

### **A Barrier framework for open e-learning in public administrations**

E-Learning and openness in education are receiving ever increasing attention in businesses as well as in academia. However, these practices have only to small extent been introduced in public administrations. The study addresses this gap by presenting a literature review on Open Educational Resources [OER] and E-Learning in the public sector. The main goal of the article is to identify challenges to open E-Learning in public administrations. Experiences will be conceptualized as barriers which need to be considered when introducing open E-Learning systems and programs in administrations. The main outcome is a systematic review of lessons learned, presented as a contextualized Barrier Framework which is suitable to analyze requirements when introducing E-Learning and OER in public administrations.

#### **General information**

Publication status: Published

MoE publication type: A1 Journal article-refereed

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

Contributors: Stoffregen, J., Pawlowski, J. M., Pirkkalainen, H.

Number of pages: 11

Pages: 674-684

Publication date: 2015

Peer-reviewed: Yes

#### **Publication information**

Journal: Computers in Human Behavior

Volume: 51

Issue number: B

ISSN (Print): 0747-5632

Ratings:

Scopus rating (2015): CiteScore 5.5 SJR 1.583 SNIP 2.184

Original language: English

ASJC Scopus subject areas: Human-Computer Interaction, Psychology(all), Arts and Humanities (miscellaneous)

Keywords: E-Learning, Open education, Open Educational Resources, Public Administrations

DOIs:

10.1016/j.chb.2014.12.024

Source: Scopus

Source ID: 84920915233

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

### **Adapting the New ACRL Framework to IL Education at Tampere University of Technology**

In 2016, the Tampere University of Technology (TUT) Library adopted the new ACRL Framework for Information Literacy for Higher Education to its information literacy education. ACRL encourages libraries to deploy the frames to best suit their own situation and needs and, accordingly, the TUT Library has adapted the frames to better suit the needs of its technical students and researchers. This paper will present the ways in which the TUT Library has adapted the Framework to teaching of information literacy, how partnership with teaching staff members was built through active collaboration, and the initial results of these changes as evaluated by both students and teaching staff.

#### **General information**

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Tampere University Library

Contributors: Sipilä, M., Miettinen, M., Tevaniemi, J.

Publication date: 20 Feb 2019

#### **Host publication information**

Title of host publication: Information Literacy in Everyday Life : ECIL 2018

Publisher: Springer Nature

ISBN (Print): 978-3-030-13471-6

ISBN (Electronic): 978-3-030-13472-3

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Name: Communications in Computer and Information Science

Volume: 989

ISSN (Print): 1865-0929

DOIs:

10.1007/978-3-030-13472-3\_40

URLs:

<http://urn.fi/URN:NBN:fi:tuni-201911186047>

## **Bibliographical note**

jufoid=53801

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

## **A decade of Finnish engineering education for sustainable development**

### **Purpose**

The paper aims to examine the current status and development of sustainable development in Finnish engineering education.

### **Design/methodology/approach**

The study consists of interviews with key stakeholders supplemented with the analysis of documented material. Development is discussed in relation to the findings of collaborative strategy process in the year 2009.

### **Findings**

The paper observes that the Finnish universities providing engineering education are committed to sustainable development in their strategies. However, a lot of work remains to be done before the strategies are implemented and sustainable development is integrated to all degree programs. Explicit knowledge and individual learning in clearly defined disciplinary boundaries have been the main focus of engineering education.

### **Practical implications**

The paper suggests that engineers need to be provided with mental tools to cope with uncertainty, complexity and ambiguity. Key competencies include holistic understanding, communication and collaboration skills, ability and willingness for critical and reflective thinking, creativity, innovativeness and entrepreneurship. Thus, collaborative learning, open dialogue and innovation are at the heart of education for sustainable development.

### **Originality/value**

This paper has a relatively wide approach as it analyses sustainable development in the context of Finnish engineering education both on institutional and societal levels and is based on a national project.

## **General information**

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Civil Engineering, KeVa

Contributors: Takala, A., Korhonen-Yrjänheikki, K.

Pages: 170-186

Publication date: 2019

Peer-reviewed: Yes

## **Publication information**

Journal: INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION

Volume: 20

Issue number: 1

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Original language: English

DOIs:

10.1108/IJSHE-07-2018-0132

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](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

## **Ammatillisen koulutuksen uudistus: uhka ja mahdollisuus**

### **General information**

Publication status: Published  
MoE publication type: B1 Article in a scientific magazine  
Organisations: Education, Tampere University of Applied Sciences, HAMK University of Applied Sciences  
Contributors: Tapani, A., Raudasoja, A., Nokelainen, P.  
Number of pages: 5  
Pages: 4-8  
Publication date: 15 Jun 2019  
Peer-reviewed: No

### **Publication information**

Journal: Ammattikasvatuksen aikakauskirja  
Volume: 21  
Issue number: 2  
ISSN (Print): 1456-7989  
Original language: Finnish  
URLs:  
<https://akakk.fi/wp-content/uploads/AKAKK-2.19-p%C3%A4%C3%A4kirjoitus.pdf>  
Research output: Contribution to journal > Editorial > Scientific

## **Ammatillisten opettajien näkemyksiä opettajan työssä tarvittavasta kompetenssista ja työelämäyhteistyöstä**

The reform of vocational upper secondary education in Finland, emphasising work-based learning, influences vocational teachers' work and brings new challenges for teachers' competence. This study examines vocational teachers' views on the required professional competence and experiences of cooperation with working life. The research data consisted of interviews with vocational teachers (N=13) who work in both apprenticeship training and school-based VET in the social and health service sector (n=5), construction work sector (n=4), and business sector (n=4). The data was analysed with thematic analysis. In this research, vocational teachers' competence was constructed based on cognitive, operational, social and metacompetence. At best, working life cooperation was described as favourable development of learning environments. However, the study also showed some important challenges in teachers' working life cooperation. Cooperation was sometimes seen as balancing between the needs of students and workplaces. In some cases, teachers were even considered to have very limited opportunities to intervene when any problems occur. The purpose of this study is to deepen our understanding of vocational teachers' professional competence on the boundaries between education and work, as well as to bring new insights for vocational institutions to develop teachers' competence and working life cooperation.

Keywords: vocational teacher, competence, working life cooperation, vocational education and training

### **General information**

Publication status: Published  
MoE publication type: A1 Journal article-refereed  
Organisations: Industrial and Information Management, Research group: Knowledge and Learning Research Center, University of Tampere  
Contributors: Lehtonen, E., Rintala, H., Pylväs, L., Nokelainen, P.  
Number of pages: 17  
Pages: 10-26  
Publication date: 19 Dec 2018  
Peer-reviewed: Yes

### **Publication information**

Journal: Ammattikasvatuksen aikakauskirja  
Volume: 20  
Issue number: 4

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Original language: Finnish  
Electronic versions:

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URLs:

<http://urn.fi/URN:NBN:fi:tty-201901231137>

Research output: Contribution to journal › Article › 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**

Publication status: E-pub ahead of print  
MoE publication type: A2 Review article in a scientific journal  
Organisations: Computing Sciences, University of Helsinki  
Contributors: Harju, V., Koskinen, A., Pehkonen, L.  
Publication date: 2019  
Peer-reviewed: Yes

### **Publication information**

Journal: EDUCATIONAL RESEARCH  
ISSN (Print): 0013-1881  
Ratings:  
Scopus rating (2019): CiteScore 2.4 SJR 0.55 SNIP 1.11  
Original language: English  
ASJC Scopus subject areas: Education  
Keywords: Digital learning, digital technology use, literature review, longitudinal research, primary and secondary education, transversal competencies  
DOIs:  
10.1080/00131881.2019.1660586  
Source: Scopus  
Source ID: 85071386320  
Research output: Contribution to journal › Review Article › Scientific › peer-review

### **Angry Birds for Fun in Learning**

#### **General information**

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Harju, V., Multisilta, J.  
Number of pages: 8  
Pages: 69-76  
Publication date: 2014

#### **Host publication information**

Title of host publication: Finnish Innovations and Technologies in Schools: a Guide towards New Ecosystems of Learning  
Publisher: Sense Publishers

Editors: Niemi, H., Multisilta, J., Lipponen, L., Vivitsou, M.  
ISBN (Print): 978-94-6209-747-6  
Source: Bibtex  
Source ID: urn:065aa8172889a9755c90a3e8fa4fcbd2  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

### **Assessing business learning by analysing ERP simulation log files**

#### **General information**

Publication status: Published  
MoE publication type: A4 Article in a conference publication  
Organisations: Department of Information Management and Logistics, Research group: Novi  
Contributors: Nisula, K., Pekkola, S.  
Publication date: 10 Dec 2016

#### **Host publication information**

Title of host publication: AIS SIGED 2016 Conference on IS education and Research. : Dublin, Ireland, December 10-11, 2016  
Place of publication: Dublin  
ISBN (Print): 978-0-692-81119-1  
URLs:  
<http://icis2016.aisnet.org/ais-siged-international-conference-education-research/>  
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](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

### **Avoimuus oppimisverkostossa**

#### **General information**

Publication status: Published  
MoE publication type: B3 Non-refereed article in conference proceedings  
Organisations: University of Tampere  
Contributors: Lappalainen, Y., Sihvonen, M.  
Pages: 37-43

Publication date: 2014

#### Host publication information

Title of host publication: Tuovi 12: Interaktiivinen tekniikka koulutuksessa 2014-konferenssin tutkijatapaamisen artikkelit  
Publisher: University of Tampere  
Editors: Viteli, J., Östman, A.  
ISBN (Electronic): 978-951-44-9561-8

#### Publication series

Name: TRIM Research Reports  
No.: 12  
ISSN (Electronic): 1799-2141  
URLs:

<http://urn.fi/URN:ISBN:978-951-44-9561-8>

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

### Children as co-creators of video stories: mobile videos for learning

#### General information

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: Regulation of learning and active learning methods (REALMEE), University of Helsinki  
Contributors: Multisilta, J., Niemi, H.  
Pages: 588-592  
Publication date: 2014

#### Host publication information

Title of host publication: 2014 37th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)  
Source: Bibtext  
Source ID: urn:3cae9f1d4bb2c72aca7cc513991df35e  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › 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  
Pages: 95-109  
Publication date: 17 Nov 2018

#### Host publication information

Title of host publication: The Future of Innovation and Technology in Education: Policies and Practices for Teaching and Learning Excellence (Emerald Studies in Higher Education, Innovation and Technology)  
Publisher: Emerald Group Publishing Ltd.  
Editors: Visvizi, A., Lytras, M. D., Daniela, L.

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

ISBN (Electronic): 978-1-78756-555-5

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

## Content and Language Integration as a part of a degree reform at Tampere University of Technology

### General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Language Centre

Contributors: Niemelä, N., Jauni, H.

Number of pages: 15

Pages: 39-53

Publication date: 2014

### Host publication information

Title of host publication: HEPCLIL, Higher Education Perspectives on CLIL, University of Vic - Central University of Catalonia, VIC, 27 and 28 March 2014

ISBN (Print): 978-84-941644-9-1

URLs:

<http://mon.uvic.cat/hepclil>

### Bibliographical note

HEPCLIL (Higher Education Perspectives on Content and Language Integrated Learning) Contribution: organisation=kie,FACT1=1 Portfolio EDEND: 2014-12-30

Source: researchoutputwizard

Source ID: 1132

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

## Creating a National Digital Learning Environment for Enhancing University Teachers' Pedagogical Expertise – The Case UNIPS

**Abstract.** This article analyses the design, implementation, and evaluation of a nation-wide project to create a common digital solution for university teaching staff's pedagogical training in Finland. During three years, eight universities collaborated in developing an online learning platform called UNIPS, the University Pedagogical Support system. The areas to develop were A) a learning platform based on technical design principles, B) pedagogical principles, and C) broadening the scope of offered studies. The results have been promising. With a carefully planned timetable, all participating universities were able to produce, test, and offer UNIPS modules in collaboration with other universities on the area of their expertise. This paper presents the design process and looks at both developers' experiences on how they perceived the process and the UNIPS platform as its result, and students' experiences about studying in the UNIPS platform.

### General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Education and Learning, Tampere University, University of Turku, University of Oulu, Hanken School of Economics, Lappeenranta University of Technology, University of Jyväskylä

Contributors: Murtonen, M., Laato, S., Lipponen, E., Salmento, H., Vilppu, H., Maikkola, M., Vaskuri, P., Mäkinen, M., Naukkarinen, J., Virkki-Hatakka, T., Pajarre, E., Selänne, S., Skaniakos, T.

Number of pages: 23

Pages: 7-29

Publication date: Dec 2019

Peer-reviewed: Yes

### Publication information

Journal: International Journal of Learning, Teaching and Educational Research

Volume: 18

Issue number: 13

Article number: 13

ISSN (Print): 1694-2493

Ratings:

Scopus rating (2019): CiteScore 0.3 SJR 0.164 SNIP 0.234

Original language: English

Keywords: university teaching, higher education, pedagogical training, pedagogical support, digital solution

DOIs:

10.26803/ijlter.18.13.2

URLs:

<http://ijlter.org/index.php/ijlter/article/view/1922/pdf>

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

### **Designing Learning Ecosystems for Mobile Social Media**

Social media has gained interest not only in entertainment applications, but also with learning and business applications; however, there are not many research frameworks available for designing learning activities for learning ecosystems based on mobile social media. In this chapter, a framework for designing and analyzing learning activities in learning ecosystems that are based on mobile and social media is presented. The framework is based on Activity Theory (AT) and Experiential Learning Theory (ELT). In the chapter the existing research on e-learning, mobile learning, and multimodal learning are discussed and reviewed. The research on learning ecosystems based on mobile social media is also positioned to this multi-scientific research field. Finally, two examples of using the framework for designing, learning, and analyzing learning activities in mobile social media learning ecosystems are presented.

#### **General information**

Publication status: Published

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

Organisations: University of Helsinki

Contributors: Multisilta, J.

Number of pages: 22

Pages: 270-291

Publication date: 2012

#### **Host publication information**

Title of host publication: Informed Design of Educational Technologies in Higher Education

Publisher: IGI Global

Editors: Olofsson, A. D., Lindberg, J. O.

ISBN (Print): 978-1-61350-080-4

Keywords: 516 Educational sciences, 113 Computer and information sciences

DOIs:

10.4018/978-1-61350-080-4.ch014

Source: Bibtex

Source ID: urn:c8c180952ad8e571998c50a8def29d00

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

### **Digitaalisen tarinankerronnan monet mahdollisuudet**

#### **General information**

Publication status: Published

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

Organisations: University of Helsinki

Contributors: Viitanen, K., Harju, V., Niemi, H., Multisilta, J.

