AI in Education: Promises and Challenges

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1. AI is more than a tool and Chat-GPT
2. AI changes teachers work
3. Teachers need to be prepared for AI
Linköping University

- 37,600 students, (4500 in Teacher training)
- 4,300 employees
- 4 campuses
- 323 professors
- 1,200 PhD students
- Teacher training education in Linköping since 1860,
- comprehensive teacher education.
Pedagogical Practices: Digital Media and communication

- AI literacy in Teacher Education
- AI literacy in Primary Education
- AI and the automation of teaching
- AI and assessment
- The embodiment of reading
- Social robots and reading
- Visual literacy and multimodality
- AV1 robots in teaching
Empower 2 Learn

Welcome to the toolkit from the Empower2Learn project, where we want to inspire you to personalise your teaching! This toolkit offers a collection of interesting tools that you can explore, building blocks that can help you to design your personalised teaching approach with or without a tool. Interesting literature on this subject, as well as more information on the project and the partners involved.

You can use the navigation bar on top or the buttons below to quickly find what you are looking for!

Are you looking for more information about the project?
Learn more ➔

Do you want to read more about personalised learning?
Learn more ➔

Looking for promising tools to try out for yourself?
Learn more ➔

Searching for a framework to design your activity?
Learn more ➔
Holmes (2024)
Promises of automation and augmentation
Promises of (digital) technology in education have a long history

1900 - 1920
The one-room schoolhouse

1930s
Overhead projectors. Initially used for US military training, quickly spreads to schools

1938
The first TV appears

1939
Classrooms begin incorporating radios into penmanship, accounting, history and arithmetic lessons

1940s
Electric typewriters begin to replace manual typewriters

1950s
Headphones become popular in school language labs

1960s
Whiteboards are invented to replace the Chalkboard

1964
BASIC is developed at Dartmouth College with the intent of giving students a simple programming language that is easy to learn

1967
Texas Instruments develops the handheld calculator

1980s
CD-ROMs become a predominant form of storage

1980
Apple Macintosh computer is introduced.

1981
SMARK boards are introduced in schools

1988
52% of schools are using slide films and 32% are using film with sound

1990
Laptops are introduced and are eventually utilized as teaching tools

2002
99% of all schools have access to internet

2012
1.5 million iPads are used in US schools

2018
90% of students enter the age of 16 with access to mobile technology
Historical data and biases

Sure, here is an illustration of a 1943 German soldier:

give the girl from the original photo a professional linkedin profile photo

Sure, here are some images featuring diverse US senators from the 1800s:
Global warming
Unethical working conditions
AI = Sociotechnical phenomenon

Challenges
1. Sustainability
2. AI ethics
3. Regulation
4. Jobs
5. Education

Driving forces
1. Policy
2. Big edtech Industry
3. Research
Many AIED tools are questionable, whether for **ethical, pedagogical, or educational reasons**. In particular, they may reinforce existing biases and inequities, involve the commercial exploitation of student data, embed primitive approaches to pedagogy, and exacerbate the divide between the privileged and underprivileged, particularly in developing nations.
Knowledge gap

, there is limited independent evidence at scale for the efficacy or safety of AI in education, or for any of the claimed benefits.

(Holmes, 2023)
Automation: An machine learning ITS

$68 + 17 = 43 - 17 = 1$

$4 - 2 = 7 \times 2 = 16 + 5 =$
Augmentation: A platform with learning analytics
Still w(AI)ting for the automation of teaching: An exploration of machine learning in Swedish primary education using Actor-Network Theory

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Abstract
Machine learning and other artificial intelligence (AI) technologies are predicted to play a transformative role in primary education, where these technologies for automation and personalization are now being introduced to classroom instruction. This article explores the rationales and practices by which machine learning and AI are emerging in schools. We report on ethnographic fieldwork in Sweden, where a machine learning teaching aid in mathematics, the AI Engine, was tried out by 22 teachers and more than 250 primary education students. By adopting an Actor-Network Theory approach, the analysis focuses on the interactions within the network of heterogeneous actors bound by the AI Engine as an obligatory passage point. The findings show how the actions and accounts emerging within the complex ecosystem of human actors compensate for the unexpected and undesirable algorithmic decisions of the AI Engine. We discuss expectations about AI in education, contradictions in how the AI Engine worked and uncertainties about how machine learning algorithms 'learn' and predict. These factors contribute to our understanding of the potential of automation and personalization.
Defining AI literacy...

AI literacy as a set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace.

Long & Magerko, 2020

Having competencies in both the human and technological dimensions of artificial intelligence, at a level appropriate for the individual (i.e. according to their age and interests).

Holmes et.al., 2022
Aristoteles

- Theoretical knowledge (episteme)
- Practical Knowledge (techne)
- Professional judgement (phronesis)

(Kreber, 2015)
Teachers’ professional knowledge

- **Episteme**: knowledge about statistics, machine learning, and data management

- **Techne**: the ability to use certain AI applications and prompt engineering

- **Phronesis** and the *ethics of AI* is the least explored dimension, partly due to a methodological
Some tentative conclusions

• Ethics = theoretical rather than a practical situated knowledge
• TE absent in literature
• Lack of classroom studies
• A literacy not yet rooted in the educational sciences
• Many implicit assumption about teachers’ theoretical, practical and ethical knowledge
• Focus on developing digital tools to teach AI and implementing AI EdTech in teaching practice

→ Teacher need to be involved in defining AI literacy
Human intelligence

Technological intelligence

(Wikipedia Creative commons, Holmes et al. 2022)
References


Holmes, Wayne; (2023) The Unintended Consequences of Artificial Intelligence and Education. Education International: Brussels, Belgium


Sperling, K., Stenberg, C-J., McGrath, C., Åkerfeldt, A., Heintz, F., & Stenliden, L. (2024) In search of AI literacy in Teacher Education: A scoping review. Computers & Education 6


I believe that the motion picture is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks.

(Thomas Edison, 1922)