Policy Paper

Impact of Artificial Intelligence-enabled Technologies on Education

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Background

Recent years have marked an unprecedented increase in the use of Artificial Intelligence (AI)-enabled technologies in the education sector[1], further accelerated by emergency remote teaching and learning during the COVID pandemic.

Technologies such as analytics, chatbots, expert systems, natural language processing, intelligent tutoring systems, social robots, generative AI systems, immersive environments, and large data processing are being increasingly used in the education sector at all levels.

Defining AI-enabled education technologies and their impact is challenging due to the fast pace of technological advancement, the existence of multiple definitions, and the lack of research on the impact their impact on education, teaching and students' cognitive development. Considered the last frontier of innovation, the term 'artificial intelligence' is predominant in all domains of the European economy and society, with the education sector making no exception. The terms AI-enabled technologies and digital technologies are often used in combination or improperly confused.

For the purpose of this policy paper, 'AI-enabled technologies' is understood as encompassing the following components:

Firstly, an artificial component which may be identified as a machine, software, algorithm, or mathematical technique. Secondly, a human component, which is responsible for setting objectives and/or instructions and inputting them into the artificial intelligence system. Third is the AI system's action, which consists of making predictions, recommendations, and decisions in either virtual realm, or extended environments.

AI-enabled technologies can also be distinguished by their level of automation; as the level of automation of the technology increases, the degree of control exercised by teachers over the

[1] It is understood that the education sector encompasses all levels of education including early childhood education, general education, higher education and research, vocational education and training as well as initial teacher education and continuous professional development.

technology correspondingly decreases. At intermediate levels, human control and technology autonomation work in a hybrid manner, blending human judgment with technological assistance.

Whereas the policy paper highlights that AI systems differ from traditional digital technologies, the increasing availability and affordability of AI-enabled technologies, particularly generative AI, alongside growing trends to reduce public investment in education, are likely to favour a widespread integration of artificial intelligence into more traditional digital technologies.

AI-enabled technologies promise to impact various facets of education. For teachers, these technologies could be used to assist with critical tasks related to their role such as long as the principle of professional autonomy is respected. For students, AI can improve learning experiences through intelligent tutoring systems, personalised learning paths, and real-time feedback tailored to the students' needs and progress. At the organisational level, AI-enabled technologies can assist educational institutions by offering data-driven insights for enhanced decision-making, optimising resource allocation, and streamlining administrative processes. Nevertheless, despite growing interest in and use of AI-enabled technologies in the education sector, their long-term impact on teachers, education staff and students has still to be observed and their real benefit for education sector yet to be proved as there is little data available national approaches to AI-enabled technologies in education'.

Education trade unions in Europe continuously strive for attractive working conditions and quality inclusive education for all, firmly grounded in education as a fundamental human right and a public good for everyone. Education trade unions acknowledge that AI-enabled technologies introduces both opportunities and challenges to educational pedagogies, recruitment, and working conditions. AI-enabled technologies must be conceived, developed, and used while respecting the values of education as a human right and a public good, democracy, and inclusion. In this context, education trade unions are committed to leveraging AI's potential while addressing its challenges to ensure the implementation of these technologies upholds the principles of inclusion, sustainability, democracy, and participation.

Consistent with the Resolutions adopted by the 8th EI Congress in Bangkok (2019), the Resolutions adopted by the ETUCE Conference in 2020 and the ETUCE Extraordinary Conference 2022, and moving from the ETUCE Policy Paper on the 21st Century Teaching Profession and the Use of ICT, and the ETUCE Resolution *Campaigning to enhance the Teaching Profession for Solidarity, Democracy, Equality and Sustainability* (2020), this policy paper directly implements the ETUCE Resolution on *Artificial Intelligence in the Education Sector* (2021) in which ETUCE member organisations committed to '*developing a common policy strategy at European level to address and overcome the concerns of education trade unions on Artificial Intelligence in education, both in terms of professional issues and working conditions'.*

This policy paper further implements the Resolution on Technology, Artificial Intelligence and The Future of the Teaching Profession as well as the Resolution on Data Collection and Privacy in Education (2024) adopted at the 10th EI Congress in Buenos Aires (2024). It aligns with the EI-OECD Principles on *Opportunities, guidelines and guardrails for effective and equitable use of AI in Education* and other existing ETUCE policy documents on digitalisation and artificial intelligence.

