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UNIVERSITY OF HELSINKI
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LAPIN YLIOPISTO
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CICERO

USING 21ST CENTURY INTELLIGENT TECHNOLOGY TOOLS IN EDUCATION: SEMINAR

FEBRUARY 13-15 2019
HELSINKI FINLAND



HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

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Sino-Finnish
Joint Learning Innovation Institute
中芬联合创新学习研究院



未来教育高精尖创新中心
Advanced Innovation Center for Future Education
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LEARNING



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PROFESSOR HANNELE NIEMI

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SEMINAR 13-15TH OF FEBRUARY,
HELSINKI FINLAND

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SEMINAR DAY AT
UNIVERSITY OF HELSINKI

THURSDAY 14TH OF FEBRUARY
TENTATIVE GROUP WORK AT
UNIVERSITY OF HELSINKI,

BUSINESS EVENT AT CLIC

FRIDAY 15TH OF FEBRUARY
PUBLICATION COOPERATION AT
CALLIOLA

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Using 21st Century Intelligent Technology Tools in Education

Chinese — American — Finnish Workshop Feb. 13-15, 2019

University of Helsinki



Foreword

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 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.

In the United States, the project “One Hundred Year Study on Artificial Intelligence (AI100)” was launched at Stanford University on August 1, 2016 (<https://ai100.stanford.edu>). It is a long-term investigation into the field of AI and its influences on people, their communities, and society as a whole. It indicates that we need 100 years of continuous research to take full advantage of AI as well as to identify urgent research needs and issues of AI governance.

“Though different instances of AI research and practice share common technologies, such as machine learning, they also vary considerably in different sectors of the economy and society. We call these sectors “domains,” and in this section describe the different states of AI research and implementation, as well as impacts and distinct challenges, in eight of them: transportation; home/service robotics; healthcare; education; low-resource communities; public safety and security; employment and workplace; and entertainment.” (<https://ai100.stanford.edu>).

Regarding education, the report summarizes that there have been several common themes worldwide, such as teaching robots, intelligent tutoring systems (ITS), online learning, and learning analytics. Massive open online courses (MOOCs) and other models of online education operate at all levels; sophisticated learning management systems that incorporate synchronous as well as asynchronous education and adaptive learning tools have already been widely offered and used

over the past several years. The report also emphasizes that despite of many changes, still teachers' role is important "*quality education will always require active engagement by human teachers*".

The same kind of evolution is occurring in China. A new discussion paper from the McKinsey Global Institute, originally presented at the 2017 China Development Forum, explores AI's potential to fuel China's productivity and growth—and to disrupt the nation's workforce. AI technologies have exciting and far-reaching potential to improve health care, the environment, security, and education. **Artificial intelligence**, or the idea that computer systems can perform functions typically associated with the human mind, has gone from futuristic speculation to present-day reality.

In 2018, the Chinese Ministry of Education published *AI Innovation Action Plan for Colleges and Universities* and distributed it to education departments and institutions of higher education. This action plan aims to advance Chinese universities to the world-leading frontiers of science and technology; energize their capabilities in AI technological innovation, talent cultivation, and global cooperation; and provide strategic support for the development of next-generation AI in China. The plan sets ambitious goals for the next 12 years including achievements in first-class theoretical research, innovative technologies, and applications of AI.

The Finnish government has also set up a working group to explore what *AI means in Finnish society, publishing a national AI strategy in 2017*. It identified many same issues as the 'One Hundred Year Study on Artificial Intelligence.' In addition, it raised Internet-based platform economy and recycling economy as important AI related topics. The Finnish strategy emphasizes also human-machine collaboration. Even though AI provides big data and machine learning offers scenarios for solving problems, many jobs still require human decision-making in critical situations, e.g., in industrial processes, health care, or the management of large amounts of data. An ability to manage rapidly changing situations and conditions will become a more important skill. The capacity of human beings is also needed in designing complex and challenging systems.

Another issue that is discussed in the Finnish report is that the skills and competences needed for future work are changing. Artificial intelligence will significantly change the labor market. A typical feature is that computers can perform routine and repetitive tasks more efficiently. The report emphasizes the importance of communication and interpersonal skills in the future work. This sets also important goals for education.

We are all aware that big changes are occurring in society, and the use of AI and technology are accelerating these developments. But at the same time, we are witnesses to growing inequalities within societies and between countries. We have a "learning crisis" in global education: according to recent reports from UNESCO and the World Bank, millions of young students face the prospect of losing out on opportunities because their schools are failing to educate them to succeed in life. We also know that unemployment is a reality for many youngsters and adults because the nature of work is changing and new competences are needed.

