated by the socio-contextual burnout experience. Altogether 2310 Finnish teachers completed the study's survey. The results indicate that teachers can learn the kinds of strategies that allow them to reduce burnout and construct a better working environment fit. Both the learning and use of the strategies is highly embedded in a school's social interactions.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), Ita-Suomen yliopisto, University of Helsinki

Contributors: Pietarinen, J., Pyhältö, K., Soini, T., Salmela-Aro, K.

Number of pages: 11

Pages: 62-72

Publication date: Oct 2013

Peer-reviewed: Yes

Publication information

Journal: TEACHING AND TEACHER EDUCATION

Volume: 35

ISSN (Print): 0742-051X

Ratings:

Scopus rating (2013): CiteScore 2.41 SJR 1.933 SNIP 2.146

Original language: English

ASJC Scopus subject areas: Education

Keywords: Proactive strategies, Teacher burnout, Teacher-working environment fit

DOIs:

10.1016/j.tate.2013.05.003

URLs:

<http://www.scopus.com/inward/record.url?scp=84879810216&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84879810216

Research output: Contribution to journal › Article › Scientific › peer-review

How do ninth-graders perceive their involvement in the most meaningful episodes of their school career?

This study explored students' perceived involvement in school. The data were collected from six schools around Finland. The participants were ninth graders (n 518) who were asked to take a retrospective look at their nine-year school career by completing an open-ended survey. Data were analyzed by using abductive content analysis. According to the results, the students viewed their involvement in school internally regulated and autonomous in over half of the cases (51%, f 637) but students reported almost equally involvement, which was externally regulated and pressured (49%, f 614). Most of the described episodes concerned involvement in school's academic and social processes. Involvement in co-curricular activities was almost exclusively internally regulated, as described by ninth graders.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), University of Helsinki, Ita-Suomen yliopisto, School of Management (JKK)

Contributors: Westling, S. K., Pyhältö, K., Pietarinen, J., Soini, T.

Number of pages: 11

Pages: 25-35

Publication date: 2013

Peer-reviewed: Yes

Publication information

Journal: INTERNATIONAL JOURNAL OF EDUCATIONAL RESEARCH

Volume: 58

ISSN (Print): 0883-0355

Ratings:

Scopus rating (2013): CiteScore 0.78 SJR 0.516 SNIP 0.744

Original language: English

ASJC Scopus subject areas: Education

Keywords: Co-curricular activities, External regulation, Internal regulation, Learning, Peer interaction, Psychological needs, Student involvement, Teacher-student interaction

DOIs:

10.1016/j.ijer.2012.12.005

URLs:

<http://www.scopus.com/inward/record.url?scp=84873997604&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84873997604

Research output: Contribution to journal › Article › Scientific › peer-review

How do students solve parsons programming problems? - Execution-based vs. line-based feedback

In large introductory programming classes, there typically are no resources for adequate individual guidance. Automatic feedback for programming tasks can facilitate students' learning by allowing them to get immediate individual feedback regardless of time and place. This paper presents a study on how the type of automatic feedback in Parsons problems affects how students solve them. Students on their first programming class were divided into two groups and, in two assignments, each group in turn received different type of feedback. The type of feedback had an effect on how students constructed their programs and how quickly they were able to complete them. With feedback based on execution as opposed to the visible arrangement of code, the programs were more frequently executable when feedback was requested and, overall, feedback was requested less frequently. Based on the analysis, we discuss possible future

improvements to automatic feedback in this type of an assignment.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Regulation of learning and active learning methods (REALMEE), Aalto University, Department of Computer Science and Eng.

Contributors: Helminen, J., Ihantola, P., Karavirta, V., Alaoutinen, S.