Number of pages: 25

Pages: 187-211

Publication date: 2014

#### **Host publication information**

Title of host publication: Rajaton luokkahuone

Place of publication: Jyväskylä

Publisher: PS-kustannus

Editors: Niemi, H., Multisilta, J.

ISBN (Print): 978-952-451-618-1

#### **Publication series**

Name: Opetus 2000

Source: Bibtex

Source ID: urn:8ebf2ec34e0f186ec90ce07069060bf6

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



### **Digital Storytelling for 21st -Century Skills in Virtual Learning Environments**

This article finds that the new virtual learning environments comprise more spaces and practices in which digital resources, tools, and applications are used. The article introduces how digital storytelling can create virtual learning environments when it is used for learning 21st-century skills and competencies needed in students' future working life. The study describes how students (n = 319) in three countries and their teachers (n = 28) value digital storytelling and what they think students have learned. Their experiences are analyzed using a theoretical conceptualization of the global sharing pedagogy that sets categories of processes or tools as mediators: 1) learner-driven knowledge and skills creation, 2) collaboration, 3) networking, and 4) digital literacy. Analyses have been quantitative and qualitative. The article describes students' experiences when they created their digital stories and how they engaged in learning. The major findings are that students enjoyed creating their stories, and they were very engaged in their work. They learned many 21st-century skills when creating their digital stories.

#### **General information**

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: University of Helsinki

Contributors: Niemi, H., Harju, V., Vivitsou, M., Viitanen, K., Multisilta, J.

Number of pages: 15

Pages: 657-671

Publication date: 2014

Peer-reviewed: Yes

#### **Publication information**

Journal: Creative Education

Volume: 5

ISSN (Print): 2151-4755

Original language: English

Keywords: 21 st -century skills, 21st-Century Skil, Digital Story Telling, Learning, collaboration, digital story telling, engagement, learning, videos

DOIs:

10.4236/ce.2014.59078

Source: Mendeley

Source ID: 5e35104f-3945-3a84-9ee6-9119a2e4c65e

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

### **Education and Information Technologies, Volume 19, Issue 3, September 2014: Special Issue: Special Section on Intergenerational learning and digital technologies and Special Section on Mobile and Panoramic Video in Education**

#### **General information**

Publication status: Published

MoE publication type: C2 Edited books

Organisations: University of Helsinki

Contributors: Passey, D. (ed.), Multisilta, J. (ed.)

Publication date: 2014

#### **Publication information**

Publisher: Springer

Original language: English

#### **Publication series**

Name: Education and Information Technologies

Publisher: Springer

Volume: 19

No.: 3

ISSN (Print): 1360-2357

ISSN (Electronic): 1573-7608

Source: Bibtex

Source ID: urn:6034a18f4b59ba0670157ebd05bd00ae

Research output: Book/Report > Anthology > Scientific > peer-review

### **Effects of progressive inquiry on cognitive and affective learning outcomes in adolescents' geography education**

Adolescents need skills to acquire information and compare, analyze, transform, and experiment with knowledge. However, little research has been conducted on the content and pedagogical practices that are necessary to achieve these skills. This article seeks to contribute to this discussion because geography enables the attainment of the so-called

higher-order thinking skills, and the progressive inquiry model provides suitable pedagogical practices. This study provides empirical evidence on the effects of the progressive inquiry teaching method and learning models on cognitive and affective learning outcomes. This paper focuses on learning outcomes among 253 Finnish middle and upper secondary school students. This comparison between different developmental stages reveals the effects of the teaching and learning methods in question. The results indicate that the progressive inquiry method improves cognitive learning results at both educational levels in the context of geography education. The research provides evidence that older students benefit more from the learning model. Additionally, the self-regulated learning skills that the students possess at the beginning of the course do not affect their cognitive learning outcomes. Progressive inquiry clearly enhances the motivation levels of middle school students; however, the effect on the motivation level was more ambiguous among the upper secondary students.

#### **General information**

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Industrial and Information Management, Research group: Knowledge and Learning Research Center, University of Tampere

Contributors: Kuisma, M., Nokelainen, P.

Number of pages: 19

Publication date: 30 Jul 2018

Peer-reviewed: Yes

#### **Publication information**

Journal: Frontline Learning Research

Volume: 6

Issue number: 2

ISSN (Print): 2295-3159

Ratings:

Scopus rating (2018): CiteScore 0

Original language: English

DOIs:

10.14786/flr.v6i2.309

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

#### **Enhancing Learning in Engineering Mathematics Education: Utilising Educational Technology and Promoting Active Learning**

This study contributes to the discussion of development of engineering mathematics education from two different perspectives: to explore the possibilities to enhance engineering mathematics teaching and learning with the help of educational technology, and to promote active learning of students. From these two perspectives, it has been explored, for example, how engineering students experience the usage of selected educational technology and does utilisation of educational technology affect students' activity or learning. The investigations have concentrated on developing a feasible framework for mathematics teaching and learning in Bachelor's level engineering education. From the theoretical perspective, this dissertation discusses instruments to promote students' active learning as a part of the framework.

The research has been conducted between 2011-2017 with four empirical studies at Tampere University of Applied Sciences. The adopted research approach is design-based research that has included several iterative cycles for developing the framework for mathematics teaching and learning. This process has included twentyfive university of applied sciences level engineering mathematics course implementations. Short educational video lectures and computer-aided assessment were the main educational technologies that were implemented during the research process.

As an outcome of the research, the guidelines for utilising selected educational technology and activating students in similar educational setting are given. These guidelines provide knowledge for developing instructional design and learning resources especially at UAS-level engineering mathematics context. The findings indicated that engineering students experience short educational video lectures and computer-aided assessment as meaningful and feasible for mathematics learning.

Students used short educational videos for different learning purposes and pointed out such benefits as repeatability and having more time in peace to learn and understand the current task at hand. When non-compulsory automatically assessed online exercises were provided, high completion rate were detected among study groups.

Utilising short educational videos and computer-aided assessment provides instant feedback to students about their learning process. The findings indicated that such resources have a potential to motivate, activate and promote self-regulated learning. However, the most of the students were studying nearby the deadlines. Hence, proper and distinct assignment deadlines guide students' learning activity and are more likely to activate them.

Overall, the focus of this dissertation has been on the utilisation of potential of digitalisation and the promotion of active learning. At the center of the prevailing digitalisation hype, these both goals play a central role in higher education. Thus,

the dissertation discusses topics covered in many higher education institutions nationally and internationally.

#### **General information**

Publication status: Published  
MoE publication type: G4 Doctoral dissertation (monograph)  
Organisations: Education  
Contributors: Kinnari-Korpela, H.  
Number of pages: 180  
Publication date: 29 Mar 2019

#### **Publication information**

Publisher: Tampere University  
Volume: 38  
ISBN (Print): 978-952-03-1012-7  
ISBN (Electronic): 978-952-03-1013-4  
Original language: English

#### **Publication series**

Name: Tampere University Dissertations  
Volume: 38  
ISSN (Print): 2489-9860  
ISSN (Electronic): 2490-0028  
URLs:  
<http://urn.fi/URN:ISBN:978-952-03-1013-4>  
Research output: Book/Report > Doctoral thesis > Monograph

### **Epilogue: What are Innovations in the Finnish Educational Ecosystem**

#### **General information**

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Niemi, H., Multisilta, J., Lipponen, L., Vivitsou, M.  
Number of pages: 5  
Pages: 165-169  
Publication date: 2014

#### **Host publication information**

Title of host publication: Finnish Innovations and Technologies in Schools: A Guide towards New Ecosystems of Learning  
Place of publication: Rotterdam  
Publisher: Sense Publishers  
Editors: Niemi, H., Multisilta, J., Lipponen, L., Vivitsou, M.  
ISBN (Print): 978-94-6209-747-6  
Source: Bibtex  
Source ID: urn:1a48d63c8790f79d85c3eac9e5690ea4  
Research output: Chapter in Book/Report/Conference proceeding > Chapter > Scientific > peer-review

### **Examples of the Teaching of the Health Questions of Electric and Magnetic Fields at Tampere University of Technology in Finland**

#### **General information**

Publication status: Published  
MoE publication type: A1 Journal article-refereed  
Organisations: Department of Electronics and Communications Engineering, Research group: Environmental Health, TMI Rauno Pääkkönen  
Contributors: Korpinen, L., Pääkkönen, R.  
Number of pages: 6  
Pages: 277-282  
Publication date: 2015  
Peer-reviewed: Yes

#### **Publication information**

Journal: Journal of Physical Science and Application  
Volume: 5  
Issue number: 4

ISSN (Print): 2159-5348

Original language: English

ASJC Scopus subject areas: Electrical and Electronic Engineering

DOIs:

10.17265/2159-5348/2015.04.005

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

### **Female technology education teachers' experiences of Finnish craft education**

In order to introduce a more equitable gender balance in education and consequently in the labour market, it is highly relevant to continue to expand our knowledge of technology education and to give attention to gender related issues. The ultimate purpose of this study was to contribute to efforts to get more women to study technology and pursue technological careers by investigating their experiences. To approach this, the aim was to offer an overview of the gendered processes that girls and women may experience when studying and working in the area of technical craft and technology education.

The study was carried out using semi-structured theme interviews, and the data were collected from November to December 2014. The study group consisted of seven female teachers of technical craft and technology education working in basic education schools. A qualitative theory-oriented thematic analysis was carried out through the identification, coding, analysis and reporting of patterns within the data. The findings revealed that all of the participants had experienced gendered patterns in terms of divisions of labour, construction of symbols and images and interactions between women. It is hoped that the findings of this study will facilitate the implementation of supportive interventions in the future.

#### **General information**

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: University of Jyväskylä, University of Helsinki

Contributors: Niiranen, S., Hilmola, A.

Number of pages: 48

Pages: 41

Publication date: 2016

Peer-reviewed: Yes

#### **Publication information**

Journal: DESIGN AND TECHNOLOGY EDUCATION: AN INTERNATIONAL JOURNAL

Volume: 21

Issue number: 2

ISSN (Print): 1360-1431

Original language: English

Keywords: Technology education, Technical craft, Women

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

### **Finnish Innovations and Technologies in Schools: a Guide towards New Ecosystems of Learning**

#### **General information**

Publication status: Published

MoE publication type: C2 Edited books

Organisations: University of Helsinki

Contributors: Niemi, H. (ed.), Multisilta, J. (ed.), Lipponen, L. (ed.), Vivitsou, M. (ed.)

Number of pages: 175

Publication date: 2 Oct 2014

#### **Publication information**

Place of publication: Rotterdam

Publisher: Sense Publishers

ISBN (Print): 978-94-6209-747-6

Original language: English

Source: Bibtex

Source ID: urn:acc503c02a8b1e66660f5e823b95fa02

Research output: Book/Report › Anthology › Scientific › peer-review

### **From systematic design process towards teaching product designer's toolkit**

In higher level of engineering education, the training of single development process in the field of product development is no longer sufficient, because our students are employed in such jobs that they need to be able to understand the customer's perspective and the company's business goals in addition to the technical design process. In the past, we taught the systematic design process because it provided a good understanding of product design. The disadvantage was

that the student's user centric, organizational centric, and society centric design methods and skills required in development projects did not grow due to strong focus on the systematic design process. Our purpose is to educate engineering professionals for the future who have a design method toolkit, from which they select tools with apt combination for the future task. The focus of this study is to prototype different learning solution, in which the learning goals and education approach is changed. The learning goal is that every student is skilled with ten methods, familiar with at least 30 methods and is able to find even more methods. The students are trained to identify the key approach of the method and evaluate its suitability for the present task. We use the Educational Design Research (EDR) approach to course design and implementation. In addition, we use the pedagogical content knowledge of product development based on the previous studies. The EDR serves also as a research framework for this study. In the beginning of the course, students are allowed to choose the subject for their product concept. In the first design session, we ask students to explore the desirable properties of their concepts. In the second design session, we make an intervention by presenting "Seven Deadly Sins in product development". Then we motivate the students by explaining that the methods help to avoid the common pitfalls. In the design studio, descriptions of 30 different methods has been placed on the walls. The methods are grouped according to their purpose to enable efficient choosing. We ask students to choose methods for a toolkit that they can answer to all mentioned common pitfalls. We ask each group to tell why their choices are solving the problematic situation. Students will continue the development work with their chosen methods and they can change methods as the work progresses if they see it necessary. Reflecting is an integral part of the course. We ask how well students think they were successful in developing a product solution and how suitable tools, methods and development process did they succeed in choosing. The results of this approach have been very good. With this approach, we are able to teach students that there are many different product development methods, and students can choose their methods. In the past, we have received feedback from our alumni for some years that, the engineering is not done as it is taught at university. The purpose of this teaching development narrows this gap and thus develops industrial working methods in the long run.

### 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, University of Tampere

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

Number of pages: 6

Pages: 92-97

Publication date: 5 Sep 2018

### Host publication information

Title of host publication: Proceedings of 20th International Conference on Engineering & Product Design Education : 6 & 7 September 2018, Dyson School of Design Engineering, Imperial College London, UK

Volume: 93

Publisher: The Design Society

Editors: Bohemia, E., Kovacevic, A., Buck, L., Childs, P., Green, S., Hall, A., Dasan, A.

ISBN (Print): 978-1-912254-02-6

URLs:

<https://www.designsociety.org/publication/40840/FROM+SYSTEMATIC+DESIGN+PROCESS+TOWARDS+TEACHING+PRODUCT+DESIGNER%E2%80%99S+TOOLKIT>

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

### Gender and technology education

Technology-oriented fields are still mostly male dominated. Increasing the number of women in natural science and technology careers remains an elusive goal in EU countries. Although gender equality and non-discrimination have been critical long-time concerns in education, gender-related divisions continue to occur in the field technology and the subjects that pupils decide to study. Also, significant variations between girls' and boys' interest and behavior have been documented in technology education. In today's society, technology education plays an important role in providing children with opportunities and in improving their ability to interact with everyday technologies. Technology education also equips children with the necessary knowledge to perform a wide variety of jobs. In order to introduce a more equitable gender balance in higher education, technology-oriented fields, and, consequently, in the corresponding labor market, we must continue to expand our knowledge on the impact of current technology education and focus on gender-related issues. This article aims to discuss gender-related topics in technology education and careers. Could technology education have an impact on women and girls or potentially influence their advancement in technology-oriented fields? With the goal of achieving greater gender equality in technology fields, this chapter concludes with further directions for research and suggestions for new ways of thinking.

