AI in Learning Virtual Conference
- Shaping the Future!

November 18-19, 2021
Helsinki, Finland

Conference Book

UNIVERSITY OF HELSINKI

Warmly welcome to the conference!

Artificial intelligence (AI) is changing the world. It impacts societies, organizations, work, and education, and it is becoming more and more a part of everyday life. It opens new doors for industry and causes the radical disruption of work. AI will decisively change also the concept of learning, expertise, and the businesses based on it. This situation offers enormous opportunities to expand educational settings for learning in and beyond the traditional classroom, but it also requires a significant investment in lifelong learning so that all levels of education can take the changing technology into account.

The conference has four sub-themes

- AI in Wellbeing and Lifelong Learning
- AI in Games and Simulations
- AI in Intelligent Tutoring Systems (ITS) for Virtual Learning Environments (VLE)
- AI in Learning: Ethical Challenges and Solutions

This conference provides opportunities to Researchers, Companies, Policymakers, Teachers, School Leaders, and all users of Artificial Intelligent (AI)

to share their research, innovations, reflections, experiences, and thoughts on how AI can change the learning landscapers and make learning more available and open to different learners.

This conference is organized by AI in Learning Consortium led by University of Helsinki, Finland, and It is a Co-Innovation project (2020-2021) funded by Business Finland.

You all are the most welcome to the AI in Learning Virtual Conference!

Hannele Niemi, Chair of the conference
Professor, University of Helsinki, Finland

Programme

AI in Leraning Conference – Shaping the future!
November 18-19, 2021 (Virtual conference)
https://www2.helsinki.fi/en/conferences/ai-in-learning-shaping-the-future

Contents: keynote speeches, presentations and discussions, parallel research collaborative sessions, discussion and networking
Participants: Researchers, Companies, Policymakers, Teachers, School Leaders, and all users of Artificial Intelligent (AI)
Location: ZOOM sessions
New ZOOM link:
https://helsinki.zoom.us/j/63455870014?pwd=Tmx3cEdZdGFIb3ZtbGFoR051RlJ0QT09
ID is: 634 5587 0014
Password: AI2021

Thursday 18.11.2021	**09:00 – 17:45 (Finnish time)** New ZOOM link: https://helsinki.zoom.us/j/63455870014?pwd=Tmx3cEdZdGFIb3ZtbGFoR051RlJ0QT09	
	09:00 – 09:40	**Opening of the conference** Hanna Snellman, Vice-Rector, University of Helsinki Johanna Mäkelä, Dean, Faculty of Educational Sciences, University of Helsinki Moderator: Hannele Niemi, Professor, University of Helsinki Music
	09:40 – 10:30	**Keynote 1: Creative AI** Dr. Hannu Toivonen, Professor, University of Helsinki, Finland Moderator and commentary: Hannele Niemi, Professor, University of Helsinki
	10:30 – 11:00	**Coffee Break**
	11:00 – 11:50	**Keynote 2: AI-Driven Intelligent Tutoring System for Math Education** Dr. Yu LU, Associate professor, Advanced Innovation Center for Future Education, Beijing Normal University, China Moderator and commentary: Harri Ketamo, Chairman of the board, Headai
	11:50 – 12:30	**Lunch Break**
	12:30 – 14:00	**Paper presentation and discussion session 1**: Parallel groups: A, B, C, D, E (separate ZOOM links in the group section)
	14:00 – 14:30	**Coffee Break**
	14:30 – 16:00	**Paper presentation and discussion session 2**: Parallel groups: F, G, H, I, J, K (separate ZOOM links in the group section)
	16:00 – 17:15	**Company showcases and discussion** New ZOOM link: https://helsinki.zoom.us/j/63455870014?pwd=Tmx3cEdZdGFIb3ZtbGFoR051RlJ0QT09 *Company presentation 1, School Day Helsinki Oy, Finland* Mika Kasanen, Co-Founder & CEO *Company presentation 2, Headai Oy, Finland* Futureproofing your business with responsible AI Harri Ketamo, Chairman of the board, Founder, Headai Anu Passi-Rauste, Head of business development, Headai

		Company presentation 3, UpKnowledge Oy, Finland Timo Lindqvist, Co-founder & COB, Upknowledge *Company presentation 4, NAPCON, Neste Engineering Solutions Oy, Finland* Pekka Qvist, Manager, UI and Usability Engineering, NAPCON *Company presentation 5, Henan Tianxing Education & Technology Co. ,Ltd, China* Hua SHEN, Head of R&D Center Moderator: Pekka Ollikainen, Senior Advisor, Business Finland
	17:15 – 17:45	**Share group presentations and summary of the day** Päivi Kousa, Dr., Coordinator of the AI in Learning project
Friday 19.11.2021	**09:00 – 11:15 (Finnish time)** New ZOOM link: https://helsinki.zoom.us/j/63455870014?pwd=Tmx3cEdZdGFIb3ZtbGFoR051RlJ0QT09	
	09:00 – 09:50	**Keynote 3: AI and the Future of Education** Dr. James Lester, Professor, Director of the Center for Educational Informatics & Distinguished University, U.S.A. Moderator and commentary: Minna Huotilainen, Professor, University of Helsinki
	09:50 – 10:50	**Panel discussion: How to face future learning with AI?** Panelists: Ben Cowley, Associate Professor, University of Helsinki, Finland Barbara Schneider, Professor, Michigan State University, U.S.A. Timo Lindqvist, Co-founder & COB, Upknowledge, Finland Yu LU, Associate professor, Beijing Normal University, China Chair: Minna Huotilainen, Professor, University of Helsinki
	10:50 – 11:15	**Closing**: **Forwarding messages of AI in learning and Education in the educational field** Hannele Niemi, Professor, University of Helsinki, Finland

Groups

Paper presentation and discussion groups **(Each abstract presentation is about 15 minutes + 5 minutes for questions and discussion)**		
Thursday, Nov. 18, 12:30 – 14:00 Finnish time (Group A, B, C, D, E)		
Group A: **AI supported wellbeing and lifelong learning** (Host and Chair): Elisa Rastas ZOOM link: https://helsinki.zoom.us/j/66141516354?pwd=dEdNMnFxT1RDUmRmRk1xK2NUaDdQQT09 Meeting ID: 661 4151 6354 Passcode: 513528		
	Topic	**Presenters**
I	Virtual Coaches for Wellbeing, Smart Aging, and Lifelong Learning	Kristiina Jokinen
II	Analysis and Improvement of Classroom Teaching Based on Artificial Intelligence	Zi Chun Yu & Zhong Sun
III	AI Powered Assistant for Solving Problem Behaviors in School	Penghe, Chen
IV	User engagement with intelligent social agents	Bethanie Maples & Roy Pea
Group B: **Ethical issue related to AI in learning** (Host and Chair): Hannele Niemi ZOOM link: https://helsinki.zoom.us/j/69896146120?pwd=M0R0TEdhakRscWVJZFBQTHBGR3Z0Zz09 Meeting ID: 698 9614 6120 Passcode: 903603		
	Topic	Presenters
I	Ethical guidelines of AI-based learning both in China and Finland as a part of Europe: A comparative policy analysis	Ge Wei and Hannele Niemi
II	Algorithmic and data transparency improve the user to platform trust relationship	Jana Pejoska, Silja Martikainen, Mari Falcon
III	Trustworthy Artificial Intelligence and Explicability	Pauli Peräinen

	Topic	Presenters
IV	Sustainable journalism for the algorithmic future: what media professionals should learn?	Olga Dovbysh & Mariëlle Wijermars

Group C: AI tutoring (Host and Chair): Joakim Laine
ZOOM link: https://helsinki.zoom.us/j/61536345738?pwd=UENXb3hmRmIrZUZWUGEzWHVXNDkxUT09
Meeting ID: 615 3634 5738
Passcode: 206524

	Topic	Presenters
I	Immersive virtual reality learning environments (IVRLEs) for skilled intentionality training	Joakim Laine, Tiina Korhonen & Kai Hakkarainen
II	An AI-aided educational platform to assist in teaching and learning – a case study from multiple users' perspectives at a Chinese school	Shuanghong Jenny Niu, Xiaoqing Li, Jiutong Luo, Yu Lu
III	Intelligent Tutoring for Algorithm Visualization Exercises	Artturi Tilantera, Ari Korhonen
IV	Designing of Intelligent Tutoring System of Supply Chain Management in Virtual Learning and Practical Environment	Shuang Wang & Zhihong Wu

Group D: AI related games and stimulation in learning (Host and Chair): Vilhelmiina Harju
ZOOM link: https://helsinki.zoom.us/j/61189523377?pwd=bU9kdUZLbjNha1BwZjYzcmtabjJpZz09
Meeting ID: 611 8952 3377
Passcode: 625637

