

**PAIDÉIA**

**Preparing Teachers for the AI Development in  
Education as an Innovative Asset**

**101132955**

**D 3.2: AI&EDcomp Framework**

**Teacher Competence Framework for Working with  
AI - BG**

**(Based on the European Digital Competence  
Framework)**



**НИО**



**Co-funded by the  
European Union**

**Implementation of activities**  
**under project 101132955 - Preparing teachers for the AI**  
**Development in Education as an Innovative Asset,**  
**PAIDEIA**

(Activities from WP3 and WP5 work packages)

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Year 2024

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## Introduction

One of the key issues facing the education system today is how best to prepare the modern generation for emerging challenges. In the 2024 report of the European Commission on Monitoring of the European Declaration on Digital Rights and Principles [1], it is recognized that protecting children and young people online is a topic that continues to be of concern to Europeans, as shown by the Eurobarometer survey. Overall, the majority (53%) are concerned about the safety of children online in their country, a significant increase compared to 43% last year. Only 39% of Europeans (compared to 45% last year) believe that the country guarantees a safe digital environment and content for children and young people.

One way to improve outcomes and address modern challenges is a framework for competencies teachers who use AI in teaching must possess. This means that the education sector must **update the competencies of educators while maintaining a focus on the student**. AI is increasingly becoming a teacher's assistant, transforming the classroom by providing new and improved solutions for learning and teaching, and the student from a user becomes a creator of technology. AI still needs to support and complement teachers, not completely replace them, because in addition to positive aspects, AI also has negative ones and the human factor continues to play a key role in overcoming them.

**The main goal** is to answer the question: what are the key AI competencies that teachers should possess (but not ICT teachers) in order to effectively use AI in the educational process?

To achieve the goal, the following two tasks are performed:

**Task No. 1.** Review and analysis of the documents relevant to the knowledge and skills of the teacher in ... (except for ICT teachers) for the application of AI in the educational process;

**Task No. 2.** Proposal of a Teacher Competence Framework for working with AI based on the European Digital Competence Framework, which they must have.

# 1. Review and analysis of the documents relevant to the knowledge and skills of the teacher in ... (excluding ICT teachers) for the application of AI in the educational process

## 1.1. Digital Education Action Plan (2021-2027)

The Digital Education Action Plan (2021-2027) is a renewed European Union (EU) policy initiative that sets out a common vision for high-quality, inclusive, and accessible digital education in Europe and aims to support the adaptation of Member States' education and training systems to the digital age.[2]

The Action Plan, adopted on 30 September 2020, is a call for closer cooperation at the European level in the field of digital education to address the challenges and opportunities of the COVID-19 pandemic and to provide opportunities for the education and training community (teachers, students), policymakers, academia and researchers at the national level, European and international level.

The initiative contributes to the Commission's priority "A Europe fit for the digital age" and for [3] Next Generation EU [4]. It also supports the Mechanism [5], which aims to create a greener, more digital, and resilient European Union.

The Digital Education Action Plan is a key enabler in realizing the vision to achieve the European Education Area by 2025. [6]The European Skills Agenda [7], The European Social Pillar Action Plan, and "[8]2030 Digital Compass: The European path for the Digital Decade" [9].

The Digital Education Plan sets out **two strategic priorities** and fourteen actions to support them:

**Priority 1:** Fostering the development of a high-performing digital education ecosystem  
What will the European Commission do to achieve this?

Action 1: Structured dialogue with Member States on digital education and skills

Council Recommendation on key enablers of successful digital education and training

Action 2: Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education

Action 3: European Digital Education Content Framework

Action 4: Connectivity and digital equipment for education and training

Action 5: Digital transformation plans for education and training institutions

Action 6: Ethical guidelines on the use of AI and data in teaching and learning for educators

Today, artificial intelligence (AI) systems are part of our daily lives. As they continue to evolve and the use of data increases, it is very important to develop a better understanding of its impact on the world around us, including on education and training.

AI has great potential to transform the education and training of students, teachers, and school staff. This could, for example, help reduce early school leaving, compensate for learning difficulties, and support teachers with differentiated or individualized learning through language learning apps, text-to-speech generators, AI mentors for learners, etc.

As this happens, there is a growing need for researchers, educators, and students to have a basic understanding of artificial intelligence and the use of data so that they can engage positively, critically, and ethically with this technology and harness its full potential.