### General information

Publication status: Published

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

Organisations: University of Jyväskylä

Contributors: Niiranen, S.

Number of pages: 14  
Pages: 875-888  
Publication date: 2018

#### Host publication information

Title of host publication: Handbook of Technology Education  
Publisher: Springer  
ISBN (Print): 978-3-319-44686-8  
Keywords: Gender, Technology education, Interest, Career aspiration  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

#### Global is Becoming Everywhere: Global Sharing Pedagogy

##### General information

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Niemi, H., Multisilta, J.  
Number of pages: 13  
Pages: 35-47  
Publication date: 2014

##### Host publication information

Title of host publication: Finnish Innovations and Technologies in Schools: a Guide towards New Ecosystems of Learning  
Place of publication: Rotterdam  
Publisher: Sense Publishers  
Editors: Niemi, H., Multisilta, J., Lipponen, L., Vivitsou, M.  
ISBN (Print): 978-94-6209-747-6  
Source: Bibtex  
Source ID: urn:99fc75a858f300f986c3aae5af4b5822  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

#### Government Workers' Stories about Professional Development in a Digitalized Working Life

In this article, we explore workers' stories about digitalization of work and professional development. The data (101 stories) were collected from 81 Finnish government workers through the method of empathy-based stories (MEBS). MEBS is a qualitative data collection method in which participants write short imaginary texts based on an introductory script (frame story) designed by the researcher. In this study, participants were presented with two frame stories in which they were asked to imagine why digitalization had either supported or hindered professional development. The stories were analyzed inductively using qualitative thematic analysis. The findings illustrate the double-edged nature of digitalization, as it may both support and hinder professional development and learning by changing work tasks, work practices and knowledge development and management. Overall, the stories revealed that the participants perceived that digitalization may support professional development and learning, especially by providing opportunities for job control in terms of flexibility, and new ways for knowledge development and management.

##### General information

Publication status: E-pub ahead of print  
MoE publication type: A1 Journal article-refereed  
Organisations: Education, Helsinki University  
Contributors: Wallin, A., Pylväs, L., Nokelainen, P.  
Publication date: 2 Apr 2020  
Peer-reviewed: Yes

##### Publication information

Journal: Vocations and Learning  
ISSN (Print): 1874-785X  
Original language: English  
Electronic versions:  
Wallin2020\_Article\_GovernmentWorkersStoriesAboutP  
DOIs:  
10.1007/s12186-020-09248-y  
URLs:  
<http://urn.fi/URN:NBN:fi:tuni-202006246214>  
Research output: Contribution to journal › Article › Scientific › peer-review

### **Guiding the workplace learning in vocational education and training: A literature review**

This review provides an overview of the empirical research concerning guidance in the context of vocational education and training (VET). The study examines practices, providers and supporting and hindering factors related to guidance and learning at the workplace. After the inclusion/exclusion process, the final number of research articles included in this review is 18. Results show strong evidence for the collective nature of workplace guidance, with the entire work community providing learners with guidance and assistance. Guidance provided to VET students at workplaces seems to relate strongly to the activities of the members of communities of practice. Guidance provided by the members of communities of practice opens up opportunities for learners to participate in collective practices by gradually assuming more responsibility and more demanding tasks as their skills develop. The learner's self-regulative skills, such as responsibility and the ability to take the initiative and to actively seek guidance, affect how guidance is afforded to him/her in the work community during training. Furthermore, these skills may also determine the learner's prospects for developing expertise in future workplaces.

#### **General information**

Publication status: Published

MoE publication type: A2 Review article in a scientific journal

Organisations: Industrial and Information Management, Research group: Knowledge and Learning Research Center, University of Tampere, University of Helsinki

Contributors: Mikkonen, S., Pylväs, L., Rintala, H., Nokelainen, P., Postareff, L.

Publication date: 2017

Peer-reviewed: Yes

Early online date: 18 Apr 2017

#### **Publication information**

Journal: Empirical Research in Vocational Education and Training

Volume: 9

Issue number: 9

ISSN (Print): 1877-6345

Ratings:

Scopus rating (2017): CiteScore 1.3 SJR 0.357 SNIP 0.704

Original language: English

Electronic versions:

s40461-017-0053-4

DOIs:

10.1186/s40461-017-0053-4

URLs:

<http://urn.fi/URN:NBN:fi:tty-201711202176>

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

### **Harjoittelukäytänteet yliopistoissa 2015: - kooste opiskeluaikaista harjoittelua kartoittaneesta kyselystä TYyli-hankeeseen osallistuvilla yliopistoilla. Yhteiset ja yliopistokohtaiset tulokset 1/2016**

#### **General information**

Publication status: Published

MoE publication type: D4 Published development or research report or study

Organisations: Teaching and Learning Services

Contributors: Pajarre, E.

Number of pages: 42

Publication date: 26 Jan 2016

#### **Publication information**

Publisher: Tampereen teknillinen yliopisto

Original language: Finnish

Keywords: harjoittelu, yliopisto

URLs:

[https://tyylihanke.files.wordpress.com/2016/01/harjoittelu\\_tyyli\\_yliopistoissa\\_loppuraportti\\_01\\_2016.pdf](https://tyylihanke.files.wordpress.com/2016/01/harjoittelu_tyyli_yliopistoissa_loppuraportti_01_2016.pdf)

Research output: Book/Report > Commissioned report > Professional

### **Harjoitus tekee mestarin - harjoittelu maisterin? Kokemuksia uudeltaisista yliopisto-opintoihin integroiduista työelämäjaksoista**

#### **General information**

Publication status: Published

MoE publication type: B1 Article in a scientific magazine

Organisations: Education and Learning, University of Oulu, Lappeenranta University of Technology, Lapin Yliopisto

Contributors: Pajarre, E., Palosaari-Aubry, P., Virkki-Hatakka, T., Hietaniemi, R., Tompuri, H., Pajari, S.

Number of pages: 4

Pages: 42-45

Publication date: Feb 2019

Peer-reviewed: No

### Publication information

Journal: Yliopistopedagogiikka

Volume: 26

Issue number: 1

ISSN (Print): 2242-8070

Original language: Finnish

Research output: Contribution to journal > Article > Scientific

### Holistic Business Learning Environment: Bringing practice and integration to business education

For decades, business education has been criticized for being too theoretical and distant from the realities of actual business. The business school curricula are poorly aligned with the competencies and knowledge needed to succeed in today's business world. In addition to disciplinary knowledge and soft skills, graduates need the capabilities to be able to integrate these skills and implement them in practical settings. Learning practical, integrative skills in an environment that emphasizes theoretical orientation and academic research is challenging.

Experiential learning has been widely used to bring the practical element into business studies. In particular, technology-driven learning environments such as simulations, games, business information systems, virtual worlds, and social media have offered great possibilities for experiential exercises.

And yet the criticism continues. Despite the technological developments, education still continues to be theoretical and academic. Experiential business education has not become mainstream. Different types of experiential learning solutions have been presented but they tend to solve specific areas of business management. They often focus on the technology rather than on a holistic, pedagogical model. Business education research is yet to present an experiential learning environment that combines people and information technology in a holistic way.

This dissertation investigates how an experiential business learning environment should be constructed to provide a holistic business perspective and a practical training ground to enhance the competencies required of future business graduates. First, the theoretical foundations of learning and learning environments are examined. Second, the relevant research on business learning environments and curricula is presented. These lead on to the refined research questions. A design science approach is chosen as a method to construct and study a business learning environment artifact consisting of an enterprise resource planning (ERP) system, a business simulation, and learning communities of students and teachers. It is structured around a supply chain network, and the business transactions utilize automated information flows in an information system structure that is based on the principles of ERP II.

The artifact alone does not solve the challenge of integrated business learning. It needs to be attached to the whole learning process. This dissertation presents an integrated business learning model that combines the artifact with a business curriculum based on the dynamic capabilities' framework. This brings the intellectual coherence that indicates how disciplines, courses, and the business learning environment influence each other. It is the concrete combining factor between the people and the disciplinary topics on the curriculum plans and documents.

There are positive indications of learning on all of Bloom's domains. In particular, the artifact appears to improve the poor and average students' long-term lower-level cognitive learning. The dissertation offers an explanation for such improvement: The artifact acts as a boundary infrastructure where different stakeholders carry out their own roles and tasks and interrelate with each other. It provides a common ground to join the theoretical perspective to the practical processes and tasks of business management. It is flexible and can be used from many different perspectives and for many different purposes at the same time.

### General information

Publication status: Published

MoE publication type: G5 Doctoral dissertation (article)

Organisations: Information and Knowledge Management

Contributors: Nisula, K.

Number of pages: 152

Publication date: 22 May 2019

### Publication information

Publisher: Tampere University



Volume: 53  
ISBN (Print): 978-952-03-1070-7  
ISBN (Electronic): 978-952-03-1071-4  
Original language: English

#### **Publication series**

Name: Tampere University Dissertations

Volume: 53

ISSN (Print): 2489-9860

ISSN (Electronic): 2490-0028

URLs:

<http://urn.fi/URN:ISBN:978-952-03-1071-4>

Research output: Book/Report > Doctoral thesis > Collection of Articles

### **How is it sustainable? Identifying key indicators for sustainable educational design**

#### **General information**

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Civil Engineering

Contributors: Sandström, N., Hytti, V., Nenonen, S., Lonka, K.

Number of pages: 3

Pages: 4217-4219

Publication date: 2016

#### **Host publication information**

Title of host publication: 10th INTED 2016 Conference Proceedings : 7-9 March, 2016, Valencia, Spain

Editors: Gómez Chova, L., López Martínez, A., Candel Torres, I.

ISBN (Electronic): 978-84-608-5617-7

#### **Publication series**

Name: INTED proceedings

ISSN (Electronic): 2340-1079

Keywords: 516 Educational sciences

DOIs:

[10.21125/inted.2016.2037](https://doi.org/10.21125/inted.2016.2037)

Source: Bibtex

Source ID: urn:6581b3d417d27c5477c844ae889e72da

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

### **How to develop a new innovation education tool: case of impact canvas**

#### **General information**

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Industrial Management, Research group: Center for Innovation and Technology Research, Innovation Services, Research Services, University of Tampere

Contributors: Aarikka-Stenroos, L., Boedeker, S., Köppä, L., Langwaldt, J.

Publication date: Dec 2016

#### **Host publication information**

Title of host publication: In the Proceedings of ISPIM Innovation Summit. The International Society for Professional Innovation Management (ISPIM). : 4-7 December 2016, Kuala Lumpur, Malaysia.

ISBN (Electronic): 978-952-265-931-6

URLs:

<http://summit.ispim.org/>

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

### **How to facilitate freshmen learning and support their transition to a university study environment**

**ABSTRACT**Most freshmen enter universities with high expectations and with good motivation, but too many are driven into performing instead of true learning. The issues are not only related to the challenge of comprehending the substance, social and other factors have an impact as well. All these multifaceted needs should be accounted for to facilitate student learning. Learning is an individual process and remarkable improvement in the learning practices is possible, if proper actions are addressed early enough. We motivate and describe a study of the experience obtained from a set of tailor-

made courses that were given alongside standard curriculum. The courses aimed to provide a 'safe community' to address the multifaceted needs. Such support was integrated into regular coursework where active learning techniques, e.g. interactive small groups were incorporated. To assess impact of the courses we employ the feedback obtained during the courses and longitudinal statistical data about students' success.

#### General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Department of Electronics and Communications Engineering, Department of Electrical Engineering

Contributors: Kangas, J., Rantanen, E., Kettunen, L.

Number of pages: 16

Pages: 1-16

Publication date: 28 Jul 2016

Peer-reviewed: Yes

#### Publication information

Journal: European Journal of Engineering Education

ISSN (Print): 0304-3797

Ratings:

Scopus rating (2016): CiteScore 2.2 SJR 0.509 SNIP 1.344

Original language: English

DOIs:

10.1080/03043797.2016.1214818

Source: RIS

Source ID: urn:BE2A6B2857AAA2500273835E2A83BFF6

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

#### Huomio! Obs! Alert! "Työelämä on globaalissa murroksessa ..."

#### General information

Publication status: Published

MoE publication type: B1 Article in a scientific magazine

Organisations: Teaching and Learning Services

Contributors: Nokelainen, P.

Pages: 4-8

Publication date: 2016

Peer-reviewed: No

#### Publication information

Journal: Ammattikasvatuksen aikakauskirja

Volume: 18

Issue number: 2

ISSN (Print): 1456-7989

Original language: Finnish

URLs:

[http://www.okka-saatio.com/aikakauskirja/pdf/Aikak\\_2016\\_2\\_paakirjoitus.pdf](http://www.okka-saatio.com/aikakauskirja/pdf/Aikak_2016_2_paakirjoitus.pdf)

Research output: Contribution to journal › Editorial › Scientific

#### I feel great - university students affective experiences on learning and teaching

According to Kolb [1], experience is the source of learning and development. This is a statement that serves as the starting point of this study. We argue that the role of affective experiences cannot be overlooked when evaluating university learning and teaching. In the present paper, we will study students' affective experiences in higher education setting, specifically in engineering education in a technological university. The perceived affective experiences are empirically analysed through a mystery shopper data set, which was gathered in the case university by a group of students. The study bases theoretically on affective experiences framework, more familiar from the consumer behaviour research stream. The aim of the study is to analyse what kinds of affective experiences students recognise when studying in a technical university and further to elaborate, how these affective experiences could be used to increase student engagement and the students' motivation to learn. The study provides an innovative approach to university learning and teaching by applying mystery shopper method and affective experience approach from more businessoriented disciplines. The contribution to education science is the increased understanding of the role of affective experience in learning.