	Topic	Presenters
I	Artificial Intelligence in Education as a Massively Multiplayer Game: A thought experiment in AI ethics	Ben Cowley
II	AI-supported Simulation-Based Learning: Professional's Experiences Related to Stress-Levels	Heli Ruokamo
III	Game metrics in nursing simulation game for learning clinical reasoning skills	Sara Havola, Jaana-Maija Koivisto, Henna Mäkinen, Elina Haavisto

Group E: AI related games and support in learning (Host and Chair): Päivi Kousa
ZOOM link: https://helsinki.zoom.us/j/65011430852?pwd=U0VseFE3eXVVSzdnRXNFYmFwZzE0Zz09
Meeting ID: 650 1143 0852
Passcode: 334952

	Topic	Presenters
I	Game-based features on intrinsic motivation in intelligent game-based learning environments: A systematic literature review	Liping Sun
II	Simple AI may be good enough for guiding training of reading acquisition (AI in learning	Heikki Lyytinen
III	Self-supervised End-to-End ASR for Low Resource L2 Speech	Mikko Kurimo
IV	Speech recognition in language learning	Inmaculada Haba-Ortuño

Thursday, Nov.18, 14:30 – 16:00 Finnish time (Group F, G, H, I, J, K)

Group F: AI related language learning (Host and Chair): Hannele Niemi
ZOOM link: https://helsinki.zoom.us/j/69455418929?pwd=U3ZXbnIrT1M2bk9SRzBJZ09GWEd5UT09
Meeting ID: 694 5541 8929
Passcode: 562005

	Topic	Presenters
I	AI in Language Learning	Jue Hou, Anisia Katinskaia, Ilmari Kylliainen, Giacomo Furlan, Roman Yangarber
II	Artificial intelligence as a tool for diagnosing learning challenges among first-generation immigrant learners using finnish as a second language: games and simulations	Frank Ojwang
III	AI in Computer Assisted Language Learning for the Russian Language	Andrea Grillandi & Mikhail Kopotev
IV	Innovations in English Language Teaching in Primary Schools in Poland and Uzbekistan	Nigina Misirova

Group G: AI in education and learning (Host and Chair): Jenny Niu
ZOOM link: https://helsinki.zoom.us/j/65972442298?pwd=NWdiaWthb3VXclFQbHVVRnJGN3p4QT09
Meeting ID: 659 7244 2298
Passcode: 466322

	Topic	Presenters
I	AI that learns more like we do - replicating interactive learning	Nike Haber
II	Learning Creativity with Artificial Intelligence: Research into the role of AI in Sociocultural Learning Environments	Jeongki Lim and Teemu Leinonen
III	Do Finnish teachers think AI can replace teachers?	Joonas Pesonen
IV	5th and 6th grade students' conceptions of Artificial Intelligence	Janne Fagerlund, Pekka Mertala, Oscar Calderón

Group H: Ethics issues related AI in education and learning (Host and Chair): Päivi Kousa
ZOOM link: https://helsinki.zoom.us/j/68735559402?pwd=QkZpaE5VMWlXQjJVelRWdUxRNGRIQT09
Meeting ID: 687 3555 9402
Passcode: 129172

	Topic	Presenters
I	AI and Learning: ethical opportunities and challenges from the perspectives of education service providers and users	Päivi Kousa
II	AI in learning: Ethical Challenges and Solutions	Quratulain Sarwat, Aisha Mahmood, Christopher Gordon
III	Teaching with AI and teaching about AI	Marcelo Worsley
IV	Is There Really AI in Education?	Erkki Kaila, Jussi-Pekka Järvinen and Einari Kurvinen

Group I: AI in education and learning (Host and Chair): Vilhelmiina Harju

	Topic	Presenters
	ZOOM link: https://helsinki.zoom.us/j/63193468826?pwd=TEJVWnpSbCtCYWJLY3NOM1VtQWozZz09 Meeting ID: 631 9346 8826 Passcode: 698385	
I	Intelligent Text Book: A Review of Tools and Technologies	Bo Jiang, Meijun Gu & Ying Du
II	Artificial Intelligence in Educational Escape Rooms	Sonsoles López-Pernas
III	Artificial Intelligence in everyday educational experiences of adults	Elżbieta Makowska-Ciesielska
IV	Assessing and Monitoring School Wellbeing through an Automated Scoring System: Schoolday Wellbeing Model	Xin Tang, Katja Upadyaya, Hiroyuki Toyama, Mika Kasanen, Katariina Salmela-Aro
Group J: **AI in education and learning** (Host and Chair): Leila Pehkonen ZOOM link: https://helsinki.zoom.us/j/68488634632?pwd=TmMxeEdJSDZHcXYxc3RLRk9iRmtLZz09 Meeting ID: 684 8863 4632 Passcode: 853331		
I	Artificial Intelligence role in K12 Education – EU countries overview	Lidija Kralj
II	AI in Small states: Potentialities and Challenges	Subrata Ganguly
III	Artificial intelligence's role in initial teacher education and continuous professional development of teachers	Gyori Janos
IV	Vocational school as a trailblazer in AI education	Leila Pehkonen, Tarja Lang
Group k: **AI in life and work** (Host and Chair): Pauli Peräinen ZOOM link: https://helsinki.zoom.us/j/67944509321?pwd=dTNyLzdHMkVSR0hKZXZZbnFCSXl4dz09 Meeting ID: 679 4450 9321 Passcode: 225742		
I	Social-Haptic Communication; Human touch into remote haptic communication	Riitta Lahtinen & Russ Palmer
II	Artificial intelligence revolutionizes automotive competencies in VET	Tarja Lang, Leila Pehkonen, Risto Öörni
III	AppSkilling21	Thomas Ahnfeld, Alexandra Baer, Michael Schratz
IV	Upknowledge Oy Company presentation	Timo Lindqvist

IT Technical Support

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Panel discussion

Friday 19.11.2021 at 09:50 – 10:50 (Finnish time)

How to face future learning with AI?
Chaired by Minna Huotilainen, Professor, University of Helsinki

Panel members:

Ben Cowley
Associate Professor, University of Helsinki, Finland

Barbara Schneider
Professor, Michigan State University, U.S.A.

Timo Lindqvist
Co-founder & COB, Upknowledge, Finland

Yu LU
Associate professor, Beijing Normal University, China

Panel discussion

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Abstracts of the Keynotes

Creative AI

Hannu Toivonen, Professor, University of Helsinki, Finland

Abstract

Artificial intelligence tools are showing signs of creativity by being able to generate artefacts of various types. But can computers be creative, and if so, in what sense? In this talk I will give a short introduction to the field of computational creativity, and will suggest possible uses of creative AI to improve learning and well-being.

AI-Driven Intelligent Tutoring System for Math Education

Yu LU, Associate professor, Advanced Innovation Center for Future Education, Beijing Normal University, China

Abstract

Intelligent tutoring system (ITS) can be defined as the system that provides immediate and customized instruction or feedback to learners. Driven by the latest AI techniques and the large demands from the education community, new ITS design could better model learners, provide learners the automatic grading service and the personalized learning guidance. This talk will discuss the key AI techniques required, and then present the latest ITS developed by the advanced innovation center for future education at Beijing Normal University.

How AI and the Future of Education

James lester, Professor, Director of the Center for Educational Informatics & Distinguished University, U.S.A.

Abstract

It has become clear that AI will profoundly transform society. AI will dramatically change the socio-technological landscape, produce seismic economic shifts, and fundamentally reshape the workforce in ways that we are only beginning to grasp. With its imminent arrival, it is critically important to deeply engage with questions around how we should design education in the Age of AI. Fortunately, while we must address the significant challenges posed by AI, we can also leverage AI itself to address these challenges. In this talk we will consider how (and at what rate) AI technologies for education will evolve, discuss emerging innovations in AI-augmented learning environments for formal and informal contexts, and explore what competencies will be elevated in an AI-pervasive workforce. We will discuss near-future AI technologies that leverage advances in natural language processing, computer vision, and machine learning to create narrative-centered learning environments, embodied conversational agents for learning, and multimodal learning analytics. We will conclude by considering what all of these developments suggest for K-12 education and the future of human learning.

Abstracts of the paper sessions

Group A, AI supported wellbeing and lifelong learning

Virtual Coaches for Wellbeing, Smart Aging, and Lifelong Learning

Kristiina Jokinen, University of Helsinki

Abstract
In recent years, AI technologies have enabled potentially useful applications in such varied areas as healthcare, education and lifelong learning, coaching, assisted living, etc. In this talk, I will discuss research and development on virtual robot coaches in the context of smart ageing. The examples are drawn from the EU-Japan collaboration project e-VITA (Virtual Coach for Smart Ageing https://www.e-vita.coach/), which aims at new AI-based solutions to develop a digital coach which motivates elder adults for healthy and active life and supports their independence and
well-being. Lifelong learning, as self-initiated education, is regarded as a crucial part of the activities that elder adults can engage themselves with, to improve quality of life and pursue their personal development. The project deploys participatory and value-based design in real life setting and focuses on technologies related to conversational AI, knowledge graphs, and humanoid robot agents.