**Purposes**

To help teachers and educators understand the potential that AI applications and the use of data can have in education and raise awareness of possible risks, the European Commission has developed ethical guidelines on the use of AI and data in teaching and learning.

The Commission will support related research and innovation activities through the Horizon Europe program and develop a training program for researchers and students on the ethical aspects of AI and the use of data.

**Key activities**

To help address these challenges, the Commission published in October 2022 ethical guidelines on the use of AI and data in teaching and learning for educators .[10]

The guidelines provide practical support and guidance mostly for primary and secondary teachers with some or no previous experience in the use of AI.

Using specific examples, the guidelines aim to:

- ✓ explain how artificial intelligence is used in schools;
- ✓ to assist teachers and students in their teaching and learning;
- ✓ support administrative processes in an educational environment;



- ✓ present the ethical considerations and requirements underlying the guidelines.

## **Priority 2:** Enhancing digital skills and competences for the digital transformation

Action 7: General guidelines for teachers and educators to promote digital literacy and tackle disinformation through education and training

### **Key activities**

To address these challenges, the Commission launched in October 2022 Guidelines to help teachers and educators promote digital literacy and tackle disinformation through education and training.[11]

The guidelines provide practical guidance for teachers and educators, including practical advice and action plans. They are designed for primary and secondary teachers with or without specialized knowledge in the field of digital education. They are accompanied by a final report , which brings together the main findings and recommendations of the expert group.[12]

The guidelines and the final report have been developed with the support of an informal Commission expert group,[13], bringing together expertise from the community in the fields of education and training, academia, radio and television planning, the private sector and others.

Action 8: Update the European Digital Competence Framework to include AI and data related skills

Citizens need to gain a basic understanding of new and emerging technologies, including artificial intelligence (AI), in order to engage confidently, critically and safely with them.

Increased awareness will also lead to improved sensitivity to potential issues related to emerging technologies related to ethics, environmental sustainability, data protection and privacy and electronic equipment, children's rights, discrimination and prejudice, including gender and disability bias, ethnic and racial discrimination.

Every European, including students, jobseekers and workers, will need to have digital skills to adapt to new and emerging technologies and thrive in fast-growing societies.

Education and training professionals in all sectors and at all levels need to have the necessary competences and confidence to effectively apply a wide range of technologies, including AI, in their work.

## **Purposes**

The European Commission has updated the Digital Competence Framework (DigComp 2.2) to include skills, knowledge, and attitudes related to AI and data use. The Commission will also support the development of AI learning resources for education and training [14].

The DigComp 2.2 update now includes an app with more than 70 examples that can help citizens better understand where and in what situations in their daily lives they can expect to encounter AI systems. It also provides practical examples of the ways in which emerging technologies are being applied in our daily lives.

The aim is to enable all citizens to become confident, critical and responsible users of digital technologies powered by AI and autonomous decision-making systems, as well as to improve their understanding of AI, its potential and limitations.

## **Key activities**

As a result of two international online meetings in which participants agreed on skills, knowledge, and attitudes related to AI and data literacy, the DigComp 2.2 Digital Competence Framework was published in 2022.

Action 9: European Digital Skills Certificate (EDSC)

Action 10: Council Recommendation on improving the provision of digital skills in education and training

Action 11: International data collection and EU-level target on students' digital skills

Action 12: Traineeships for digital opportunities

Action 13: Women's participation in STEM

## **1.2. European Digital Education Centre**

To support both priority areas, the Commission set up a European Digital Education Centre in 2022, which aims to strengthen cooperation and exchanges in the field of digital education at the EU level. The main activities it develops are: [15]

- Accelerator program: unlocking innovation in digital education
- Mentoring and advice
- Knowledge Building Webinars
- Seminars and working groups.

Two years after its founding, the Center has 4,500+ members, 90+ publications and 200+ activities.

### **1.3. Final report of the Commission's Expert Group on Tackling Disinformation and Promoting Digital Literacy through Education and Training**

In The final report of the Commission's Expert Group on Tackling Disinformation and Promoting Digital Literacy through Education and Training, 2022, the main themes related to disinformation and digital literacy are [12]:

**Topic 1:** The nature of disinformation and how to tackle it Disinformation in the 21st century

Disinformation Technologies and Psychology

Fighting disinformation

**Topic 2:** Main dimensions of digital literacy

What is meant by digital literacy?