The UNESCO conference call for AI research and applications demands:

“Already today, there is a major skills gap in the labour market when it comes to AI-related jobs and skills. Educational institutions and training providers will need to address these skills gaps to ensure that future graduates will meet the requirements of the job market and enable an AI-literate citizenry.”

https://en.unesco.org/sites/default/files/unesco-mlw2019-call_for_proposals-en.pdf

We need serious efforts to prevent the development in which AI will exacerbate digital divides and deepen existing income and learning inequalities, as marginalized and disadvantaged groups are more likely to be excluded from AI-powered education. The penetration of AI in education comes also with concerns about *ethics, security and human rights*. It sets several new challenges to research, policy-making and governance as well as companies with their business.

Our workshop builds on the strategic cooperation between Chinese, American, and Finnish universities to bring education into the forefront of AI research. Our aim is to draw on multidisciplinary research to use AI as a significant opportunity to ensure high-quality education for all and change the learning crisis into quality learning at both the local and global level.

I warmly welcome all participants to the 2nd workshop
Using 21st Century Intelligent Technology Tools in Education

Hannele Niemi

Professor, Research Director

UNESCO Chair on Educational Ecosystems for Equity and Quality of Learning

Faculty of Educational Sciences, University of Helsinki

Using 21st Century intelligent technology tools in education: Helsinki

Wednesday 13th of February, 2019
place: Siltavuorenpenger 5A, Minerva K108

12:00 to 13:00	Registration and lunch
13:00 to 14:00	<p>Welcoming remarks</p> <p>Chair: Prof. Hannele Niemi, University of Helsinki Vice-rector, Hanna Snellman, University of Helsinki The representative of Ministry of Education and Culture Dean Johanna Mäkelä, University of Helsinki Prof. Liu Jia, Dean of JOLII Institute Prof. Barbara Schneider, Michigan State University</p>
14:00 to 14:15	<p>Break and group photo</p> <p>Future opportunities and challenges of AI in learning and education What are we aiming at – joint research and joint funding? Chair: Professor Barbara Schneider</p> <p>14:15-14:30 Introduction to the rationale of joint research agenda</p> <ul style="list-style-type: none"> • Hannele Niemi, Professor, University of Helsinki <p>14:30-14:45 National-Level Research Funding for Educational Technology in China</p> <ul style="list-style-type: none"> • Professor Zheng Yonghe, Beijing Normal University <p>14:45-15:00 Discussion</p> <p>15:00-15:00 Coffee and fruits</p> <p>15:15-15:30 Simulations and gaming</p> <ul style="list-style-type: none"> • Professor Heli Ruokamo, University of Lapland & Pekka Qvist educational games manager, Napcon games at Neste <p>15:30-15:45 Personalized and socio-emotional learning</p> <ul style="list-style-type: none"> • Professor Barbara Schneider, Michigan State University & Professor Katariina Salmela-Aro, University of Helsinki <p>15:45-16:00 AI and Learning Crisis in a global world</p> <ul style="list-style-type: none"> • Professor Eric Hamilton; UNESCO <p>16:00-16:15 What can we do with AI? The Finnish Center for Artificial Intelligence, FCAI</p> <ul style="list-style-type: none"> • Professor Petri Myllymäki, University of Helsinki <p>16:15-17:00 Joint discussion</p>
18:00	<p>Dinner (place: Restaurant Seurahuone Helsinki, Kaivokatu 12) Opening words: Tiina Vihma-Purovaara, Senior Ministerial Adviser, Ministry of Education and Culture, Finland</p>

Thursday 14th of February, 2019
place: Siltavuorenpenger 5A, Minerva K108

8:30 to 9:00	Coffee
9:00 to 11:45	<p>Starting the joint research agenda</p> <p>Future opportunities and challenges of AI in learning and education Chair: Katariina Salmela-Aro Video presentation of Joseph Krajcik, Michigan State University 3 video presentations from Stanford University, introduced by Keith Devlin</p> <ul style="list-style-type: none"> • Jeremy Bailenson • James Landay • Martha Russell <p>Forming tentative groups* and identifying research topics. Tentative groups: Intelligent data collection (1), Intelligent tutoring (2), Simulations and gaming (3), Personalized and socio-emotional learning (4)</p>

Business seminar:
The possibilities and challenges of using artificial intelligence in knowledge creation in companies
place: Tapahtumatalo Bank, Unioninkatu 20

