2.1a Exploring and documenting implications of GenAI on teaching and learning (external challenge)

TE_REG Teacher Education Regenerated (TE_REG)

Beyond Competencies. Rethinking and redesigning teacher education curricula in the GenAI era.

GenAI and Teaching and Learning, Overview

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Sari Muhonen & Perttu Ervelius

University of Helsinki, Viikki Teacher Training School

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Introduction

In Finland GenAI and its implications has been discussed widely in press, media and in social media. AI has been around us already for years, but the rapid development of GenAI and its' potentials and challenges are something that we need to understand better. One of the main stands of discussions has been how to learn to use Gen AI ethically and learn to take advantage of it in teaching-learning processes paying attention to appropriate age level. Also, it has been highlighted that thinking skills and critical thinking are crucial – GenAI has to be used wisely. AI literacy can be viewed as a natural extension of multiliteracy, helping students to critically understand, use, and evaluate algorithmic systems and automated content.

Guidelines

Due to the decentralized nature of the Finnish education system, the implementation of GenAI varies significantly across regions, highlighting the need for coherent national coordination. Ensuring equity in GenAI use requires not only equal access to tools, but also targeted teacher training and infrastructure support, particularly in under-resourced areas.

While national strategies provide ethical and pedagogical direction, practical implementation still depends on the availability of hands-on guidance, peer support, and real-world classroom examples.

Policies for the digitalisation of education and training (2023) and Curricula (FNCC, 2014)

According to the Policies for the digitalisation of education and training until 2027 report from the Ministry of Education and Culture (2023), “The vision for Finland is to become the world's leading developer and user of sustainable digitalisation in teaching and education and training by 2027.” Digitalisation is viewed to “promote equal opportunities for everyone to learn and develop” as well as to support “cooperation between actors and learning at different stages of life.” It is also expected that principles of sustainable development will be followed in the digitalization process. “The realisation of these policies will mean increasing the competence of individuals and advancing equality, long-term, innovative and systematic development of digital solutions in the sector, strengthening the knowledge base of education policy and education management, and improving wellbeing extensively through active digital citizenship.” (Policies for the digitalisation of education and training until 2027 - Valto (valtioneuvosto.fi) (2023)). The meaning of being active actors in digitalization is also emphasized in the current curricula.

Finnish National Core Curriculum for Basic Education (FNCC, 2014) does not explicitly mention GenAI, but yet its implications align closely with existing seven transversal competences—especially multiliteracy and ICT competence. The transversal competence of multiliteracy emphasizes the ability to interpret, produce, and critically evaluate various forms of texts and media. It involves understanding and creating meaning from diverse texts, including written, visual, digital, and auditory forms. It aims to equip students with skills to navigate the complex information landscape of today's world. Multiliteracy is integrated across all subjects and educational levels. It encourages students to engage with different types of media and texts, fostering critical thinking and effective communication. Media literacy, as part of multiliteracy, becomes even more critical in the age of GenAI, where students must be able to evaluate AI-generated content with a questioning and informed mindset.

Teachers across all subjects play a key role in developing students’ GenAI awareness through subject-specific applications, reinforcing multiliteracy as a shared responsibility. The current policy vision highlights Finland’s ambition to lead in sustainable digitalisation, but reaching this goal requires concrete integration of GenAI in curriculum updates and teacher education.

AI guidelines from EU (2022) and from Finnish National Agency for Education, and the Ministry of Education and Culture (2025)

The Ethical guidelines (2022) provided by the European Union AI Guidelines | Finnish National Agency for Education (oph.fi) and Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators - Publications Office of the EU (europa.eu) emphasize the importance of ethical AI use, including fairness, transparency, and accountability. They also highlight the need to protect student data and comply with data protection regulations and remind us to identify and reduce biases in AI systems. It also emphasizes the role of teacher support: providing guidance and resources are needed for teachers to effectively integrate AI into their teaching practices. Furthermore, these guides encourage raising awareness and engaging with the community to foster a better understanding of AI in education.