Digital literacy programs

Key and emerging components in the field

**Topic 3:** What do teachers and educators need?

Creating an effective learning environment for digital literacy

Engaging young people

Involvement of parents/carers and families

**Topic 4:** Key approaches and initiatives in the Member States

Teaching digital literacy across Europe

**The report contains conclusions and two main recommendations: 1).** Recommendations to teachers and educators and **2).** Recommendations for initial and continuing teacher training/training, detailed as follows:

#### **Recommendations for teachers and educators**

- ✓ Student-centered educational approaches with appropriate support from teachers, as well as research-based materials, have proven to be very effective in promoting digital literacy and students are more resistant to disinformation in an online environment. Students (especially at the intermediate level and above) often feel more comfortable with digital media and use it frequently. The role of the teacher is increasingly to offer the necessary context, critical reflection, and support. Respectful interaction between

teachers and students, as well as honest conversations, can help build and strengthen trust in the teacher-student relationship. Teachers need support to strengthen their abilities to take on such new roles and responsibilities.

- ✓ Students should be challenged by their teachers to think outside the box and question their assumptions about the digital world.
- ✓ Overconfident students need support and constructive, age-appropriate feedback to see their biases and limitations when it comes to digital literacy.
- ✓ At the school level, digital literacy and media literacy initiatives are most effective as both an integrated cross-curricular and a separate subject approach, which means there is a place for both at school. The combination of formal and non-formal educational initiatives is also effective.
- ✓ Teachers need guidance on the different criteria that relate to digital literacy, such as what criteria to use when selecting appropriate resources and approaches. They also need support in providing the right conditions to develop lesson plans in their often crowded schedule.
- ✓ Given the vast experience most students have with digital platforms and social media, they can provide teachers with insights that can be the foundation for further learning. • Teachers need effective tools to assess their own progress and their ability to navigate challenges posed by teaching in a digital environment. They may need help from colleagues when faced with challenges. Where possible, it is helpful to join teacher networks where such challenges and potential solutions are discussed.
- ✓ Teachers and educators, as pedagogical experts, can take advantage of the huge potential of the digital world to promote students' knowledge and understanding. More than ever, students can find the most up-to-date information by interacting online with experts and other students around the world, collaborate with them, keep up with what's new in society, conduct research, etc. Teachers tend to have overly busy schedules. They should be given time to upgrade their knowledge and competencies related to digital literacy.
- ✓ Teachers have the right to teach in a safe environment. Mechanisms should be put in place at the school level to support them in dealing with the challenges they may face. Such initiatives may include school psychologists and social workers.
- ✓ There is no "one-size-fits-all" when it comes to educational approaches to promote digital literacy and tackle disinformation. Teachers can best assess what works best in their learning environment depending on the competencies of the students, the subject

being taught, support from the school management, connections with the external community, etc.

- ✓ There are differences in disinformation, which gives rise to different challenges and solutions related to the fight against each one, which has an impact on teaching.
- ✓ Teachers need help identifying and implementing effective resources and strategies that engage students in critical analysis.
- ✓ Motivating students to become more digitally literate can be challenging. Sharing strategies and learning new strategies can be an effective tool for promoting digital literacy.
- ✓ It is important for everyone to be aware of the various legal issues and privacy concerns associated with interventions in students' digital worlds, such as blogs and social media platforms. This also applies to common privacy issues related to digital media.
- ✓ Teachers can benefit from upskilling their teaching repertoire to meet the needs of education in the digital world. This includes acquiring competencies to work with video and podcasts, online research and interviewing, games, social media campaigns, storytelling, and dealing with online hate speech and cyberbullying. This also applies to expanding knowledge on key issues related to the digital universe, such as resistance to facts, truth bias, echo chambers, confirmation bias, identity threat, reverse effect and illusion of truth, cheap fakes, and deepfakes.
- ✓ Discussions related to disinformation, such as discussions about conspiracy theories, can be controversial and evoke (strong) emotions. This presupposes sufficient knowledge of how to effectively deal with controversial issues. In some cases, this requires creating a safe space in the classroom where students feel comfortable expressing their opinions and having the ability to effectively direct discussions. School psychologists and social workers also play a role here.
- ✓ Relevant NGOs can support teachers in dealing with disinformation and digital literacy.
- ✓ In the field of digital literacy, students are well-positioned to co-create a variety of digital materials and learning resources and disseminate the results of their creative work. Traditional educational approaches are less effective in such cases. Teachers, as classroom managers, can guide and support their students in this process. Students teaching other students (peer learning) is also a valuable approach.
- ✓ Digital literacy is best achieved if students' work starts from their interests, using devices with which they are most familiar. This will help them become lifelong learners

and responsible citizens, as well as positive social actors. Colleagues, parents and the general public have the potential to play a role in this process with joint efforts.