#### General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Language Centre, Department of Information Management and Logistics, Research group: Novi, Managing digital industrial transformation (mDIT), Tampere University of Applied Science  
Contributors: Tukiainen, M., Helander, N., Hellsten, P., Jussila, J., Myllärniemi, J., Boedeker, M.  
Number of pages: 8  
Pages: 4453-4460  
Publication date: 4 Jul 2016

#### Host publication information

Title of host publication: Proceedings of EDULEARN16 Conference : 8th International Conference on Education and New Learning Technologies, 4-6 July, 2016  
Volume: 8  
Place of publication: Barcelona  
Publisher: IATED Academy  
Editors: Gómez Chova, L., López Martínez, A., Candel Torres, I.  
ISBN (Electronic): 978-84-608-8860-4

#### Publication series

Name: EDULEARN Proceedings  
Publisher: IATED Academy  
ISSN (Electronic): 2340-1117  
Keywords: Affective experience, Mystery shopper, learning, student engagement  
DOIs:

10.21125/edulearn.2016.2080

URLs:

<https://iated.org/edulearn/>

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

### Increasing girls' interest in technology education as a way to advance women in technology

#### General information

Publication status: Published  
MoE publication type: G5 Doctoral dissertation (article)  
Organisations: Industrial and Information Management  
Contributors: Niiranen, S.  
Publication date: 2016

#### Publication information

Publisher: University of Jyväskylä  
ISBN (Electronic): 978-951-39-6736-9  
Original language: English

#### Publication series

Name: Jyväskylä studies in education, psychology and social research 71  
Keywords: Technology education  
URLs:

<http://urn.fi/URN:ISBN:978-951-39-6736-9>

Research output: Book/Report > Doctoral thesis > Collection of Articles

### Informaatiolukutaidon uudet kehukset tiedonhankintataitojen opetuksessa TTY:llä

#### General information

Publication status: Published  
Organisations: Library  
Contributors: Sipilä, M., Miettinen, M., Tevaniemi, J.  
Publication date: 17 Aug 2017  
Peer-reviewed: Unknown  
Event: Paper presented at Peda-forum, .  
Electronic versions:

Informaatiolukutaidon uudet kehukset

URLs:

<http://urn.fi/URN:NBN:fi:tty-201709181889>

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

### **Informal workplace learning: Turning the workplace into a learning site**

In recent decades, people have faced various global economic, technological, and social changes. Consequently, there is a need for ongoing vocational and professional development in working life. Simultaneously, there has been a growing body of literature that recognizes the importance of informal learning next to formal training arrangements. This chapter provides an overview of prominent context and individual factors related to informal workplace learning. Since the overall structure of the chapter follows the tentative 3-P model of workplace learning, some central learning activities and outcomes of informal workplace learning are shortly presented. Nevertheless, informal workplace learning processes are often unplanned and unconscious, and the outcomes may be unpredictable. This chapter may serve as a base for employees, managers, and human resource development professionals for understanding informal workplace learning and workplaces as sites for learning. This chapter may also provide researchers with future research directions by discussing previous findings and research instruments and identifying some limitations of current research.

#### **General information**

Publication status: Published

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

Organisations: Education, Research group: Knowledge and Learning Research Center, School of Education, University of Tampere

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

Number of pages: 14

Pages: 1-14

Publication date: 17 Feb 2019

#### **Host publication information**

Title of host publication: Handbook of vocational education and training : Developments in the changing world of work

Publisher: Springer

Editors: McGrath, S., Mulder, M., Papier, J., Suart, R.

ISBN (Electronic): 978-3-319-49789-1

ASJC Scopus subject areas: Arts and Humanities(all)

DOIs:

10.1007/978-3-319-49789-1\_97-1

#### **Bibliographical note**

INT=educ,"Pylväs, Laura"

DUPL=46704429

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

### **Integrating mobile orienteering to team forming activity in a software engineering course**

One of the most important skills software engineers need when entering work life is working in teams, including communicating, collaborating, as well as coordinating work in a team. This paper presents a team building activity aiming to support the first phases of team formation with a mobile orienteering activity. Created tasks at orienteering checkpoints were related to communication, collaboration and work division. Students were enthusiastic about the activity and expressed in their group reports on the activity that it supported the team building activity well, helped break the ice and supported agreeing the ways of working. Students also liked getting out of the classroom. The approach seems promising and we will investigate in the future similar type of activities in the first phases of team formation as well as will explore further integrating physical activity to the exercise sessions.

#### **General information**

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Department of Pervasive Computing, Research area: User experience

Contributors: Väättäjä, H., Ahtinen, A.

Publication date: Sep 2016

#### **Host publication information**

Title of host publication: SEFI 2016 Annual Conference Proceedings : Engineering Education on Top of the World:

Industry University Cooperation

Publisher: European Society for Engineering Education SEFI

ISBN (Electronic): 9782873520144

Keywords: soft skills, engineering skills, collaboration, Team working, group forming, mobile orienteering, team forming  
URLs:

[http://www.sefi.be/conference-2016/papers/Engineering\\_Skills/vaataja-integrating-mobile-orienteering-to-team-forming-activity-176.pdf](http://www.sefi.be/conference-2016/papers/Engineering_Skills/vaataja-integrating-mobile-orienteering-to-team-forming-activity-176.pdf)

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

### **Internal and external stakeholders' impact on product development curriculum design**

Teachers do not develop curriculum independently of other stakeholders. Instead, the development activity is seen here as a joint effort of both internal and external stakeholders having a common goal of improving curriculum design and practice. In this case, internal stakeholders include the faculty, the students, and the higher education teachers' own community while external stakeholders refer to the higher education policy and the labour market. The aim of the paper is twofold: Firstly, to analyse and make visible what kind of influence various stakeholders have on curriculum design work in product development education, and secondly, to discuss the ways in which higher education curriculum can be improved as a collaborative process between internal and external stakeholders.

The research data was collected from the curriculum development session conducted at the Laboratory of Mechanical Engineering and Industrial Systems on October 2018. The participants in the session were four product development teachers, a coach, a researcher and a research assistant. In the session, the participants aimed at jointly creating a particular flow chart to describe and document the specific competence goals as well as the knowledge, skills, routines, and attitudes the students should learn to achieve those goals. The researcher observed the session and intervened with questions about the various stakeholder roles in the curriculum design work. The three-hour session was recorded on an audio tape and then transcribed. The method of content analysis was used as a qualitative research strategy to analyse the transcription of the session. In conclusion, the paper highlights the importance of collaboration with relevant stakeholders at least at some point of the curriculum design work. By paying attention to different, or even contradictory stakeholder motives and interests, we can achieve a deeper understanding about the nature and dynamics of curriculum design work and therefore about the future of higher education.

#### **General information**

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Communication Sciences, Social Sciences, Automation Technology and Mechanical Engineering

Contributors: Lindsten, H., Auvinen, P., Juuti, T.

Publication date: 12 Sep 2019

#### **Host publication information**

Title of host publication: DS 95: Proceedings of the 21st International Conference on Engineering and Product Design Education (E&PDE 2019), University of Strathclyde, Glasgow. 12th -13th September 2019

Publisher: The Design Society

ISBN (Electronic): 978-1-912254-05-7

Keywords: curriculum design, stakeholders, product development education, competence-based curriculum

DOIs:

10.35199/epde2019.64

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

### **Kansainvälinen jakamisen pedagogiikka**

#### **General information**

Publication status: Published

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

Organisations: University of Helsinki

Contributors: Niemi, H., Multisilta, J.

Number of pages: 15

Pages: 50-64

Publication date: 2014

#### **Host publication information**

Title of host publication: Rajaton luokkahuone

Place of publication: Jyväskylä

Publisher: PS-kustannus

Editors: Niemi, H., Multisilta, J.

ISBN (Print): 978-952451-618-1

#### **Publication series**

Name: Opetus 2000

Source: Bibtex

Source ID: urn:69775a789834f4188da70b0542f6d495

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

### **Katsaus oppisopimuskoulutukseen instituutiona Saksassa, Englannissa ja Suomessa**

#### **General information**

Publication status: Published  
MoE publication type: A2 Review article in a scientific journal  
Organisations: Industrial and Information Management, University of Tampere  
Contributors: Rintala, H., Nokelainen, P., Pylväs, L.  
Pages: 128-140  
Publication date: 2017  
Peer-reviewed: Yes

#### Publication information

Journal: Kasvatus  
Volume: 48  
Issue number: 2  
ISSN (Print): 0022-927X  
Original language: Finnish  
Research output: Contribution to journal › Review Article › Scientific › peer-review

### Kohti itseohjautuvaa oppimista ammatillisessa koulutuksessa

#### General information

Publication status: Published  
MoE publication type: B1 Article in a scientific magazine  
Organisations: Education  
Contributors: Nokelainen, P.  
Number of pages: 6  
Pages: 4-9  
Publication date: 1 Mar 2019  
Peer-reviewed: No

#### Publication information

Journal: Ammatikasvatuksen aikakauskirja  
Volume: 21  
Issue number: 1  
ISSN (Print): 1456-7989  
Original language: Finnish  
URLs:  
<https://akakk.fi/wp-content/uploads/AKAKK.-1.2019-paakirjoitus.pdf>  
Research output: Contribution to journal › Editorial › Scientific

### Koulu rajattomuuden keskellä

#### General information

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Niemi, H., Multisilta, J.  
Number of pages: 24  
Pages: 12-35  
Publication date: 2014

#### Host publication information

Title of host publication: Rajaton luokkahuone  
Place of publication: Jyväskylä  
Publisher: PS-kustannus  
Editors: Niemi, H., Multisilta, J.  
ISBN (Print): 978-952-451-618-1

#### Publication series

Name: Opetus 2000  
Source: Bibtex  
Source ID: urn:d9daf36b47036bacd6dad15d2c53e5ee  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

### Language Learning in Task Management and Task Accomplishment In Higher Education Perspectives on Content and Language Integrated Learning

### General information

Publication status: Published  
MoE publication type: A4 Article in a conference publication  
Organisations: Language Centre  
Contributors: Jauni, H., Niemelä, N.  
Number of pages: 11  
Pages: 183-203  
Publication date: 2014

### Host publication information

Title of host publication: HEPCLIL, Higher Education Perspectives on CLIL, University of Vic - Central University of Catalonia, VIC, 27 and 28 March 2014  
ISBN (Print): 978-84-941644-9-1  
URLs:  
<http://mon.uvic.cat/hepclil>

### Bibliographical note

HEPCLIL (Higher Education Perspectives on Content and Language Integrated Learning) Contribution:  
organisation=kie,FACT1=1Portfolio EDEND: 2014-12-30  
Source: researchoutputwizard  
Source ID: 592  
Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

## Leikilliset oppimateriaalit innostavat oppimaan

### General information

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Harju, V., Multisilta, J.  
Number of pages: 15  
Pages: 270-284  
Publication date: 2014

### Host publication information

Title of host publication: Rajaton luokkahuone  
Place of publication: Jyväskylä  
Publisher: PS-kustannus  
Editors: Niemi, H., Multisilta, J.  
ISBN (Print): 978-952-451-618-1

### Publication series

Name: Opetus 2000  
Source: Bibtex  
Source ID: urn:d30c0cd7fa0fca27885cc0eb957cad66  
Research output: Chapter in Book/Report/Conference proceeding > Chapter > Scientific > peer-review

## Leikkien mutta tosissaan: Leikillä iloa oppimisympäristöön

### General information

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Harju, V., Multisilta, J.  
Number of pages: 15  
Pages: 153-167  
Publication date: 2014

### Host publication information

Title of host publication: Oppiminen pelissä  
Place of publication: Tampere  
Publisher: Vastapaino  
Editors: Krokfors, L., Kangas, M., Kopisto, K.  
ISBN (Print): 978-951-768-441-5  
Source: Bibtex

Source ID: urn:ce86df96eaa96c4017e9e8db1435839d

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

### **Lifelong learning with a digital math game: Performance and basic experience differences across age**

Gaming is acknowledged as a natural way of learning and established as a mainstream activity. Nevertheless, gaming performance and subjective game experience were hardly examined across adult age groups for which the game was not intended to. In contrast to serious games as specific tools against a natural, age-related decline in cognitive performance, we evaluated performance and subjective experiences of the established math learning game Semideus across three age groups from 19 to 79. Observed decline in performance in terms of processing speed were not exclusively predicted by age, but also by gaming frequency. Strongest age-related drops of processing speed were found for the middle-aged group aged 35 to 59 years. On the other hand, more knowledge-dependent performance measures like the amount of correctly solved problems remained comparably stable. According to subjective ratings, the middle-aged group experienced the game as less fluent and automatic compared to the younger and older groups. Additionally, the elderly group of participants reported fewer negative attitudes towards technology than both younger groups. We conclude that, albeit performance differences with respect to processing speed, subjective gaming experience stayed on an overall high positive level. This further encourages the use of games for learning across age.

#### **General information**

Publication status: Published

MoE publication type: A4 Article in a conference publication

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

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

Number of pages: 11

Pages: 301-311

Publication date: 2019

#### **Host publication information**

Title of host publication: Games and Learning Alliance- 8th International Conference, GALA 2019, Proceedings

Publisher: Springer

Editors: Liapis, A., Yannakakis, G. N., Gentile, M., Ninaus, M.

ISBN (Print): 9783030343491

#### **Publication series**

Name: Lecture Notes in Computer Science

Volume: 11899

ISSN (Print): 0302-9743

ISSN (Electronic): 1611-3349

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

Keywords: Applicability, Elderly, Game-based learning, Life-long learning, Number-line estimation, Reliability, User-experience

DOIs:

10.1007/978-3-030-34350-7\_29

#### **Bibliographical note**

jufoid=62555

Source: Scopus

Source ID: 85082506812

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

### **Lokikirja oppimisen arviointimenetelmänä**

#### **General information**

Publication status: Accepted/In press

MoE publication type: A1 Journal article-refereed

Organisations: Automation Technology and Mechanical Engineering, Research area: Design, Development and LCM

Contributors: Rättyä, K., Juuti, T.

Publication date: 1 Sep 2019

Peer-reviewed: Yes

#### **Publication information**

Journal: KASVATUS, SUOMEN KASVATUSTIETEELLINEN AIKAKAUSKIRJA

ISSN (Print): 0022-927X

Original language: Finnish

URLs:

<http://urn.fi/URN:NBN:fi:tuni-202001201398>. Embargo ended: 1/12/20



### **Bibliographical note**

INT=educ,"Rättyä, Kaisu"

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

### **Luennot vuorovaikutuskeinona**

#### **General information**

Publication status: Published

MoE publication type: D3 Professional conference proceedings

Organisations: Department of Information Management and Logistics, Research group: Novi

Contributors: Hellsten, P., Myllärniemi, J., Helander, N.