Number of pages: 7

Pages: 55-61

Publication date: 2013

Host publication information

Title of host publication: Proceedings - 2013 Learning and Teaching in Computing and Engineering, LaTiCE 2013

Article number: 6542239

ISBN (Print): 9780769549606

ASJC Scopus subject areas: Computer Science Applications, Education

Keywords: Automatic Feedback, Parsons Puzzles, Python

DOIs:

10.1109/LaTiCE.2013.26

URLs:

<http://www.scopus.com/inward/record.url?scp=84881103728&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84881103728

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

The innovations in learning and education SAVI

This poster highlights a "Science Across Virtual Institutes" SAVI, involving sixteen research teams in Finland and the USA. The groups have formed a collaboration of eight teams (one research group from each country per team) devoted to research and development in learning sciences and technologies. The core unifying theme of the SAVI is a mission to find conditions under which immersive learner engagement can be routinely elicited.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Regulation of learning and active learning methods (REALMEE), Pepperdine University, University of Helsinki

Contributors: Hamilton, E., Multisilta, J.

Number of pages: 2

Pages: 511-512

Publication date: 2013

Host publication information

Title of host publication: Computer-Supported Collaborative Learning Conference, CSCL

Volume: 2

ASJC Scopus subject areas: Human-Computer Interaction, Education

URLs:

<http://www.scopus.com/inward/record.url?scp=84886533677&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84886533677

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Touch gestures in communicating emotional intention via vibrotactile stimulation

Remote communication between people typically relies on audio and vision although current mobile devices are increasingly based on detecting different touch gestures such as swiping. These gestures could be adapted to interpersonal communication by using tactile technology capable of producing touch stimulation to a user's hand. It has been suggested that such mediated social touch would allow for new forms of emotional communication. The aim was to study whether vibrotactile stimulation that imitates human touch can convey intended emotions from one person to another. For this purpose, devices were used that converted touch gestures of squeeze and finger touch to vibrotactile stimulation. When one user squeezed his device or touched it with finger(s), another user felt corresponding vibrotactile stimulation on her device via four vibrating actuators. In an experiment, participant dyads comprising a sender and receiver were to communicate variations in the affective dimensions of valence and arousal using the devices. The sender's task was to create stimulation that would convey unpleasant, pleasant, relaxed, or aroused emotional intention to the receiver. Both the sender and receiver rated the stimulation using scales for valence and arousal so that the match between sender's intended emotions and receiver's interpretations could be measured. The results showed that squeeze

was better at communicating unpleasant and aroused emotional intention, while finger touch was better at communicating pleasant and relaxed emotional intention. The results can be used in developing technology that enables people to communicate via touch by choosing touch gesture that matches the desired emotion.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Augmented Human Activities (AHA), Field robotics for efficient work sites (FIRE)

Contributors: Rantala, J., Salminen, K., Raisamo, R., Surakka, V.

Number of pages: 12

Pages: 679-690

Publication date: 2013

Peer-reviewed: Yes

Publication information

Journal: International Journal of Human-Computer Studies

Volume: 71

Issue number: 6

ISSN (Print): 1071-5819

Ratings:

Scopus rating (2013): CiteScore 2.68 SJR 0.861 SNIP 2.286

Original language: English

ASJC Scopus subject areas: Human Factors and Ergonomics, Software, Education, Engineering(all), Human-Computer Interaction, Hardware and Architecture

Keywords: Affective interaction, Emotions, Haptics, Mediated social touch, Mobile devices, Tactile communication

DOIs:

10.1016/j.ijhcs.2013.02.004

URLs:

<http://www.scopus.com/inward/record.url?scp=84876589281&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84876589281

Research output: Contribution to journal > Article > Scientific > peer-review

Do comprehensive school teachers perceive themselves as active professional agents in school reforms?

