



**Final report of the Commission
expert group on Artificial Intelligence
and data in education and training
Executive Summary**

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Executive Summary

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The EU Policy Context

The overall digital strategic priority of the European Commission is to shape Europe's Digital Future¹ and make it fit for the Digital Decade². The European approach to the digital transformation will ensure that digital technologies work inclusively for all citizens, that the digital economy is both competitive and fair, and that the development and application of digital technologies contributes to a democratic and sustainable society.

Building on the EU's first framework for digital education from 2018-2020, the new **Digital Education Action Plan (2021-2027)**³ outlines the European Commission's vision for high-quality, inclusive and accessible digital education in Europe to foster the development of a high-performing digital education ecosystem and enhance digital skills and competences needed for digital transformation.

Central to achieving this vision are education and training actions to address skills gaps, to raise the digital skills and competences of educators and learners, and to improve the quality and effectiveness of teaching and learning. Digital technologies, when utilised effectively, hold the potential to complement, as well as enhance, teaching and learning both inside and outside the classroom. Digital technologies can play a central role in removing barriers to access to learning and enhancing inclusiveness. They can also lead to more individualised learning.

The COVID-19 pandemic placed a Europe-wide magnifying glass on the current state of digital education. It accelerated and widened the uptake of digital technologies in education, but it also highlighted the challenges in effectively integrating digital tools in compulsory education contexts.

Furthermore, the rapid development of Artificial Intelligence (AI) and the use of associated data has highlighted tensions in many areas of our societies. This is particularly the case between the individualisation of learning (such as better-focused content and curricula), privacy (such as the pervasive storage of data about learners), and equity (such as the interplay between algorithms and data quality) in the field of education.

The Commission's **White Paper on Artificial Intelligence**⁴, which presented policy options to enable a trustworthy and secure development of AI in Europe, further highlighted the crucial importance of a European approach to AI being underpinned by a strong focus on filling the digital competence and skills shortages. This has also been a high priority of the updated **European Skills Agenda**⁵.

As part of its digital strategy, the European Commission has proposed a comprehensive legal framework for AI (**AI Act**)⁶ laying down mandatory requirements for "high-risk" AI systems in several areas, including education and vocational training. This will build on the EU regulatory and policy developments on AI and data, which include the **Ethics Guidelines for Trustworthy AI** presented in 2019 by the **High-Level Expert Group on AI (AI HLEG)**, the **General Data Protection Regulation (GDPR)** and the proposal for a **Data Act**.

As AI systems increasingly affect all aspects of human activity, it seems essential that educators understand how to use AI tools in an ethical way in their teaching and their students' learning across the EU.

¹ Shaping Europe's digital future. https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en

² Europe's Digital Decade: digital targets for 2030. https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

³ European Commission (2020). Digital Education Action Plan 2021-2027: Resetting education and training for the digital age. https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en

⁴ White Paper on Artificial Intelligence - A European approach to excellence and trust. https://ec.europa.eu/info/sites/default/files/commission-white-paper-artificial-intelligence-feb2020_en.pdf

⁵ The European Skills Agenda. <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>

⁶ Proposed Regulatory framework on Artificial Intelligence. <https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai>

The **Digital Education Action Plan**, under Priority 1 “Fostering the development of a high-performing digital education ecosystem” and includes the development of **Ethical Guidelines on the use of Artificial Intelligence (AI) and Data in Teaching and Learning for Educators**. This action aims to help educators and citizens to understand the potential that the applications of AI and data usage have in education and to raise awareness of the possible risks.

Methodology, objectives and structure of a preparatory report

In July 2021, the European Commission established the Expert Group on Artificial intelligence (AI) and data in education and training⁷ (hereafter “**The Expert Group**”). The 25 members of the group included researchers and academics in the field of AI, data and ethics in education, as well as representatives of UNICEF, UNESCO and OECD. The Expert Group’s mandate was to help the Commission to implement the DEAP Action 6, notably by means of a preparatory report to support the elaboration of **Ethical Guidelines on the use of Artificial Intelligence (AI) and Data in Teaching and Learning for Educators**. The Report provides analysis and insights into the philosophy of ethics and research on education and training, as well as into developments in AI and educational technologies, while taking stock of related initiatives and existing guidelines, especially those of the European Commission. The Expert Group considered, as an important basis, the work of the **High-Level Expert Group on Artificial Intelligence**, including the **Ethics Guidelines for Trustworthy AI** and **The Assessment List for Trustworthy Artificial Intelligence (ALTAI)**⁸, which serves as a tool to support AI developers and deployers in developing trustworthy AI.