I will present a framework for designing social dialogues to enable flexible, long-term interaction between elder adults and a coach, and discuss enablements for robot agents that could observe and understand the needs and emotions of human users. Finally, I will survey challenges in modelling virtual coach interaction and building socially competent AI agents which support human well-being and lifelong learning. I will also consider various ethical aspects, including issues related to acceptability, trust, and cooperation..

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Analysis and Improvement of Classroom Teaching Based on Artificial Intelligence

Zi Chun Yu[1], Zhong Sun[1],
[1]Capital Normal University, China

Abstract
Classroom is an authentic and complex teaching and learning environment. Traditional classroom teaching analysis methods mainly conduct time sampling by manual counting, which had to face the difficulties on subjective-experience-centered, low analysis efficiency, small-scale services and over-reliance on trained human resources. Therefore, the current research proposed the teaching event sampling analysis framework named as TESTII. Taking teaching events as the basic analysis dimension, the TESTII integrates the teacher-student-centered teaching structure theory, computer vision and natural language understanding and other emerging AI technologies. The framework contains five stages including teaching events identification, Sequence of Pedagogy Structure,

behavior and speech interaction analysis by time sampling, evidence-based teaching interpretation and teaching improvement of human-AI cooperation. The implication of teaching events sampling AI-supported analysis can inform researchers on the new classroom rooming analysis method to support the improvement of classroom teaching quality.

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AI Powered Assistant for Solving Problem Behaviors in School

Penghe Chen, Beijing Normal University

Abstract
Problem behavior denotes undesirable behavior compared with social norms, which is the major obstacle of moral education. According to Maslow's Need Hierarchy, need deficiency referring to the unsatisfied need is what drives people's behavior, thus problem behavior could be reduced through fulfilling the deficiency. Hence, how to diagnose students' need deficiency efficiently and accurately is crucial to moral education and the students themselves. However, the traditional education mainly relies on teachers' experiences to diagnose students' need deficiency, which is not systematic and severely affected by teachers' knowledge and experiences. In addition, diagnose need deficiency requires knowledge from psychology, pedagogy, sociology and physiology, which is not easy to master for normal teachers and parents. To address these issues, leveraging on the advances of artificial intelligence, we develop an intelligent assistant to help teachers and parents diagnose students' need deficiency automatically. Specifically, a domain knowledge graph summarizing all relevant factors of need deficiency is built, which provides a theoretical foundation for the newly proposed system. Guided by the knowledge graph, reinforcement learning model is adopted to learn dialogue policy and implement the dialogue system. Experimental results demonstrate that the developed dialogue system achieves its design objectives.

Contact: chenpenghe@bnu.edu.cn

User Engagement with Intelligent Social Agents

Bethanie Maples[1], Roy Pea[1]
[1]Stanford University

Abstract
"Intelligent Social Agents" (ISAs), conversational agents sufficiently anthropomorphised to pass Turing tests in short exchanges, are eliciting deep emotional bonding with users, leading researchers to re-examine the impact and potential uses of these human-machine relationships in education. In this work, we evaluated how a best-in-class ISA, Replika, might influence social or psychological support compared to human support. We tested two competing hypotheses about the role of ISAs in social and psychological support: (1) ISAs enhance and stimulate human relationships and connectedness, or (2) ISAs displace social relationships.

A mixed-method study of twenty-seven adult Replika users explored relationships between user loneliness, use motivations, use patterns, and user outcomes. Results suggested pilot users were lonely or experiencing a time of change and distress; Replika was used for its availability, friendship, therapy, and personal learning. Implications for human-computer interaction and cognitive science research are discussed..

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Group B, Ethics issues related AI in education and learning

Ethical guidelines of AI-based learning both in China and Finland as a part of Europe: A comparative policy analysis

Ge Wei[1]; Hannele Niemi[2];
[1]Capital Normal University; [2]University of Helsinki

Abstract
As artificial intelligence (AI) has been a core technology in national power and global competition, it has been received much attention and support from the global states. During the past five years, both Finnish and Chinese governments have initiated programmatic policies to promote the development of AI-based learning in society. This presentation will uncover what the main ethical guidelines are when applying AI in education and learning in these countries. We adopt an inductive analytical approach to reviewing the major state policies to initiate and facilitate AI within and beyond the formal education field, such as learning in working environments, both in Finland and mainland China.

In our analysis, policy documents have been selected for this review. Five themes with commonplaces about AI in learning emerge in our comparative analysis, which include: (1) the potential of AI to reshaping basic education and school quality; (2) emphasizing the importance of AI in working force and employment; (3) connecting AI with human development and students' well-being; (4) promoting teachers' AI literacy in the digitalized times; and (5) AI for lifelong learning reform in a civil society. It, however, emerges that AI ethics in learning is discussed very little at the policy level. The guidelines of policy documents discuss ethical themes at more general level than specifying ethical challenges for educational environments. Therefore, the presenation further analyses the detailed ethical challenges amidst the five above themes when AI-based tools and environments are used in education, and then critically reflects on what kinds ethical guidelines would be needed when AI is applied in education.

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Algorithmic and data transparency improve the user to platform trust relationship

Jana Pejoska, Silja Martikainen, Mari Falcon, University of Helsinki

Abstract
At the moment, service providers mainly decide how the user's activity data is used and which data insights are chosen to be shown as information to the user and which are kept hidden. Based on the existing literature, more knowledge about the individual's experiences regarding transparency of data use is needed. Here we explore the current understanding about how trust is formed in online learning platforms, and seek answers to the following questions: (1) Are users interested in knowing more about how their data is processed into information? (2) How do users experience different augmentations aiming at supporting trust towards a platform? We present preliminary insights into our research, based on theoretical backgrounds in psychology, science and technology, as well as human computer interaction studies. Our several ongoing data collections investigate trust in user-to-platform relationships through quantitative and qualitative methods with ethnographic approaches. Our preliminary findings suggest that both data use and algorithmic transparencies can improve the user's experience of trust towards the platform. In line with previous work, important factors also include the platform's ease-of-use, absence of marketing, and giving clear justifications for collecting and use of the data in question. As learning activities and other interactions increasingly take place online, there is a growing need to understand which factors influence trust from the user's perspective. Trust is crucial for creating good communication and learning experiences, and can be supported by opening up the algorithmic mechanisms which helps the users make informed decisions about the platform's trustworthiness.

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Trustworthy Artificial Intelligence and Explicability

Pauli Peräinen, University of Helsinki

Abstract
The growing importance of Artificial Intelligence (AI) applications has revived the need for defining ethical guidelines for trustworthy AI. The techniques of Machine Learning (ML) and Artificial Neural Networks (ANN) are utilised to create more efficient ways for the usage of AI in many areas of our life. While these techniques increase the utility and efficiency of the AI, their non-transparent nature raises questions about the explicability (formerly referred to as explainability) of the AI. The purpose of this presentation is to investigate the concepts related to trustworthy AI more closely. This presentation is based on a literature review and concept analysis that aim to clarify how the concept explicability (explainability) is understood in the contemporary literature and documents. The presentation aims to show what it means for trustworthy AI to be explicable and why this is an objective highlighted in many papers and documents. The conversation and research about the ethical guidelines and trustworthiness of AI is very contemporary by its nature and the concepts that are used in the conversation vary. This adds to the problem of understanding how the ethical guidelines should be applied. The presentation will introduce the existing literature and research about the explicability of Artificial Intelligence and aims to show that the explicability needed by different stakeholders (e.g., developers, users) may vary by its nature.

Contact: pauli.perainen@helsinki.fi

Sustainable journalism for the algorithmic future: what media professionals should learn?

Olga Dovbysh[1] *and* Mariëlle Wijermars[2];
[1]University of Helsinki, [2]Maastricht University

Abstract

Artificial intelligence (AI) plays an increasingly important role on many levels of making and distributing news today: from smart tools that assist journalists in producing their stories to the fully automated production of news stories, and from audience profiling that inform editorial board decisions to the AI-driven recommendation system that match specific content to users. Technological uptake arises new economical, ethical, political, legal and other issues related to news work and the development of media sphere. Media professionals of the future need not only be informed about the opportunities of new technologies for media, but also be able to critically assess the possible influence of AI-driven tools and services on journalism as profession and social institution. Clear understanding on what exactly media professionals should know about AI and algorithms still remains limited.