This article focuses on exploring comprehensive school teachers' professional agency in the context of the most recent school reforms in Finland (i.e., developing undivided basic education). In this article, the emphasis is on analyzing the premises on which teachers view themselves and their work in terms of developing their own school, catalyzed by the national school reform. Teachers' perceptions and the relation between their perceptions of the development work and their educational backgrounds were empirically examined by means of essays entitled "Remembering the Future." Results suggested that both teachers' perceptions of undivided basic education and their perceptions of themselves in the development process varied considerably. Further investigation showed that teachers' perceptions of the reform and of themselves within the reforms were interrelated. More specifically, perceiving oneself as an active subject in the development work seemed to promote a holistic and functional perception of the object of the development. On the basis of the results, it seems that as highly educated professionals, teachers were very capable of identifying and analyzing what should be changed in schools and/or the school districts. However, a challenge for the teachers' active professional agency in educational reforms seems to be the lack of shared and informed assumptions of how change can be brought about.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Regulation of learning and active learning methods (REALMEE), University of Helsinki, Ita-Suomen yliopisto, School of Management (JKK)

Contributors: Pyhältö, K., Pietarinen, J., Soini, T.

Number of pages: 22

Pages: 95-116

Publication date: Feb 2012

Peer-reviewed: Yes

Publication information

Journal: JOURNAL OF EDUCATIONAL CHANGE

Volume: 13

Issue number: 1

ISSN (Print): 1389-2843

Ratings:

Scopus rating (2012): CiteScore 1.54 SJR 1.635 SNIP 2.302

Original language: English

ASJC Scopus subject areas: Education

Keywords: Agency, Comprehensive school, School reform, Teacher development

DOIs:

10.1007/s10833-011-9171-0

URLs:

<http://www.scopus.com/inward/record.url?scp=84855346631&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84855346631

Research output: Contribution to journal > Article > Scientific > peer-review

A Mobile learning application for parsons problems with automatic feedback

In this paper, we present a tool that facilitates the learning of programming by providing a mobile application for Parsons problems. These are small assignments where learners build programs by ordering and indenting fragments of code. Parsons problems are well-suited to the mobile context as the assignments form small chunks of learning content that individually require little time to go through and may be freely divided across multiple learning sessions. Furthermore, in response to previous analysis of students using a web environment for Parsons problems, we describe improvements to the automatic feedback given in these assignments.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Regulation of learning and active learning methods (REALMEE), Aalto University, Department of Computer Science and Eng.

Contributors: Karavirta, V., Helminen, J., Ihanola, P.

Number of pages: 8

Pages: 11-18

Publication date: 2012

Host publication information

Title of host publication: Proceedings - 12th Koli Calling International Conference on Computing Education Research, Koli Calling 2012

ISBN (Print): 9781450317955

ASJC Scopus subject areas: Computational Theory and Mathematics, Education

Keywords: Mlearning, Mobile learning, Parsons problem, Parsons puzzle, Python

DOIs:

10.1145/2401796.2401798

URLs:

<http://www.scopus.com/inward/record.url?scp=84871554575&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84871554575

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Exploring facilities management - Towards future campuses

Traditional facilities management practices do not totally support the needs of learning landscape today. As universities are competing with each other, the environment in which they function is laid more and more importance on but at the same time costs are cut because of change in university fundings. Facilities managers of universities have to rethink the ways of making the existing space use more efficient, more meaningful and less costly. They have to focus on supporting the core functions. The core of university consist on researching, teaching and learning. Learning is the main function inside each of the areas mentioned and therefore it can be said to be the very core business. Learning can be identified to take place in various settings and forms. Facilities of a University should support the myriad of purposes. Three key development directions supporting each other have been identified as: [1] New ways of learning, [2] increasement of virtuality and embedded learning environments and [3] need for multi-functional spaces. Facilities management can be considered as a service provided by the university for a customer. Therefore, it should respond to the needs of the whole learning landscape by providing [1] new space types, [2] holistic virtual and physical systems in various social contexts and [3] appealing spaces that are flexible in terms of spatial layout and services. To find out the problems between facilities management practices and the development in learning landscapes, Aalto University is taken as a case example to be analysed in this paper from functional and strategic aspects. Aalto University is an interesting example because it merged in 2010 from three traditional Finnish universities representing fields of art, science and technology and economics with the aim of creating synergies through interdisciplinary collaboration resulting in innovations in a longer perspective. Combining all the functions, creating a cross-disciplinary atmosphere, encouraging people to collaborate and creating consistent facilities management practices to support those actions will be a huge task for the young, ambitious organisation but also a possibility of creating something totally unique. As a result, a proposal of how to make the FM more efficient and meaningful is provided. The methodology of the study is based on an analysis of Aalto's space

