

The Research Groups and Institutes



CICERO LEARNING - Network

CICERO Learning is a network for distinguished researchers and research groups on learning. The researchers of the network are based in different universities and research institutes in Finland. The network builds co-operation with research groups and units around the world.

Currently CICERO Learning Network members are Aalto University, University of Helsinki, University of Lapland and University Consortium of Pori and the Finnish Institute of Occupational Health. CICERO Learning Network was established in 2005, and is coordinated by the University of Helsinki.

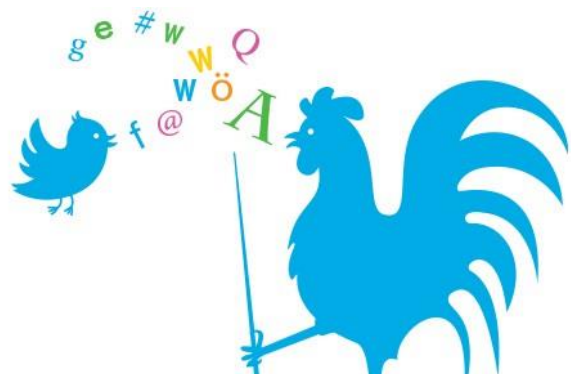
CICERO Learning network promotes cutting edge research on learning across the boundaries between diverse scientific fields. The network aims to nurture academic innovations and synergies among research communities, businesses and industry, for the benefit of the Finnish society in particular and global community in general.

Research focuses around five themes: 1) Learning and the impact of technology, 2) Learning across the lifespan, 3) Learning, the brain and the mind, 4) Learning and the Society, and 5) New understandings about learning.

Homepage: <http://www.cicero.fi/>



Between digital natives
and educational practices



Centre for Science Education Research (CSER)

Department of Teacher Education, University of Helsinki, Finland
Director Professor Jari Lavonen

The Centre for Science Education Research (CSER) conducts research and development work in several areas including school science, physics, chemistry, computer science, and technology education. The aim is to develop education in these areas, at both the school and university levels; therefore, research is strongly connected to practice and derives from relevant educational theories.

The members of the CSER are:

Professor Jari Lavonen,

[https://tuhat.halvi.helsinki.fi/portal/en/persons/jari-matti-juhani-l\(27d1fa4b-3699-4f14-a4ac-96f69bc6b34e\).html](https://tuhat.halvi.helsinki.fi/portal/en/persons/jari-matti-juhani-l(27d1fa4b-3699-4f14-a4ac-96f69bc6b34e).html)

Senior lecturer Kalle Juuti,

[https://tuhat.halvi.helsinki.fi/portal/en/persons/kalle-juuti\(1484bc73-5f76-4f1b-8bd3-be4d4add6c46\).html](https://tuhat.halvi.helsinki.fi/portal/en/persons/kalle-juuti(1484bc73-5f76-4f1b-8bd3-be4d4add6c46).html)

Senior lecturer Jarkko Lampiselkä,

[https://tuhat.halvi.helsinki.fi/portal/en/persons/jarkko-juhani-lampi\(6752a94d-121c-4298-80ac-337c9b348cf1\).html](https://tuhat.halvi.helsinki.fi/portal/en/persons/jarkko-juhani-lampi(6752a94d-121c-4298-80ac-337c9b348cf1).html)

Post Doc Anni Loukomies,

[https://tuhat.halvi.helsinki.fi/portal/en/persons/anni-loukomies\(907705b5-05f2-47c8-8d30-646555d9ba00\).html](https://tuhat.halvi.helsinki.fi/portal/en/persons/anni-loukomies(907705b5-05f2-47c8-8d30-646555d9ba00).html)

PhD students Janna Linnansaari, Tiina Korhonen, Kati Sormunen,

Current activities in the above areas focus on models of teaching, teaching and learning processes, the use of information and communication technologies (ICTs), and the development and production of teaching and learning materials. CSER has wide collaborative relationships with other Finnish universities and research groups as well as well-established international research cooperation. The following are examples of research projects during the last 10 years:

- The effective Use of ICT in Science Education (EU-ISE) (2005–2008) was an EU-funded project that aimed to identify best practices in ICT use across Europe and propose a system for benchmarking this area and, based on these, to prepare and test a course for in-service and pre-service teacher training.
- European Science Teachers: Scientific Knowledge, Linguistic Skills and Digital Media (PEC) (2005–2008) was an EU-funded project that aimed to develop initial science teacher education and innovative science activities that emphasised reading and writing.
- European Teachers Professional Development for Science Teaching in a Web-Based Environment (EuSTD-web) (2007–2009) was an EU-funded project

that focused on the professional development of science teachers at the primary and secondary levels.

