Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for Educators

Acknowledgements

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Foreword

From the way we stay informed to the way we make decisions, artificial intelligence (AI) is becoming ubiquitous in our economy and society. Naturally, it has reached our schools as well. AI in education is no longer a distant future. It is already changing the way schools, universities and educators work and our children learn. It is making educational settings more responsive by helping teachers address each learner's specific needs. It is fast becoming a staple in personalised tutoring and in assessment. And it is increasingly showing its potential to provide valuable insights in student development. The impact of AI on our education and training systems is undeniable, and will grow further in the future.

Students and educators already benefit from AI in their everyday lives, in many cases without being aware of its presence. Online learning environments often span several continents – often without users being entirely aware how and where their data is used. This raises specific ethical challenges when using AI and processing large amounts of data in education. It goes without saying: we must ensure that teachers and educators understand the potential AI and big data can have in education – while being aware of the associated risks.
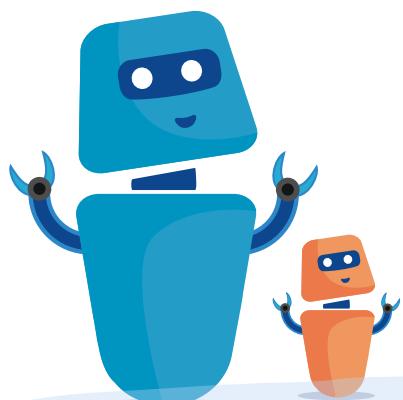
It is for this reason that I am pleased to share with you the present Ethical Guidelines on the use of AI and data in teaching and learning for educators. The Guidelines will undoubtedly help our teachers and educators reflect on how they can use AI and data in their daily practices – and empower them to act accordingly.

I am grateful for the valuable contribution of the Expert Group set up by the European Commission to the preparation of these Guidelines. This group brought together a wide range of experts: from practitioners to researchers in AI, data, ethics and education, as well as representatives of various international organisations, such as UNICEF, UNESCO and OECD.

The Expert Group offered rich knowledge and expertise building on the Ethics Guidelines for Trustworthy AI and The Assessment List for Trustworthy AI (ALTAI), areas that have been already high on EU's political agenda. Focusing on both the ethics of education and the ethics of AI and Data, the Group also took into account the proposed legal framework for AI (Artificial Intelligence Act), the General Data Protection Regulation (GDPR), and the proposals for a Data Act and for an EU Declaration on digital rights and principles.

These Guidelines are to be used in schools across Europe and we shall actively promote them through the Erasmus+ programme. Collectively or individually, teachers and school leaders will now have a solid basis to venture out and expand their use of these technologies in a considerate, safe and ethical way.

These Guidelines, along with their use on the ground, are fundamental to our ongoing efforts to achieve the European Education Area, while supporting the work being carried out by EU Member States. The Guidelines are part of a longer journey, while the EU is negotiating and preparing for a comprehensive and effective regulatory framework for trustworthy AI, to be implemented across all sectors in the EU, including education. And our work does not stop here. As we move forward, we will continue to develop a better understanding of how to apply these technologies, allowing educators to be even more inclusive and pragmatic, especially in primary and secondary education.

Therefore, I would invite all European teachers and educators to take advantage of these guidelines, and to share their feedback on their practical application and experience, as this will support our ongoing efforts regarding the digital transition in education. We shall also strongly benefit from the views and experience of our pupils, their families, and all stakeholders in the field of education about the use and impact of AI in their daily work and how to make it further beneficial while avoiding risks and negative effects to human rights and our fundamental EU values.

Our joint work on AI and data in education shows a shared commitment to the education community, to our learners, to their development and well-being. These Guidelines are an important starting point. It is now up to all of us to promote them and put them into practice. I am counting on you.

My warmest thanks to the experts of this Group who made this happen. Your ideas and dedication come to life in the pages that follow. Thank you

Mariya Gabriel

The Context for these Guidelines

Digital Education Action Plan

The Digital Education Action Plan (2021-2027) is the renewed European Union (EU) policy initiative to support the sustainable and effective adaptation of the education and training systems of EU Member States for the digital age.

The Digital Education Action Plan:

- offers a long-term strategic vision for high-quality, inclusive and accessible European digital education;

- addresses the challenges and opportunities of the COVID-19 pandemic, which has led to the unprecedented use of technology for education and training purposes;

- seeks stronger cooperation at the EU level on digital education and underscores the importance of working together across sectors to bring education into the digital age;

- presents opportunities, including improved quality and quantity of teaching concerning digital technologies, support for the digitalisation of teaching methods and pedagogies and the provision of infrastructure required for inclusive and resilient remote learning.

The Digital Education Plan puts forward two strategic priorities, each of which have a number of actions for the period 2021-2027:

The Digital Education Action Plan (2021-2027) has two strategic priorities

1 To foster high-perfoming digital education ecosystems, we need:

- **infrastructure**, **connectivity** and **digital equipment**

- **effective digital capacity planning and development**, including effective end up-to-date organisational capabilities

- **digital-competent** and **confident educators** and **education & training staff**

- **high-quality content, user friendly tools and secure platforms**, respecting privacy and ethical standards

2 To enhance digital skills and competences for the digital age:

- support **the provisions of basic digital skills and competences** from an early age:

  - digital literacy, including management of information overload and recognising disinformation
  - computing education
  - good knowledge and understanding of data-tensive technologies, such as AI

- **boost advanced digital skills**: enhancing the number of digital specialises and of girls and women in digital studies and careers

Under Priority 1: Fostering the development of a high-performing digital education ecosystem, the Digital Education Action Plan outlines a set of actions to foster the development of a high-performing digital education ecosystem. This includes a specific action to develop ethical guidelines on the use of AI and data in education and training to be shared with educators and school leaders.

Artificial Intelligence and Data Use

What is Artificial Intelligence?

Throughout Europe, learners and educators increasingly use Artificial Intelligence (AI) systems, sometimes without realising it. Search engines, smart assistants, chatbots, language translation, navigation apps, online videogames and many other applications use Artificial Intelligence in our everyday lives. AI systems rely on data, which is collected in different modalities (e.g. sound, images, text, posts, clicks) and all together form our digital traces.

AI has great potential to enhance education and training for learners, educators and school leaders. AI systems are currently helping some educators to identify specific learning needs, providing learners with personalised learning experiences, and helping some schools to make better decisions, so that they can more effectively use the teaching resources available to them.