Aim and objective

This ETUCE policy paper sets forth the vision and priorities of education trade unions in Europe on the Impact of Artificial Intelligence-enabled technologies on Education. Recognising the duality of artificial intelligence embedding both risks and opportunities for education staff, the policy paper aims to:

- Set out overarching essential principles to ensure a beneficial impact of AI on education staff.
- Identify the main impact of AI on education staff, their rights and working conditions.
- Put forward recommendations for ETUCE and its member organisations.

While the primary role of education trade unions is to anticipate the long-term impact of digital technologies, including AI-enabled technologies, and address their consequences on education staff, our concern is also to ensure equitable quality education for all. Indeed, education trade unions are continuously exploring the impact of technologies on students, their well-being, learning processes and the education system as a whole. With this view, the present policy paper focuses on the impact that artificial intelligence-enabled technologies have on education staff employed at all levels of education, their rights, and working conditions. It further includes the main implications of these technologies on students and learning as well as on education systems, but an exhaustive overview in the latter dimensions would require a specific policy paper.

Essential guiding principles

The following guiding principles are identified as essential conditions that must be respected to ensure that AI in education is used responsibly and effectively. Respecting these principles is essential to ensure that technologies do not harm fundamental human and workers' rights, promote inclusion and diversity, and uphold democratic values.

Education as a fundamental Human Right

Education is not merely a service or a commodity; it is a fundamental human right essential for the development and dignity of every individual. The first principle of the European Pillar of Social Rights which defines the right to all to education, training, and lifelong learning, including students and teachers. This principle is to be enforced in the EU countries and serves as a guide the non-EU countries to improve their education systems. Access to quality education should be guaranteed for all, irrespective of gender, sexual orientation, abilities and educational needs, economic status, ethnic origin, language, religion, and migratory and citizenship status, or any other characteristic while preserving the human connection and social value of education as a prerogative. When used in education, AI-enabled technologies should ensure equitable access to educational opportunities and resources. This means designing and implementing AI systems in a way that addresses the barriers to education faced by minorities, and communities in remote areas and disadvantaged backgrounds, as well as regions with limited infrastructure. Governments and education authorities have a responsibility to prioritise education as a fundamental human right in their policies and resource allocation and keep it free from private and commercial interests. AI should be utilised when teachers find it appropriate as a tool to enhance the quality of inclusive education and to bridge the gaps in access and quality, thereby fulfilling the right to education for all individuals.

Respect for Democracy:

In a democratic society, decisions regarding the use of AI in education should be made transparently,

inclusively, and accountably. In education, this means involving teachers, academics, researchers, other education personnel, as well as other stakeholders such as students and parents from the onset of the decision-making processes related to AI design, selection, implementation and monitoring. AI systems should be designed, developed and deployed in a manner that upholds democratic values such as fairness, accountability, transparency, and justice. In the education sector, that has been identified as a high-risk sector for the use of AI system (e.g., AI Act and Council of Europe's Convention of AI), this entails a stronger responsibility for governments and the development chain of AI systems to ensure that AI technologies, in particular the training data and methods, are not biased or discriminatory, that they respect diversity and pluralism, as well as privacy and ethics, and that they do not infringe on any human and workers' rights.

Human-Centred Approach to Technologies

AI-enabled technologies in education should be designed and implemented with a focus on enhancing human capabilities and experiences. Education staff must be active participants, not passive recipients, and should be involved from the outset in of the design, implementation, and monitoring of AI systems in education. Besides, it is essential to ensure that AI-enabled technologies empower teachers and students, providing tools that enhance their ability to teach and learn effectively rather than reducing their roles to mere users of machines. Additionally, a strong emphasis must be placed on ethics in AI-enable technologies and the long-term effects of intensified use of AI-technologies to basic human skills such as thinking skills, reading, literacy, and creativity, as well as their impact on socio-emotional learning.