We created the educational materials to help future media professionals and their teachers to learn more about possible transformations in newsrooms, activate problem-based learning and critical thinking about AI-driven actors in media process. These educational materials are based on the results of the research project 'Sustainable journalism for the algorithmic future', which was implemented in the University of Helsinki in 2020-2021.

In the conference I present the concept of education materials which help students in journalism, media, and communication studies to learn about AI. Also, I discuss a more general question on what is the anticipated and sufficient level of knowledge about AI and algorithms for media professionals, working in contemporary newsrooms.

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Group C, AI Tutoring

Immersive virtual reality learning environments (IVRLEs) for skilled intentionality training

Joakim Laine, Tiina Korhonen, Kai Hakkarainen
University of Helsinki

Abstract

The purpose of this study is to examine the challenges that learners encounter within immersive virtual reality learning environments (IVRLEs) and attitudes towards artificial intelligence tutoring (AI tutor). The study is conducted in three cycles and as part of the AI Tutor for demanding expertise research project in collaboration with Upknowledge Ltd. IVRLEs offer high-fidelity emulations of real-life spaces, objects, tools, and scenarios with rich landscapes of affordances. Through participation in scaffolded real-time embodied learning experiences, immersed learners are trained

in skilled intentionality, i.e. to perceive and actualize affordances like experts. Customized intelligent tutoring systems (ITSs) have, previously, been mainly used to trace the learners' correct digital actions and progress on optimal solution paths. In VR contexts, AI tutors based on machine learning can, however, be more attentive to the learners' embodied experiences, sense their contextual affective states, and provide expanded possibilities for learner tracking. Our ongoing second cycle studies, based on video-analysis and survey data, indicate that IVRLEs ought to offer timely instructions and support, and provide a "high-enough" fidelity and realistic multi-sensory feedback. Further, preliminary results indicate that immersed learners encounter challenges that originate from four sources: 1) the VR system, 2) the IVRLE design, 3) interaction with other agents, and 4) the learning content. Currently, we are in the process of gathering more data with a refined IVRLE setup. Further, we have begun analyzing video data regarding the learners' behavior during obstacles encountered in VR. This presentation involves introducing the refined study setup and preliminary results analyses.

Contact: Joakim.laine@helsinki.fi

An AI-aided educational platform to assist in teaching and learning – a case study from multiple users' perspectives at a Chinese school

Shuanghong Jenny Niu[1], Xiaoqing Li[2], Jiutong Luo[2], and Yu Lu[2],
[1]University of Helsinki, [2]Beijing Normal University

Abstract
This study aims to provide a better understanding of how AI technology can be used to assist in teaching and learning at schools. The Smart-Learning Partner (SLP) educational platform is based on AI technology to provide new possibilities for individualized learning and more educational resources. This study used case study approach to investigate how this AI-aided SLP platform to assist in teaching and learning from multiple users' perspectives of students, teachers, and principal at a Chinese school. This presentation starts with description of AI used in education and learning. Then the AI-aided SLP educational platform is presented to illustrate in which ways it works to assist in teaching and learning. Based on the users' self-reported experience, this platform can support students' learning by providing students with individualized diagnostical feedbacks/assessments and progress of their learning, furthermore, students receive recommendations of micro lectures from the platform for improvement based on the students' assessment results. Additionally, students can also access various micro lectures according to their interests. This platform provided teachers with reports of real-time learning situation and progress of individual student as well as whole class so that teachers can better adjust their pedagogical decision and teaching according to the students' needs. Principal used the information to allocate resources and curriculum planning at school. To conclude, all users positively stated that this AI-aided SLP platform assisted in teaching and learning at school even though there were still certain challenges. In the end of the presentation, practical implications and recommendations were given.

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Intelligent Tutoring for Algorithm Visualization Exercises

Artturi Tilantera, Ari Korhonen
Aalto University

Abstract

Visual Algorithm Simulation (VAS) exercise is an interactive application which teaches an algorithm or a data structure. The exercise shows the student a visual representation of a data structure with initial data. The student imitates the execution of the algorithm by interacting with the visual representation. The student's solution is graded automatically. A misconception about the algorithm being learned can manifest itself as systematic errors which can be modelled as a new algorithm. We are developing an intelligent tutoring component for VAS exercises: we assume that the exercises could further support learning by giving constructive feedback based on automatically detected, well-known misconceptions. A recent master's thesis studied a VAS exercise on the Build-heap algorithm. A dataset of 1430 exercise submissions was analysed manually. Hypothetical misconceptions were found in manual analysis, and they were modeled as algorithms. The submissions were then automatically classified based on the found misconceptions.

The main result extends the set of known misconceptions for the Build-heap exercise. 52% of the submissions were correct and 17% matched to the hypothetical misconceptions. Some of the remaining submissions had features which imply that the student was copying the surface features of a model answer. However, the size of exercise instance (10 elements) is too small to map a submission into a particular misconception. We have ongoing doctoral research to develop the misconception detection and validation methods. Furthermore, we aim to find misconceptions in multiple VAS exercises, such the ones featuring Quicksort and Dijk-stra's algorithm.

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Designing of Intelligent Tutoring System of Supply Chain Management in Virtual Learning and Practical Environment

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Abstract

The instruction of Supply Chain Management (SCM) is a systematical education for high level student in Business Management. The instruction in this subject area should be integrated with theoretical learning and practical coaching. It is more and more important especially in this challenging age of globalization. This Paper, by designing an Intelligent Tutoring System of Supply Chain Management in Virtual Learning and Practical Environment, tries to solve the main problems in such education: big gap between theories and practices; old school cases; High costs of trial and error in practice. A Virtual Learning-Practical Environment (VLPE) refers to a system that offers digitally-based instructions aimed at creating interactive, active learning environments and practical training simulations. Based on Artificial Intelligent (AI) techniques, Intelligent Tutoring Systems (ITSs) in VLPE can help professors not only plan, create, disseminate the content of course but also can trigger dynamic practical training tasks and offer real-time react to the decisions and operations from students. In this article, we propose a framework for the design of ITSs of SCM by using

multiagent system (MAS), case base reasoning (CBR), enterprise resource plan (ERP) and Process Flow Analysis (PFA). MAS enable the multi-decision making in practical management training. CBR can propose smart and quick solutions from the intelligent system and solve the problems by adapting previously successful solutions. ERP forms the structure of coaching contents. PFA help to optimize the coaching process and logical tasks flow. This paper elaborates how to combine these technologies to design an effective ITSs of SCM and optimize the instruction in learner-centered education.

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Group D: AI related games and stimulation in Learning

Artificial Intelligence in Education as a Massively Multiplayer Game: A thought experiment in AI ethics

Ben Cowley, University of Helsinki

Abstract

In this chapter, we reflect on the deployment of Artificial Intelligence (AI) as a pedagogical and educational instrument, and the associated ethical challenges that arise from the problem: how to create explainable AI (XAI) in such a socially-constructed context. When AI enters into classrooms, it produces various socio-cognitive-technological questions that must be discussed, and can transform or render obsolete old paradigms for, e.g. data access, privacy, and transparency. AI may bring many positive consequences in schools — not only for in- dividuals, or teachers, but for the educational system as a whole. On the other hand, there are also serious risks. Thus, the analysis of the educational uses of AI in future schools pushes us to compare the pos- sible benefits (for example, using AI-based tools for supporting different learners) with the possible risks (for example, the danger of algorithmic manipulation, or a danger of hidden algorithmic discrimination).

We describe a thought experiment: "simulation of AI in education as a massively multiplayer social online game" (AIED-MMOG). Here, all actors (humans, institutions, AI agents and algorithms) are required to conform to the definition of a player: which is a role designed to maximise protection and benefit for human players. AI models that 'understand' the game space provide an API for typical algorithms, e.g. deep learning neural nets or reinforcement learning agents, to interact with the game space. The AIED-MMOG simulation suggests solutions for the well-known chal- lenges of XAI, along with five selected ethical challenges related to ex- plainability, including motivation, remote learning, legality, responsibility, and context awareness.

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AI-supported Simulation-Based Learning: Professional's Experiences Related and Their Stress-Levels

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Abstract

In In this study we explore simulator trainees learning experiences and their stress level in simulation-based learning. The goals of the research are to: 1) explore trainees emotions dealing with simulation-based learning, and 2) to develop and test a pedagogical model for AI-supported simulation-based learning. We integrate neuroscience and education, and approach learning as a physiological, emotional, motivational, as well as cognitive entity. The research questions are as follows: 1) How do trainees overcome stressful situations? 2) What kinds of self-reported emotions trainees experience during SBL? and 3) How do SBLE model supports learning?