As AI systems continue to evolve and data usage increases, it is of utmost importance to develop a better understanding of their impact on the world around us, particularly in education and training. Educators and school leaders need to have at least a basic knowledge of AI and data usage in order to be able to engage positively, critically, and ethically with this technology and to properly use it to exploit its full potential.
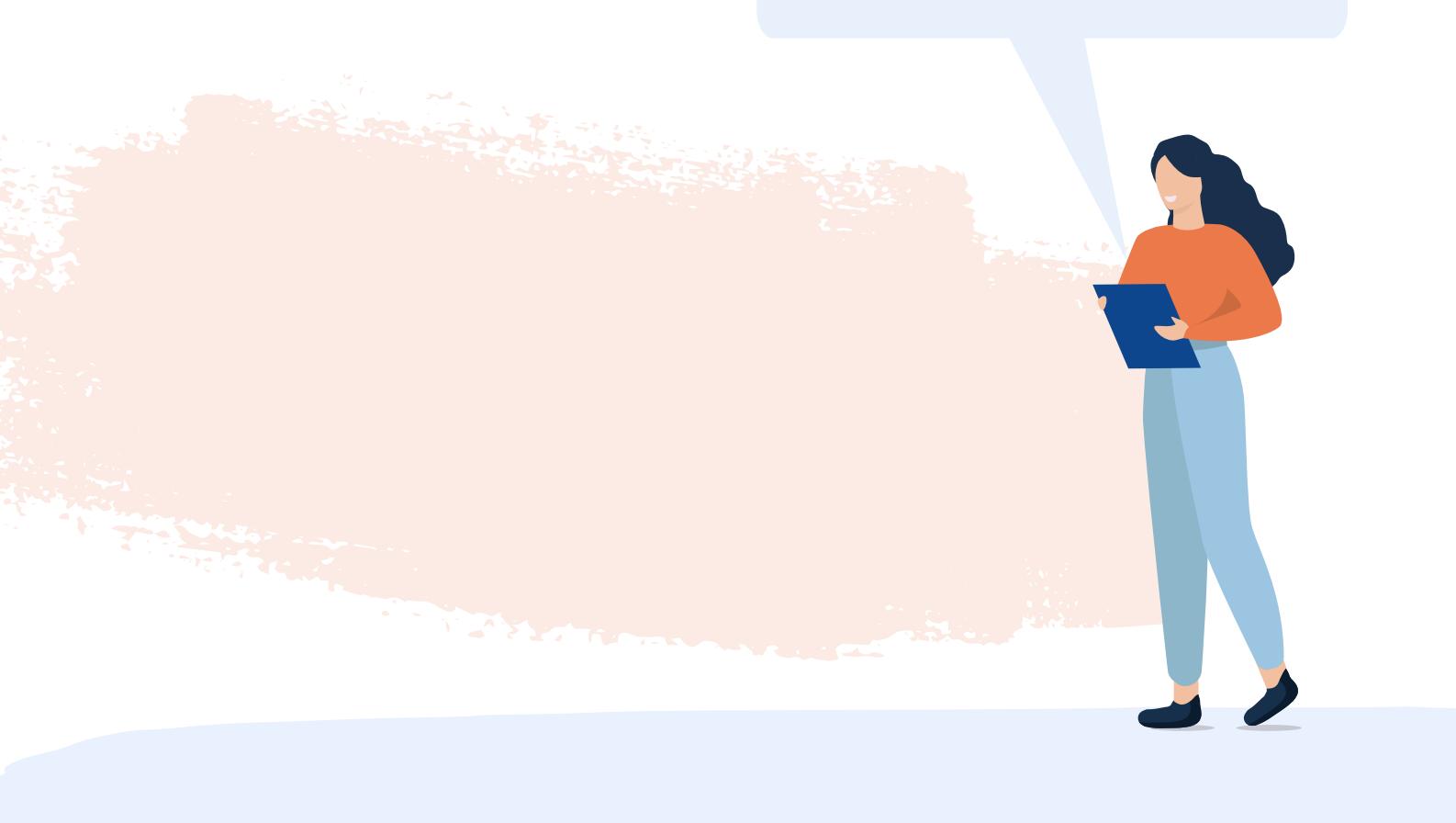
The definition of an Artificial Intelligence system (AI system) proposed in the draft AI Act is "software that is developed with one or more of the techniques and approaches (listed below) and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments it interacts with".

The listed AI techniques and approaches are:

a) Machine learning approaches, including supervised, unsupervised and reinforcement learning, using a wide variety of methods including deep learning;

b) Logic and knowledge-based approaches, including knowledge representation, inductive (logic) programming, knowledge bases, inference and deductive engines, (symbolic) reasoning and expert systems;

c) Statistical approaches, Bayesian estimation, search and optimisation methods.

When we talk about AI systems, we are referring to software in computers or machines that are programmed to perform tasks that usually require human intelligence, e.g. learning or reasoning. Using data, certain AI systems can be "trained" to make predictions, provide recommendations or decisions, sometimes without any human involvement.

What do we mean by AI and data use in Education?

Schools typically process substantial amounts of educational data including personal information about students, parents, staff, management and suppliers. Data collected, used, and processed in education is often referred to as "educational data". These consist of data recorded in student information systems for example, educational achievements, parent names, assessment grades, as well as micro-level data generated when digital tools are used. When students interact with digital devices, they generate digital traces such as mouse clicks, data on opened pages, the timing of interaction events, or key presses. In the same way when using intelligent tutoring systems (ITS) in classrooms, learning mathematics or modern languages produce learning activity traces. All this data can be combined to capture each student's online behaviour. This type of trace data (digital usage and learning activity traces) is often used for learning analytics (LA). Data in student information systems can be further used for resource and course planning and to predict dropout and guidance.

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Given the large amount of data needed to train AI systems, the automating nature of algorithms and the scalability in its applications, the use of AI raises important questions in relation to personal data, data protection and privacy.
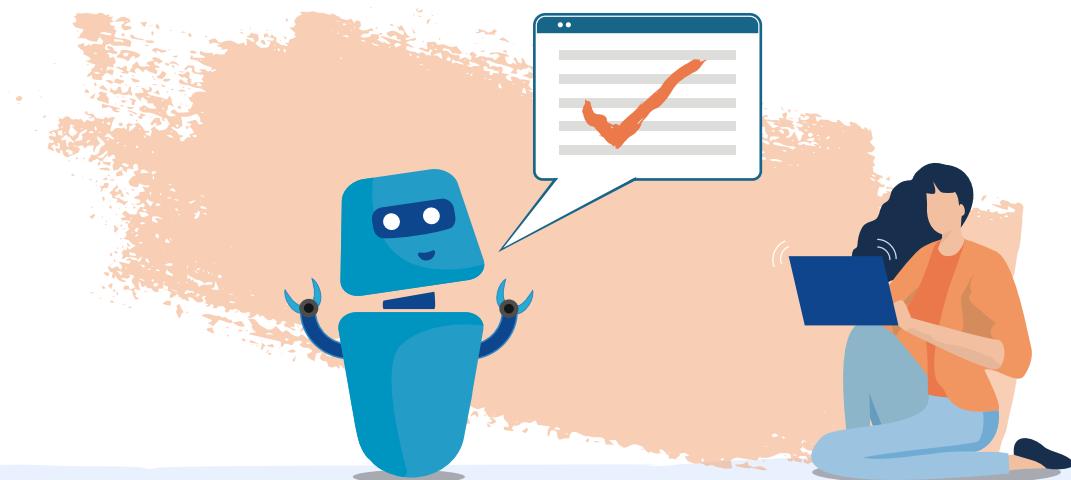
Schools are required to ensure that any data that they process is stored confidentially and securely and need to have appropriate policies and procedures in place for the protection and ethical use of all personal data, in compliance with the General Data Protection Regulation (GDPR).

Why do we need these guidelines?

The use of AI systems can potentially enhance teaching, learning and assessment, provide better learning outcomes and help schools to operate more efficiently. However, if those same AI applications are not properly designed or used carelessly, this could lead to harmful consequences. Educators need to be aware and ask questions whether AI systems they are using are reliable, fair, safe and trustworthy and that the management of educational data is secure, protects the privacy of individuals and is used for the common good. "Ethical AI" is used to indicate the development, deployment and use of AI that ensures compliance with ethical norms, ethical principles and related core values.

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These ethical guidelines on AI and data usage in teaching and learning are designed to help educators understand the potential that the applications of AI and data usage can have in education and to raise awareness of the possible risks so that they are able to engage positively, critically and ethically with AI systems and exploit their full potential.

EU Policy on Artificial Intelligence and Regulatory Framework Proposal

As part of its digital agenda, on the basis of the "Ethics Guidelines for Trustworthy AI" presented in 2019 by the High-Level Expert Group on AI (AI HLEG), the European Commission proposed in 2021 a comprehensive legal framework for AI (AI Act) laying down mandatory requirements for "high-risk" AI systems in several areas, including education and vocational training. Built on the EU regulatory and policy developments on AI and data, which include GDPR and the proposal for a Data Act, the present guidelines, taking into account the specific context of education and training, provide awareness and practical guidance for educators who are increasingly confronted with the use of AI in their teaching practice.

To understand better the EU policy context on trustworthy AI, please refer to: the proposed Regulatory framework on Artificial Intelligence[1]; the work of the AI HLEG which includes the Ethics Guidelines for Trustworthy AI and the Assessment List for Trustworthy AI (ALTAI)[2]; as well as to the EU Commission work in the area of Data[3].