resources from functional and strategic aspects. The main findings include: [1] the space types are too divergent by nature [2] physical environment management is not enough but the practices should be widened to take into account the wider perspective of virtuality and community and [3] managing the spaces has become a disconnected entity and customer value has not been the driver as it should be.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Life Cycle Effectiveness of the Built Environment (LCE@BE), Aalto University, School of Engineering, Built Environment Services Research Group (BES)

Contributors: Rytönen, E., Nenonen, S., Kärrä, S.

Publication date: 2012

Host publication information

Title of host publication: Proceedings of the 40th SEFI Annual Conference 2012 - Engineering Education 2020: Meet the Future

Publisher: European Society for Engineering Education SEFI

ISBN (Electronic): 9782873520052

ASJC Scopus subject areas: Education, Engineering(all)

Keywords: Campus development, Future trends, Learning environments, Real estate management

URLs:

<http://www.scopus.com/inward/record.url?scp=84939481223&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84939481223

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

How do students solve parsons programming problems? - An analysis of interaction traces

The process of solving a programming assignment is generally invisible to the teacher. We only see the end result and maybe a few snapshots along the way. In order to investigate this process with regard to Parsons problems, we used an online environment for Parsons problems in Python to record a detailed trace of all the interaction during the solving session. In these assignments, learners are to correctly order and indent a given set of code fragments in order to build a functioning program that meets the set requirements. We collected data from students of two programming courses and among other analyses present a visualization of the solution path as an interactive graph that can be used to explore such patterns and anomalies as backtracking and loops in the solution. The results provide insights into students' solving process for these types of problems and ideas on how to improve the assignment environment and its use in programming education.

General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Regulation of learning and active learning methods (REALMEE), Aalto University, Department of Computer Science and Eng.

Contributors: Helminen, J., Ihanntola, P., Karavirta, V., Malmi, L.

Number of pages: 8

Pages: 119-126

Publication date: 2012

Host publication information

Title of host publication: ICER'12 - Proceedings of the 9th Annual International Conference on International Computing Education Research

ISBN (Print): 9781450316040

ASJC Scopus subject areas: Computer Science (miscellaneous), Education

Keywords: Parsons puzzles, Problem solving process, Python

DOIs:

10.1145/2361276.2361300

URLs:

<http://www.scopus.com/inward/record.url?scp=84867340986&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84867340986

Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

Knowledge management through learning model in industrial projects

The objective of this paper is to introduce qualitative analysing method and learning model for project management. The new understanding gained by this analysis is needed in the steering of the project organisation's maintaining systems: control system, working system, information system and support system. The overall aim is to model a method of project

learning focused on the organisation's system critical parameters. The conceptual part of this paper deals with organisational learning, activity theory, knowledge management and systems theories. Finally, some case results from industry are introduced in this article.

General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Department of Industrial Engineering and Management, Pori Department, Managing digital industrial transformation (mDIT)

Contributors: Aramo-Immonen, H.