In March 2025, the Finnish National Agency for Education, FNAE, and the Ministry of Education and Culture published guidelines for the use of AI in early childhood education and care, pre-primary education, primary and lower secondary education, general upper secondary education, vocational education and training and liberal adult education in Finnish and in Swedish (English version is coming soon). The AI Guidelines were developed in cooperation with experts from the education sector, researchers, and other stakeholders. (See: Tekoäly varhaiskasvatuksessa ja koulutuksessa – lainsäädäntö ja suositukset | Opetushallitus).

The AI recommendations and ethical considerations aim to create a safe, fair, and transparent environment for the use of AI in education focusing on several key areas:

Data Privacy: Ensuring that student data is protected and used responsibly. This includes compliance with data protection laws and regulations.
Bias and Fairness: Addressing and mitigating biases in AI systems to ensure fair treatment of all students, regardless of their background.
Transparency: Making AI systems and their decision-making processes transparent to educators, students, and parents.
Accountability: Establishing clear accountability for the use of AI in educational settings, including who is responsible for the outcomes of AI decisions.
Ethical Training: Providing educators with training on the ethical use of AI, including understanding its limitations and potential impacts.

In all, The Finnish AI guidelines reflect a strong alignment with EU-level ethical principles but also contextualize them for national educational structures and legal frameworks. For ethical AI use to become reality in classrooms, policy must be translated into actionable, pedagogically relevant guidance for teachers across educational levels. Emphasizing teacher support is critical: ethical use of AI depends not only on regulation but also on teachers' confidence, competence, and access to appropriate tools. To ensure trust and accountability, it is essential that AI systems used in education remain transparent and that educators understand both their capabilities and limitations.

Cyber security /GDPR

The General Data Protection Regulation (GDPR) is a significant piece of legislation that impacts how personal data is handled across the European Union, including Finland. In the Finnish National Agency for Education website, GDPR is addressed in the context of educational institutions and their responsibilities. Educational institutions must adhere to GDPR principles, ensuring that personal data is processed lawfully, transparently, and for a specific purpose. This includes data minimization, accuracy, and storage limitation. GDPR grants individuals several rights regarding their personal data, such as the right to access, rectify, erase, and restrict processing. Educational institutions must facilitate these rights for students, staff, and other stakeholders. Institutions are required to implement appropriate technical and organizational measures to protect personal data from unauthorized access, alteration, or destruction. Schools and educational bodies may need to appoint a Data Protection Officer to oversee GDPR compliance and act as a point of contact for data protection issues. Processing personal data in educational settings often requires consent from individuals or must be justified by a legal basis. (see: Tietoturva ja -suoja koulussa | Opetushallitus)

As GenAI applications become more integrated into education, compliance with GDPR must extend beyond policy documents to everyday teaching practices and digital tool selection. Teachers and school leaders require practical training to recognize data privacy risks in GenAI use, especially when third-party platforms process identifiable student data. Appointing a Data Protection Officer is a legal obligation in many cases, but schools also need shared operational models to handle data securely and consistently. Strengthening cybersecurity awareness among educators is essential, as pedagogical use of GenAI often intersects with sensitive data, cloud-based services, and evolving platform policies.

(Teacher) education and GenAI – what is going on?

Currently the use of GenAI in education is relatively variable. Especially in primary grades (grades 1-6, pupils at age 7-12) it is rarely used except in AI inbuilt pedagogical applications. However, this needs to be studied in more detail. Some teachers use GenAI for lesson plannings, fewer with the students. Although most of the students in upper secondary school (students at age 16-19) use GenAI (e.g. ChatGPT, SnapAI, Copilot), for innovation, creating projects and learning the content, some of the teachers are reluctant to utilize those in teaching-learning processes. How to use it systemically and wisely is thus yet under search, and teachers need both the will and possibilities for professional development with GenAI. This applies also to teacher education.

Currently there are several GenAI projects going on, for instance The Generation AI (2023 onwards) which: a) brings together technology developers, schools, authorities, companies and NGOs, b) - strengthens the ability of children and young people to face the global societal effects of technology, and c) produces pedagogical tools for the use of teachers to revolutionize learning. The Generation AI project focuses on "technology education that takes into account the operating principles of artificial intelligence, the opportunities it offers and the dynamic effects - without forgetting its shortcomings and risks or how artificial intelligence systems can increase confrontation, discrimination, insecurity and erode trust." (See: Welcome to the website of the Generation AI project! (generation-ai-stn.fi))

Many instances have expressed their viewpoints on GenAI in education. For instance, the advisory board of Finnish Teachers Association Ethical Board (OAN) has taken a stance that "thinking can not be externalized for GenAI". By this it is stressed that quickly prompted GenAI responses do not develop one's own thinking as such, but it is important to process questions and critically examine got answers (OAN, 2024).