	<i>The international seminar for business and research is organized by CLIC Innovation and University of Helsinki</i>
12:00 to 13:00	Lunch and informal discussions
13:00 to 14:40	<p>Program</p> <p>13:00-13:20 Opening of the event: Hannele Niemi, Professor at University of Helsinki & Jatta Jussila CEO at CLIC Innovation Ltd</p> <p>13:20-13:40 "The role of AI in Education-the lesson from Mathematics" Keith Devlin, Stanford University, Emeritus</p> <p>13:40-14:00 "New business models and artificial intelligence ecosystems" Tero Ojanperä, co-founder and CEO at Silo.AI - AI for people</p> <p>14:00-14:20 "Artificial intelligence as part of a digitalized operator learning path for the global process industry" Pekka Qvist, educational games manager, Napcon games at Neste</p> <p>14:20-14:40 "The present and the future for artificial intelligence in the business" Jarno Kartela, machine learning Partner at Fourkind</p>
14:40 to 16:00	<p>Coffee and informal discussions</p> <p>15:00-15:20 "Personalized learning", Annie Chen, General Manager of Xiaoyuansouti & Yuantiku Unit, Beijing Fenbi Wailai Science and Technology Co., Ltd.</p> <p>15:20-15:40 "Empowering energy with artificial intelligence" Jan Segerstam, development director at Empower IM Ltd</p> <p>15:40-16:00 "Artificial intelligence reshaping continuous professional development" Harri Ketamo, founder and chairman at Headai</p>
16:00 to 17:00	Closing words and networking coffe
18:00	Dinner (place: Restaurant Sunn, Aleksanterinkatu 26)

Friday, the 15th of February
place: Calliola course center, Tammisaari

8:00 to 9:00	Moving to Calliola (information about transport is available later)
9:15 to 12:00	<p>Groupwork: the research agenda and joint publication</p> <ul style="list-style-type: none"> • Welcome to Calliola! • Objectives of the working groups: Professor Hannele Niemi • Thematic (tentative) working groups* drafting the publication: Intelligent data collection (1), Intelligent tutoring (2), Simulations and gaming (3), Personalized and socio-emotional learning (4)
12:00 to 13:00	Lunch and informal discussions
13:00 to 14:00	<p>Session 1</p> <ul style="list-style-type: none"> • Thematic (tentative) working groups: Intelligent data collection (1), Intelligent tutoring (2), simulations and gaming (3), personalized and socio-emotional learning (4)
14:15 to 14:30	Break
14:30 to 15:30	<p>Session 2</p> <ul style="list-style-type: none"> • Thematic (tentative) working groups continue: Intelligent data collection (1), Intelligent tutoring (2), simulations and gaming (3), personalized and socio-emotional learning (4)
15:30 to 15:45	Break
15:45 to 17:00	<p>Session 3</p> <p>Sharing the outcomes of the groups: Chair: Professor Liu Jia from BNU</p> <ul style="list-style-type: none"> • Thematic (tentative) working groups: Intelligent data collection (1), Intelligent tutoring (2), simulations and gaming (3), personalized learning (4)
17:00 to 17:30	Wrap-up summary of the day and the next steps
18:00	Dinner at Calliola
approx. 20:00	Departure to Helsinki



JOINT RESEARCH THEMATIC WORKING GROUPS (TENTATIVE GROUPS)

1 Intelligent data collection, Human-machine interaction/AI in organized learning

Participants:

LIU Jia, ZHENG Yonghe, Hannele Niemi,
Tuomas Myllykoski, Emily Öhman,
Petri Nokelainen

2 Intelligent tutoring Intelligent tutoring and coaching, feed back systems and personalized learning

Participants:

LIU Li, LU Yu, Keith Devlin, Jenny Niu,
Mikko Kylväjä

3 Simulations and gaming

Participants:

TANG Xiaoyu, CHEN Fangzhu, Margus
Pedaste, Heli Ruokamo, Marjaana Kangas,
Pekka Qvist

4 Personalized and socio-emotional learning

Participants:

WANG Jun, LIU Chunrong, SONG Jiachen,
Barbara Schneider, Joe Krajcik, Katariina
Salmela-Aro, Eric Hamilton, Päivi Kousa,
Kari Kasanen