Common Misconceptions about AI

There are many assumptions and concerns about AI and its short and long-term impacts on our education systems and on society in general. Here some of the most common misconceptions about the use of AI and data in the education context are addressed.

AI is too difficult to understand

Many people who don't have a computer science background are put off by jargon associated with AI and data systems. Even those who do have the relevant background can struggle to fully understand how AI works, as it is a broad and complex domain. This is sometimes referred to as the 'black box' problem as it is difficult to understand the AI system's inner workings. Artificial Intelligence is not a specific thing but a collection of methods and techniques to build an AI system. Rather than trying to understand the full functionality of AI systems, it is more important that educators are aware of the basic mechanisms and limitations of AI systems and how AI systems can be used to support teaching and learning in a safe and ethical way. These guidelines are designed to provide some basic questions one should ask when considering the use of an AI system and provide easy to understand use scenarios from education as well as a glossary to help with the terminology that is used to describe these systems and what they do.

AI has no role in education

AI is already changing how we learn, work and live and education is being impacted by this development. Everyone should be able to contribute to the development of AI and also benefit from it. By making ethical principles a key focus of the conversation about the role of AI in education, we can open the way for AI systems and solutions to be developed and used in an ethical, trustworthy, fair and inclusive way.

AI is not inclusive

AI can result in new forms of inequalities or discrimination and exacerbate existing ones. However, if properly designed and used, it can also offer opportunities to improve access and inclusion - in everyday life, in work, and in education. There is also significant potential for AI to provide educational resources for young people with disabilities and special needs. For example, AI-based solutions such as real-time live captioning can assist those with impaired hearing, while audio description can make access easier and more effective for people with low levels of vision.

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1 Regulatory framework on Artificial Intelligence. https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai
2 High-level expert group on artificial intelligence. https://digital-strategy.ec.europa.eu/en/policies/expert-group-ai
3 Shaping Europe's digital future: Data. https://digital-strategy.ec.europa.eu/en/policies/data

AI systems can't be trusted

As AI systems become more powerful, they will increasingly supplement or replace specific tasks performed by people. This could raise ethical and trust issues regarding the ability to make fair decisions using AI, as well as protecting the data collected and used to support those decisions. The complexity of the legal area can be a real challenge for educators. However, the proposed EU AI Act will help to ensure that certain AI systems classified as "high-risk" (in view of the risks that they may pose to the health, safety and fundamental rights of individuals) are developed by providers according to mandatory requirements to mitigate such risks and ensure their reliability. Education authorities and schools should therefore be able to verify that AI systems comply with the AI regulatory framework and focus on the ethical use of AI and data to support educators and learners in teaching, learning and assessment, while also adhering to the applicable data protection regulations.

AI will undermine the role of the teacher

Many teachers fear that as the use and impact of Artificial Intelligence in education broadens in the future, these systems will diminish their role or even replace them. Rather than replacing teachers, AI can support their work, enabling them to design learning experiences that empower learners to be creative, to think, to solve real-world problems, to collaborate effectively, and provide learning experiences that AI systems on their own cannot do. Moreover, AI can automate repetitive administrative tasks allowing more time to be dedicated to the learning environment. In this way the role of the teacher is likely to be augmented and evolve with the capabilities that new innovations for AI in education will bring. However, this requires dilligent governance of the development and use of AI applications and focus on sustaining teacher agency.

AI and Data Use Examples in Education

The use of AI systems in classrooms across Europe is growing and AI is being used in different ways to support teaching, learning and assessment practices.
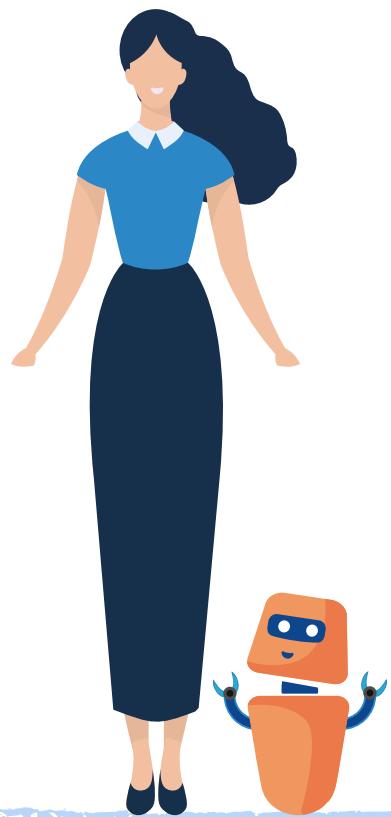
AI has great potential to enhance teaching and learning practices and help schools improve the way they are organised and how they operate. However, evidence-based research on the impact of AI in education is still limited so it is important to maintain a critical and supervised attitude.

Sometimes, AI systems can be used in different ways to support teaching or facilitate learning. When we talk about the types of AI systems that are used for teaching, learning, assessment and school administration, a common distinction is made between "student-facing," "teacher-facing," and "system-facing" AI systems.

Here we provide four use-cases which are categorised as:

- **Student Teaching** – Using AI to teach students (student-facing);
- **Student Supporting** - Using AI to support student learning (student-facing);
- **Teacher Supporting** – Using AI to support the teacher (teacher-facing);
- **System Supporting** – Using AI to support diagnostic or system-wide planning (system-facing).

The use cases described below provide some insight into how AI systems are being used by educators and learners to support the teaching, learning and assessment process.

STUDENT TEACHING
Using AI to teach students

Intelligent tutoring system	The learner follows a step-by-step sequence of tasks and gets individualised instruction or feedback without requiring intervention from the teacher.
Dialogue-based tutoring systems	The learner follows a step-by-step sequence of tasks through conversation in natural language. More advanced systems can automatically adapt to the level of engagement to keep the learner motivated and on task.
Language learning applications	AI-based learning apps are used in formal and non-formal education contexts. They support learning by providing access to language courses, dictionaries and provide real-time automated feedback on pronunciation, comprehension and fluency.

STUDENT SUPPORTING
Using AI to support student learning

Exploratory learning environments	Learners are offered multiple representations that help them identify their own routes to achieving the learning goals.
Formative writing assessment	Learners are provided with regular automatic feedback on their writing/assignments.
AI-supported collaborative learning	Data on each learner's work style and past performance is used to divide them into groups with the same ability levels or suitable mix of abilities and talents. AI systems provide inputs/suggestions on how a group is working together by monitoring the level of interaction between group members.

TEACHER SUPPORTING
Using AI to support the teacher

Summative writing assessment, essay scoring	AI is used to evaluate and grade learners' written work automatically. AI and machine learning techniques identify features such as word usage, grammar and sentence structure to grade and provide feedback.
Student forum monitoring	Key words in student forum posts trigger automatic feedback. Discussion analytics provide insights to students' forum activity and can highlight students who may need help or are not participating as expected.
AI teaching assistants	AI agents or chatbots provide answers to commonly asked questions by learners with simple instruction and directions. Over time, the AI system is able to broaden the range of answers and options provided.
Pedagogical resource recommendation	AI recommendation engines are used to recommend specific learning activities or resources based on each student's preferences, progress and needs.

SYSTEM SUPPORTING
AI to support diagnostic or system-wide planning

Educational data mining for resource allocation	Schools gather student data which are analysed and used to plan how available resources can be best allocated for tasks like creating class groupings, assigning teachers, timetabling, and highlighting students who may require additional learning support.
Diagnosing learning difficulties	Using learning analytics, cognitive skills such as vocabulary, listening, spatial reasoning, problem-solving, and memory are measured and used to diagnose learning difficulties, including underlying issues that are hard for a teacher to pick up but might be detected early using AI systems.
Guidance services	AI based guidance services provide ongoing prompts or choice to create pathways for future education. Users can form a competence profile including previous education and include their own interests. From this data, combined with up-to-date course catalogue or study opportunity information, relevant study recommendations can be created using natural language processing.

"Ethical guidelines on the use of AI and data in teaching and learning are an incremental process of continuous deliberation and learning."