- ✓ Feedback chains between teachers and the research community encourage reflection and learning. The development of digital literacy is best based on the latest scientific knowledge.

### **Recommendations for initial and continuing education/teacher training**

Currently, ITE (Initial Teacher Training) courses focused on digital literacy are often optional.

Given the critical role that digital literacy plays in modern learning, digital literacy courses must become more prominently integrated into ITE. Ideally, all ITE programs and courses would contain such elements.

- ✓ The DigCompEdu framework, which describes what it means for educators to be digitally competent and identifies 22 key competencies, can serve as an excellent starting point for all ITE and Continuous Professional Teacher Training (CPD).
- ✓ In addition to integrating elements of digital literacy into all ITE courses, a specific course on countering disinformation, and building resilience, as well as digital and information literacy is recommended as a separate course in all ITE institutions. Such a course should be a mandatory part of all teacher training programs.
- ✓ Continuous professional development of teachers must be based on active learning and must be located, extended over time, involving participation, and linked to educational practice. NRP opportunities must be in line with the needs of both schools and national education frameworks.
- ✓ More attention should be paid to the training of teacher trainers and professional development providers, as they are multipliers.
- ✓ Any ITE or CPD-related education must use engaging materials and approaches that have shown their value, especially through assessment, while allowing flexibility due to cultural and other situational factors. Materials and approaches should also be age-appropriate.
- ✓ ITE and CPD can benefit from connecting teachers and educators with existing initiatives that promote digital literacy at national and international levels. This will encourage the sharing of experience and support the possibility of transferring good digital literacy practices across the EU.
- ✓ Reliable measurement tools are needed to assess baseline levels of digital literacy among teachers and students. This will assess the impact of teaching practices.

- ✓ Digital literacy is a complex phenomenon and simplified assessment tools should be avoided. Schools, teachers, and students can benefit from clear assessment guidelines that are sensitive to the subject. The use of standard assessment standards can foster a better understanding of where gaps exist and where further efforts and measures are needed to address gaps.
- ✓ Teachers need specific training and guidance related to how best to assess the progress their students are making in terms of their digital literacy competencies.
- ✓ Teachers would benefit from special training related to how best to assess their own digital literacy and their progress in digital literacy.

As the measurement of digital literacy is relatively new, more research is needed to reach the most adequate assessment tools for students of all age groups and all types of schools.

- ✓ More research is needed to determine which ITE and CPD programs are most effective in promoting digital literacy and why.
- ✓ A systematic assessment of students' digital literacy skills at the regional/national/European level would be useful. This will make it possible to compare and track developments at a generalized level.