The Expert Group was chaired by the European Commission⁹ and the work was facilitated by two external experts, along with staff from the European Commission. Activities took place between July 2021 and June 2022 involving four formal group meetings, a series of informal workshops, internal surveys, group work, and desk research.

Designed as a working document, the Report outlines the conceptual work conducted by the Expert Group and provides a theoretical background to inform the development of the guidelines. It focusses on the ethics of education and training, as well as on the identification of key sector-specific elements of ethics of AI in education. It reflects the collaborative effort, deliberation, and writing by the experts.

The areas covered in the Report range from philosophy of ethics, research on education and training, and developments in AI and educational technologies. The report has been structured as follows:

- The first chapter introduces some **key concepts relevant to AI and data use in education** to provide references and a common base of knowledge and reflection for educators. This includes what we mean by education, what AI is, what types of AI are used in education, and how different types of data emerge in educational settings. It also briefly introduces the rationale for the ethical approach adopted by the Expert Group.
- The second chapter highlights the **ethical challenges** that emerge from the use of AI and data for learning, teaching and assessment. It provides examples that link key concepts, generic use-cases and pedagogical practices and reflects on the ethical issues that may arise when using AI and data in education.

⁷ First meeting of the expert group. <https://education.ec.europa.eu/news/first-meeting-of-the-expert-group-on-artificial-intelligence-and-data-in-education-and-training>

⁸ Assessment List for Trustworthy Artificial Intelligence (ALTAI) for self-assessment. <https://digital-strategy.ec.europa.eu/en/library/assessment-list-trustworthy-artificial-intelligence-altai-self-assessment>

⁹ Co-chaired by representatives of DG EAC and DG CNECT.

- The third chapter explores the **competences required of educators** for the ethical use of AI and data in education settings and clarifies what ethical competence means in practice. It proposes a set of rubrics for educators' ethical competence in the use of AI and data.
- The fourth chapter examines the **ethical considerations that need to be taken into account** when data and AI are used in education and training. It links these considerations to the ethical challenges and risks that the use of AI and data may pose for educators and provides an incremental approach to addressing them.
- The final section places the topic in the broader **context of existing European and international governance approaches** and highlights the initiatives and regulations that need to be considered for the use of AI and data in education and training. It takes into account the work on trustworthy AI and discusses the key issue of governance and the allocation of responsibilities for implementing the chosen solutions in formal education.

At the end of each area examined, the Report outlines key messages to be considered in the development of the guidelines.

Key elements and findings

The Report consolidates the conceptual work of the Expert Group and provides an ethical foundation for the development of the *Ethical guidelines on the use of AI and data in teaching and learning for educators*. The areas covered in the Report are wide ranging including innovation in Artificial Intelligence and educational technologies, the philosophy and ethics of AI and data use and how these apply to education and training.

Key concepts relevant to AI and data use in education

The ethics of AI and data and the ethics of education and training are deeply interrelated. As a technology, AI brings its own ethical dilemmas and challenges, but these must be interpreted in the context of teaching and learning to realise the imagined possibilities.

The Report underlines the three key society-level objectives of education and educational systems: qualification, socialisation, and subjectification¹⁰. Learning underpins all three social objectives. From a practical educator perspective, a more concrete question is how education develops students as competent and capable persons, able to fully participate in social, cultural, and economic life.

The use of AI and data has the potential to become a transformative tool for education. In such a transformation, it becomes important to think about the historical objectives of education, broader social changes, emerging societal needs, and the future of education and learning. At the same time, educators must know that AI has a long history that spans many disciplines from computer science to cognitive sciences, philosophy, technology studies, and learning sciences. "AI" means different things to different people, and it is important to illustrate ethical challenges with concrete education-focused examples to avoid misunderstandings. The ethics of AI is not only about how we use technology, but it is also about why and for what reason we use AI and data to support teaching, learning and assessment.

AI and data use in and for learning, teaching and assessment

Students and educators already 'use' AI in their everyday lives, in many cases without being aware of its presence. Online learning environments often span several continents without users always being able to

¹⁰ Biesta, G. (2010). *Good Education in an Age of Measurement: Ethics, Politics, Democracy*. Routledge.

know how and where their data is used. This leads to the emergence of specific ethical challenges when using AI and data in education.

In much of the discussion on the ethics of AI and data use, the focus has been on risks and possible harms. While it is necessary to acknowledge and address these risks, it is also important to recognise that AI and data are being used to transform teaching, learning and assessment in many positive ways.