Expert Group on AI and data in education and training

Ethical Considerations and Requirements Underpinning the Ethical Guidelines

Ethical Considerations

In developing these guidelines, four key considerations have been identified that underpin the ethical use of AI and data in teaching, learning, and assessment. These are human agency, fairness, humanity, and justified choice.

Human agency relates to an individual's capability to become a competent member of society. A person with agency can determine their life choices and be responsible for their actions. Agency underpins widely used concepts such as autonomy, self-determination, and responsibility.

Fairness relates to everyone being treated fairly in the social organisation. Clear processes are required so that all users have equal access to opportunity. These include equity, inclusion, non-discrimination, and fair distribution of rights and responsibilities.

Humanity addresses consideration for the people, their identity, integrity, and dignity. We need to consider the well-being, safety, social cohesion, meaningful contact, and respect that is necessary for a meaningful human connection. That connection implies, for example, that we approach people with respect of their intrinsic value and not as a data object or a means-to-an-end. It is at the essence of the human-centric approach to AI.

Justified choice relates to the use of knowledge, facts, and data to justify necessary or appropriate collective choices by multiple stakeholders in the school environment. It requires transparency and is based on participatory and collaborative models of decision-making as well as explainability.

These ethical considerations are intrinsically valuable and worth striving for in education. They guide educators and school leaders in their decisions about the use of AI systems in education. The key ethical requirements introduced below can help ensure that AI systems used in education and training are trustworthy and address relevant concerns.

Key Requirements for Trustworthy AI

The AI Act proposed by the Commission will lay down legally binding requirements for AI systems considered as "high-risk" in view of their intended purpose[4]. This will include certain AI systems used in the area of education and vocational training. When the AI Act becomes applicable, education institutions as users of AI systems will be able to rely on the trustworthiness of these "high-risk" AI systems based on the accompanying certification ensured by the provider, while having to comply with certain obligations.

Irrespective of whether the AI systems will fall under the scope of the legal framework, companies developing and providing AI systems (system providers) are encouraged to implement and apply ethical requirements for trustworthy AI to their design and development processes. At the same time, it is important that schools and educators are aware of these and are able to formulate relevant questions in order to better reflect on them.

The below requirements, which are based on the AI HLEG Ethics Guidelines for Trustworthy AI, are therefore recommendable for any AI system deployed and used in education. They address

important concerns, such as the risk of bias or error affecting educational outcomes:

Human agency and oversight including fundamental rights, children's rights, human agency, and human oversight.

Transparency including traceability, explainability and communication.

Diversity, non-discrimination, and fairness including accessibility, universal design, the avoidance of unfair bias, and stakeholder participation, which allows use regardless of age, gender, abilities, or characteristics - with a particular focus for students with special needs.

Societal and environmental wellbeing including sustainability and environmental friendliness, social impact, society, and democracy.

Privacy and data governance including respect for privacy, quality and integrity of data, and access to data.

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4 The proposed requirements are related to risk management, the training and testing data of the AI system and data governance, provision of technical documentation, record-keeping, transparency and provision of information to users, human oversight, and robustness, accuracy and cybersecurity.

Technical robustness and safety including resilience to attack, security and general safety, accuracy, reliability, and reproducibility.

Accountability including auditability, minimisation and reporting of negative impact, trade-offs, and redress. The considerations and requirements can help educators, school leaders and technology providers to adequately assess the impact, address the potential risks, and realise the benefits of an AI system deployed and used in education. As such they guide the development, deployment and use of trustworthy AI systems.

Guiding Questions for Educators

When considering the use of an AI system, while it may not be necessary to understand how the AI system works, it is important that the school or educator is able to formulate some relevant questions and engage in a constructive dialogue with AI systems providers or with the responsible public bodies (such as market surveillance authorities, education ministries, regional and local education authorities and school authorities). The guiding questions below are based on the key requirements for trustworthy AI systems and serve the purpose of enabling a constructive dialogue on their ethical use in education and training. Some of them are focussed more on practical implementation issues and others on ethical considerations.

While the guiding questions offer orientation and aim to initiate reflection by educators in their professional practices, they cannot replace a comprehensive legal or ethical assessment. The latter should be conducted on the basis of the Assessment List for Trustworthy AI (ALTAI) as well as the future AI Act. Nevertheless, the questions will help educators to deal better with a complex and highly innovative technology and develop awareness.

1 👍 Human Agency and Oversight

- Is the teacher role clearly defined so as to ensure that there is a teacher in the loop while the AI system is being used? How does the AI system affect the didactical role of the teacher?

- Are the decisions that impact students conducted with teacher agency and is the teacher able to notice anomalies or possible discrimination?

- Are procedures in place for teachers to monitor and intervene, for example in situations where empathy is required when dealing with learners or parents?

- Is there a mechanism for learners to opt-out if concerns have not been adequately addressed?

- Are there monitoring systems in place to prevent overconfidence in or overreliance on the AI system?

- Do teachers and school leaders have all the training and information needed to effectively use the system and ensure it is safe and does not cause harms or violate rights of students?

2 👍 Transparency

- Are teachers and school leaders aware of the AI methods and features being utilised by the system?

- Is it clear what aspects AI can take over and what not within the system?

- Do teachers and school leaders understand how specific assessment or personalisation algorithms work within the AI system?

- Are the system processes and outcomes focussed on the expected learning outcomes for the learners? How reliable are the predictions, assessments and classifications of the AI system in explaining and evaluating the relevance of its use?

- Are the instructions and information accessible and presented in a way that is clear both for teachers and learners?

3 Diversity, non-Discrimination and Fairness

- Is the system accessible by everyone in the same way without any barriers?

- Does the system provide appropriate interaction modes for learners with disabilities or special education needs? Is the AI system designed to treat learners respectfully adapting to their individual needs?

- Is the user interface appropriate and accessible for the age level of the learners? Has the usability and user-experience been tested for the target age group?

- Are there procedures in place to ensure that AI use will not lead to discrimination or unfair behaviour for all users?

- Does the AI system documentation or its training process provide insight into potential bias in the data?

- Are procedures in place to detect and deal with bias or perceived inequalities that may arise?

4 Societal and Environmental Wellbeing

- How does the AI system affect the social and emotional wellbeing of learners and teachers?

- Does the AI system clearly signal that its social interaction is simulated and that it has no capacities of feeling or empathy?

- Are students or their parents involved in the decision to use the AI system and support it?

- Is data used to support teachers and school leaders to evaluate student wellbeing and if so, how is this being monitored?

- Does use of the system create any harm or fear for individuals or for society?

5 👍 Privacy and Data Governance

- Are there mechanisms to ensure that sensitive data is kept anonymous? Are there procedures in place to limit access to the data only to those who need it?
- Is access to learner data protected and stored in a secure location and used only for the purposes for which the data was collected?
- Is there a mechanism to allow teachers and school leaders to flag issues related to privacy or data protection?
- Are learners and teachers informed about what happens with their data, how it is used and for what purposes?
- Is it possible to customise the privacy and data settings?
- Does the AI system comply with General Data Protection Regulation?

6 👍 Technical Robustness and Safety

- Is there sufficient security in place to protect against data breaches?
- Is there a strategy to monitor and test if the AI system is meeting the goals, purposes and intended applications?
- Are the appropriate oversight mechanisms in place for data collection, storage, processing, minimisation and use?
- Is information available to assure learners and parents of the system's technical robustness and safety?

7 👍 Accountability

- Who is responsible for the ongoing monitoring of results produced by the AI system and how the results are being used to enhance teaching, learning and assessment?
- How is the effectiveness and impact of the AI system being evaluated and how does this evaluation consider key values of education?
- Who is responsible and accountable for final decisions made regarding the procurement and implementation of the AI system?
- Is there a Service Level Agreement in place, clearly outlining the support and maintenance services and steps to be taken to address reported problems?