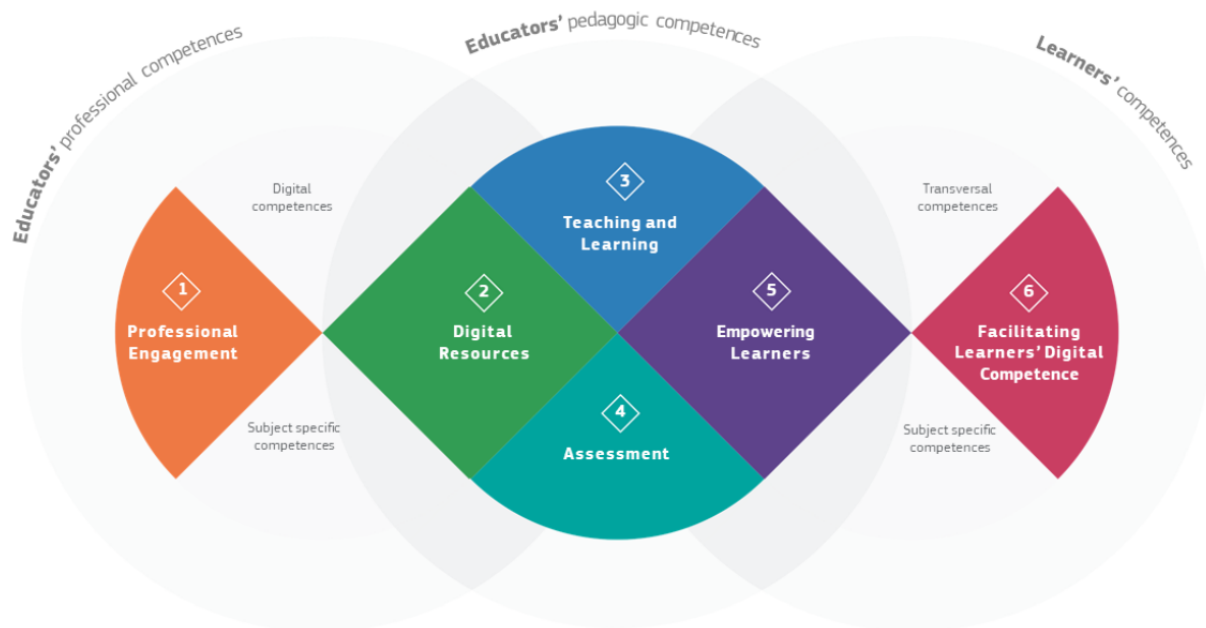
#### **1.4.Digital Competence Framework for Educators (DigCompEdu)**

Teaching professions are facing rapidly changing demands that require a new, broader, and more complex set of competencies than before. The ubiquity of digital devices and applications requires educators to develop their digital competence.

**The European Digital Competence Framework for Educators (DigCompEdu)** [16] is a science-based framework describing what it means for educators to be digitally competent. This framework supports the development of teacher-specific digital competencies in Europe.

DigCompEdu is aimed at educators at all levels of education, from early childhood to higher education and adult education, including general and vocational education and training, and education for special needs in the context of non-formal learning.

This framework builds on the work carried out by the European Commission's Joint Research Centre (JRC) on behalf of the Directorate-General for Education, Youth, Sport and Culture (DG EAC). Also, the framework addresses both the professional and pedagogical competencies of teachers and the competencies that learners should possess (**Fig. 1**).



**Fig. 1. DigCompEdu**

**DigCompEdu details 22 competences organized into six areas:**

- 1) Professional Commitment
- 2) Digital Resources
- 3) Teaching and learning
- 4) Evaluation
- 5) Empowering learners
- 6) Facilitating students' digital competence

The DigCompEdu study builds on previous work carried out to determine the digital competence of the citizens in general and [14]Digitally Competent Educational Solutions (DigCompOrg). . It contributes to the European Skills Agenda recently approved by the Commission and to the Europe 2020 flagship initiative "An Agenda for New Skills for New Jobs".[17]

The DigCompOrg framework has seven key elements and 15 sub-elements, which are common to all education sectors. There is also the possibility to add sector-specific elements and sub-elements. A number of descriptors have been developed for each of the DigCompOrg elements and sub-elements (74 in total). 2).



