Co-evolution of human capabilities and intelligent technologies

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In my talk

What kind of skills and competences are needed for the future?

What is important in human learning?

Socially shared regulation in learning

How human sciences can shape digitalization?
Socioemotional interactions
Smart thinking and creativity
Metacognition
Sensitive communication
Emotions
Motivation
Adaptive support
Patterns and models
Efficiency in processing
Routine tasks
How and what to educate and train in an uncertain and complex world for a future we can’t predict?

Covid19 is not only health crisis, but global work and educational crisis, *deepening the continuous learning needs* (OECD, 2020).
Forms of learning and education will change – skills and knowledge learned in education need to change...

...interdisciplinary intelligence, ”hot” cognition, meta-knowing, ongoing learning
What is critical for learning success in 21st century?

- ability to adapt to new situations and challenges and engage in complex problem solving
- social skills necessary for communicating and collaborating productively and proficiently,
- socio-emotional skills and empathy necessary for tackling challenging problems, and
- ability to take initiative set goals and monitor self and others.

A new set of uniquely human skills and competencies that machines cannot match or replicate will be necessary.
What is important in human learning?

SSRL
Learners can monitor and regulate their learning
“experimenting with your learning”

**Metacognition**

scanning internal and external factors - goals and plans - activating the plans - re-examine to adapt
What is self-regulated learning?
(Winne & Hadwin, 1998; Zimmerman 2010; Järvelä, Hadwin, Malmberg & Miller, 2018)

**Active** and proactive learning

**Process** of learning to monitor, evaluate, and regulate (or change) your own
  • Thinking
    • Motivation
      • Emotion
        • Behaviour
          • Learning

**Adaptive** process that you develop and refine over time
What is self-regulated learning?

(Winne & Hadwin, 1998; Zimmerman 2002)

SRL is an ability to be **strategic and make adaptive changes** in terms of cognition, motivation and emotions in challenging learning situations.
Collaborative learning

Collaborative and socioemotional interactions, transactions and knowledge building processes have **temporal and multidimensional** nature which in the optimal cases are successfully **shared** in between the collaborating partners.

(Kirschner, Sweller, Kirschner & Zambrano, 2018)
Learning is a complex process

- motivation
- affect
- emotion
- cognition
- metacognition
Successful collaboration requires

Achieving success in CL tasks depends upon:

(a) co-constructing shared task representations, shared goals, and shared strategies

(b) regulating learning through shared metacognitive monitoring and control of cognition, motivation, emotion and behavior

**Socially shared regulation** (SSRL) involves groups taking metacognitive control of the task together through negotiated, iterative fine-tuning of cognitive, behavioral, motivational, and emotional conditions/states as needed.
SSRL is

(a) **transactive**
*multiple individual perspectives contribute to joint metacognitive, cognitive, behavioral, and motivational states*

(a) **deeply metacognitive**
*monitoring and evaluation are shared amongst people to drive negotiated adaptation*

(a) **collectively agentic**
*joint goals and standards are intentionally adopted and monitored together*

(a) **socio-historically and contextually situated**
*individual and collective beliefs contribute*

How intelligent technologies can be leveraged to understand SSRL?
As a learning scientists, we face serious **methodological challenges** because the learner’s cognition, motivation, and emotion are neither visible for the researcher to study it, nor for learners so that they are able to regulate those processes to learn effectively.
SRL in a digital world - Multimodal data collection


- 360-degree video capture + audio
- Mobile eye tracking
- Multisensor devices that track student physiological activation
- Logdata, situated questionnaires, evaluation forms, student products
CL in secondary school physics
(13 years old, N = 94, 30 groups)
When students monitor learning together, they tend to synchronize physiologically with each other.

EDA signals of two students’

What follows socially shared monitoring?

Physiological state transitions discovered by machine learning methods are more frequent in sessions when groups are on-track and there is a low need for regulation.

What do we know about SSRL?

Regulation is a social phenomena (Järvenoja et al. 2015), temporal process and can be evidenced in patterns (Azevedo et al. 2016).

It is present in successful CL (Järvelä et al., 2016), but rather rare (Malmberg et al., 2017).

All regulation types play a role: CoRL reificates SRL and SSRL (Hadwin et al., 2018; Kurki et al., 2019)

Metacognitive monitoring drives groups for CL interactions (Haataja et al., 2016) for adaptation and change (Sobocinski et al., 2020).

Challenging events inviting regulation are reflected in multimodal data (Järvelä et al., 2019).
How SSRL can be leverages to intelligent technologies?
We need evidence based innovations in teaching, learning and education.
AI and adaptive systems help learners to be aware, but we want learners to learn to be adaptive.


Theory building for developing metrics to measure SSRL.
Practical support provide learners with "on the fly" support when needed.

Online delivery & retrospective analysis.


How human sciences can shape digitalization?
Generation Z and beyond: Co-evolution of human capabilities and intelligent technologies in the 21st century
How people react to and use new technologies?

How human scientists can participate co-evolution of human capabilities and intelligent technologies.

GenZ
STRENGTHENING HUMAN CAPABILITIES!
Generation Z and beyond:
The generation that has been born after the year 2000 and is familiar with technologies and the use of social media. Beyond: their children and grandchildren.

Human skills and capabilities:
The skills and capabilities that are natural for human beings and which technologies and machines lack.

Technological transformation:
Technologies are becoming more intelligent and ubiquitous (Artificial Intelligence, Virtual / Augmented / Mixed Reality, Internet of Things, Robotics, 5G/6G).

STRENGTHENING HUMAN CAPABILITIES!
What if the digital future was not driven by digital technologies but by humans?

https://www.youtube.com/watch?reload=9&v=wUvTFEFvABs
Thank You

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