Guidance for Educators and School Leaders

Artificial Intelligence could play a key role in enhancing teaching, learning and assessment practices for educators and learners. Whether it is at the system-wide, school or classroom level, it is important that careful consideration is given to the ethical use of AI and data systems. This should be done on a continuous basis and led by the school management. Here are a number of basic steps that educators and school leaders can take to review how AI and data is being, or can be used throughout the school, so that it leads to improved outcomes for all learners while being mindful of the ethical considerations.

Using the Guiding Questions

The guiding questions can be used in different ways when reviewing an AI system prior to it being set up in a school or while it is being used. The questions can be asked of the educators themselves, of those making the decision at management level, or of the system providers. The questions can also inform discussion with learners, parents and the wider school community.These school case scenarios provide examples of how the guiding questions can inform how AI systems are used in an ethical and responsible way. While all the guiding questions can be considered for each case, three questions are highlighted as

examples based on their relevance to the proposed AI solution in response to a given objective. Notably, some of these school case scenarios will become subject to the regulatory framework on AI and the respective regulated AI systems will be subject to mandatory requirements and obligations.

Using adaptive learning technologies to adapt to each learner's ability

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A primary school is using an Intelligent Tutoring System to automatically direct learners to resources specific to their learning needs. The AI based system uses learner data to adapt problems to the learner's predicted knowledge levels. As well as providing constant feedback to the learner, the system provides real-time information on their progress on a teacher dashboard.

The following guiding questions highlight areas that require attention:

- Are the system processes and outcomes focussed on the expected learning outcomes for the learners? How reliable are the predictions, assessments and classifications of the AI system in explaining and evaluating the relevance of its use? **Transparency**

- Does the system provide appropriate interaction modes for learners with disabilities or special education needs? Is the AI system designed to treat learners respectfully adapting to their individual needs?
  Diversity, non-Discrimination and Fairness

- Are there monitoring systems in place to prevent overconfidence in or overreliance on the AI system? **Human agency and oversight**

Using student dashboards to guide learners through their learning

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A post-primary school is considering the use of a personalised online student dashboard which will provide feedback to learners and support the development of their self-regulation skills. Instead of focusing on what the learner has learned, the visualisations provide the student with a view of how they are learning.

The following guiding questions highlight areas that require attention:

- Does the AI system clearly signal that its social interaction is simulated and that it has no capacities of feeling or empathy?
  Societal and environmental wellbeing

- Is access to learner data protected and stored in a secure location and used only for the purposes for which the data was collected?
  Privacy and data governance

- Is there a Service Level Agreement in place, clearly outlining the Support and Maintenance Services and steps to be taken to address reported problems? **Accountability**

Providing individualised interventions for special needs

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A school is considering how AI systems can help reduce barriers for students with special educational needs. The school is currently trialling an AI system to detect student support demands early on and provide tailored instructional support. By detecting patterns of corresponding characteristics from measures such as learning performance, standardised tests attention span or reading speed, the system suggests probabilities of specific diagnoses and related recommendations for interventions.

The following guiding questions highlight areas that require attention:

- Are procedures in place for teachers to monitor and intervene, for example in situations where empathy is required when dealing with learners or parents? **Human agency and oversight**

- Is information available to assure learners and parents of the system's technical robustness and safety? **Technical robustness and safety**

- Is the teacher role clearly defined so as to ensure that there is a teacher in the loop while the AI system is being used?
  How does the AI system affect the didactical role of the teacher?
 **Human agency and oversight**
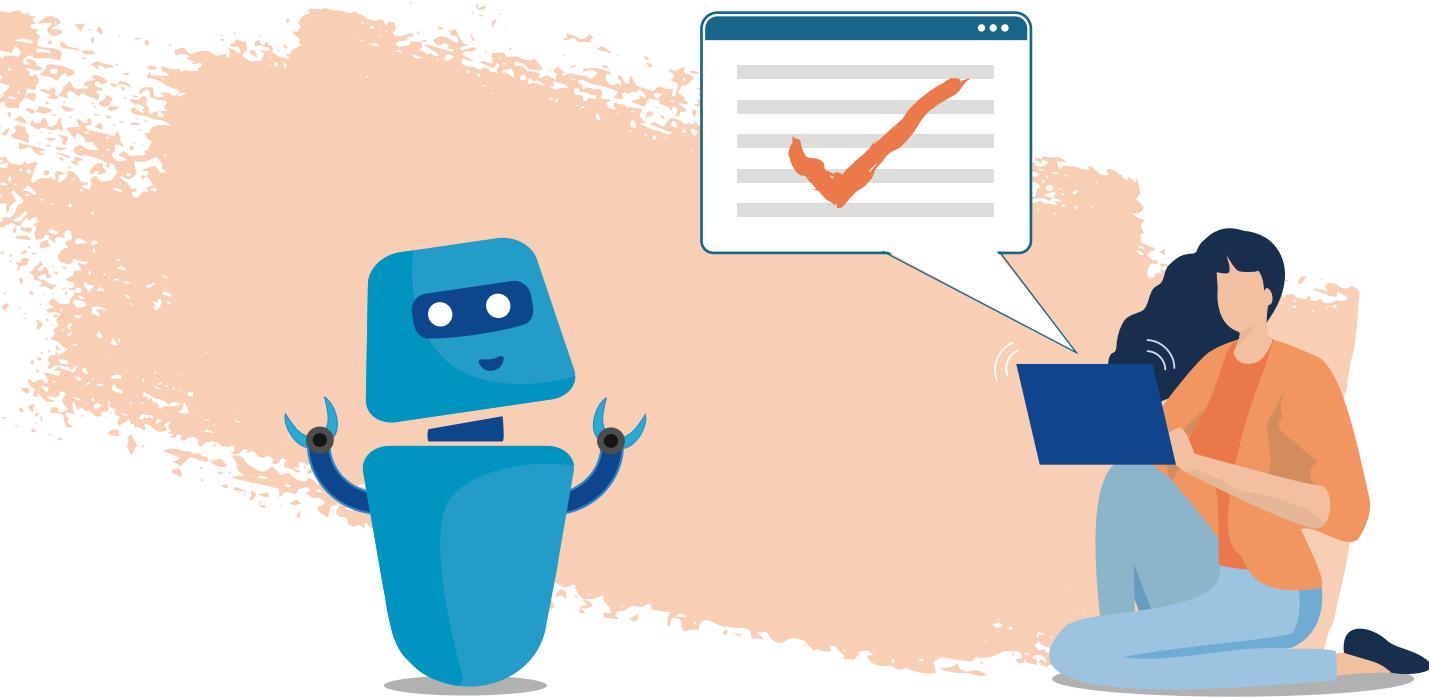
Scoring essays using automated tools

A school is looking at how AI systems can support the assessment of student written assignments. A provider has recommended an automated essay scoring system which uses large natural language models to assess various aspects of text with high accuracy. The system can be used to check student assignments, automatically identify errors, and assign grades. The system can also be used to generate sample essays. Over time, the system can train large artificial neural networks with historical cases that contain various types of student mistakes to provide even more accurate grading. The system has a plagiarism detection option which can be used to automatically detect instances of plagiarism or copyright infringement in written work submitted by students.

The following guiding questions highlight areas that require attention:

- Are there procedures in place to ensure that AI use will not lead to discrimination or unfair behaviour for all users? **Diversity, non-discrimination and fairness**

- Who is responsible for the ongoing monitoring of results produced by the AI system and how the results are being used to enhance teaching, learning and assessment? **Accountability**

- Do teachers and school leaders understand how specific assessment or personalisation algorithms work within the AI system? **Transparency**

Managing student enrolment and resource planning

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A school uses the data collected when students enrol to predict and better organise the number of students who will attend in the coming year. The AI system is also used to assist with forward planning, resource allocation, class allocations and budgeting.
This has enabled the school to consider more student attributes than before, for example, to increase gender parity and student diversity. The school is now considering using prior grades and other metrics like standardised tests to develop targets for their students to achieve and to support educators to predict student success on a per subject basis.