We develop a pedagogical model for AI-supported simulation-based learning, and divide learning process in three phases: Introduction, Scenario and Debriefing. In Introduction environment and scenario are presented and learning goals are set. In Scenario learners participate in the simulation practising knowledge and skills required in challenging situations. In Debriefing learning processes, knowledge and learning environment are evaluated, reflected and critically analysed. We carried out simulator experiment during 16-19 of August 2021 in a specific simulation environment provided by Neste Engineering Solutions Ltd. 2 simulator trainers and 12 simulation trainees participated the simulation experiment in which online observations, screen and video recordings, stimulated recall interviews (STR) and First beat measurements were collected. Data will be analysed using mixed methods both qualitatively and quantitatively and the results will be presented from multidisciplinary approaches.

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Game metrics in nursing simulation game for learning clinical reasoning skills

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Abstract
The rapid development of technology has enabled the adoption of different types of simulation games in healthcare education, offering new ways to learn. Simulation games are used by students in nursing education for learning clinical reasoning (CR) skills. Game metrics offer a new and objective way to evaluate nursing students' CR skills. Game metrics can be utilized to develop adaptive features for nursing simulation games and develop games that adapt to the students' skill level. The aim is to describe the possibility of game metrics in light of the results of two empirical studies to provide objective data of how students learn CR skills in playing simulation games. To achieve this goal, a simulation game was implemented as part of the learning process of nursing students.

Nursing students (n=416) of four universities of applied sciences in Finland played the single-player simulation game using computer and VR headset. In this study, game metrics are defined as the number of playthroughs, the score, and the playing time. The total number of playthroughs was 2417 with computer and 40 playthroughs with VR headset. The results show that the playing time was significantly associated with the score. In addition, there was an association between better scores and better self-evaluated CR skills. Game metrics give objective data of students' competence and learning, and therefore game metrics can be utilized to improve students' CR skills. Analysing game metrics enables the further development of simulation games to be used in future nursing education.

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Group E: AI related games and support in Learning

Game-based features on intrinsic motivation in intelligent game-based learning environments: A systematic literature review

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Abstract
As we know, intelligent game-based learning environments integrate commercial game technologies with AI methods from intelligent tutoring systems to intelligent narrative technologies. The results of recent empirical studies demonstrate that intelligent game-based learning environments have great potential to create dynamic learning experiences which are both effective and engaging. In intelligent game-based learning environments, the game-based features may include devices such as performance rewards, personalized agents, and navigational options, which work as effective ways to enhance students' interest and maintain persistent interaction within the learning environments. The application of such interactive game-based features increases students' motivation and engagement in their learning tasks. In this study, we review existing literature in the field of the intelligent game-based learning environments in education, and provide answers for the following research questions: 1) What kind of game-based features are available in intelligent game-based learning environments? and 2) How students' intrinsic motivation in learning activities are influenced by game-based features within these learning environments? The systematic literature review (SLR) will be used as a method in this study. This research will produce new knowledge of effective game-based features in intelligent game-based learning environments and figure out the effects of game-based features on students' intrinsic motivation in learning, which will improve students' performance and promote their learning achievements. Implications of this research will be beneficial for designers to find out appropriate approaches and techniques to effectively apply game-based features into intelligent game-based learning environments.

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Simple AI may be good enough for guiding training of reading acquisition (AI in learning

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Abstract

The acquisition of the basic reading skill follows at best the association learning principle. Accordingly, child learns to connect spoken items to the corresponding written items. In consistently written languages this means learning to connect the phonemes to corresponding graphemes. Next one needs only to invent that sounding out the phonemes in the order of graphemes makes one able to read whatever pronounceable sequences of letters independent of necessarily knowing the meaning of what follows. In less consistently written languages such as English the items to-be-connected need to be large enough to find connections which are always true, such as is "ing" because practically none of the letters represent the same sound everywhere in written English. When choosing the order of introducing the connections simple rule of thumb optimizes learning. This is how our Grapholearn technology (grapholearn.info) makes training of the basic reading skill effective. Accordingly, in consistently written language one is motivated to listen (to then store it to writing) first the sounding of such written items whose sounds are easy to differentiate from each other to make one able to choose the corresponding written item first from few alternatives and then introduce more difficult to differentiate sound items such as /l/, /m/ and /n/ to-be-connected to one of a larger number of alternative letters, etc. A comparable logic needs to be followed in training the basic reading skill of other types of writings.

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Self-supervised End-to-End ASR for Low Resource L2 Speech

Mikko Kurimo, Aalto University

Abstract

Automatic speech recognition (ASR) has several potential use cases for second language (L2) learners. In addition for providing automatic transcripts for native speech, the L2 learners' own speech can be analysed for computing feedback in assessment and self-learning of oral language skills. However, the L2 ASR has several challenges including foreign accents, hesitations, corrections, repetitions and pronunciation, lexical and grammatical errors. An additional challenge is that the available L2 speech resources and datasets are small and the collection and transcription of L2 speech is hard. This makes the training of ASR and other AI tools particularly problematic and their performance can remain low.

Unlike conventional ASR, end-to-end systems simplify the training procedure by directly mapping acoustic features to sequences of characters, thereby eliminating the need for specialized acoustic, language, or pronunciation models. However, the end-to-end ASR systems require more training data than conventional ASR systems to achieve similar accuracy. This makes it difficult to develop ASR systems for tasks where transcribed target data is limited such as developing L2 ASR. Nonetheless, recent advancements in self-supervised acoustic learning, manifested in, for example, wav2vec models, leverage the available untranscribed speech data to provide compact acoustic representation that can achieve high performance when incorporated in end-to-end systems. To

this end, we have experimented with several monolingual and cross-lingual self-supervised acoustic models to develop end-toend L2 ASR for Finnish and Swedish. Even though our test sets are small, they indicate that competitive performance with conventional ASR pipeline trained on the same target data.

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Speech recognition in language learning

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Abstract
A hundred years ago, in 1918, Charles C. Clarke, Yale's professor, explained how a 'talking machine' would improve the teaching of pronunciation and oral skills in foreign languages. Nowadays, that 'talking machine' has been created and if you own a smartphone you have one, but now it is called 'speech recognition'. This technology, made with AI, fosters lifelong learning since it allows students to practice their oral skills whenever they want. Not only practicing but, even better, practicing with feedback. Thus, the learning can be carried out when the students decide, encouraging their agency and autonomy to learn.

However, are there experiences which promotes the use of speech recognition in learning contexts? Indeed, a good example of that is the Finnish start-up Elias Robot. Nevertheless, are we taking advantage of this technological advance to teach languages? What do languages' students think about including speech recognition in their personal learning environment?

I've been trying to solve those questions with my research, asking 200 students through a questionnaire about their speech recognition's use and opinions. The results show that pupils know about speech recognition but they are not familiar with its pedagogical benefits neither know how to take advantage of it..

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Group F: AI related language learning

AI in Language Learning

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Abstract
The Revita Project is a novel, AI-based approach to language learning. We aim to develop a learning environment for learners beyond the beginner level. Our main (but not exclusive) focus is on languages with rich morphology, such as Finnish and Russian. The system tries to: model the learner's competency, generate exercises optimally suited to the learner's estimated skills, analyze the learner's answers, provide feedback to guide the learner toward correct answers, and use the

answers to continually adjust the student model. Equally important is support for teachers: the system lets teachers share learning materials with students, control learning settings, and provide detailed analytics to track the learners' performance.

Learning toward intermediate-to-advanced levels requires a massive investment of time. To keep the learner engaged and motivated for the long term, we pursue gamification strategies, which can be divided into two kinds of incentives: improving competency and enjoyment. Thus, a crucial principle underlying the approach is personalization. Revita allows users to upload arbitrary texts about their favorite topics, and creates an unlimited amount of exercises based on these texts. This leverages the student's interest to maximize practice time. To enhance enjoyment, the system offers multiple practice modes, including flashcards, and competition against an opponent and against time. AI methods are employed in multiple components of the system - in particular, for language modeling, using neural networks, and in learning analytics and student modeling, using educational data science. Learner data collected over time is made available to the wider educational research community.