- MaterialsScience was a university-school partnership project that aimed to design and implement research-based, ICT-enhanced modules on material. It was funded by the European Commission, under the Science and Society Program (2007–2009).
- The Effective Use of Computer-Aided Teaching and Learning Materials in Science Teaching was a teacher-training course with a European perspective. It was an EU-funded project (2009–2010) that aimed to design and test modules for a teacher-training course in the use of ICT in science teaching.
- Science Teacher Education Advanced Methods: The S-TEAM Project was a coordination and support action under FP7, SiS 2008, action 2.2.1.1 Innovative Methods in Science Education (2009–2011). The aim was to develop teaching modules through a design-based research approach.
- The use of ICT in Science Education (UIC-SE) (2010–2011) was a joint project of several universities and was financed by TEKES (Technological Science Foundation). The aim of our sub-project was to develop a database tool for mathematics and science assessment through a design-based research approach.
- As a part of an OECD project called New Millennium Learners, an ICT project and initial teacher training was implemented in Finland by CSER in 2009–2010.
- The Finable Project (2012–2015) is a joint project of several universities and is financed by TEKES (Technological Science Foundation). The aim is to research boundless learning through a design-based research approach.
- EAGER (Improving Understandings of Student Engagement in STEM) is an international collaboration and is funded by the Finnish Academy (2013–2015). The EAGER project aims to determine the characteristics of science teaching and learning that support students' engagement. The data has been collected through the experience sampling method (ESM) and smartphones.

The funding for these research projects, which amounts to €2.4 million over the last 10 years, has been provided by the Finnish Science foundation, the Finnish Technological Science Foundation, the Ministry of Education and the European Union. CSER researchers have published over 200 refereed scientific papers in journals and books as well as approximately 150 other articles and 200 books

**Department of Teacher Education
Faculty of Behavioural Sciences
University of Helsinki**

FUTURE LEARNING IN MUSIC

Members of the research team:

Adjunct Prof. Dr. Inkeri Ruokonen,

Prof. Dr. Heikki Ruismäki

Doctoral Student Olli Vallo

Doctoral Student Pirkko Juntunen

Dr. Anu Sepp

We are willing to develop co-operation with

Brain research unit, Prof. Minna Huotilainen and Prof. Mari Tervaniemi

Sibelius Academy, Aleks Ojala

Co-operative and comparative research plan

Our challenge is to share and compare new music pedagogical ideas, research and create the new possibilities of more open and co-operative learning environmental solutions in music and intercultural education between China and Finland. The project combines the education, open learning environments, blended learning, (and brain research), co-operation between daycare centers, schools and music schools. The project combines three different music pedagogical ideas, research and co-operates with three Finnish companies (International Minifiddlers/Caprice, Rockway, SongHi Entertainment).

A. Distance learning environment

The first International Minifiddlers- project is connected with instrumental pedagogy and distance learning. It uses some of the latest teleconferencing technology for online and real-time instruction. The sessions and research material are documented for online broadcasting. The aim of this study is to find out how distance learning environment operates according to participants in Finland and China. Also co-operation with the brain research (Minna Huotilainen and Mari Tervaniemi) can be connected with this study. Research problems are to find out how distance learning environment is supporting early musical giftedness and new Colour Strings based instrument pedagogy in China. The qualitative research data is collected through video group interviews with the participants.



B. Online pedagogy and flipped classrooms

The second project is connected with developing the online pedagogy between Finland and China concerning music studies on teacher training. The research is done in the quasi experimental setting where from both countries the test groups (50 students) are studying one university period with a blended learning system by using Rockway-online pedagogy, and the control groups (50 students) are studying in a traditional way. The learning results in music between these learning environmental settings are compared both quantitatively and qualitatively methods. Also new intercultural online pedagogy is developed.



C. Creative producing and sharing in internet

The third project is connected with creative producing in music by using SongHi-learning environment. The aim is to share students' musical ideas and creativity between China and Finland by sharing the creative process and results. The aim of the research is to study creative processes in music making connected to the music didactics of basic education. The qualitative data is collected through teacher students' observations of school children's composing processes. Also the creative thinking of the participants can be measured by Torrance ATTA-test.

Summary

The first aim of all these three projects is to share and research new Finnish music pedagogical knowledge and to develop and apply and compare it in Chinese culture. The second aim is to create the co-operative network between China and Finland for sharing and developing the best practices of musical co-operation and research of both countries. The third aim is to promote intercultural learning and sensitivity through music.

International Minifiddlers: <http://sarestoakatemia.org/minifiddlers/>

Rockway: <http://www.rockway.fi/>

SongHi: <http://www.songhi.com/>

Brain Research

The Institute of Behavioural Sciences, University of Helsinki

The Phonetics and Speech Synthesis Research Group Led by Professor Martti Vainio

Conducts research into the perception and modelling of speech, including prosody and language studies, physiological modelling, and speech synthesis technology, seeking to understand how people speak and hear, and how developmental and cultural differences can change the way we communicate.



The Cognitive Brain Research Unit (CBRU)

Under Research Director Professor Mari Tervaniemi

Conducts research into many diverse areas of cognitive science, including neuroaesthetics, language learning and perception, cognitive effects of developmental and learning disabilities, and cognition in development and aging.