Empower and not replace teachers

AI-enabled technologies should empower, not replace, the critical and unique role of teachers and other education personnel, especially when it comes to education for special needs. This can only be implemented safely and in a pedagogically meaningful way if teachers and education staff are adequately trained and supported on the potential use, benefits, and challenges of AI-enabled technologies and their impact on their jobs, tasks and responsibilities. Teachers and other education staff must be seen as equal partners and be involved in strategy settings and decisions at national, regional, and education institution levels on AI-enabled technologies. Besides, teachers' and academics' professional autonomy to decide when it is appropriate to use these technologies must be ensured. Crucially, high-stake decisions in education, such as hiring and evaluating teachers, admitting students to education programmes and evaluating them, should not be left to AI-based decision-making. AI should be considered a complementary tool to assist teachers and other education personnel in delivering quality and inclusive education rather than a substitute for their professional skills and personal interactions with students. The use of AI-enabled technologies should not hinder the access and quality of essential human components of education, such as empathy, mentorship, and personalised guidance, which cannot be replicated or multiplied by AI-enabled technologies and online or remote teaching.

Needs-Based Technology Integration

The integration of AI-enabled technologies must not be driven for on the sake of innovation or commercial profit but by pedagogical and professional needs identified through general educational strategies agreed upon by the whole educational community. In addition, the implementation of AI-

enabled technologies should respect the principle "as much as needed, as little as possible" and must be compatible with the goal of providing high-quality, holistic education.

Transparency and Accountability

Transparency in the collection, use, and sharing of data generated by educational technologies should be ensured. Stakeholders must understand how their data is being used and have control over it. The transparency of algorithms used in educational technologies should be promoted, in order to allow teachers, other education staff and students to understand and trust the processes behind AI-enabled technologies, particularly when these are used in decision-making affecting them. Companies must be held accountable for the data they collect, use, and profit from, ensuring compliance with privacy regulations and transparency in digital trade practices. They should be legally obliged to disclose the algorithms driving their AI systems, making them accessible for scrutiny. Moreover, clear accountability must be established for the actors responsible for the misuse or harmful and discriminatory outcomes of AI-enabled technologies.

Equity and Inclusion

The principle of equal access to AI-enabled technologies for all should be embraced, transcending socio-economic and other barriers. While technology holds promises of enhancing pedagogies, easing teacher workload, and addressing labour shortages, evidence suggests it can exacerbate disparities among students and education institutions, hinder the learning experience and students' well-being and increase the administrative burden of teachers and other education staff. Notably, the growing use of online training courses for teachers (e.g., MOOCS) based on standardised knowledge entail the concrete risks of a biased and discriminatory approached towards teachers, especially those from minority groups. Furthermore, factors such as the lack of diversity in the workers tasked with the design and training of AI systems, as well as the unequal representation in the dataset used for AI training, are serious factors leading to discrimination and various algorithmic biases. These contrasts highlight the imperative for evidence-based assessments of technology's impact on education, recognising the diverse contexts and varying accessibility to tools and infrastructure.

Sustainability and Environmental Responsibility

AI-enabled technologies in education must be developed, implemented, and maintained in line with sustainability and environmental responsibility, including the ecological footprint, from the energy consumption required for data processing to the environmental impact of hardware production and disposal. This includes supporting research into sustainable AI solutions, lowering the energy consumption and impact of data centers, and incorporating sustainability criteria in the procurement of educational technologies. Ultimately, the responsible use of AI technologies in education should reflect a holistic commitment to sustainability in every aspect of education.