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Artificial intelligence as a tool for diagnosing learning challenges among first-generation immigrant learners using finnish as a second language: games and simulations

Frank Ojwang, University of Lapland

Abstract
Finnish Immigrants' learning trajectory underexploits academic capacity and strength of first generation immigrant learners attending Finnish education systems. This is exacerbated by the immigrant families using another language as the primary language of communication at home and the minimal to zero support given to the children at home by the caregivers. The use of Artificial Intelligence (AI) games and simulation in Finnish language can provide an accelerated approach to help identify the challenges and weaknesses faced by learners in the course of their learning. This study uses an ethnographic approach and anchors on grounded theory to analyze the learning challenges diagnostic interventions for rapid response and solutions to enhance and optimize academic learning. A sample size of 30 learners spread across 5 schools in Helsinki region will be provided with a tablet loaded with a diagnostic gaming and simulations app for an in-depth analysis of the learning gap area for first-generation immigrant learner. The suitable learners will have lived in Finland for less than five years, and will be in the primary school grade four. The learners will be followed up on the independent usage of the app to engage in progression-designed interface over-one year period and performance tracked in the Finnish language use in learning. The learners will be selected from the group of eligible immigrant learners considered as weak and being in need of specialized support in the Finnish education system.

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AI in Computer Assisted Language Learning for the Russian Language

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Abstract

The CAT&kittens project is being developed to assist users, who want to perfect their skills in academic Russian writing. The platform is aimed at comparing student texts ("kittens") against a big corpus of academic texts (CAT).

One of the future goals is developing an AI-supported algorithm, which allows for detecting and substituting erroneous collocations, for example, powerful coffee, instead of strong coffee. The main ideas beyond this service are, first, detecting incorrect collocations in a student text, and second, creating a list of substitutes, which are semantically similar, yet statistically correct. The goals are achieved using distributional semantic models, like word2vec, GLoVe, ELMo, BERT, and GPT models. Distributional semantic modeling allows for creating multidimensional vectorial spaces, where every word is assigned a vector in a semantic space. Using the vectorial representations one can retrieve collocations, which are similar in meaning — to the detected erroneous collocations.

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Innovations in English Language Teaching in Primary Schools in Poland and Uzbekistan

Nigina Misirova, University of Warsaw, Poland

Abstract

The paper reveals different types of innovations that can help and motivate teachers to reinvent their teaching ways and make their courses more interesting and productive for pupils during teaching English as a second language in primary schools. They include modern approaches towards teaching English, CLT method, interactive activities, games, as well as using new technologies in ELT. The special attention is paid to the issue of the influence of technology advances on teaching English at schools. Mobile devices, Edmodo, Piktochart, Kahoot, and Multimedia have gained popularity as tools for teaching English and contributed to the current changes in the teaching process. In this study, it is claimed that the contemporary schools have to introduce innovations into the educational process in order to respond to the challenges of the daily life and prepare children for the future. As a result, the teacher's role is the ultimate in the use of innovations in ELT in contemporary schools. In this study attention is paid to ELT in primary schools. This level of education is part of compulsory education in both countries. The presented analyses are based on the literature review. In this presentation, the researcher defines the term of innovation and the role of teacher, explains the scientific problem, research methods and the expected results and states the main recommendations for the better use of new technologies and different types of innovative pedagogies, which help pupils in improving their learning skills and motivate them to arouse their desire to learn a language.

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Group G: AI in education and learning

AI that learns more like we do - replicating interactive learning

Nike Haber, Stanford University

Abstract
Human learning is interactive learning. As "scientists in the crib," children learn through curiosity, tirelessly seeking novelty and information as they interact -- really, play -- with both physical objects and the people that surround them. As adults, we constantly learn about our worlds and gain new skills by actively engaging with our environments. A crucial component of interactive learning is social. We learn from and about others, picking up collaborative and competitive capacities, not by simply observing them, but through rich social interaction that, each day, recruits a lifetime of accrued social skills. Yet the full complexity of our learning behaviors remains poorly understood. In particular, how would we engineer an artificial, autonomous agent that can flexibly interact with its environment, and the other agents within it, in order to learn as humans do? In this presentation, I will give an overview of results in deep reinforcement learning aimed at replicating interactive learning, along with efforts to understand human behavior through this lens. I will then speculate on several profound impacts success in this AI engineering program may have on the future of education. First, it may give us fine-grained computational models of learning, including for those with developmental differences. Second, with these models, we may be able to test, in silico, learning interventions, from intensive early childhood interventions to teaching best practices. Third, AI that learns more like we do, and in particular, learns socially as we do, promises to enable a wide variety of rich learning technologies.

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Learning Creativity with Artificial Intelligence: Research into the role of AI in Sociocultural Learning Environments

Jeongki Lim and Teemu Leinonen, Aalto University

Abstract
Creativity is a universal skill that is agnostic to discipline and field and an essential learning outcome for 21st-century education. We are interested in exploring what kind of role AI could have in the process of learning creativity. The presentation will share the ongoing research that seeks to develop a learning environment for developing creative capacity in humans and machines. The presentation will include experimental designs and early research insights from several empirical studies using the techniques and applications in computational creativity and computational design and methodologies from design-led research. As a theoretical framework, the concepts from the cultural-historical activity theory are used to analyze the roles and activities of artificial intelligence (AI) and humans as a tool, tutor, and peer in a socio-cultural learning environment. The insights from the research are important for its potential to develop a practical AI-enable tool for creativity education and a technological and pedagogical model for integrating artificial intelligence in general learning environments. The presentation topics include, and are not limited to: machine learning in

education, creativity theories, art and design education, early childhood education, computational creativity, and cultural-historical activity theory.

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Do Finnish teachers think AI can replace teachers?

Joonas Pesonen, University of Helsinki

Abstract
Use of digital technologies in education has rapidly increased due to the COVID-19 pandemic. It is important to discuss these technologies' impact on the teaching profession. Ina classroom setting, the teacher can support learners' self-regulation and then gradually decrease the amount of support, promoting the learning of self-regulation skills. With the development of artificial intelligence (AI) solutions such as adaptive learning technologies (ALTs), this scaffolding support may partly be transferred to technological systems. Using thematic analysis and epistemic network analysis (ENA), we analyzed 114 social media posts by Finnish education professionals commenting on an opinion piece about artificial intelligence (AI) technology taking responsibilities usually attributed to a teacher. Out of the analyzed posts, 32 were supportive, 30 ambivalent, and 52 critical towards the presented scenario. The epistemic network analysis graphs showed some differences between posts with a different attitude. Supportive posts, on average emphasized technological capabilities and their connections with teacher workload and self-directed/self-regulated learning. In comparison, the critical posts on average emphasized human presence and its connections with pupil diversity and technological capability. Our findings both reveal the relevant themes in the discussion about technologies' impact on the teaching profession and underline the differences in supportive and critical argumentation.

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5th and 6th grade students' conceptions of Artificial Intelligence

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Abstract
The 21st century has brought with it a growing variety of authentic and engaging learning environments. While significant portions of human learning still take place in traditional classrooms, researchers and educators have also introduced several learning types of learning experiences that are embodied, project-based, inquiry-driven, collaborative, and open-ended. Furthermore, there has been greater acknowledgement of the varying timescales and contexts where meaningful learning takes place, as well as greater appreciation for previously under-appreciated competencies like creativity, self-regulation, and collaboration. This expansion in the types, contexts, and timescales of human learning necessitate novel analytic approaches. This presentation will discuss artificial intelligence-based tools and technologies that can help researchers and practitioners navigate and enact these novel approaches to learning, while also providing a meaningful lens for

student reflection and inquiry. Consequently, this will include technologies that offer insights within groups of students using audio/video information, resources for studying learner electrodermal activity, and analytic techniques and interfaces for helping researchers collect and analyze different types of multimodal data across contexts. The presentation will also discuss some of ethics surrounding these types of data and analytic approaches.

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Group H, Ethics issues related AI in education and learning

AI and Learning: ethical opportunities and challenges from the perspectives of education service providers and users

Päivi Kousa, University of Helsinki

Abstract
This study will discuss on opportunities and challenges that AI is bringing to learning in schools and working life contexts. Here the focus is on ethical issues that are viewed from the perspectives of companies who produce educational AI-based tools and services, and those who use them in schools and workplaces for learning.

From companies' viewpoints, ethical challenges are related to regulations, equality and accessibility, machine learning, and society. From schools' perspectives the major critical questions are who has the power to decide which educational services the school can use and who is responsible for the ethical issues of those services e.g., student privacy. In addition, schools are concerned how to ensure that AI-based services and tools are equally accessible to all and, genuinely useful in supporting teaching and learning. As a vast amount of data is collected, stored and processed every second, in-depth discussion between producers and consumers is essential. Both parties also need national and international guidance on how to act in an ethically sustainable manner. The aim is to increase common AIknowledge through education in order to understand its opportunities and challenges and keep up with our rapidly evolving society.