Publication date: 17 Aug 2016

#### **Host publication information**

Title of host publication: PedaForum -päivät 17.–18.8.2016, Jyväskylä

URLs:

<https://www.jyu.fi/koulutus/pedaforum2016/abstraktit/teemaryhma13>

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Professional

### **Matematiikan oppimisen tukeminen teknillisessä yliopistokoulutuksessa**

#### **General information**

Publication status: Published

MoE publication type: D2 Article in professional manuals or guides or professional information systems or text book material

Organisations: Mathematics, Guangdong Technion-Israel Institute of Technology, Technion

Contributors: Pohjolainen, S., Rasila, A., Kuosa, K.

Number of pages: 24

Pages: 450-474

Publication date: 2018

#### **Host publication information**

Title of host publication: Matematiikan opetus ja oppiminen

Place of publication: Porvoo

Publisher: Niilo Mäki Instituutti

Editors: Joutsenlahti, J., Silfverberg, H., Räsänen, P.

ISBN (Print): 978-951-39-7584-5

ASJC Scopus subject areas: Mathematics(all), Social Sciences(all)

Keywords: mathematics education, mathematics teaching, mathematics learning

Research output: Chapter in Book/Report/Conference proceeding › Chapter › Professional

### **Matka AVOmerelle: Avoimuutta ja verkostomaista toimintakulttuuria tutkimassa**

#### **General information**

Publication status: Published

MoE publication type: D4 Published development or research report or study

Organisations: University of Tampere

Contributors: Lappalainen, Y.

Number of pages: 104

Publication date: 31 Mar 2014

#### **Publication information**

Publisher: University of Tampere

ISBN (Print): 978-952-6669-02-1

ISBN (Electronic): 978-952-6669-03-8

Original language: Finnish

URLs:

<http://wiki.eoppimiskeskus.fi/display/AVOkoulutukset/Matka+AVOmerelle+->

[+avoimuutta+ja+verkostomaista+toimintakulttuuria+tutkimassa](#)

Research output: Book/Report › Commissioned report › Professional

## Media ja yhteisölliset sovellukset

### General information

Publication status: Published  
MoE publication type: B2 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Multisilta, J.  
Publication date: 2014

### Host publication information

Title of host publication: Ikäteknologia  
Editor: Leikas, J.

### Publication series

Name: Vanhustyön keskusliiton tutkimuksia  
No.: 2  
Source: Bibtex  
Source ID: urn:84e5b0766f301d285b265f3c25b0ef85  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific

## Miten suomalainen koulu valmistaa tulevaisuuteen?

### General information

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Multisilta, J., Niemi, H., Lavonen, J.  
Number of pages: 13  
Pages: 286-298  
Publication date: 2014

### Host publication information

Title of host publication: Rajaton luokkahuone  
Place of publication: Jyväskylä  
Publisher: PS-kustannus  
Editors: Niemi, H., Multisilta, J.  
ISBN (Print): 978-952-451-618-1

### Publication series

Name: Opetus 2000  
Keywords: 516 Kasvatustieteet  
Source: Bibtex  
Source ID: urn:b9336b7394ddd242e1e061bc729a2ccb  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

## Motivational orientations and learning strategies of engineering students using MSLQ

Determining university students' motivational orientations and their use of different learning strategies reveals important characteristics of their self-regulation skills and personal functioning. Psychologists and educational researchers have sought different ways to assess these characteristics e.g., by several questionnaires. One of the most well-known questionnaire is the MSLQ (Motivated Strategies for Learning Questionnaire) that has been developed by Pintrich et al. in 1991. In this study, goal orientations, control of learning beliefs, self-efficacy for learning performance, resource management strategies as well as cognitive and metacognitive strategies of 62 engineering students from TUT (Tampere University of Technology) have been assessed using an extract of 22 questions from the MSLQ plus five additional queries, which have been formed by the author.

Students rated themselves anonymously using integers on a Likert scale between 1 ("not at all true of me") and 5 ("very true of me"). The rating distributions obtained indicate that the goal orientation of the students is mostly intrinsic than extrinsic. The students also have relatively strong control beliefs over their own learning. However, for some reasons, they have only moderate self-efficacy beliefs for learning performance. In addition, students' use of resource management strategies like scheduling of own learning considerably varies between individuals. Relative large deviations were also observed within learning strategies scales. Nonetheless, the results from the questionnaire gives insight into students' motivational orientations and their use of learning strategies, which help staff members to gain better understanding of different functioning of students attending to the class.

### General information

Publication status: Published  
MoE publication type: A4 Article in a conference publication  
Organisations: Automation and Hydraulic Engineering, Research group: Automation and Systems Theory  
Contributors: Pyrhönen, V.  
Number of pages: 8  
Pages: 411-418  
Publication date: 21 Sep 2018

#### Host publication information

Title of host publication: Proceedings of the 46th SEFI Annual conference: Creativity, Innovation and Entrepreneurship for Engineering Education Excellence  
Publisher: European Society for Engineering Education SEFI  
ISBN (Electronic): 978-2-87352-016-8  
Keywords: Self-Regulation, Learning Strategies, MSLQ, SELF-EFFICACY, Motivation, Metacognitive knowledge, cognitive control  
URLs:  
<https://www.sefi.be/wp-content/uploads/2018/10/SEFI-Proceedings-2-October-2018.pdf>

#### Bibliographical note

jufoid=8743  
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

#### MYSTERY SHOPPERS RECOGNISING KNOWLEDGE SHARING BARRIERS IN HIGHER EDUCATION

This study focuses on the knowledge sharing barriers in the space between learning and teaching in higher education as reported by mystery shoppers. There is surprisingly little context-specific research on learning and teaching in a knowledge intensive community like a university from the perspective of knowledge management (KM). Discussing learning and teaching within KM is based on considering students controversially as customers or stakeholders. Thus including them more meaningfully in assessing and developing teaching practices, or knowledge flow, seems justified. The specific aim of this paper is to first recognise possible knowledge sharing barriers and then categorize such barriers emerging from the material into three larger domains, namely, individual barriers, technological barriers and organisational barriers.

There were 45 students from all faculties participating in a mystery shopper project in a Finnish university of technology. They observed their learning experience for six weeks in order to supplement data from other sources, to add a student voice on the process of developing learning and teaching in higher education.

The research approach represents qualitative content analysis in which knowledge-sharing barriers were recognised from the qualitative mystery shopper data. The results identify teaching practises that contribute to creating knowledge sharing barriers. More detailed and almost real-time contextual activity sampling is suggested as a method for further study and also an avenue for instant feedback for teaching staff. The results will provide data on current knowledge practices and learning processes in a technical university in Finland.

#### General information

Publication status: Published  
MoE publication type: A4 Article in a conference publication  
Organisations: Language Centre, Department of Information Management and Logistics, Research group: Novi, University of Tampere  
Contributors: Tukiainen, M., Helander, N., Mäkinen, M.  
Publication date: 16 Nov 2015

#### Host publication information

Title of host publication: ICERI2015 Proceedings : 8th annual International Conference of Education, Research and Innovation Seville (Spain). 16th - 18th of November, 2015.  
ISBN (Electronic): 978-84-608-2657-6  
URLs:  
<https://iated.org/iceri/>

#### Bibliographical note

ORG=kie,0.5  
ORG=tlo,0.5  
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

#### Näkemyksiä nykyopettajuudesta yliopistossa

#### General information

Publication status: Published  
MoE publication type: D3 Professional conference proceedings

Organisations: Department of Information Management and Logistics, Research group: Novi  
Contributors: Myllärniemi, J., Hellsten, P., Helander, N.  
Publication date: 18 Aug 2016

#### Host publication information

Title of host publication: PedaForum -päivät 17.–18.8.2016, Jyväskylä

URLs:

<https://www.jyu.fi/koulutus/pedaforum2016/abstraktit/teemaryhma12>

Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Professional

#### Neurofunctional plasticity in fraction learning: An fMRI training study

Background: Fractions are known to be difficult for children and adults. Behavioral studies suggest that magnitude processing of fractions can be improved via number line estimation (NLE) trainings, but little is known about the neural correlates of fraction learning.

Method: To examine the neuro-cognitive foundations of fraction learning, behavioral performance and neural correlates were measured before and after a five-day NLE training.

Results: In all evaluation tasks behavioral performance increased after training. We observed a fronto-parietal network associated with number magnitude processing to be recruited in all tasks as indicated by a numerical distance effect. For symbolic fractions, the distance effect on intraparietal activation was only observed after training.

Conclusion: The absence of a distance effect of symbolic fractions before the training could indicate an initially less automatic access to their overall magnitude. NLE training facilitates processing of overall fraction magnitude as indicated by the distance effect in neural activation.

#### General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Education, Research group: TUT Game Lab, Computing Sciences, Eberhard-Karls University Tuebingen, Universitätsmedizin Greifswald, Leibniz-Institut für Wissensmedien, Loughborough University, Individual Development and Adaptive Education Center, Université de Paris

Contributors: Wortha, S. M., Bloechle, J., Ninaus, M., Kiili, K., Lindstedt, A., Bahnmüller, J., Moeller, K., Klein, E.

Number of pages: 15

Publication date: 1 Dec 2020

Peer-reviewed: Yes

#### Publication information

Journal: Trends in Neuroscience and Education

Volume: 21

Article number: 100141

ISSN (Print): 2211-9493

Original language: English

ASJC Scopus subject areas: Neuroscience (miscellaneous), Education, Cognitive Neuroscience, Behavioral Neuroscience

Keywords: Flow experience, fMRI, Fraction processing, Number line estimation training, Numerical distance effect

DOIs:

10.1016/j.tine.2020.100141

Source: Scopus

Source ID: 85090911630

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

#### On Actor-Network Theory and Learning Ecosystems based on Mobile Social Media

In this paper we will define learning ecosystems based on social media and try to describe the learning process in these environments using Actor-Network Theory. Especially, we are interested in the question of how an ad-hoc group of learners could be understood as an actor-network in ANT. We claim, that the availability of social media does not guarantee that the actors in the social media system form the actor-network. However, it would be important to know under which conditions the actor-network is formed and what kind of quality we get from the actor-networks. Finally, we conclude that pedagogically meaningful and high-quality learning ecosystems based on mobile social media can be described as actor-networks.

#### 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

Contributors: Multisilta, J.

Pages: 193-198

Publication date: 2011

### Host publication information

Title of host publication: Proceedings of the IADIS International Conference on Mobile Learning

Place of publication: Lisbon

Editors: Arnedillo Sánchez, I., Isaías, P.

ISBN (Print): 978-972-8939-45-8

ISBN (Electronic): 978-972-8939-42-7

Source: Bibtex

Source ID: urn:1d3e650081e019c44ba2b322f2354ad1

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

## Opiskelijoiden lähestymistavat oppimiseen ja tiedon luomisen menetelmät rakennustekniikan yliopistokoulutuksessa

### General information

Publication status: Published

MoE publication type: G5 Doctoral dissertation (article)

Organisations: Civil Engineering

Contributors: Salmisto, A.

Number of pages: 63

Publication date: 8 Mar 2019

### Publication information

Publisher: Tampereen yliopisto

Volume: 30

ISBN (Print): 978-952-03-0976-3

ISBN (Electronic): 978-952-03-0977-0

Original language: Finnish

### Publication series

Name: Tampereen yliopiston väitöskirjat

No.: 30

ISSN (Print): 2489-9860

ISSN (Electronic): 2490-0028

Electronic versions:

errata

URLs:

<http://urn.fi/URN:ISBN:978-952-03-0977-0>

Research output: Book/Report > Doctoral thesis > Collection of Articles

## Oppilaiden tuottamien videoiden käyttö opetuksessa

### General information

Publication status: Published

MoE publication type: B2 Part of a book or another research book

Organisations: University of Helsinki

Contributors: Multisilta, J., Niemi, H.

Number of pages: 12

Pages: 66-77

Publication date: 2013

### Host publication information

Title of host publication: Uusi oppiminen

Publisher: Eduskunta

ISBN (Print): 978-951-53-3521-0

ISBN (Electronic): 978-951-53-3522-7

### Publication series

Name: Eduskunnan tulevaisuusvaliokunnan julkaisu

No.: 8/2013

Source: Bibtex

Source ID: urn:55d626fdcafb68a9f7bec1f2f9e7aa5

Research output: Chapter in Book/Report/Conference proceeding > Chapter > Scientific

## 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  
Pages: 93  
Publication date: 16 Aug 2018  
Peer-reviewed: Unknown  
Event: Paper presented at Peda-forum-päivät 2018, Turku, Finland.  
ASJC Scopus subject areas: Education  
URLs:  
<http://web.abo.fi/lc/pedaforum2018/abstracts.pdf>  
Research output: Other conference contribution > Paper, poster or abstract > Professional

### Otos iloa – Lasten kokemuksia iloa tuottavasta oppimisympäristöstä

#### General information

Publication status: Published  
MoE publication type: A1 Journal article-refereed  
Organisations: Industrial and Information Management, Research group: Knowledge and Learning Research Center, University of Tampere, University of Helsinki  
Contributors: Huhtamäki, E., Holma, H., Nokelainen, P., Kumpulainen, K.  
Pages: 336-352  
Publication date: 2017  
Peer-reviewed: Yes

#### Publication information

Journal: Kasvatus  
Volume: 48  
Issue number: 4  
ISSN (Print): 0022-927X  
Original language: Finnish  
Research output: Contribution to journal > Article > Scientific > peer-review

### Pääkirjoitus

#### General information

Publication status: Published  
MoE publication type: B1 Article in a scientific magazine  
Organisations: Teaching and Learning Services  
Contributors: Nokelainen, P.  
Pages: 4-6  
Publication date: 2016  
Peer-reviewed: No

#### Publication information

Journal: Ammattikasvatuksen aikakauskirja  
Volume: 18  
Issue number: 1  
ISSN (Print): 1456-7989  
Original language: Finnish  
URLs:  
[http://www.okka-saatio.com/aikakauskirja/pdf/Aikak\\_2016\\_1\\_paakirjoitus.pdf](http://www.okka-saatio.com/aikakauskirja/pdf/Aikak_2016_1_paakirjoitus.pdf)  
Research output: Contribution to journal > Editorial > Scientific

### Pedagogical Content Knowledge in Product Development Education

Engineering education at university faces challenge concerning the efficiency in producing results in learning. Engineering Education will be exposed to globalisation resulting in tough competition between the service providers and individual contributors. This study focus on capturing and discussing teachers' pedagogical content knowledge on product development education. Currently there are no holistic approaches presented from teacher knowledge viewpoint. The next steps how to develop this knowledge of product development teaching further by focusing on the continuous learning

process.