Recommendations

Based on the above-mentioned guiding principles, the ETUCE Conference calls on national education trade unions to take actions in the following areas:

1. **Impact on Teachers' Working Conditions**

- Assess the impact of AI-enabled technologies on education staff, including recruitment, working conditions, workload, data privacy and security, intellectual property rights, work-life balance and pedagogical strategies, and assessment.
- Evaluate the impact of AI-enabled technologies on teachers' performance management through social dialogue and collective bargaining, advocating for a strong emphasis on fair, transparent, and democratic processes that prioritise professional development.
- Advocate for policies and practices ensuring that the integration of AI-enabled technologies respect the culture of trust in education institutions, professional autonomy and academic freedom, ensuring the right of teachers, academics, and education staff to make informed and conscious choices about when and how to use AI-enable technologies and, whenever applicable, how to best integrate them.
- Emphasise the impact on intellectual property rights of teachers, academics and researchers by advocating for legislation to require AI developers to declare the lawful acquisition of training datasets and to be held liable for copyright violations.
- Address the health and safety implications of technology use, protecting the right to disconnect, and providing resources to mitigate physical strain and mental health concerns.

2. **Impact on Pedagogy**

- Examine how technology affects both pedagogy and the teaching profession, recognising the interconnected yet distinct nature of these dimensions.
- Promote discussions and analysis within the educational community on the ethical implications of AI-enabled technologies and their long-term effects on basic human cognitive development.
- Encourage critical thinking and evaluation of AI-enabled technologies in education, maintaining a balance between personalisation and standardisation.
- Promote the integration of AI-enabled technologies in a manner that fosters collaborative teaching and learning, empowering both teachers and students to engage more effectively and creatively.
- Assess the impact of AI on the quality of available educational resources, cultural and linguistic diversity and potential embedded biases.

3. **Reinforce Regulatory Frameworks**

- Advocate for the development of robust regulatory frameworks to govern the use of AI-enabled technologies at the national and European level.
- Demand involvement of education staff and education trade unions in the design, implementation and monitoring of strategies for AI-enabled technologies in the education sector.
- Advocate for stronger coordinated action among countries at European level and better address common interests and challenges, including the shortcoming of existing legislations (e.g., on AI, as well as data privacy and security).
- Demand that governments establish clear oversight mechanisms to protect the value of education as a human right and a public good from undue commercial influence.

4. **Enhancing social dialogue and education trade union capacity**

- Strengthen negotiation and collective bargaining to address the challenges arising from the use of AI-enabled technologies in the education sector and ensure better protection of work-related rights of education workers.
- Foster social dialogue to ensure that education trade unions actively participate in governance and oversight of AI-enabled technologies in public education, including procurement, implementation, and monitoring of these technologies.
- Strengthen the role of education unions in governance and oversight of AI-enabled technologies in order to improve the unions' role in establishing clear frameworks for education professionals to take well informed decisions on the use of AI in their work.
- Encourage and strengthen local union representatives to obtain in their schools or school groups, the development and elaboration of an AI policy through constructive social dialogue.
- Reinforce advocacy actions by developing specific demands towards national and European regulatory authorities, education authorities, and policymakers to govern the role of AI in education and the actions of Edtech companies in education.
- Engage in negotiations with governments aiming to secure terms and conditions in AI technologies that guarantee transparency, privacy, and adaptability to pedagogical needs.

5. **EdTech and Commercialisation of education**

- Scrutinise the role of EdTech companies to counter privatisation and commercialisation, ensuring AI-enabled technologies serve public interests and uphold educational and democratic values. While the EdTech industry increasingly views education as a market for profit, education authorities often consider technology as a way to reduce costs. Digitization and data collection is not neutral. It influences the conception of what (good) education is and (co)shapes the teaching and learning process.
- Monitor public procurement procedures aiming at contracting out educational and data management services.
- Advocate for the respect of data minimisation principles by EdTech companies, while ensuring transparency, accountability, privacy, and accessibility on the data collection and storage.
- Hold governments, education authorities, and EdTech companies accountable to ensure that AI-enabled technologies in education do not undermine the efforts towards sustainable development and the fight against climate change, including through mandatory disclosure of data on energy consumption and carbon footprint.