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AI in learning: Ethical Challenges and Solutions

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Abstract
Along with other life activities, Artificial Intelligence (AI) has significantly affected education in form and function. Advancements in computer science research in the last ten years and the introduction of sophisticated software, hardware, cloud computing, and big data brought revolutionary

automaticity. This automation, not only affects the way we live but also influences our educational perception and perspectives. Although the integration of AI technologies unlocks vast learning potential for students in AIED; however, various aspects of humanity are ignored by AI. The most important of which is the ethics in learning. Educational ethics is the area that continues to develop with the increased use of AI technology in the field of education. The use of AI-based tools and technologies in everyday life and their effects on education, security, and ethical aspects of learning are important considerations when developing efficacious solutions. The ethical outlook for faculty, learners, and institutions needs to be defined for the upcoming challenges of AI in learning. Teachers and students are using AI assistants for pedagogy, learning, and grading, that pass over many human perspectives which are expected in a conventional classroom. Similarly, schools using AI technology are supposed to be within the boundaries of the ethical domain such that intellectual property, honesty, trust, equality, and equity for learners and educators. This paper will provide information on the current status of the ethical challenges faced by educational institutes, faculty, and learners regarding the use of AI in education and will propose potential solutions for the ethical challenges inherent in the implementation of AI systems.

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Teaching with AI and teaching about AI

Marcelo Worsley, Northwestern, U.S.A.

Abstract
In the educational sphere, two branches of research and practice in AI can be distinguished: teaching with AI and teaching about AI. In the spirit of digital literacy adopted in various countries' core curricula, including in Finland (FNBE, 2014), in addition to international recommendations for AI education (e.g. ACM, 2018; ISTE, 2019), teaching people about AI has become all the more important. This issue is vital because empirical research suggests that peoples' conceptions of AI are rather limited (Cave et al., 2019; Kerr et al., 2020; The Royal Society, 2017).
We conducted a qualitative survey that enquired 195 Finnish 5th and 6th grade students' conceptions of AI. We employed an abductive method (Dey, 2003; Suddaby, 2006) to analyze the students' written responses regarding the following aspects of AI: what AI means, where it is/what it is used for, how it works, why it is used, and what words, things or objects are related to it. The students situated AI commonly in everyday technologies, industrial technologies, the Internet, and media. AI was commonly perceived in a positive light for making life easier and assisting people in various tasks. We also observed thematic dichotomies, such as one between "weak "and "strong" AI, the latter of which encompassed giving AI almost antropomorphic qualities and juxtaposing AI with human-like cognition and experience. Some students demonstrated outright misconceptions, however, while several students told they had no knowledge of the topic. In the presentation, we overview the main results and discuss especially their pedagogical implications.

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Is There Really AI in Education?

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Abstract

Many of the education systems currently referred to as AI-based would hardly be considered as such in other fields. Labeling simple Boolean algebra or statistical methods as AI leads to potential issues in the credibility of real AI systems in the future. Moreover, the validity of such systems may be compromised if the basis on decisions is not solid enough. Nobody wants to use a system that makes important, future-shaping decisions based on inconsistent data and overly-simplified algorithms. There are, however, real chances for utilizing AI in education. First, with the current tools, we can utilize machine learning techniques to provide valid classification of learning entries. In the future, data-based decision making, based on large data masses, could be a valid way to provide automated assistance for teaching as long as we can ensure an ethically sustainable way to collect the data needed.

It is important to keep in mind that something being possible from a technological perspective does not mean that it is ready to be adopted in education. In the example of technologies referred to as AI or actually constituting AI, there are a few key questions that need to be addressed when thinking about their possible affordances and limitations in schools. What are the existing challenges we hope AI will solve? What ethical considerations need to be addressed when it comes to the use of data and AI? We argue that the future of education will depend on the collaboration between the technological and educational fields.

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Group I: AI in education and learning

Intelligent Text Book: A Review of Tools and Technologies

Bo Jiang, Meijun Gu, Ying Du
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Abstract

Reading is one of the most common and important learning behaviors that happened to everyone. Understanding how people read and interact with e-textbook could not only promote our understanding of how people learn, but also benefit us to provide intelligent learning support to learners. Recently, there is a growing interest from the community of research and industry to develop intelligent textbook that could offer intelligent learning support to learners. This presentation first summarizes the history of intelligent textbooks, and give a formal definition to intelligent textbook. We also provide an overview of key intelligent technologies used in intelligent textbooks, including student modeling and domain modeling technologies. The students modeling is summarized from three aspects: the learners' knowledge state modeling, the learners' learning behavior modeling, and the learners' psychological characteristic modeling. Moreover, it introduces some popular intelligent textbook authoring platforms that used for creating intelligent textbooks.

This presentation would promote peers' understanding of the current state of the technology and platform development of intelligent textbooks.

Artificial Intelligence in Educational Escape Rooms

Sonsoles López-Pernas, Universidad Politécnica de Madrid

Abstract
Escape rooms have recently made their way into education, as they offer an engaging method to learn collaboration and problem-solving skills and practice creative thinking in a gameful way. One of escape rooms' key characteristics is that they are time constrained. As such, it is of crucial importance that learners use their time wisely, so they can gain exposure to all the puzzles that an escape room comprises. To prevent students from becoming stuck, hints are usually provided by the instructors. However, in some contexts, it becomes infeasible for educators to closely monitor and provide timely help to all students. Artificial Intelligence (AI) offers a solution for adaptive support that can be tailored to match students' profiles. In this contribution, I will demonstrate the different ways AI can be used in escape rooms to offer needed support using different levels of automation. For instance, in a semi-automated scenario, AI could be used to suggest to the instructors different ways to help lagging teams (e.g., by offering them a hint). In a completely automated scenario, AI would directly provide help to lagging students without instructors' interventions by offering hints in an adaptive way, similar to the well-known Computerised Adaptive Testing (CAT). Moreover, a completely AI-controlled escape room could adapt the difficulty of the puzzles according to, e.g., students' pre-knowledge, tailoring the experience to each specific player. Thus, everyone would get the most out of the activity even in asynchronous learning settings with little instructor support such as MOOCs.

Artificial Intelligence in everyday educational experiences of adults

Elżbieta Makowska-Ciesielska, University of Lower Silesia

Abstract
The aim of this study is to present conclusions from the first stage analysis of qualitative data collected in the research project "Human - new technologies". Artificial intelligence (AI), as the science and engineering of creating intelligent machines (J. McCarthy, 1956) addresses many of categories of new technologies. With the increased use of AI in organizations, work, and education, rapid changes are occurring in adult learning concepts and practices.

The first part of the paper presents a reconstruction and a critical analysis of the selected theoretical and empirical achievements of the author in relation to the issue of the strategy of familiarizing to

new technologies. This term can be understood as two types of competences of one's potential: knowledge about achieving general goals and practical experience in the field of new technologies. The second part presents classifications of strategies of familiarizing to new technologies, including AI. The aforementioned classifications address one of the questions of the research project: what educational strategies are applied by adults when they face new technologies in their daily lives? The last part presents the research methods, techniques, tools and the conclusions from the first stage of the analysis of the qualitative data in relation to one of the research questions: What is the meaning of AI for adults in their everyday learning process? The general conclusions concern adults giving meaning to AI in their daily lives.

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Assessing and Monitoring School Wellbeing through an Automated Scoring System: Schoolday Wellbeing Model

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Abstract
Students' wellbeing is critical as it marks their positive development in school life and ensures their growth in the future. The assessment of wellbeing has been often static and lagged behind for the diagnostic/intervention purpose. In this research, we aim to introduce an automated scoring wellbeing system, Schoolday Wellbeing Model, that is featured as dynamic and real-time. During the COVID-19 pandemic, the call for such a system is imperatively needed as students wellbeing has been largely dampened. The Schoolday model can collect wellbeing data at low cognitive cost, report wellbeing lively at multi-layer (e.g., individual-, class-, school-), and give immediate feedback. The model is constructed on the basis of School Well-being Model (Konu & Rimpelä, 2002), School Demand-Resource Model (Salmela‐Aro & Upadyaya, 2014), and OECD Social-Emotional Skill Model (OECD, 2021). The aim is to report the psychometric properties of the wellbeing model by using the first stage data (N of students = 2551) that we have collected during March-May 2020 around the globe. Through the analysis (e.g., Confirmatory Factor Analysis; CFA), we found that the model has good reliability and structural validity. We further examined the role of social emotional skills to wellbeing. Linear mixed model showed that task performance and emotion regulation skills were the most consistent skills to promote psychological wellbeing, academic wellbeing, and health-related outcomes. Those findings were consistent across the globe. The future development of the model will be discussed.