In teacher education, it is crucial to provide future teachers with the competence to use constantly changing technology and the needed learning conception that adapts for changes. AI may be an effective tool in planning, teaching, and evaluating. Finnish Teacher Training Institutions have created an AI guide for teachers (eNorssin..., 2024). It provides teachers with a compact guide to use AI in a teacher's work with practical examples. Teacher-writers collaborated with FCLab.fi network and Innokas network. Current digital learning environments include many AI features, e.g. Power Point Live Translations, Reading Progress tool, etc. This AI guide concentrates on the use of generative AI a

applications, e.g. text generation AI models (ChatGPT, Bing and Google Gemini), picture generation AI models (Midjourney, Dall-E and Stable Diffusion), video generation AI models (Sora, HeyGen), and voice and other generation AI models.

Thus, the uneven use of GenAI across school levels and regions underscores the need for systematic mapping and research to inform targeted professional development. Pre-service teacher education should not only introduce GenAI tools but also foster a pedagogical mindset that embraces experimentation, reflection, and ethical responsibility. Projects like Generation AI demonstrate the importance of involving future teachers in co-creating learning models that integrate GenAI critically and inclusively. National-level resources such as the eNorssi AI guide offer concrete starting points, but their impact depends on active dissemination and integration into teacher education curricula.

Challenges to be solved - essential competences need to be taught

The growth of GenAI has been surprisingly rapid and requires us to think how we can together be ready for transformation and collaborative – also critical – learners in the future. As stated earlier, critical thinking in the use of AI is needed, we can not externalize thinking for AI. However, we are in need to reconsider our view on learning conception and the learning environments.

Teachers are in key position in building competences for the future. There is research-based evidence that practitioners are reluctant to change already working habits. Therefore, it is important to provide equal opportunities for every teacher to take part in professional development and training. Our pre-service teacher training provides a good starting point for working as a constantly learning teacher. However, currently our teachers' in-service training is largely dependent on teachers' own responsibility, will, and the economic situation of the education provider. Advice on the use of GenAI and Ethical advice does not directly change practices, but own experiences related to the use of GenAI are needed.

It is important to educate both teachers and students to make use of genrative AI and highlight the meaning of critical thinking and profound understanding. The educational ethics advisory board (2024) took a position on artificial intelligence seeing AI as a potentially valuable tool, reminding that "*Thinking can not be externalized for AI. Your own thinking does not develop with ready-made artificial intelligence answers, but it is important to process the questions to be addressed yourself."* (OAJ, 2024). The future work life requires from us

- competences to utilize AI (tekoäly)
- experiences of the use of "supporting intelligence" ("tukiäly")
- skills to discuss critically of the use of AI with its possibilities and restrictions. (Opetusalan eettinen...2024).

Thus, all teachers need to have knowledge on AI: ***Learning about AI, learning to use AI, and AI as learning content*.** That suggests creating wide possibilities for professional learning in in-service teaching and creating learning modules for pre-service teaching. For the teachers to take AI into use in teaching learning processes, it is essential to have personal experiences in the use of AI as well as how it works and what are its' strengths and restrictions, what is challenging for AI (eNorssi, 2024). AI is best learned by experimenting, trying and reflecting – important learning to learn competences from the past applies also for the future and concerning students and teachers alike.

Furthermore, developing GenAI competence requires a shift in pedagogical culture, from rule-based control to guided exploration, supported by ethical reflection and iterative learning. Teachers need not only access to tools, but structured opportunities to experiment, fail, reflect, and succeed with GenAI in real educational contexts. Both pre-service and in-service teacher education should adopt the beforementioned three-part model: *learning about AI, learning to use AI, and understanding AI* as a subject of critical inquiry. National strategies should aim to scale promising local pilots and create sustained professional learning ecosystems that support teachers beyond one-time trainings.

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