The following guiding questions highlight areas that require attention:

- Who is responsible for the ongoing monitoring of results produced by the AI system and how the results are being used to enhance teaching, learning and assessment? **Accountability**

- Are there mechanisms to ensure that sensitive data is kept anonymous? Are there procedures in place to limit access to the data only to those who need it? **Privacy and data governance**

- How is the effectiveness and impact of the AI system being evaluated and how does this evaluation consider key values of education? **Accountability**

Using chatbots to guide learners and parents through administrative tasks

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A school uses a chatbot virtual assistant on its website to guide learners and parents through administrative tasks such as enrolment for courses, paying course fees or logging technical support issues. The system is also used to help students to find learning opportunities, provide feedback on pronunciation or comprehension. The virtual assistant is also used to support students with special educational needs through administrative tasks.

The following guiding questions highlight areas that require attention:

- Does the AI system clearly signal that its social interaction is simulated and that it has no capacities of feeling or empathy?
Societal and environmental wellbeing

- Is there a strategy to monitor and test if the AI system is meeting the goals, purposes and intended applications?
Technical robustness and safety

- Is there a mechanism to allow teachers and school leaders to flag issues related to privacy or data protection?
Privacy and data governance

Planning for Effective Use of AI and Data in School

When considering the use of AI and data, it is important that the school prepares and puts in place a collaborative and reflective process of internal school review. This requires educators to examine how they can use AI systems to positively support their teaching and student learning. Predicting the consequences and the impact of the use of data and AI in education can be very difficult. Therefore, an incremental approach to the development and deployment of these technologies and their assessment is needed. The idea is to gradually introduce these tools into their contexts and to constantly monitor the societal effects that can emerge, leaving open the possibility to step back when unintended consequences occur. Ethical application of AI in education requires agency at the student, educator, school management and institutional level.

Review current AI systems and data use

The questions provided in these guidelines can be used as the starting point to inquire about the AI systems that are already in place, or as a basis for discussion if considering the future use of AI and data within a school. When carrying out a review, it is useful to list what data is being gathered by the school and clarify what purpose this serves. Schools should consider if there is less specific information that could be gathered to achieve the same outcome. They should also consider how long the data will be needed for and how the school might be able to retain it for as little time as possible. The European Union General Data Protection Regulation (GDPR) requires this kind of analysis.

Initiate policies and procedures

Prior to implementing an AI system, school wide policies and procedures need to be put in place to establish expectations and to provide guidance on how to consistently deal with issues when they arise. These could include measures for:

- ensuring public procurement of trustworthy and human-centric AI;
- implementing human oversight;
- ensuring that input data is relevant to the intended purpose of the AI system;
- the provision of appropriate staff training;
- monitoring the operation of the AI system and taking corrective actions; and,
- complying with relevant GDPR obligations, including carrying out a data protection impact assessment.

This will provide direction regarding what is appropriate as well as inappropriate or unacceptable behaviour and will help ensure that people are treated fairly and equally. It is important that policies and procedures are communicated to educators, learners, and parents so that they understand what is expected of them.

Carry out a pilot of the AI system

Before introducing new AI systems across the school, it can be useful to trial the system with a particular learner cohort. It is important to have a clear vision of what the school wants to achieve with the new technology so that an informed decision can be made involving students and their parents. Specific evaluation criteria are required so that an informed judgement can be made on the effectiveness of the AI system in terms of improvement of learning outcomes, value for money and ethical use. This will also highlight some of the key questions that may need to be asked of the supplier before purchasing the system.

Collaborate with the AI system provider

It is important to maintain contact with the AI system provider prior to deployment and throughout the lifecycle of the AI system. Look for clear technical documentation and seek clarification on any aspects that are unclear. A Service Level Agreement (SLA) should be agreed with the provider setting out the support and maintenance services and steps to be taken to address reported problems. Assurances should be sought from the provider in terms of their adherence to applicable legal obligations. The school should also consider future dependence on the provider if, for example, it seeks to change provider in the future, or move to a different AI system altogether. It is also important that any human oversight measures identified by the provider are implemented by the school while the AI system is being used.

Monitor the operation of the AI system and evaluate the risk

The use of the AI system should be monitored on an ongoing basis to evaluate the impact on learning, teaching, and assessment practices. At school level it will be important to decide how monitoring will be organised and carried out, who will be responsible for monitoring and how progress will be determined and reported. The evidence gathered, as a result of ongoing monitoring, should inform and influence the future use of AI systems or the decision not to use them in particular circumstances.

Raising Awareness and Community Engagement

Discuss with colleagues

Collaboration between educators contributes to school improvement and student success. Educators often draw support from each other and can delegate tasks in ways that help them collectively to be more effective. Working collaboratively can help to make more informed decisions and helps ensure a more consistent approach to using AI and data systems across the school.

Collaborate with other schools

Collaboration between schools is an effective way to share experiences and best practices and learn how other schools have implemented AI systems. This can also be useful in identifying and dealing with reliable providers of AI and data systems that adhere to the key requirements for trustworthy AI. It is important that schools participate in supervised projects and experiments organised at regional, national, or European level through initiatives such as Erasmus+. These provide opportunities for educators and school leaders to participate collaboratively in a process of applied research and inform future use and development of AI and data use in schools.

Communicate with parents, learners and school community

Involving parents and learners in discussions and decision making will lead to better understanding and trust in what the school is aiming to achieve through the use of AI systems. Careful consideration needs to be given to explain what data is being collected, what is being done with the data, how and why it is being collected, and how this is protected. It will be important to share these explanations with learners and parents and to provide opportunities for them to provide their feedback and voice possible concerns. Learners, depending on their age, might require different approaches in order to engage them so that they can participate in informed decision making.

Keep up to date

As AI systems continue to evolve and data usage increases, it is very important to develop a better understanding of their impact on the world around us, including in education and training. Educators will need to continue to keep informed of new innovations and development through participation in continuing professional learning and involvement in communities of practice. School leaders will need to provide opportunities for staff to upskill and continue to develop competences for ethical use of AI and data.

Emerging Competences for Ethical use of AI and data

Educators and school leaders play a central role in the successful adoption of AI systems and in realising the potential benefits of digital data in education. Because of this, it is important that teachers and school leaders are aware of and appreciate the opportunities and challenges of employing AI systems and how they can enhance teaching, learning and assessment practices. This will lead to the development of new digital competences to be considered in the context of the European Framework for the **Digital Competence of Educators (DigCompEdu)** which provides a general reference framework to support the development of educator-specific digital competences in Europe. Here are some potential indicators of the emerging educator and school leader competences for ethical use of AI and data in teaching and learning.

Area 1: Professional Engagement
Using digital technologies for communication, collaboration, and professional development

Competence element	Potential Indicators
Is able to critically describe positive and negative impacts of AI and data use in education	• Takes an active part in continuous professional learning on AI and learning analytics and their ethical use. • Able to give examples of AI systems and describe their relevance. • Knows how the ethical impact of AI systems is assessed in the school. • Knows how to initiate and promote strategies across the school and its wider community that promote ethical and responsible use of AI and data.
Understand the basics of AI and learning analytics	• Aware that AI algorithms work in ways that are usually not visible or easily understood by users. • Able to interact and give feedback to the AI system to influence what it recommends next. • Aware that sensors used in many digital technologies and applications generate large amounts of data, including personal data, that can be used to train an AI system. • Aware of EU AI ethics guidelines and self-assessment instruments.