6. AI-informed decision-making vs automated decision making

- Education authorities should prioritise teachers' and students' well-being above the introduction of AI-enabled technologies.
- Ensure that AI-enabled technologies in education do not replace the professional judgement of teachers and other education staff. Decision-making supported by AI systems should be exceptional and assessed on a case-by-case basis, ensuring the principle of human review.
- Especially ensure that no high-stake decisions regarding employment such as teachers' and other education staff's qualifications, contracts, performance and evaluation are taken by AI-enabled technologies.
- Advocate for mechanisms to be in place for teachers and other education staff to input objective

human judgment into AI-supported decisions. In case of violations, provide support for education workers to appeal to competent courts, with the backing of education trade unions**.**

- Confronting techno-ableism, i.e. a tendency to use a technology as a "solution" for "fixing" special needs and disabilities. Education systems shape the perspectives of future generations, and when these systems are imbued with techno-ableism, they perpetuate a narrow understanding of special needs and disability.

7. **Initial education and continuous professional development**

- Advocate for the integration of digital, online and media literacy within teacher initial education and continuous professional development programmes. This is important not only to ensure that teachers and other education staff might make conscious decisions on when and how to integrate AI-enabled technologies within their pedagogical strategies, but also to empower them to develop a critical understanding of AI-enabled technologies, including understanding their benefits and potential risks and make informed decision about their use and the need of educating students to understand the impact and ethical questions relating to these technologies.
- Promote equal access to training opportunities for all teachers and other education staff by organising free-of-charges training activities and within regular working hours.
- Ensure that teacher training programmes are up-to-date, meaningful for their professional needs, and implemented according to collegial decisions.
- The integration of AI-enabled technolgies in education should align with broader goals of sustainability education, fostering an understanding among teachers, other education staff and students about the environmental implications of emerging technologies.

8. **Auditing and Impact Assessment Tools**

- Develop tools to audit and assess the impact of digital and AI technologies in education processes, guiding policy and practice based on concrete evidence.
- Use impact assessments tools to identify and mitigate the negative consequences of AI-enabled technologies in education through trials and long-term monitoring mechanisms during the technology lifetime. Emphasise that education at its core is social in nature, where the human relations between students and teachers play an irreplaceable role. Therefore, the integration of AI systems should respect the principle 'as much as necessary, as little as possible'.
- Demand access to further research and easy access to data to improve audit mechanisms and evaluation of AI-enabled technologies
- Demand more independent research on the impact of AI-enabled technologies on teachers, education staff and students and their real benefit for the education sector.

9. **Respect for human rights and Ethical Use of Technology**

- Advocate for updating human rights frameworks to address AI-enabled technologies in education, ensuring that existing universal values and rights are effectively applied to the education sector.
- Demand further efforts from government and educational authorities to ensure the right of every student and teacher, regardless of their economic and social background and/or

geographical location, to access high-quality AI-enabled tools. It is crucial that these AI tools meet high standards, and that the professional judgment of teachers determines in which situations they are used. . Greater efforts must be placed to detecting hidden biases and ensuring effective remedies in case of violations.

- Call for stronger regulatory actions from government and regulatory authorities to ensure the EdTech industry operates with greater transparency, and guarantees the privacy and safety of students, teachers, and other education staff.
- Provide guidelines and support for teachers and other education staff in using AI-enabled technologies that respect students' rights and privacy and avoid all kinds of discrimination and exclusion. Advocate for legal protections for teachers from liability when using mandated technologies.
- Develop multi-professional teams to oversee the human rights and ethical aspects of AI-enabled technologies hand-in-hand with the pedagogy and working conditions.

The ETUCE Conference further mandates ETUCE to:

- Support education trade unions in identifying the evolving impact of Artificial Intelligence-enabled Technologies on Education through training activities and continuous research.
- Develop concrete practical guidelines for education trade unions to foster effective collective bargaining and advocacy action on AI-enabled technologies.
- Share insights and foster education trade union strategies to assess the impact of emerging European regulations (e.g., AI Act, upcoming Council of Europe's Convention on AI, and Education) and explore how education trade unions can effectively leverage these frameworks to protect and advance the interests of teachers and other education staff.
- Provide a platform for education trade unions for mutual learning and information sharing on the impact of AI systems in education.
- Advocate and promote the ETUCE policies and guidelines on AI in education towards European institutions, particularly the Council of Europe and the European Parliament.

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