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Group J: AI in education and learning

Artificial Intelligence role in K12 Education – EU countries overview

Lidija Kralj, European Schoolnet

Abstract
Artificial Intelligence in Education is one of the currently emerging fields in educational technology. Whilst it has been around for about 30 years with high expectations about its potential, it is still unclear how it can impact on teaching and learning, and how to make pedagogical advantage of it on a broader scale. European Schoolnet conducted the survey about Artificial Intelligence (AI) role in K12 education in 2021 among Ministries of Education. Eighteen countries answered the questionnaire and joined expert interviews: Belgium-nl, Croatia, Cyprus, Estonia, Finland, France, Greece, Hungary, Ireland, Lithuania, Luxembourg, Malta, Norway, Portugal, Republic of Serbia, Spain, Switzerland, and Turkey.

This presentation present current state of AI in K12 education in European Union with examples of learner, instructor and institutional system-oriented AI. We also talk about challenges and possibilities of AI in education, ethics and risks, equity and conclusion regarding AI in education potential and recommendations. Most of the countries already have some projects or pilot projects and seven countries have policy documents connected with AI in K12 education, we are presenting examples of those projects and policy documents in next few chapters. All examples mentioned in this report lead us towards the idea of the powerful and immersive use of AI in education in near future. Interactive dialogues discussing the role of data, learning analytics, and AI in education will help in achieving innovations beyond the current state and learn how to grasp the endless possibilities AI offers education, as well as how to mitigate the risks associated to it.

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AI in Small states: Potentialities and Challenges

Subrata Ganguly, University of Warsaw

Abstract
The paper aims to presents a qualitative research on the potentialities and challenges of AI in small states, Bhutan and Malta, by utilizing Bereday's comparative model. The paper discusses that the Artificial Intelligence (AI) promises to benefit humankind in unprecedented ways but small states are especially vulnerable to the technology's downside short of strengthening social cohesion and resilience. One of the crucial argumentations here is that AI-enabled automaton will displace many workers in the service industry precisely because their work tends to be traditionally structured. But on the other hand, the paper argues and thereafter conclude with findings that to thrive in this high-tech scenario, small states must constantly innovate and adapt taking into consideration of the point that human ingenuity might be something that AI could never match. In Bhutan, a small state of Asia, the Gross National Happiness (GNH) - Health, Wealth, and Safety of the people can be determined by using AI, which is a different and relatively unbiased approach to the problem. On the other hand, Malta, a small state in Europe, is aspiring to become the ultimate AI launch-pad. According to Malta's new education plan 2020, the educational courses and study programmes will

incorporate AI and will cross-link with other disciplines such as healthcare, marketing, sociology, etc. The new educational strategy of Government of Malta, 2020 proposes a range of policies towards the reform of primary, secondary and higher education systems and it extends support for teachers to enhance their course offerings in AI.

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Artificial intelligence's role in initial teacher education and continuous professional development of teachers

Gyori Janos, Eotvos Lorand University

Abstract

AI literature, also the literature on the relationship of AI and education became very wide in the past decades. A significant part of this literature is concentrating on students' learning and AI, mostly AI supported learning of students in general and also in higher education, and students' and teachers' knowledge on, attitude to and familiarity with AI (eg. Fotea, Fotea & Tundrea, 2019; Lindner & Romeike, 2019). However, the literature doesn't concentrate on the overlapping issues of AI and two special communities of learners: students in initial teacher education and practicing teachers in in-service teacher education. One way of effective learning is experienced learning (Kolb, 1984). We think that teachers in the future can use AI in the classroom in an effective way if themselves also gain experiences how AI supports different educational activities. In our presentation we introduce some of the possibilities of AI supported learning of student teachers in teacher education and AI supported learning of practicing teachers in the CPD: during their initial and in-service education programs they can gain experiences on AI and personalized, adaptive learning (Peng, Ma & Spector, 2019), AI and (self-)assessment (Gonzalez-Calatayud, Prendes-Espinosa & Roig-Vila, 2021), essay scoring (Kumar & Boulanger, 2020), learning analytics (Ochoa and Wise, 2020) and others.

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Vocational school as a trailblazer in AI education

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Abstract

The researchers shown that artificial intelligence (AI) will create totally new working life with new – now still unknown – jobs, occupations and products and replace the old ones. In the light of our current knowledge, there are signals that in the near future the AI will affect not only on the routine tasks and occupations and on those least educated, but it reaches its affects on professions that require higher education, too. These visions challenge the systems of education and vocational training. In Finland, the educational authorities (Ministry of Education and Culture or National Board of Education) have not given any strategies or guidelines for the educational field concerning the challenges of AI. So far, all the guidelines come from the Ministry of Economic Affairs and

Employment. This puts all the educational agents, but especially the vocational education providers in an interesting situation.

Although the national educational authorities are still considering the state of affairs, there are those who have been proactive about AI in the field of vocational education. OMNIA, The Joint Authority of Education in The Espoo Region with its AI Lab is one of those trailblazers in Finland. In our presentation, we will show and discuss, how OMNIA developed its approach to AI education. How they took risks, crossed the borders and developed new ways to work, train and educate in co-operation with various educational agents, working life, companies, teachers and researchers. The data of our presentation is based on the interviews of key actors in Omnia and various documents.

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Group K: AI in life and work

Social-Haptic Communication; Human touch into remote haptic communication

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Abstract
Our development and wellbeing from very early stage in our life is based on human touch. Agreed touch messages, haptices (2008), were first researched and developed with deafblind people. Social-haptic communication (SHC) includes different subgroups of haptices. Through haptices we share emotions, body language, social quick messages, routes, mapping our environment, art and games. SHC is now, 20 years later, being used by different client groups internationally from health care, dementia, learning difficulties and sensory impaired people. EU-project SUITCEYES 2018-2021 (suitceyes.eu) started to develope smart clothes, which improve the life for deafblind people through intelligent haptic technologies. The information portrate through haptic smart vest are based on haptices. The human grammar of touch, haptemes, are conveyd into haptograms read through vest's sensors. During this practical presentation we will share how haptices and haptemes were introdused to the researchers, and how they were applied for a deafblind receiver during the challenging pandemic time, online.

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Artificial intelligence revolutionizes automotive competencies in VET

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Abstract
The transport technology is currently undergoing a transformation affected by global megatrends. Automation and robotics with AI are the key drivers of change. Self-driving cars have been said to be the frontrunners of the Industrial Revolution (Industry 4.0). Alternative propulsion cars such as electric cars and hybrid cars with more than one propulsion have entered the market. The transformation requires completely new kind of competencies from VET-professionals.

The Clemet -project (Cleantech mobility education for tomorrow, 2020 -2021) has studied competence needed of the automotive education together with secondary- and higher education and working life. The data is based on the interviews of VET-students, teachers and working life representatives (N=24) and analysis of documents. According to the results, the curriculum of secondary education is lagging behind the technology transformation. Artificial intelligent is weakly displayed in current automotive curriculum and the steering effect of curriculum is small. The connections to working life are perceived as deficient in both secondary- and higher education. Teachers acquire their skills from working life and learning material mainly directly from the automotive brand stores. The teaching needs research-based support. Educational institutions need more working life relationship.

According to the analysis of secondary school students, the most important area of expertise in the automotive sector of the near future is content-specific knowledge and skills in the automotive sector, consisting of in-depth professional knowledge, strong professional knowledge and ICT- and digital skills and application management. According to the higher education student data, the most important area of expertise for the future of the automotive industry is transdisciplinary content information, which contains content information that crosses and combines the boundaries of different information.

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AppSkilling21

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Abstract
Everyone is talking about the relevance of 21st century skills, but how are they acquired in a sustainable way? We want to use the versatile possibilities of modern technology to develop a multifunctional learning app. It supports the sustainable acquisition of the most important 21st century skills in school and out-of-school contexts.
In the first step, the learners negotiate together which skills are important for them and which of the 17 sustainable development goals they consider particularly relevant. Guiding questions are intended to encourage the learners to take an in-depth look at both areas and, in doing so, to repeatedly establish a transfer to their own lifeworld and their vision of the future. Pedagogically targeted "experiences" generate further opportunities for discussion. Finally, learners create a product of their work (e.g., short presentation, video snippet, audio recording, and more), which they add to the app. Motivationally, this process is fostered by transparency, reward, appreciation, and community engagement to give the app an additional playful framework. The app should take

into account numerous current developments for this learning process. For example, it can be used remotely and thus in distance learning, enables all kinds of creative presentations and relies very strongly on cooperative learning. In addition, its content is geared to the most important challenges of our time. In the future, it should bundle the learning experiences of all users, integrate research results and contribute to holistic, interdisciplinary learning.

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Upknowledge Oy Company presentation

Timo Lindqvist, Upknowledge Oy, Finland

Abstract
The thing is, very few people actually want to spend time learning. And it's not that they do not like learning, it's that they just have way too much to learn and remember. Upknowledge Oy is a digital creative agency specializing in technical learning solutions. What we try to do is help people learn more in less time. Our companies creates VR learning solutions and tools, and find the best ways to learn for others.

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