#### 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, University of Tampere

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

Number of pages: 6

Pages: 483-488

Publication date: 7 Sep 2017

#### Host publication information

Title of host publication: Proceedings of the 19th International Conference on Engineering and Production Design Education, 2017, Oslo, Norway, 7th - 8th September 2017

Publisher: The Design Society

ISBN (Print): 978-1-904670-84-1

Keywords: pedagogical content knowledge, product development education, student's misconceptions, evaluation methods

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

#### Pelataan suomalainen koulu kukoistukseen

##### General information

Publication status: Published

MoE publication type: D1 Article in a trade journal

Organisations: University of Helsinki

Contributors: Multisilta, J.

Number of pages: 1

Pages: 18

Publication date: 2014

Peer-reviewed: Unknown

##### Publication information

Journal: Tiedosta

Volume: 2014

Issue number: 1

ISSN (Print): 1795-5351

Original language: Finnish

Keywords: 516 Kasvatustieteet

Source: Bibtex

Source ID: urn:b91a1807d1c1d15a3f68efb6b92d65a7

Research output: Contribution to journal › Article › Professional

#### Practice makes perfect! Developing internship process in Finnish universities

##### General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Teaching and Learning Services

Contributors: Virkki-Hatakka, T., Pajarre, E., Heikkilä, M., Hietaniemi, R., Pajari, S., Tompuri, H.

Pages: 1402-1408

Publication date: 21 Sep 2018

##### Host publication information

Title of host publication: Proceedings of the SEFI annual conference 17-22 September 2018

Publisher: European Society for Engineering Education SEFI

ISBN (Print): 978-2-87352-016-8

Keywords: practice, internship, higher education

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

#### Proceedings of the SEFI 47th Annual Conference, 2019: Varietas delectat... Complexity is the new normality

##### General information

Publication status: Published

MoE publication type: C2 Edited books

Organisations: Computing Sciences, Technological University Dublin, Budapest University of Technology and Economics

Contributors: Nagy, B. V. (ed.), Murphy, M. (ed.), Järvinen, H. (ed.), Kálman, A. (ed.)

Number of pages: 2,128

Publication date: 30 Oct 2019

### Publication information

Publisher: European Society for Engineering Education SEFI

ISBN (Electronic): 978-2-87352-018-2

Original language: English

URLs:

[https://www.sefi.be/wp-content/uploads/2019/10/SEFI2019\\_Proceedings.pdf](https://www.sefi.be/wp-content/uploads/2019/10/SEFI2019_Proceedings.pdf)

Research output: Book/Report > Anthology > Scientific > peer-review

### Process Safety Competence of Vocational Students

Since safety demands are an integral part of the process industry, process safety competence should be developed accordingly. When developing this competence during the vocational education and training (VET) of process operators, close collaboration between the students, VET providers, and workplaces is essential. The aim of this study was to examine the current needs regarding process safety education in the process industry with respect to VET. Interviews ( $n = 46$ ) and a workshop were carried out with participating process industry, VET, and expert organizations. Competence requirements were categorized into (1) knowledge and skills, (2) values and attitudes, and (3) abilities and traits needed to achieve the required level of performance in the process industry. Developing these competencies can be helpful to VET organizations, as they enable students to adapt to workplaces' process safety requirements. Moreover, the study results can be utilized in the development of the process safety competence of senior employees.

### General information

Publication status: Published

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

Organisations: Industrial Engineering and Management, Research group: Centre for Safety Management and Engineering

Contributors: Tappura, S., Nenonen, S., Nenonen, N., Kivistö-Rahnasto, J.

Number of pages: 10

Pages: 383-392

Publication date: 6 Jun 2019

### Host publication information

Title of host publication: Advances in Safety Management and Human Factors : Proceedings of the AHFE 2019 International Conference on Safety Management and Human Factors, July 24-28, 2019, Washington D.C., USA

Place of publication: Cham

Publisher: Springer International Publishing

Editor: Arezes, P.

ISBN (Print): 978-3-030-20496-9

ISBN (Electronic): 978-3-030-20497-6

### Publication series

Name: Advances in Intelligent Systems and Computing,

Volume: 969

ISSN (Print): 2194-5357

Electronic versions:

Process Safety Competence of Vocational Students. Embargo ended: 6/06/20

DOIs:

10.1007/978-3-030-20497-6\_36

URLs:

<http://urn.fi/URN:NBN:fi:tuni-202009096938>. Embargo ended: 6/06/20

### Bibliographical note

jufoid=75019

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

### Projektiyöskentely matematiikan opiskelussa yläkoululaisten ja heidän opettajiensa kokemana

### General information

Publication status: Published

MoE publication type: A4 Article in a conference publication



Organisations: Mathematics, Research group: Computer Science and Applied Logics, University of Helsinki  
Contributors: Viro, E., Joutsenlahti, J., Eriksson, S.  
Publication date: 31 Oct 2017

#### Host publication information

Title of host publication: 2017: Proceedings of the annual FMSERA symposium 2016

#### Publication series

Name: Proceedings of the FMSERA annual symposium  
Publisher: Finnish Mathematics and Science Education Research Association (FMSERA)  
ISSN (Electronic): 2489-4583  
Electronic versions:  
FMSERA  
URLs:  
<https://journal.fi/fmsera/article/view/60934>  
<http://urn.fi/URN:NBN:fi:ty-201711202177>

#### Bibliographical note

EXT="Eriksson, Sirkka-Liisa"  
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

#### Prologue: Towards a Global Ecosystem

##### General information

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Niemi, H., Multisilta, J., Lipponen, L., Vivitsou, M.  
Pages: ix-xii  
Publication date: 2 Oct 2014

##### Host publication information

Title of host publication: Finnish Innovations and Technologies in Schools: a Guide towards New Ecosystems of Learning  
Place of publication: Rotterdam  
Publisher: Sense Publishers  
Editors: Niemi, H., Multisilta, J., Lipponen, L., Vivitsou, M.  
ISBN (Print): 978-94-6209-747-6  
Source: Bibtex  
Source ID: urn:428e026a42270240fd84f51f0240c03f  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

#### Relationships among Civil Engineering Students' Approaches to Learning, Perceptions of the Teaching-Learning Environment, and Study Success

This study examines the relationship among civil engineering students' approaches to learning, their perceptions of the teaching-learning environment, and their study success. The aim was to identify civil engineering students' approaches to learning and how their approaches to learning are related to their perceptions of the learning-teaching environment and their study success. The data of the study consist of the students' answers to a questionnaire (n=215) and their study success data (n=204), which were gathered from their university's study register. The study success data consist of the cumulative study credits and weighted averages of their course grades. The students were classified into four clusters according to their approaches to learning. Differences in their perceptions of the teaching-learning environment and study success between the clusters were statistically significant. Students who belonged to clusters that emphasized the deep approach to learning experienced their teaching-learning environment more positively than did other students. Students who belonged to clusters emphasizing organized studying earned more credits and higher marks in their studies than did other students.

##### General information

Publication status: Published  
MoE publication type: A1 Journal article-refereed  
Organisations: Civil Engineering, Research group: Digitalization in the real estate and construction sector, Industrial and Information Management, University of Helsinki  
Contributors: Salmisto, A., Postareff, L., Nokelainen, P.  
Publication date: 1 Oct 2017  
Peer-reviewed: Yes

### Publication information

Journal: Journal of Professional Issues in Engineering Education and Practice

Volume: 143

Issue number: 4

Article number: 04017010

ISSN (Print): 1052-3928

Ratings:

Scopus rating (2017): CiteScore 2.3 SJR 0.456 SNIP 1.301

Original language: English

ASJC Scopus subject areas: Civil and Structural Engineering, Industrial relations, Strategy and Management

Keywords: Approaches to learning, Engineering education, Study success, Teaching-learning environment

DOIs:

10.1061/(ASCE)EI.1943-5541.0000343

Source: Scopus

Source ID: 85023205638

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

### Salivary cortisol reactivity to psychological stressors in infancy: A meta-analysis

Measurement of salivary cortisol is a practical and non-invasive tool for studying stress reactivity to various types of stressors even in young infants. Whereas studies using physical stressors during the first months of life have found robust cortisol responses to painful stimuli, research with older infants using psychological stressors (e.g., parental separation) has produced mixed findings, limiting our understanding of potential developmental changes in cortisol reactivity across infancy. In the present study, we used meta-analysis to systematically investigate whether psychological stressor paradigms are associated with measurable cortisol responses in infants under 18 months of age and whether the magnitude of the responses is moderated by the type of psychological stressor (i.e., separation, frustration, novelty, or disruption of parental interaction), infant age, and other potential moderators. Across 47 studies (N = 4095, age range: 3–18 months), we found that commonly used psychological stressor paradigms are associated with a small (Hedges'  $g = .11$ ) increase in salivary cortisol levels in typically developing infants. Stressor type moderated the effect sizes, and when effect sizes in each category were analyzed separately, only the separation studies were associated with a consistent increase in cortisol following the stressor. Age did not moderate the effect sizes either in the full set of studies or within the separate stressor types. These meta-analytic results indicate that the normative cortisol response to psychological stressors across infancy is small and emphasize the need for standardized stressor paradigms to assess cortisol responses systematically across infancy.

### General information

Publication status: Published

MoE publication type: A2 Review article in a scientific journal

Organisations: Education, Human Information Processing Laboratory

Contributors: Puhakka, I. J., Peltola, M. J.

Publication date: 1 May 2020

Peer-reviewed: Yes

### Publication information

Journal: PSYCHONEUROENDOCRINOLOGY

Volume: 115

Article number: 104603

ISSN (Print): 0306-4530

Original language: English

ASJC Scopus subject areas: Endocrinology, Diabetes and Metabolism, Endocrinology, Endocrine and Autonomic Systems, Psychiatry and Mental health, Biological Psychiatry

Keywords: Cortisol, Infant, Meta-Analysis, Saliva, Stressor

DOIs:

10.1016/j.psyneuen.2020.104603

Source: Scopus

Source ID: 85081216139

Research output: Contribution to journal > Review Article > 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

### **Sosiaalinen media ja verkkovideot vihteessä ja oppimisessa**

#### **General information**

Publication status: Published

MoE publication type: B2 Part of a book or another research book

Organisations: University of Helsinki

Contributors: Multisilta, J.

Number of pages: 10

Pages: 73-82

Publication date: 2012

#### **Host publication information**

Title of host publication: Tykkää tästä! Opettajan ammattietiikka sosiaalisen median ajassa

Place of publication: Jyväskylä

Publisher: PS-kustannus

Editors: Niemi, H., Sarras, R.

ISBN (Print): 978-952-451-550-4

Source: Bibtex

Source ID: urn:84d76909f4ec4fcc5954e0bb1c334741

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

### **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](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

#### **Standing and attractiveness of vocational education and training in Finland: focus on learning environments**

This article discusses the standing and attractiveness of vocational education and training (VET) in Finland. We argue that learning environments, along with the expectations for and attitudes towards them, are related to the attractiveness of VET. The empirical part of the article describes a comprehensive view of learning environments based on our several interview data sets and previous findings. Four sets of existing interview data (N = 96) are combined to depict school-work connection from the viewpoints of VET providers and teachers (n = 23) and workplace actors, including employer representatives and learners' workplace trainers and co-workers (n = 30), as well as from the perspective of VET learners (students and apprentices; n = 43). The article discusses the design rationale behind learning environments and the challenges these environments face in Finland. The article concludes that learning environment design is focused on alignment between school and work. However, based on the interview data, there are attitudes and practices that hinder the connectivity between education and work, and the responsibility to align various experiences is largely left to the learner.

#### **General information**

Publication status: E-pub ahead of print

MoE publication type: A1 Journal article-refereed

Organisations: Education

Contributors: Rintala, H., Nokelainen, P.

Publication date: 2020

Peer-reviewed: Yes

#### **Publication information**

Journal: JOURNAL OF VOCATIONAL EDUCATION AND TRAINING

ISSN (Print): 1363-6820

Original language: English

ASJC Scopus subject areas: Education

Keywords: attractiveness, learning environment, standing, Vocational education

DOIs:

10.1080/13636820.2020.1744696

Source: Scopus

Source ID: 85082451882

### **Structural development of substance in engineering education: Method of cornerstones**

During the current millennium, engineering education has confronted an emerging problem with learning. Driving forces have mainly been economical, since financial pressure and effort for increasing efficiency have given rise to growing amount of accessed and graduated students. Consequently, in the lack of time and financial resources, universities have had a tendency to decrease the emphasis on thorough and time-consuming learning of fundamentals. As a result, so called immediate skills have gained excessive role in comparison with long-term skills in engineering education. According to a generally accepted view, students learn to carry out engineering tasks quite well, but they do not necessarily learn to think. Recently, a study carried out at MIT ended up to call for "coherent and interconnected curriculum structure" to achieve excellence in engineering education. We suggest that by utilizing the hierarchical structure of natural sciences in engineering education, such a coherent and interconnected structure can be created. In this paper, we show how the method of cornerstones is implemented to clarify engineering substance and to promote higher learning. By making cornerstone-based structure visible to students, we aim to clarify and harmonize the substance and to promote both immediate and long-term engineering skills.

#### **General information**

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: Electrical Energy Engineering, Tampere University of Applied Sciences

Contributors: Korpela, A., Tarhasaari, T., Kettunen, L., Mikkonen, R., Kinnari-Korpela, H.