Area 2: Digital resources
Sourcing, creating, and sharing digital resources
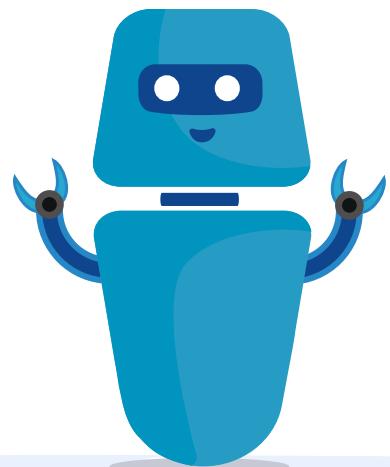
Competence element	Potential Indicators
Data governance	• Aware of the various forms of personal data used in education and training. • Aware of responsibilities in maintaining data security and privacy. • Knows that the processing of personal data is subject to national and EU regulation including GDPR. • Knows that processing of personal data usually cannot be based on user consent in compulsory education. • Knows who has access to student data, how access is monitored, and how long data are retained. • Knows that all EU citizens have the right to not be subject to fully automated decision making. • Able to give examples of sensitive data, including biometric data. • Able to weigh the benefits and risks before allowing third parties to process personal data especially when using AI systems.
AI governance	• Knows that AI systems are subject to national and EU regulation (notably AI Act to be adopted). • Able to explain the risk-based approach of the AI Act (to be adopted). • Knows the high-risk AI use cases in education and the associated requirements under the AI Act (when adopted). • Knows how to incorporate AI edited/manipulated digital content in one's own work and how that work should be credited. • Able to explain key principles of data quality in AI systems.

Area 3: Teaching and Learning
Managing and orchestrating the use of digital technologies in teaching and learning

Competence element	Potential Indicators
Models of learning	• Knows that AI systems implement designer's understanding of what learning is and how learning can be measured; can explain key pedagogic assumptions that underpin a given digital learning system.
Objectives of education	• Knows how a given digital system addresses the different social objectives of education (qualification, socialisation, subjectification).
Human agency	• Able to consider the AI system impact on teacher autonomy, professional development, and educational innovation. • Considers the sources of unacceptable bias in data-driven AI.
Fairness	• Considers risks related to emotional dependency and student self-image when using interactive AI systems and learning analytics.
Humanity	• Able to consider the impact of AI and data use on the student community. • Confident in discussing the ethical aspects of AI, and how they influence the way technology is used.
Participates in the development of learning practices that use AI and data	• Can explain how ethical principles and values are considered and negotiated in co-design and co-creation of learning practices that use AI and data (linked to learning design).

Area 4: Assessment
Using digital technologies and strategies to enhance assessment

Competence element	Potential Indicators
Personal differences	• Aware that students react in different ways to automated feedback.
Algorithmic bias	• Considers the sources of unacceptable bias in AI systems and how it can be mitigated.
Cognitive focus	• Aware that AI systems assess student progress based on pre-defined domain-specific models of knowledge. • Aware that most AI systems do not assess collaboration, social competences, or creativity.
New ways to misuse technology	• Aware of common ways to manipulate AI-based assessment.

Area 5: Empowering Learners
Using digital technologies to enhance inclusion, personalisation, and learners' active engagement

Competence element	Potential Indicators
AI addressing learners' diverse learning needs	• Knows the different ways personalised learning systems can adapt their behaviour (content, learning path, pedagogical approach). • Able to explain how a given system can benefit all students, independent of their cognitive, cultural, economic, or physical differences. • Aware that digital learning systems treat different student groups differently. • Able to consider impact on the development of student self-efficiency, self-image, mindset, and cognitive and affective self-regulation skills.
Justified choice	• Knows that AI and data use may benefit some learners more than others. • Able to explain what evidence has been used to justify the deployment of a given AI system in the classroom. • Recognises the need for constant monitoring of the outcomes of AI use and to learn from unexpected outcomes.

Area 6: Facilitating learners' digital competence
Enabling learners to creatively and responsibly use digital technologies for information, communication, content creation, wellbeing and problem-solving

Competence element	Potential Indicators
AI and Learning Analytics ethics	• Able to use AI projects and deployments to help students learn about ethics of AI and data use in education and training.

Glossary of AI and Data Terms

The words associated with AI and data use might sound unfamiliar or strange. Here are the most common terms associated with AI and data use and explanation of how it can apply to education.

The explanations provided here are written to be accessible to those involved in schools and should not be considered as full technical definitions. The Assessment List For Trustworthy Artificial Intelligence (ALTAI)[5] and the Commission's Glossary of human-centric Artificial Intelligence[6].

| .AI Term	What it means	How it can apply to education
ALGORITHM	A process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.	AI algorithms can uncover patterns in students' performance and can help teachers optimise their teaching strategies/methodologies to personalise learning and improve outcomes.
AUGMENTED REALITY (AR)	AR is an interactive experience where real-world environments and objects are supplemented by computer-generated 3D models and animated sequences which are displayed as if they are in a real-world environment. AR environments can employ AI techniques.	AR creates opportunities for teachers to help students grasp abstract concepts through interaction and experimentation with virtual materials. This interactive learning environment provides opportunities to implement hands-on learning approaches that increase engagement and enhance the learning experience.
AUTOMATION	The computer system performs a function that normally requires human involvement. A system that can perform tasks without needing continuous human supervision is described as autonomous.	Schools and teachers can use software to perform many repetitive and time-consuming tasks like timetabling, attendance, and enrolment. Automating such tasks can allow teachers to spend less time on routine tasks and more time with their students.

5 ALTAI. https://digital-strategy.ec.europa.eu/en/library/assessment-list-trustworthy-artificial-intelligence-altai-self-assessment
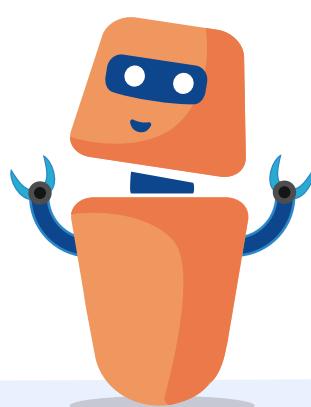
6 Estevez-Almenzar, M., Fernández-Llorca, D., Gomez, E., Martinez-Plumed, F., Glossary of human-centred artificial intelligence, Publications Office of the European Union, Luxembourg, 2022

.AI Term	What it means	How it can apply to education
BIAS	Bias is an inclination of prejudice towards or against a person, object, or position. Bias can arise in many ways in AI systems. For example, in data-drive AI systems, such as those produced through machine learning, bias in data collection and training can result in an AI system demonstrating bias. In logic-based AI, such as rule-based systems, bias can arise due to how a knowledge engineer might view the rules that apply in a particular setting. It does not necessarily relate to human bias or human-driven data collection. It can arise, for example, through the limited contexts in which a system is used, in which case there is no opportunity to generalise it to other contexts. Bias can be good or bad, intentional or unintentional. In certain cases, bias can result in discriminatory and/or unfair outcomes (i.e. unfair bias).	Assumptions made by AI algorithms, could amplify existing biases embedded in current education practices i.e., bias pertaining to gender, race, culture, opportunity, or disability status. Bias can also arise due to online learning and adaptation through interaction. It can also arise through personalisation whereby users are presented with recommendations or information feeds that are tailored to the user's tastes.
BIG DATA	Datasets so large that they cannot be collected, stored and analysed using traditional data processing applications. Big data refers not only to the volume of data but also to the capacity to search, aggregate, and cross-reference large data sets.	Through big data analysis, educators can potentially identify areas where students struggle or thrive, understand the individual needs of students, and develop strategies for personalised learning.
CHATBOT	A program that communicates with people through text or voice commands in a way that mimics human-to-human conversation.	Chatbots can be virtual advisors for learners and in the process adapt to their learning pace and so help personalise their learning. Their interactions with students can also help identify subjects with which they need help.
DATA MINING	The analysis of a large volume of data to bring out models, correlations and trends.	Educational Data Mining (EDM) based systems can use data mining, machine learning, and statistics to better understand learners and the settings in which they learn.
DATASET	A collection of related data points, usually with a uniform order and tags.	Datasets in education are mainly provided and used to support new educational research, and in the sharing and application of existing research.
DATABASE	A computer file containing a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means.	School administration systems contain databases of student information in including personal profiling and learning attainment data. These are sometimes linked timetabling, assessment and learning management systems.