Participants 13.-15.2.2019		
Finland		
Name	Title	Organization
Huotilainen, Minna	Professor	University of Helsinki, Faculty of Educational Sciences
Dorota, Glowacka	Assistant Professor	Helsinki Institute for Information Technology, University of Helsinki
Kangas, Marjaana	University Lecturer	University of Lapland
Kasanen, Kari	Chairman of the Board, Founder	Kasanen Koulutusyhtiöt, School Day Helsinki, Valmennuskeskus
Ketamo, Harri	Founder and Chairman	Headai
Korhonen, Tiina	University Lecturer/ Head of Innokas Network	University of Helsinki, Faculty of Educational Sciences
Kousa, Päivi	Project Coordinator, PhD Student	University of Helsinki, Faculty of Educational Sciences and Faculty of Science
Kurhila, Jaakko	Chief digitalisation Officer	University of Helsinki
Lavonen, Jari	Professor	University of Helsinki, Faculty of Educational Sciences
Lindqvist, Timo	Founder, COB	Upknowledge
Myllykoski, Tuomas	PhD Student	University of Tampere
Mäkelä, Johanna	Dean	University of Helsinki, Faculty of Educational Sciences

Name	Title	Organization
Niemi, Hannele	Professor, Research Director	University of Helsinki, Faculty of Educational Sciences, UNESCO
Niu, Jenny	PhD Student	University of Helsinki, Faculty of Educational Sciences
Nokelainen, Petri	Professor of Engineering Pedagogy	University of Tampere
Nyysönen, Sophie	Project Assistant	University of Helsinki
Pedaste, Margus	Professor at Educational Technology	University of Tartu, Estonia
Pölönen, Pasi	PhD Student	University of Helsinki
Qvist, Pekka	Educational Games Manager	Napcon
Ruokamo, Heli	Professor, Vice Dean	University of Lapland
Salmela-Aro, Katariina	Professor	University of Helsinki, Faculty of Educational Sciences
Salmi, Anna-Maria	Head of Development, International Affairs	University of Helsinki
Snellman, Hanna	Vice-Rector	University of Helsinki
Tervaniemi, Mari	Research Director at CICERO Learning	University of Helsinki
Vihma-Purovaara, Tiina	Senior Ministerial Adviser	Ministry of Education and Culture, Finland
Öhman, Emily	PhD student	University of Helsinki, Department of Digital Humanities

China		
Name	Title	Organization
Chen, Fangzu (Cissy)	Ms/Program Coordinator, Jolii	Beijing Normal University, Faculty of Psychology
Chen, Mengqin (Annie)	General Manager of Xiaoyuansouti & Yuantiku Unit	Beijing Fenbi Wailai Science and Technology Co., Ltd.
Liu, Chunrong	Ms/Vice Dean	Beijing Normal University, Faculty of Psychology
Liu, Jia	Professor	Beijing Normal University, Faculty of Psychology
Liu, Li	Professor/Vice Dean	Beijing Normal University, Faculty of Psychology
Lu, Yu	Associate professor	AICFE, Faculty of Education, Beijing Normal University
Tang, Xiaoyu	Ms/Postgraduate student	AICFE, Faculty of Education, Beijing Normal University
Wang, Jun	Dr/Vice Dean	Beijing Normal University, Faculty of Psychology

United States		
Name	Title	Organization
Devlin, Keith	Emeritus, https://web.stanford.edu/~kdevlin/	University of Stanford
Hamilton, Eric	Sr. Manag. for Critical and Emerging Issues in Curriculum and Related Areas	International Bureau of Education UNESCO
Schneider, Barbara	Professor	Michigan state university

Video presentations from Stanford University:		
Name	Title	Organization
Bailenson, Jeremy	Professor	University of Stanford
Landay, James	Professor	University of Stanford
Russell, Martha	Executive Director of mediaX	University of Stanford
Video presentation from Michigan State University:		
Krajcik, Joseph	Professor	Michigan state university

CONTACTS

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tel. +358294120667

ARRIVAL INSTRUCTIONS



Siltavuorenpenger 5A maindoor on left

Siltavuorenpenger 5A
00170 Helsinki

(Minerva building), Room Minerva K108 is situated in the K1 floor. Go down one set of stairs from the main door. Walk straight to the other end of the building. K108 is on the right at the end of the big corridor. Nearest bathrooms in levels 1 and K1.

Restaurant Seurahuone Helsinki, Kaivokatu 12, 00100 Helsinki

CLIC Business event:
Tapahtumatalo Bank (Event Venue Bank)
Unioninkatu 20, 00130 Helsinki

Restaurant Sunn, Aleksanterinkatu 26, 00170 Helsinki

Calliola Conference and Event Centre
Rågöntie 315, 10710 Snappertuna
(Bus transportation for participants Friday 16th of February at 8.00AM from Elielinaukio 5, 00100 Helsinki)