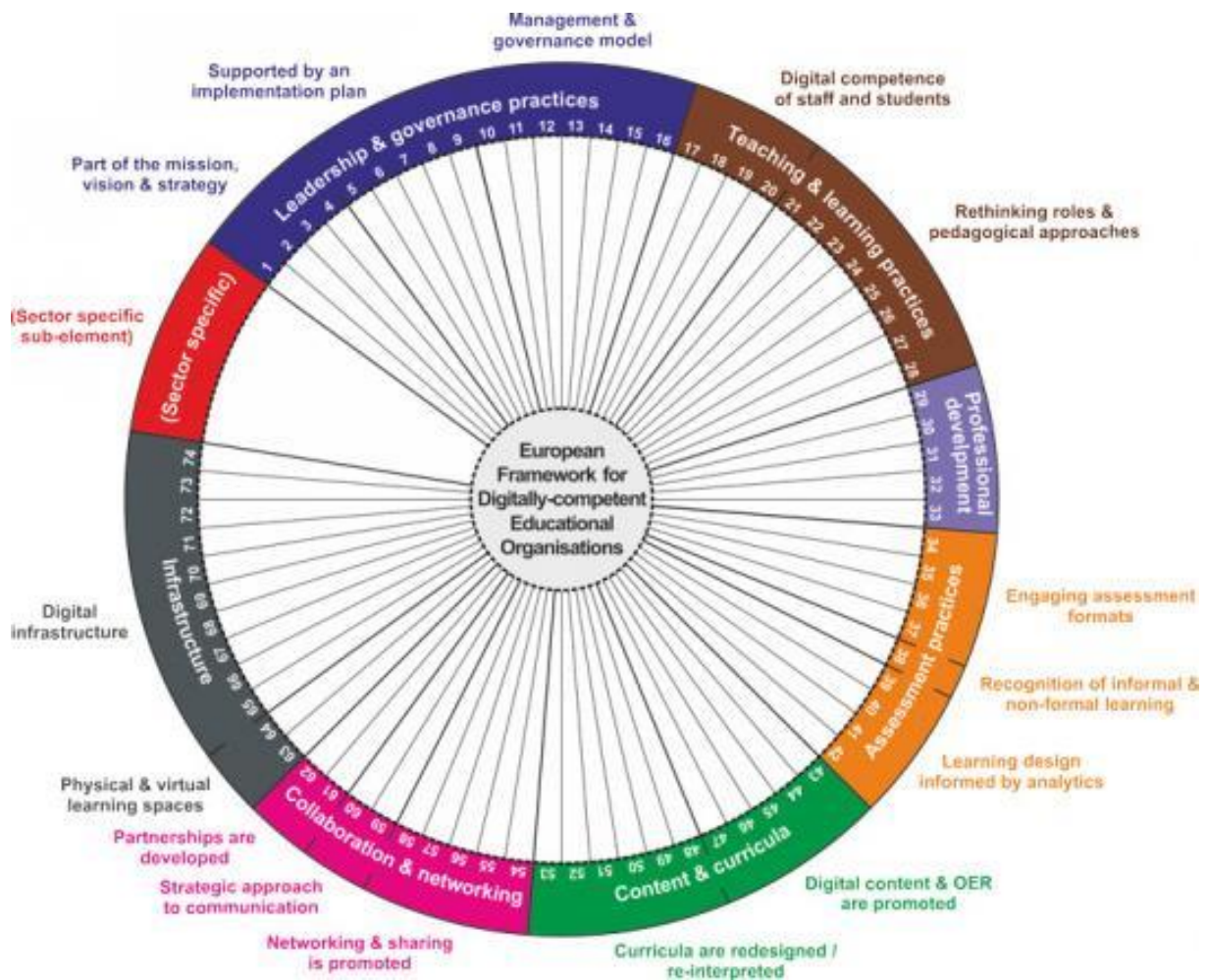
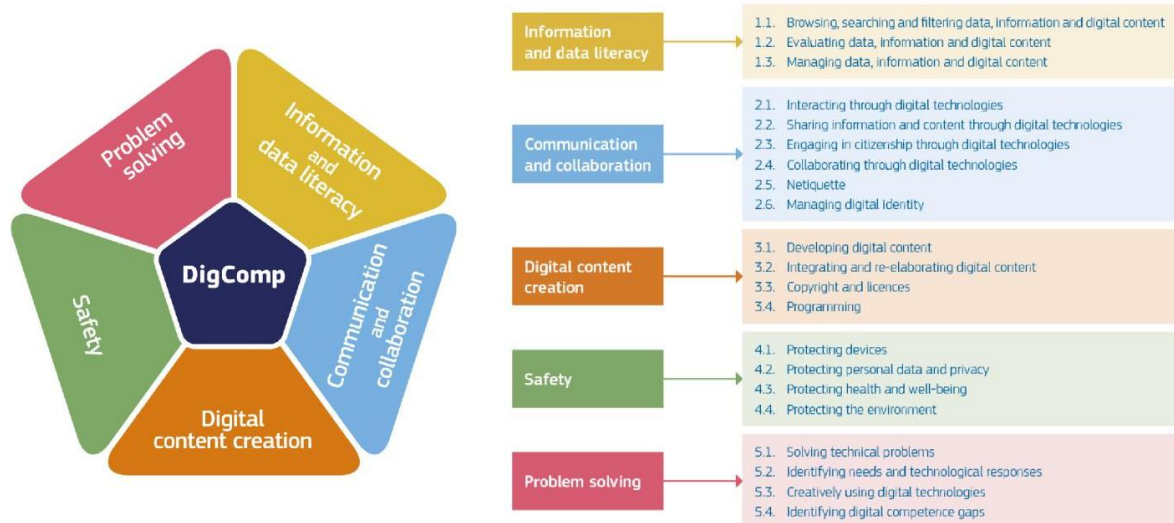