Homepage: <http://www.cbru.helsinki.fi/>

The Brain and Music Team (In CBRU)

Focuses on cognitive approaches to understanding music perception, expression, and engagement with projects investigating emotions, dance, music in schools, music and language, and music therapy.

Homepage: <http://www.cbru.helsinki.fi/music/>

All three groups are internally and internationally collaborative and use many different research techniques from computer modelling, behavioural testing, electroencephalography (EEG) and magnetoencephalography (MEG), to functional magnetic resonance imaging (fMRI) and genetics studies.



Individual learning difference and evidence-based educational support

- mathematical, cognitive, motivational and well-being development and interventions

Pirjo Aunio (professor in Special Education, pirjo.aunio@helsinki.fi) and Markku Niemivirta (professor in Education, Institute of Behavioural Sciences)

The aim of our research work is to increase the scientific knowledge of dynamics in learning and learning difficulties in mathematics related to cognitive, motivational and wellbeing elements. Our approach is longitudinal and often person-centered. We also aim to increase the scientific knowledge of educational support (i.e. intervention) methods for children (i.e. evidence based practice). We target to decrease unnecessary struggling with math learning in all children and youngsters. Our special interest groups are children and young people with at risk development, learning difficulties or high achievement. In our intervention studies teachers have an important role, for which we provide professional-development training. We apply quasi-experimental intervention design with pre-post measurements with test and control groups in natural learning environments (schools).

Helsinki-Beijing collaboration offers possibilities to do high quality scientific cross-cultural research in developmental dynamics in mathematics, cognition, motivation and well-being. It will also make possible to focus on intervention studies aiming to design (special) education support for those who struggle with learning basic academic skills or who has high achievement.

Research on Positive Psychology at Schools

Lotta Uusitalo-Malmivaara and PhD students Kaisa Vuorinen, Tiina Korpela-Liimatainen and Mia Vainio

Our research group is developing character strength interventions and materials for both mainstream and special educational classes. The overall aim is to promote well-being, feelings of competence, empowerment and involvement of all students. Inclusion of children with special needs is at the heart of these actions. Instead of focusing on what is wrong, one should pay attention to what is strong in a child and build on well-functioning parts of every individual. Traditionally, special education has been driven by diagnosing various difficulties, dysfunctionality, behavioral problems and poor adjusting.

Positive psychology aims at emphasizing *what is right with you* and how that could be cultivated. Our group develops methods for explicitly teaching how to identify and use character strengths and how to apply them in daily school life. Our approach also involves teaching of positive school culture, positive learning experiences and positive social interactions for every child irrespective of potential learning difficulties. As already stated by James J. Heckman (2001), trustworthiness, tenacity and motivation are the keys for success, not just academic competences or other cognitive skills. Children with special educational needs particularly profit from intentional emphasis on these driving, mostly non-cognitive skills.

Our group studies how character strength interventions can be incorporated in a compulsory school curriculum and what changes will be obtained. We run classic test-control group designed interventions and measure both behavioral and learning outcomes. Grit, self-control and school-related happiness are concepts of particular interest. Also, we aim at promoting teacher well-being and resilience and gather data on how teacher flourishing promotes student outcomes. In Finnish schools, rates of both student and teacher burnout have been high and, despite of good learning records, school satisfaction has been rather low.

As concluded by the European Agency for Special Needs and Inclusive Education, inclusive education benefits all. Living and learning in a school community welcoming all students and highlighting their individual strengths exercises not just acceptance but celebration of diversities. We very much consider strength education as a tool to foster equity and build a non-discriminatory society.

Diagnosing sanities instead of diseases (Peterson & Seligman, 2004) and noticing *what went well* not only demands a refreshed attitude and renaissance in instruction but novel assessment tools, as well. Our group develops and tests ways to document and report positive performance in a structured manner. This asks for innovating new scales and observation methods both for practical and scientific use. We warmly welcome international collaboration in joint endeavors to relocate the focus of education of all children into an area where labeling is based on individual excellence.





LUMA- Centre Finland

LUMA Centre Finland is an umbrella organization established to promote education in mathematics, natural sciences and technology for children and youth.

LUMA Centre Finland was established in November 2013 to unite the 12 individual LUMA Centre's located in Finnish Universities and University campuses around Finland.

LUMA Centre Finland promotes competence in LUMA subjects (i.e. mathematics, natural sciences and technology) according to a national strategy and a plan of action validated by the board. The plan is implemented by (i) supporting life-long learning of both teachers and students (ii) by using the latest pedagogical methods and activities and (iii) by strengthening the development of research-based teaching. Most of the activities at the LUMA Centre are aimed for 3-19 year old students and their teachers.

The head of the Luma Centre Finland, prof. Maija Aksela, E-mail: maija.aksela@helsinki.fi

More information from: <http://www.luma.fi/news>