Number of pages: 15

Pages: 298-312

Publication date: 2012

Peer-reviewed: Yes

Publication information

Journal: International Journal of Knowledge and Learning

Volume: 8

Issue number: 3-4

ISSN (Print): 1741-1009

Ratings:

Scopus rating (2012): SJR 0.148 SNIP 0.21

Original language: English

ASJC Scopus subject areas: Education

Keywords: Activity theory, Knowledge management, Organisational learning, Project management, Qualitative analysis, Systems theory

DOIs:

10.1504/IJKL.2012.051675

URLs:

<http://www.scopus.com/inward/record.url?scp=84906997537&partnerID=8YFLogxK> (Link to publication in Scopus)

Source: Scopus

Source ID: 84906997537

Research output: Contribution to journal › Article › Scientific › peer-review

A systemic perspective on school reform: Principals' and chief education officers' perspectives on school development

Purpose: This study aims to gain better understanding of the perceptions comprehensive school principals and chief education officers have about the implementation of school reform and the means they use to facilitate the development of such. **Design/methodology/approach:** This research project was carried out using a systemic design research approach. Open-ended questionnaires provided the data for the study and these were completed by educational leaders operating in local school districts. **Findings:** The results demonstrated that pedagogy was emphasized most often as the core of school reform by principals but chief education officers considered technical and financial factors more often as the critical core of educational reform. Nevertheless, both groups had quite similar ideas on how to promote school development. **Research limitations/implications:** The findings reflect the Finnish educational system and capture only two levels of leadership within the system. Future research ought to focus on studying school reforms within different school systems as a complex of correlated events, processes, strategies, interactions and qualities. **Practical implications:** To be able to achieve a successful and sustainable school reform more attention must be devoted to creating and activating collaborative learning environments, not only for pupils and teachers, but also for educational leaders at all levels of school administration. **Originality/value:** The study adds to an understanding of the often-mentioned gap or conflict in perceptions and beliefs between different actors in an educational system.

General information

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Contributors: Pyhältö, K., Soini, T., Pietarinen, J.

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Teaching cross-platform design and testing methods for embedded systems using DICE

DICE (the DSPCAD Integrative Command Line Environment) is a package of utilities that facilitates efficient management of software projects. Key areas of emphasis in DICE are cross-platform operation, support for projects that integrate heterogeneous programming languages, and support for applying and integrating different kinds of design and testing methodologies. The package is being developed at the University of Maryland to facilitate the research and teaching of methods for implementation, testing, evolution, and revision of engineering software. The platform- and language-independent focus of DICE makes it an effective vehicle for teaching high-productivity, high-reliability methods for design and implementation of embedded systems for a variety of courses. In this paper, we provide an overview of features of DICE - particularly as they relate to testing driven design practices - that are useful in embedded systems education, and discuss examples and experiences of applying the tool in courses at the University of Maryland aimed at diverse groups of students - undergraduate programming concepts for engineers, graduate VLSI architectures (aimed at research-oriented students), and graduate FPGA system design (aimed at professional Master's students).

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Contributors: Bhattacharyya, S. S., Plishker, W., Shen, C. C., Gupta, A.

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Integrated design framework: Towards an approach for early design

Making the mechatronics product development process more efficient is a key point for companies, researchers in the field of Design Theory and Methodology or teachers in Mechanical Engineering. In the early design stages, this sort of products requires an integrated framework that helps designers of each domain to have a clear view of the functions, behaviors or structures of the entire system. It also helps them to be early informed of the choices about the different conceptual or architectural solutions that affect their future performance. In the literature and in most curricula, presentations of design methodologies or models are still based on specific viewpoints. In that way, there is still a lack of a global or integrated framework. Consequently, the development of such a framework is important. The joint engineering curriculum with novel learning aids presented in this paper tries to satisfy these needs. The design approach proposed will be applied in a real joint engineering study process. This development is the result of cooperation between five European universities of technology. In this paper, we present our initial attempt to combine coherently SysML for modeling purpose and Dimensional Analysis Theory for early comparison, simulation and evaluation of the proposed design solutions. The introduction to the context of mechatronics product development process naturally leads us to summarizing the fundamental aspects of SysML and Dimensional Analysis. We then articulate coherently these two approaches. as a conclusion we underline the necessity of future development of the SysML language to include tools dedicated to evaluation, comparison and simulation.

General information

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