Number of pages: 11

Pages: 566-576

Publication date: 2017

#### **Host publication information**

Title of host publication: Interactive Collaborative Learning - Proceedings of the 19th ICL Conference - Volume 1

Publisher: Springer Verlag

ISBN (Print): 9783319503363

#### **Publication series**

Name: Advances in Intelligent Systems and Computing

Volume: 544

ISSN (Print): 2194-5357

ASJC Scopus subject areas: Control and Systems Engineering, Computer Science(all)

Keywords: Engineering education, Higher learning, Method of cornerstones

Electronic versions:

cornerstones\_icl2016\_full\_paper

DOIs:

10.1007/978-3-319-50337-0\_54

URLs:

<http://urn.fi/URN:NBN:fi:tuni-201910023650>

#### **Bibliographical note**

jufoid=75019

EXT="Korpela, Aki"

EXT="Kinnari-Korpela, Hanna"

Source: Scopus

Source ID: 85010639773

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

### **Students' experiences of Workplaces as Learning Environments in Vocational Education and Training in Finland**

#### **General information**

Publication status: Published

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

Organisations: Industrial and Information Management, Research group: Knowledge and Learning Research Center, University of Tampere

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

Publication date: 15 Dec 2018

#### **Host publication information**

Title of host publication: Vocational Education & Training - The World of Work and Teacher Education : Emergent Issues in Research on Vocational Education & Training Vol. 3

Publisher: Stockholm University Press  
Editors: Gougoulakis, P., Teräs, M., Moreno Herrera, L.  
ISBN (Print): 9789186743888

### **Bibliographical note**

jufoid=8678

Research output: Chapter in Book/Report/Conference proceeding › Chapter › 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**

Publication status: Published  
MoE publication type: A1 Journal article-refereed  
Organisations: Education  
Contributors: Niiranen, S.  
Pages: 1-13  
Publication date: 16 Sep 2019  
Peer-reviewed: Yes

### **Publication information**

Journal: International Journal of Technology and Design Education  
ISSN (Print): 0957-7572  
Ratings:  
Scopus rating (2019): CiteScore 3 SJR 1.014 SNIP 2.213  
Original language: English  
ASJC Scopus subject areas: Education  
Keywords: learning-by-doing approach, hands-on learning, pragmatism, craft, technology education  
Electronic versions:  
Niiranen2019\_Article\_SupportingTheDevelopmentOfStud

DOIs:

10.1007/s10798-019-09546-0

URLs:

<http://urn.fi/URN:NBN:fi:tuni-201910254094>

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

### **Survey of health informatics education in Finland in 2017**

The European Union and the USA collaborate in developing the skills of the application of information technology in the health care workforce. A part of this activity is a project which studies the gaps in the present education and proposes methods of filling these gaps. The objective of this paper is to identify the existing IT related education to the health care work force in Finland. A secondary objective was to get an impression of the experience and attitudes of the members of this workforce about health IT education.

This paper presents the results of the survey of how information technology is educated to the students of the health care professions in Finland in the year 2017. In addition to literature search including also the study guides of many major health care professional education organizations, 24 telephone interviews of health care professionals in different fields in Finland were made.

The results show that although basic information technology education is often available at every level of education, it is expected that the health care professionals learn to use the health information systems during their training periods or later in working life. The interviews showed that the given education varied considerably and some of the personnel had received no or only a little education on IT during studies. As the amount and quality of on-the-job information technology education varies, many health care professionals are not able to fully benefit from the information systems if their general feeling is that they just "survive" from daily activities with them.

#### **General information**

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Sleep and Sensory Signal Analysis Group-SSSAG, Research group: Personal Health Informatics-PHI

Contributors: Tolonen, J., Värri, A.

Number of pages: 15

Pages: 217–231

Publication date: 22 May 2017

Peer-reviewed: Yes

#### **Publication information**

Journal: Finnish Journal of eHealth and eWelfare

Volume: 9

Issue number: 2-3

ISSN (Print): 1798-0798

Original language: English

ASJC Scopus subject areas: Computer Science(all)

Keywords: health informatics competency, health informatics skills, health informatics workforce, health informatics education, health information technology

Electronic versions:

SurveyOfHleduInFinland2017

URLs:

<http://urn.fi/URN:NBN:fi:tty-201710051987>

URLs:

<https://journal.fi/finjehew/article/view/60999> (the article "Survey of health informatics education in Finland in 2017" in the Finnish Journal of eHealth and eWelfare)

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

### **Teacher perceptions of teaching CLIL courses**

After various definitions and discussions about what CLIL / ICLHE is, there is a need to take a critical stance on the actual teaching practices teachers employ in (adjunct) CLIL classrooms in a higher education setting. We aim to contribute to a better understanding of teacher perceptions of teaching CLIL courses, which can lead to a better ability in identifying staff training needs. Based on a questionnaire and small-scale interview, we give the voice to the teachers to describe their current teaching from the ICLHE point of view. Through thematic analysis we focus on the areas the interviews show as in need of development. These are identified based on how the teachers describe their own teaching. The results report similarities, but also differences, between the responses to questionnaire items and interview answers on the same topics. There is a need for a deeper understanding of the pedagogical and didactic differences between CLIL teaching and subject-specific language teaching. The results show that these teachers would benefit from training focusing on the basic

didactic practices of CLIL, and especially on the cognitive dimension in CLIL teaching. The results provide information from an adjunct CLIL context to researchers and serve as guide for future teacher development.

#### **General information**

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: Language Centre  
Contributors: Niemelä, N., Jauni, H.  
Pages: 77-96  
Publication date: 2017

#### **Host publication information**

Title of host publication: Integrating Content and Language in Higher Education : Perspectives on Professional Practice. Selected Papers from the IV International Conference Integrating Content and Language in Higher Education 2015  
Place of publication: Frankfurt  
Publisher: Peter Lang  
Editors: Valcke, J., Wilkinson, R.  
ISBN (Print): 978-3-631-68126-8  
ASJC Scopus subject areas: Arts and Humanities(all)  
DOIs:  
10.3726/978-3-653-07263-1  
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

### **Teachers' perspectives on project-based learning in mathematics and science**

#### **General information**

Publication status: Published  
MoE publication type: A1 Journal article-refereed  
Organisations: Computing Sciences, Tampere University, University of Eastern Finland  
Contributors: Viro, E., Lehtonen, D., Joutsenlahti, J., Tahvanainen, V.  
Pages: 12-31  
Publication date: 2020  
Peer-reviewed: Yes

#### **Publication information**

Journal: European Journal of Science and Mathematics Education  
Volume: 8  
Issue number: 1  
ISSN (Print): 2301-251X  
Original language: English  
URLs:  
<http://scimath.net/articles/81/813.pdf>  
Research output: Contribution to journal › Article › Scientific › peer-review

### **The concept of active learning and the measurement of learning outcomes: A review of research in engineering higher education**

Active learning has gained growing political, instructional, and research interest. However, the definitions of active learning are wide. The learning outcomes related to it have been mostly positive but the measurement methods are not without problems. This review provides an overview of active learning, especially in the context of engineering higher education, by answering two research questions: (1) How is the concept of active learning defined and justified in engineering higher education research? (2) What are the learning outcomes connected to active learning and how is learning measured in engineering higher education research? Sixty-six empirical articles were analyzed inductively with qualitative content analysis. The analysis showed that active learning was defined in various ways, and in some articles, it was not defined at all. In addition, justification (theoretical or empirical) for the use of active learning was seldomly reported. Finally, the indicators used to measure the impact of active learning on students' learning outcomes were mostly based on students' self-report data and focused on course specific development in subject-related knowledge. More thorough descriptions and theoretical justifications, as well as the consideration of learning outcomes with appropriate research methods, could reinforce the transparency of empirical interventions and the application of active learning.

#### **General information**

Publication status: Published  
MoE publication type: A1 Journal article-refereed  
Organisations: Education, Research group: Knowledge and Learning Research Center, Helsinki University  
Contributors: Hartikainen, S., Rintala, H., Pylväs, L., Nokelainen, P.  
Number of pages: 19



Publication date: 19 Nov 2019

Peer-reviewed: Yes

### Publication information

Journal: EDUCATION SCIENCES

Volume: 9

Issue number: 4

Article number: 276

ISSN (Print): 2227-7102

Ratings:

Scopus rating (2019): CiteScore 0.8 SJR 0.242 SNIP 0.733

Original language: English

ASJC Scopus subject areas: Education, Developmental and Educational Psychology, Public Administration

Keywords: Active learning, Engineering, Higher education, Learning outcomes, Review

Electronic versions:

education-09-00276

DOIs:

10.3390/educsci9040276

URLs:

<http://urn.fi/URN:NBN:fi:tuni-201912136858>

### Bibliographical note

dupl=52290317

Source: Scopus

Source ID: 85075329022

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

### The Definition of Informatics Competencies in Finnish Healthcare and Social Welfare Education

Finland is a world leader in the use of public electronic services. Continuous improvement to competencies is a prerequisite for the success of digitalisation in the service development sector. The increasing use of information technology in health and social care needs to be taken into account in the education of the health and social care sector work force. The mandate of the national SotePeda 24/7 project is to identify and define the informatics competencies required for multidisciplinary education of this sector in Finland. The project has adapted international recommendations for use in the national context. The national recommendation covers 12 areas of competency and related content. In addition to defining competencies, the project has produced a toolbox of materials for use by educators of these topics in universities that cover applied sciences and lifelong learning. The results of the project are expected to significantly improve the preparedness of graduating health and social care and related engineering and business sector students to make full use information technology, all of which benefits the national health and social welfare system.

### General information

Publication status: Published

MoE publication type: A4 Article in a conference publication

Organisations: BioMediTech, Tampere Uni. of Applied Sci., Laurea University of Applied Sciences, University of Eastern Finland

Contributors: Värri, A., Tiainen, M., Rajalahti, E., Kinnunen, U. M., Saarni, L., Ahonen, O.

Number of pages: 5

Pages: 1143-1147

Publication date: 16 Jun 2020

### Host publication information

Title of host publication: Digital Personalized Health and Medicine : Proceedings of MIE 2020

Publisher: IOP Press

ISBN (Print): 978-1-64368-082-8

ISBN (Electronic): 978-1-64368-083-5

### Publication series

Name: Studies in Health Technology and Informatics

Volume: 270

ISSN (Print): 0926-9630

ASJC Scopus subject areas: Biomedical Engineering, Health Informatics, Health Information Management

Keywords: competence, education, health care, informatics, information technology, skill, social care

Electronic versions:

SHTI-270-SHTI200341

DOIs:

10.3233/SHTI200341

URLs:

<http://urn.fi/URN:NBN:fi:tuni-202007076340>

Source: Scopus

Source ID: 85086905812

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

### **The significance of self-regulation in digitalized online courses**

Many traditional classroom activities such as lectures and exercise classes are moving out of on-campus facilities as a result of digitalization. Most often they are replaced by video lectures and other online learning activities like automated quizzes and assignments. Digitalized activities improve spatial and temporal flexibility of learning because all digitalized material can be published at once, and they are accessible from any place at any time without the need for physical presence at a specific time. Hence, they also support self-paced study of variety of learners having different backgrounds. For example, a learner can watch videos repeatedly or rewind back to a difficult topic that requires revision from the learner. On the other hand, fast-paced students can fast-forward easier parts or skip them entirely, which allow them to focus on more difficult content.

However, reality may not be so auspicious, especially when academic courses are digitalized by a large extent, which typically increases academic freedom of all learners. In such cases, learner's self-regulation skills and specific use of personally selected processes like 1) willingness to set goals, 2) ability to select suitable learning strategies for attaining goals, 3) ability to monitor own learning progress, 4) effective time management skills, and 5) ability to reject distractions in own personal learning environment significantly affect learner's potential to succeed in academic activities.

In this study, teaching and learning experiences from a highly digitalized course intended for Bachelors' level engineering students in three different course implementations are discussed. Specific focus is steered towards the five self-regulation skills and processes listed above, and their connection to academic achievement. After the first implementation, dropouts and those who displayed poor academic performance also lacked self-regulation skills, especially, the five above- listed key factors were almost completely missing. Lack of self-regulation skills was identified by a questionnaire that focuses on the five key factors at a personal level. As a result, specific activities and monitoring processes were tailored for the next two implementations, which aimed to help learners to pay personal attention to key factors of self-regulation, and thereby enabled them to become more initiative in their own learning processes and regulation. Based on this study, it seems that digitalized courses launched at an early stage of academic studies may need additional support for self-regulatory processes in order to enable successful progression of studies and satisfactory grades.

#### **General information**

Publication status: Published

Organisations: Automation and Hydraulic Engineering

Contributors: Pyrhönen, V.

Publication date: 24 Jan 2018

Peer-reviewed: Unknown

Event: Paper presented at Teaching for Learning - The University Perspective, Tartu, Estonia.

Keywords: Self-Regulation, Digitalization, Learning Environment, Learning outside the classroom, Problem-based learning

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

### **The StarT Project Competition from the Perspective of Mathematics and Academic Literacy**

This article concerns mathematical project work in the context of Finnish StarT project competition. The focus is on how well pupils achieve the learning objective of their project work: learning mathematics and practicing 21st century skills. Development of the learning objectives is considered from the viewpoint of Finnish national core curriculum and evaluated using the framework of academic literacy. The research material consists of teams' project reports, observation, and questionnaires. Project work in the StarT competition seems to develop the learning objectives of project-based learning: pupils practice 21st century skills while studying mathematical contents.

#### **General information**

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Mathematics, Research group: Computer Science and Applied Logics

Contributors: Viro, E., Joutsenlahti, J.

Publication date: 4 May 2018

Peer-reviewed: Yes

#### **Publication information**

Journal: EDUCATION SCIENCES

Volume: 8

Issue number: 2

ISSN (Print): 2227-7102

Ratings:

Scopus rating (2018): CiteScore 0.3 SNIP 5.28

Original language: English

Keywords: project-based learning, academic literacy, Mathematics, Education

Electronic versions:

education-08-00067

DOIs:

10.3390/educsci8020067

URLs:

<http://urn.fi/URN:NBN:fi:tyy-201805291877>

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

## Tila haltuun! Suositukset virtuaalisen suomen opiskelun toteuttamiseen

### General information

Publication status: Published

MoE publication type: D4 Published development or research report or study

Organisations: University of Tampere

Contributors: Lappalainen, Y., Poikolainen, M., Trapp, H., Eloranta, J., Itähaarla, A., Järvenpää, L., Kamppari, H., Korkalainen, T., Lakkala, M., Lehtonen, T., Liukkonen, T. N., Mäkilä, T., Okkonen, J., Rakkolainen, I., Rasila, M., Tapaninen, T., Vauhkonen, T.

Number of pages: 135

Publication date: 18 Jun 2015

### Publication information

Publisher: Turun yliopiston Brahea-keskus

ISBN (Electronic): 978-951-29-6162-7

Original language: Finnish

### Publication series

Name: Turun yliopiston Brahea-keskuksen julkaisuja

Publisher: Turun yliopiston Brahea-keskus

No.: 6

ISSN (Electronic): 2342-4273

Research output: Book/Report › Commissioned report › Professional

## Toimijuus ja ammatillinen kasvu

### General information

Publication status: Published

MoE publication type: B1 Article in a scientific magazine

Organisations: Education

Contributors: Niiranen, S., Nokelainen, P.