.AI Term	What it means	How it can apply to education
DEEP LEARNING	Deep learning techniques are part of machine learning methods and are based on artificial neural networks. They are applied in different tasks, e.g., to recognize objects in images or words in speech.	Deep learning AI systems have the potential to predict minute aspects of educational performance which can aid in the development of strategies for personalised learning.
INTERNET OF THINGS (IoT)	A network of interconnected physical objects—(things) that are embedded with sensors, software, and other technologies so that they can connect and exchange data with other devices and systems over the internet.	IoT connected devices can provide learners better access to everything from learning materials to communication channels and provides teachers with the ability to measure student learning progress in real-time.
LEARNING ANALYTICS	Learning analytics involves the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.	Learning management systems record data on student interaction with course materials, their interaction with teachers and other peers, and how they perform on digital assessments. Schools can use analysis of this data to monitor student performance, predict overall performance and facilitate the provision of support through personalized feedback to each student.
MACHINE LEARNING	The ability of a computer system to learn, extract patterns and change in response to new data, without the help of a human being.	Machine learning is a form of personalised learning that is used to give each student an individualised educational experience. Learners are guided through their own learning, can follow the pace they want, and make their own decisions about what to learn based on system prompts.
MACHINE TRANSLATION	The translation of text or voice data by an algorithm in real-time and without any human involvement.	Machine translation tools are used in language teaching to help learners improve their understanding and pronunciation and can enable teachers to devote more time to the content and communicative aspects of a language.

.AI Term	What it means	How it can apply to education
METADATA	Metadata is information used to describe, reference, contextualise or characterise a data file such as a web page, image, video, document, or file. It is data that describes data, but it isn't the data itself.	Through the use of metadata teachers can source and evaluate teaching and learning resources more easily so they have more choice in the material they choose for their learners. This can help to direct each student to content at their ability or readiness level.
NATURAL LANGUAGE PROCESSING (NLP)	Natural language processing is a form of AI that helps computers read and respond by simulating the human ability to understand everyday language.	Virtual tutoring system can use speech recognition to identify problems in a student's reading ability and can provide real-time, automatic feedback on how to improve as well as helping to match the student with reading material that's best suited to them.
NEURAL NETWORK	A computer system that is designed as a collection of units and nodes, inspired by biological neural neurons in animals, connected in a way to transmit signals.	A neural network can be trained to learn a new skill or ability by using the repetition method of learning.
OPTICAL CHARACTER RECOGNITION (OCR)	OCR is the conversion of images of text (typed, handwritten, or printed) into machine-encoded text.	Optical character recognition can help students with literacy difficulties by allowing them to listen to text rather than read it. It can also create a searchable digital document which enables students to look up the definition of a word more easily, or to bookmark different parts of the text.
PERSONAL DATA	Information relating to an identified or identifiable natural person, directly or indirectly, in particular by reference to one or more elements specific to that person.	Schools accumulate substantial amounts of personal information about students, parents, staff, management, and suppliers. Schools, as data controllers, are required to store data which they process confidentially and securely and need to have appropriate policies and procedures in place for the protection and proper use of all personal data.
PREDICTIVE ANALYTICS	The use of statistical algorithms and machine learning techniques to make predictions about the future using current and historical data.	Predictive analytics can provide insight into which students require additional support, not only based on their current and historical performance, but their predicted future performance.
ROBOTICS	Robotics is the design, construction, and operation of robots that can help and assist humans with a variety of tasks.	Educational robotics and simulators allow students to learn in different ways in science, technology, engineering, and mathematics (STEM) subjects, with the objective to facilitate students' skills and attitudes for analysis and operation of robots. Such activities can include design, programming, application, or experimentation with robots.

.AI Term	What it means	How it can apply to education
SUPERVISED LEARNING	This is a type of machine learning where structured datasets, with inputs and labels, are used to train and develop an algorithm.	Supervised Learning systems are defined by their use of labelled datasets to train algorithms to classify data or predict outcomes accurately. They can help teachers identify at-risk students and target interventions. They can also improve the efficiency of teaching, assessments, and grading by helping to personalise learning.
TEXT TO SPEECH	Text-to-speech is the generation of synthesised speech from text. The technology is used to communicate with users when reading a screen is either not possible or inconvenient.	Text-to-speech technology allows learners to focus on the content rather than on the mechanics of reading, resulting in a better understanding of the material, better retention and increased confidence and motivation.
TRACE DATA	Trace data refers to records of activity such as mouse clicks, data on opened pages, the timing of interaction events, or key presses undertaken through an online information system.	Trace data, in conjunction with metadata and predefined datasets, provide a wealth of contextual information on learning efficacy and student performance, which can in turn shape strategies for personalised learning.
TRAINING DATA	The data used during the process of training a machine learning algorithm.	Machine learning algorithms learn from data. They find relationships, develop understanding and make decisions from the training data they are given. In an educational context this data can be used to make learning more efficient, adaptable, and personalised by providing detailed analytics of past and predicted future achievement.
UNSUPERVISED LEARNING	This is a form of training where an algorithm is programmed to make inferences from datasets that don't contain labels. These inferences are what help it to learn.	Unsupervised learning is conducted to discover hidden and interesting patterns in unlabelled data. These patterns are valuable for the prediction of students' performance analysing a range of contextual information like demographics and how these relate to overall attainment.
VIRTUAL PERSONAL ASSISTANT (VPA)	A virtual personal assistant is an application that understands natural language voice commands and completes tasks for the user like dictation, reading text or email messages aloud, scheduling, making calls and setting reminders.	Virtual personal assistants can enable interaction with technology using voice only thus saving time by providing instant access to information. Students can access class schedules, information and resources and communicate with teachers and peers. VPAs are also used by teachers to prepare lessons, set assignments, and provide feedback.
VIRTUAL REALITY (VR)	Virtual reality is a computer-generated scenario that simulates a real-world experience that can be interacted with using special electronic equipment, such as a VR headset or gloves fitted with sensors.	Learners explore and interact with computer-generated objects in a 3D space and see everything as if it was in front of them such as a walk-through of an art gallery or an ancient monument.

Further Information

Keeping up to date with AI and data trends, technologies, applications, and regulations will be more important than ever. There is a growing range of resources available to help us keep up with new innovations and research that is relevant to educators. Here are a selected number of starting points:

EU Commission (2020). A European strategy for data

https://digital-strategy.ec.europa.eu/en/policies/data

EU Commission (2021). Digital Education Action Plan (2021-2027)

https://education.ec.europa.eu/focus-topics/digital-education/about/digital-education-action-plan

EU Commission (2018). Handbook on European data protection law

https://op.europa.eu/en/publication-detail/-/publication/5b0cfa83-63f3-11e8-ab9c-01aa75ed71a1

High-Level Expert Group on Artificial Intelligence (AI HLEG) (2020).

Assessment List For Trustworthy Artificial Intelligence (ALTAI)

https://digital-strategy.ec.europa.eu/en/library/assessment-list-trustworthy-artificial-intelligence-altai-self-assessment

Independent Expert Group on AI (2019). Ethics Guidelines for Trustworthy AI

https://op.europa.eu/en/publication-detail/-/publication/d3988569-0434-11ea-8c1f-01aa75ed71a1

JRC (2017). Digital Competence Framework for Educators (DigCompEdu)

https://publications.jrc.ec.europa.eu/repository/handle/JRC107466

JRC (2022). DigComp 2.2: The Digital Competence Framework for Citizens

https://publications.jrc.ec.europa.eu/repository/handle/JRC128415

JRC (2020). Emerging technologies and the teaching profession

https://publications.jrc.ec.europa.eu/repository/handle/JRC120183

OECD (2021). Recommendation of the Council on Artificial Intelligence

https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449

UNESCO (2021). Recommendation on the Ethics of Artificial Intelligence

https://unesdoc.unesco.org/ark:/48223/pf0000381137.locale=en

UNESCO (2019). Artificial Intelligence in Education:

Challenges and Opportunities for Sustainable Development

https://unesdoc.unesco.org/ark:/48223/pf0000366994

UNICEF (2021). Policy guidance on AI for children

https://www.unicef.org/globalinsight/reports/policy-guidance-ai-children