The Report outlines generic use-cases of AI and data use in education and training, highlighting the ethical challenges that emerge in their use. The use-cases focus on how AI technologies can be used in various teaching and learning contexts, and on the ethical questions that educators need to consider when these technologies are introduced and implemented in schools.

For each use-case, a set of questions highlights the ethical considerations for use of AI and data in teaching and learning. Use-cases include the use of AI and data to:

- analyse learner mindset and data for evidence-based education;
- detect students' level of self-efficacy to predict the students' goal achievements;
- make decisions on student enrolment;
- automate the scoring of student assignments;
- predict student progress and dropout;
- personalise learning using adaptive learning technologies;
- allow students to self-regulate their own learning;
- automate learning tasks using educational chatbots;
- detect support demands and provide individualised interventions for students with special needs.

Competences for the ethical use of AI and data in education

Knowledge of AI technologies is becoming increasingly important for educational innovation and everyday teaching practice, leading to new professional competence requirements for educators.

The European Framework for the **Digital Competence of Educators (DigCompEdu)**¹¹ provides a general reference framework to support the development of educator-specific digital competences in Europe. Based on this, the Report outlines the emerging educator and school leader competences for the ethical use of AI and data and proposes a set of rubrics on what educators and educational organisations need to know and be able to do to use AI and data in an ethical way.

Ethical considerations for AI and data in education and training

The Report defines four different but interdependent ethical considerations that need to be taken into account when using AI and data in education and training: agency, social fairness, humanity and justified choice.

The developmental dimension of education is centrally concerned with the question of how a person becomes a competent actor in a social and increasingly technology-mediated world. This question is approached using the concept of **agency**.

¹¹ DigCompEdu. https://joint-research-centre.ec.europa.eu/digcompedu_en

The distribution of rights, responsibilities, resources, and power among different social groups generates a social dimension in ethics. The ethical challenges related to this are captured in the concept of **social fairness**.

Ethics is also about what it is to be a human. To be an ethical human requires that we respect others and try to understand the world through the eyes of others. This implies openness, humility, and willingness to listen and learn. It also implies that all humans have dignity and cannot be treated as a means to an end. This aspect of ethics is about **humanity**.

Ethics is deeply linked with our ideas on what counts as knowledge, fact, and evidence, and how these can be used to justify arguments. This aspect of ethics is concerned with questions on an acceptable argument, the concept of rationality, and the processes that are used to negotiate different points of view and different value systems. This requires transparency and leads to participatory and collaborative models of decision-making. This is captured with the concept of **justified choice**.

Using these four interrelated ethical considerations, the Report highlights various ethical dilemmas and challenges that may arise when using AI and data in education and training. Among those discussed are teacher de-qualification, algorithmic bias, nudging, self-efficacy, dropout prediction, system impact, privacy and dignity, transparency and explicability. The Report highlights the need for joint effort of various stakeholders to support the implementation of ethical guidelines on the use of AI and data.

European and international governance approaches

The Expert Group Report highlights the existing governance instruments and mechanisms that are relevant for the use of AI and data in education in the context of the broader regulatory and policy developments. It outlines among others the **Ethics Guidelines for Trustworthy AI**¹² presented in 2019 by the **High-Level Expert Group on AI (AI HLEG)**, the proposed legal framework for AI (**AI Act**), and the **General Data Protection Regulation (GDPR)**¹³.

The governance and use of AI and data in education requires that there is a common understanding about what needs to be controlled, how the governance processes should be organised and managed and how the responsibilities are allocated.

Preparing for the Ethical Guidelines

The Report describes the current understanding of technology development, deployment and innovation in educational contexts. As AI techniques and the use of associated data increase, there is a need to develop guidelines for their use in education, as we see the first uses by early adopters. This requires an incremental approach and joint efforts by the different stakeholders to support the development and implementation of shared guidelines. This calls for the longer-term development and progressive evaluation of a larger number of use cases to assess the relevance and impact of AI and data use have in teaching and learning. The involvement of educators in this process is essential as they bring a critical understanding of educational practices and contexts that is rarely effectively accessed by technology specialists. In this regard, some of the key messages arising from the expert group report to inform the development of the guidelines include:

- Students and educators already use AI in their everyday lives. The digitalisation of our education systems vastly increases the amount of data that can be stored, copied, transferred, and processed. Online

¹² Ethics guidelines for trustworthy AI. <https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai>

¹³ Data protection in the EU. https://ec.europa.eu/info/law/law-topic/data-protection_en

learning environments often span several continents without users always being able to know how and where their data is used. This creates new ethical challenges. While AI has great potential, the realisation of this potential requires that ethical challenges are acknowledged and addressed.