Number of pages: 4

Pages: 4-7

Publication date: 22 Mar 2020

Peer-reviewed: No

### Publication information

Journal: Ammattikasvatuksen aikakauskirja

Volume: 22

Issue number: 1

ISSN (Print): 1456-7989

Original language: Finnish

URLs:

[https://akakk.fi/wp-content/uploads/Aikakauskirja-1.20\\_p%C3%A4%C3%A4kirjoitus.pdf](https://akakk.fi/wp-content/uploads/Aikakauskirja-1.20_p%C3%A4%C3%A4kirjoitus.pdf)

Research output: Contribution to journal › Editorial › Scientific

## Understanding and promoting students' well-being and performance in university studies

The aim of this study was to examine pharmacy students' experiences of a small ACT-based intervention that was implemented as a 7-week course with weekly online modules. Students' well-being, experiences of stress, organised studying and psychological flexibility were measured with questionnaires at the beginning and end of the course. Students' experiences of how the course affected their studying were analysed from open-ended responses and a reflective journal.

The results show that students' well-being and time and effort management increased during the course. Students experienced that the course affected their studying in various ways. This study showed that it is possible to foster students' well-being and study skills with an online intervention course. More research is needed to identify the long-lasting effects of these kind of interventions.

#### **General information**

Publication status: Published  
MoE publication type: A1 Journal article-refereed  
Organisations: Computing Sciences, University of Helsinki  
Contributors: Asikainen, H., Kaipainen, K., Katajavuori, N.  
Publication date: 2019  
Peer-reviewed: Yes

#### **Publication information**

Journal: Journal of University Teaching and Learning Practice  
Volume: 16  
Issue number: 5  
Article number: 2  
ISSN (Print): 1449-9789  
Ratings:  
Scopus rating (2019): CiteScore 1.2 SJR 0.315 SNIP 0.743  
Original language: English  
ASJC Scopus subject areas: Psychology(all), Education, Computer Science(all)  
Keywords: psychological flexibility, well-being, higher education, university students, stress management, organised studying  
URLs:  
<https://ro.uow.edu.au/jutlp/vol16/iss5/2>  
Research output: Contribution to journal › Article › Scientific › peer-review

### **University Students' Perceptions of Academic Writing: An Academic Literacies Perspective**

#### **General information**

Publication status: Published  
MoE publication type: A4 Article in a conference publication  
Organisations: Language Centre, Department of Information Management and Logistics, Research group: Novi, University of Tampere  
Contributors: Tukiainen, M., Mäkinen, M., Helander, N.  
Number of pages: 7  
Pages: 7589-7595  
Publication date: 16 Nov 2015

#### **Host publication information**

Title of host publication: ICERI2015 Proceedings : 8th annual International Conference of Education, Research and Innovation Seville (Spain). 16th - 18th of November, 2015.  
ISBN (Electronic): 978-84-608-2657-6  
URLs:  
<https://iated.org/iceri/>

#### **Bibliographical note**

ORG=kie,0.5  
ORG=tlo,0.5  
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › 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 yliopistokampustyypin, 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 keskisellä paikalla kaupunkikeskustan ruutukaava-alueen tuntumassa, mutta silti niiden ongelmana 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

#### Utilizing electronic exams in programming courses: a case study

A great number of university students' work during their studies, leading to problems with the scheduling of courses and examinations. One way to solve the problem related to exams is to utilize electronic tests, which allow flexible timetables and video-based control against cheating. In Finland, a consortium of 20 universities is using a recently developed electronic examination system called Exam. The system supports essay and multiple choice examinations in particular. In this study, we experiment with the Exam system in computer programming tests. The outcome of the study is discussed from both the students' and teachers' perspectives.

#### General information

Publication status: Published  
MoE publication type: A4 Article in a conference publication  
Organisations: Pori Department, Research group: Software Engineering and Intelligent Systems  
Contributors: Saari, M., Mäkinen, T.  
Number of pages: 6  
Pages: 7155-7160  
Publication date: 2016

#### Host publication information

Title of host publication: EDULEARN16 Proceedings : 8th International Conference on Education and New Learning Technologies Barcelona, Spain. 4-6 July, 2016  
Publisher: IATED  
ISBN (Print): 978-84-608-8860-4

#### Publication series

Name: EDULEARN proceedings  
Publisher: IATED  
ISSN (Print): 2340-1117  
Keywords: Electronic exam, Programming education, Exam room, Student feedback  
DOIs:  
10.21125/edulearn.2016.0560  
Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

#### Vesihuollon koulutus ja tutkimus lähemmäksi rakennettua ympäristöä

#### General information

Publication status: Published  
MoE publication type: D1 Article in a trade journal  
Organisations: Civil Engineering  
Contributors: Katko, T. S.

Number of pages: 2  
Pages: 24-25  
Publication date: Aug 2019  
Peer-reviewed: Unknown

#### Publication information

Journal: Vesitalous  
Volume: 60  
Issue number: 4  
ISSN (Print): 0505-3838  
Original language: Finnish  
URLs:  
<http://www.vesitalous.fi/fi/lehtiarkisto-/lehtiarkisto.html>

#### Bibliographical note

Contribution: organisation=keb,FACT1=1<br/>Portfolio EDEND: 2014-12-11  
Research output: Contribution to journal > Article > Professional

#### Videot nuorten maailmassa ja digitaalinen tarinankerronta

##### General information

Publication status: Published  
MoE publication type: A3 Part of a book or another research book  
Organisations: University of Helsinki  
Contributors: Multisilta, J., Niemi, H.  
Number of pages: 13  
Pages: 174-186  
Publication date: 2014

##### Host publication information

Title of host publication: Rajaton luokkahuone  
Place of publication: Jyväskylä  
Publisher: PS-kustannus  
Editors: Niemi, H., Multisilta, J.  
ISBN (Print): 978-952-451-618-1

##### Publication series

Name: Opetus 2000  
Source: Bibtex  
Source ID: urn:1a344dde35cea1b14e743ec3541837a6  
Research output: Chapter in Book/Report/Conference proceeding > Chapter > Scientific > peer-review

#### Virtual Reality Situational Language Trainer for Second Language: Design & Evaluation

##### General information

Publication status: Published  
MoE publication type: A4 Article in a conference publication  
Organisations: University of Tampere  
Contributors: Korkalainen, T., Pääskylä, J., Liukkonen, T. N., Järvenpää, L., Mäkilä, T., Lappalainen, Y., Kamppari, H.  
Publication date: 2 Dec 2015

##### Host publication information

Title of host publication: GAMEON' 2015. 16th International Conference on Intelligent Games and Simulation  
Editors: Bakkes, S., Nack, F.  
ISBN (Print): 978-90-77381-91-5  
Research output: Chapter in Book/Report/Conference proceeding > Conference contribution > Scientific > peer-review

#### Vocational Education and Learners' Experienced Workplace Curriculum

There has been a growing emphasis on providing students in vocational education and training (VET) with workplace experiences. School-based VET and apprenticeship training have been parallel routes in the Finnish VET system, but relatively little is known of their characteristics regarding students' experiences. This study addresses this research gap by investigating these two VET pathways and addressing the following research question: How do learners experience workplace learning on various learning pathways? This study further investigates three different vocational fields: social and health care, business and administration, and construction. The study was based on semi-structured individual interviews (N= 33): 18 of the participants were students in school-based VET, and 15 were apprentices. The interview

data were analysed with thematic analysis. The themes highlighted how the VET pathway builds a frame for participation that is then shaped by work practices and social practices and how, eventually, individuals alter boundaries to participation. The study implies that the two VET pathways, school-based VET and apprenticeship training, have significant differences. However, in the construction sector, differences between students' experiences of workplace learning seem to be less visible. Based on learning experiences, it seems that apprenticeship training and school-based VET cannot be considered parallel or interchangeable routes. This should be acknowledged because the recent reform of vocational upper secondary education aims to advance a flexible combination of school- and work-based pathways, and it can also be considered when discussing the coherence of VET systems.

#### General information

Publication status: E-pub ahead of print  
MoE publication type: A1 Journal article-refereed  
Organisations: Education  
Contributors: Rintala, H., Nokelainen, P.  
Publication date: 8 Aug 2019  
Peer-reviewed: Yes  
Early online date: 8 Aug 2019

#### Publication information

Journal: Vocations and Learning  
ISSN (Print): 1874-785X  
Ratings:  
Scopus rating (2019): CiteScore 2.7 SJR 0.653 SNIP 1.62  
Original language: English  
Electronic versions:  
Rintala-Nokelainen2019\_Article\_VocationalEducationAndLearners  
DOIs:  
10.1007/s12186-019-09229-w  
URLs:  
<http://urn.fi/URN:NBN:fi:tty-201909122090>  
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

### **Work-Based Learning in Vocational Education and Training: Varied Communities, Fields and Learning Pathways**

There is currently a strong focus on work-based learning (WBL) in vocational education. This doctoral dissertation investigates work-based learning, particularly apprenticeship training in Finland, and provides knowledge and understanding of workplace learning (WPL) in vocational education and training (VET). The dissertation includes four publications in total, of which publications I and II are literature reviews, and publications III and IV are studies based on empirical interview data. Interviews (N = 73) were collected in 2015 and 2017. The first dataset (n = 40) consisted of interviews with apprentices and members of their work communities in 10 workplaces. The second dataset (n = 33) covered interviews with both apprentices and students in school-based VET who were participating in onthejob learning periods. The findings of the studies were based on a qualitative synthesis of previous research and qualitative and thematic analysis of interview data. School-based VET has been the dominant model of education in the Finnish VET system. This research highlights that apprenticeship, as an institution, has been supported by a clear and legal framework, but the goals and the target group have not always been clear. According to the experiences of the participants, apprenticeship training was a demanding work-based pathway; moreover, its educational meaning was not always recognised by the actors, including apprentices, trainers or employers. Employers also expected apprentices to quickly become productive workers. However, full participation was not always possible due to productive, financial or safety reasons. The empirical studies investigated more closely three fields of VET – social and health care, business and administration and technology – and two learning pathways in VET – learners as apprentices in work and learners in school-based VET. Learners revealed differing experiences in both the field of work and in the learning pathways. For example, in the social and health care field, learners more quickly progressed to more independent and responsible tasks than they did in the technology field. As regards the learning pathways, while their roles could be more autonomous, for apprentices, the transition to responsible tasks could come too quickly. In contrast, students in school-based VET gradually moved to more demanding tasks and environments and were supported by the school and the work community. However, learners were in some cases 'relegated' to tasks more assistive in nature as a result of being positioned lower in the hierarchy. Despite the differences among the fields and between the learning pathways, it is suggested that learning environments provided by the various work communities can be developed by promoting learners' opportunities to participate, receive guidance and feel a sense of belonging. The summary of the four publications, led to the conclusion that WBL in VET is related to multiple aspects at the micro, meso and macro levels. Learners and their characteristics and behaviours are central to WBL. Overall, to fully benefit from learning opportunities at work mean having a self-directed approach. Also, there is a need to consider the context, including various communities and organisations that participate in VET and the role of education within learning at work. More widely, developments related to the VET system and society cannot be overlooked.

#### **General information**

Publication status: Published

MoE publication type: G5 Doctoral dissertation (article)

Organisations: Education, Research group: Knowledge and Learning Research Center

Contributors: Rintala, H.

Publication date: 31 Jan 2020

#### **Publication information**

Publisher: Tampere University

Volume: 196

ISBN (Print): 978-952-03-1403-3

ISBN (Electronic): 978-952-03-1404-0

Original language: English

#### **Publication series**

Name: Tampere University Dissertations

Volume: 196

ISSN (Print): 2489-9860

ISSN (Electronic): 2490-0028

URLs:

<http://urn.fi/URN:ISBN:978-952-03-1404-0>

Research output: Book/Report › Doctoral thesis › Collection of Articles

### **WorldSkills achievers' and their co-workers' and employers' perceptions of vocational expertise and school-to-work pathways**

This paper examines the perceptions of vocational expertise and school-to-work pathways among WorldSkills Competition (WSC) achievers and their co-workers and employers within the Finnish context. At the biennial international WSC, young people (aged 18-to-23 years) from over 60 countries demonstrate their skills in more than 40 trades. Individualized training for this competition is provided through the cooperation of vocational institutions (e.g., expert coaches, team leaders and competition panellists) and industry (e.g., mentors, sponsors, materials, equipment). Semi-structured thematic interviews (N=51) were conducted in 2013 and 2014 with former Finnish WSC medal or diploma winners (n=18) who had since begun their working lives (1-to-15 years of work experience). Their employers (n=16) and colleagues (n=17) were also



interviewed. Results showed that in addition to vocation-specific knowledge and skills, problem-solving skills, creativity, social skills and self-regulatory skills were acknowledged as the most significant elements of vocational expertise. The findings also indicated that formal vocational education combined with deliberate practice and training based on expert mentoring improved the long-term career progress and vocational expertise of the WSC achievers.

#### General information

Publication status: Published

MoE publication type: A1 Journal article-refereed

Organisations: Industrial and Information Management, Research group: Knowledge and Learning Research Center, University of Tampere

Contributors: Pylväs, L., Nokelainen, P.

Pages: 95-116

Publication date: 31 Aug 2017

Peer-reviewed: Yes

#### Publication information

Journal: International Journal for Research in Vocational Education and Training

Volume: 4

Issue number: 2

ISSN (Print): 2197-8638

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Scopus rating (2017): SNIP 1.307

Original language: English

Electronic versions:

206-1-648-2-10-20170918

DOIs:

10.13152/IJRVET.4.2.1

URLs:

<http://urn.fi/URN:NBN:fi:tyy-201711062104>

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

#### Yhteiset osaamistavoitteet Tampereen korkeakoulu yhteisön tutkinnoissa – mitä ne ovat ja miten niiden saavuttamista tuetaan opetussuunnitelmatyössä?

Tampereen korkeakoulu yhteisössä määriteltiin kaikille tutkinnoille yhteiset osaamistavoitteet vuonna 2018. Yhteiset osaamistavoitteet sisällytetään tutkintoihin osaamisperustaisen opetussuunnitelmatyön kautta. Opettajille tarjotaan työn tueksi muun muassa osaamisperustaisuustyöpajoja sekä osaamisperustaisen opetuksen verkkokurssi, jonka materiaalit ovat saatavilla myös itseopiskelua varten. Monialaisten ryhmien avulla voidaan tuoda kunkin ryhmän oman alueen yhteisiä osaamistavoitteita integroitavaksi myös muihin tutkinto-ohjelmiin.

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