- The adoption and appropriation of AI in education is a complex process, often driven by expected benefits. The impact of emerging technologies on learning outcomes is not yet proven by large-scale objective empirical evidence. It is important that the expectations are justified in an ethically acceptable way and agreed by the stakeholders. This suggests that participatory processes are ethically important.
- Different use cases lead to different ethical challenges. A bottom-up approach that derives more general guidance from concrete cases can be useful. This suggests that the guidelines should be a process-oriented tool that helps educators to work on the challenges, for example using workbooks and gamified approaches.
- The guidelines need to take into account the specific context of education and training to provide awareness and practical guidance for educators who are increasingly confronted with the use of AI in their teaching practice. For educators, it is important to know how responsibilities are allocated. Educators need to know that they can focus on teaching while using AI or learning analytics.
- Ethics of AI and data use in education must be based on ethics of education. Ethical considerations should be framed in the context of the social and developmental objectives of education. Human rights are an integrated part of the ethics of education.
- There are alternative ethical traditions that have been used to discuss the ethical challenges of AI and data use in education. For practical and operational guidelines, it is important to avoid mixing concepts from different ethical traditions. Many ethical terms bring with them specific points of view.¹⁴ The research literature shows that in most ethical guidelines, the basic ethical assumptions remain unclear.
- There are many ethics guidelines that focus on the design and development of AI systems, but very few that address educators specifically. The ethics of data usage has more extensively been discussed in learning analytics literature. Likewise, ethical theory has largely focussed on the moral behaviour of competent adults and social arrangements in abstract societies while educational researchers, by contrast, have studied the development of ethical thinking and capabilities in children. It is important that the guidelines draw on multidisciplinary approaches and clearly explain the role of complementary ethical approaches in the ethical use of AI and data in education and training.
- The complexity of the legal field is a challenge for teachers. It may be useful to highlight that the AI Act will help guarantee that providers consider the protection of ethical principles with respect to AI systems that are likely to pose high risks to fundamental rights and safety. Educators, therefore, can consider the ethics of AI and data use from an educational perspective.
- A simple graphical depiction of the ecosystem actors and an associated governance model would be useful in the guidelines so that teachers can easily map themselves in this territory and see their domain of responsibility. The emerging teacher Digital Competence of Educators framework can provide a starting point for this.
- Development of competence rubrics is a labour-intensive process, and the rubrics are often refined based on trials and testing. This requires participation from all relevant stakeholders. Clearly defined

¹⁴ For example, the concept of “harm” is usually associated with consequentialist ethics, “ethical imperatives and principles” are associated with duty ethics and deontological approaches, “responsibility” with care ethics, and “development” with virtue and capability-based approaches.

competence rubrics operationalise abstract ethical concepts and describe expectations of professional behaviour.

- As the future impact of new technologies is often impossible to predict, the introduction of ethical use of AI and data in education and training, therefore, becomes an incremental process of continuous deliberation and learning. The guidelines need to describe processes that integrate ethics in the ongoing activities in education, as well as ways to manage risk relations among the stakeholders.

The ethical guidelines, therefore, can be viewed as an evolving practical tool for educators and school leaders. It would be effective to present them in an accessible way so as to make the guidelines actionable and engaging for potential users.

Concluding remarks

The Report introduces key considerations for the ethical use of AI and data in teaching and learning for educators, with example uses of AI and data in the educational domain and associated ethical challenges. Emerging competences for teachers and school leaders, required to operationalise ethics of AI and data usage, are proposed and these can potentially inform professional development initiatives or other teacher support measures. General ethics-related policy initiatives at the European and international levels have been outlined. Key points are highlighted that could be considered in the development of the ethical guidelines on the use of AI and data in teaching and learning for educators.

The guidelines will need to describe processes that integrate ethics in the ongoing activities in education, as well as ways to manage risk relations among the stakeholders. Educators bring with them a critical understanding of teaching practices and contexts that technology specialists rarely can effectively access. The development and introduction of guidelines will be an incremental process of continuous deliberation and learning where technical solutions are jointly developed alongside ethical usage models by all relevant stakeholders involved in the process.

The **Ethical Guidelines on the use of Artificial Intelligence (AI) and Data in Teaching and Learning for Educators** will be an important starting point for the digital education ecosystem envisioned in the **Digital Education Action Plan**. They will provide a foundation and inform educators on the potential that applications of AI and data usage can have in education and to raise awareness of the possible risks. This will enable educators to engage positively, critically and ethically with AI systems and to realise their full potential.