Fig. 2. DigCompOrg

*It can be seen that the focus is not solely on the technical skills that teachers should have, but rather the framework aims to describe in detail how digital technologies can be used to improve by innovating in education and training.*

### 1.5. Citizens' Digital Competence Framework (DigComp)

The Citizens' Digital Competence Framework [14] **Determined** key components of digital competence in five domains and 21 specific competencies (Fig. 3). It also describes eight levels of proficiency, examples of knowledge, skills, and attitudes, and use cases in the context of education and employment.



**Fig. 3. DigComp**

*The described 22 key competences, grouped into five areas, Fig. XXX2, have proven their effectiveness over time and continue to be upgraded and can serve as a basis for the development of digital competencies of teachers in various academic disciplines.*

## 1.6. European Declaration of Digital Rights and Principles

The Declaration of Digital Rights and Principles sets out the EU's vision for digital transformation. This vision puts people at the center, in line with EU values and fundamental rights. The Declaration provides a reference framework for citizens and guides the EU and Member States on our path to digital transformation.[18]

Europe aims to empower businesses and people in a human-centered, sustainable, and more prosperous digital future (Europe's Digital Decade: digital targets for 2030). [9]The 2030 Digital Decade Policy Agenda sets out an annual cycle of cooperation to achieve common goals and targets. This governance framework is based on an annual cooperation mechanism involving the Commission and the Member States.

The cooperation mechanism consists of:

- ✓ a structured, transparent, and shared monitoring system based on the index on the Digital Economy and Society (DESI), to measure progress towards each of the 2030 targets.[19]
- ✓ an annual report in which the Commission assesses progress and provides recommendations for action. The second 'State of the Digital Decade Report' was published in July 2024.[20]

- ✓ every two years adjusted Strategic Roadmaps for the Digital decade in which Member States outline the actions adopted or planned to achieve the 2030 targets.[21]
- ✓ mechanism to support the implementation of multi-country projects, through the establishment of a European Digital Infrastructure Consortium [22].

The Commission has developed a trajectories at EU level . Baseline trajectories outline how the EU will progress in line with current trends, while projected trajectories outline the path that annual progress should follow towards achieving the 2030 targets. The Commission is reviewing the 2026 targets to take stock of technological, economic and societal developments.[23]

On 15 December 2022, European Commission President Ursula von der Leyen signed the European Declaration on Digital Rights and Principles [24] together with the President of the European Parliament, Roberta Metsola, and the Czech Prime Minister, Petr Fiala, for the rotating presidency of the Council.

The declaration stipulates that everyone has the right to education, training and lifelong learning and should be able to acquire all basic and advanced digital skills, while the overall objective of the Digital Decade commits to 'bridging the digital divide by promoting continuous opportunities for all, developing basic and advanced digital skills and competences' and achieving gender balance.

The declaration presented by the Commission in January 2022 sets out the EU's commitment to a secure, safe and sustainable digital transformation that puts people at the center in line with the EU's fundamental values and fundamental rights.

1) People in the center

Digital technologies should protect **people's rights, support democracy and ensure that all digital actors act responsibly and safely**. The EU promotes these values around the world.

2) Freedom of choice

People need to benefit from a fair **online environment, be protected from illegal and harmful content**, and be empowered when interacting with new and evolving technologies such as artificial intelligence.

3) Safety and security

The digital environment must be **safe and secure**. All users, from childhood to old age, must be empowered and protected.

4) Solidarity and inclusion

Technology must **unite, not divide people**. Everyone must have access to the internet, to digital skills, to digital public services and to fair working conditions.

#### 5) Participation

Citizens should be able to **participate in the democratic process at all levels and have control over their own data**.

#### 6) Persistence

**Digital devices should support sustainability** and the green **transition**. People need to be aware of the environmental impact and energy consumption of their devices.

The digital rights and principles outlined in the declaration will complement existing rights, such as those enshrined in the EU Charter of Fundamental Rights and data protection and privacy legislation. They will provide a reference framework for citizens on their digital rights, as well as guidance for EU Member States and companies when working with new technologies. They aim to help everyone in the EU make the most of the digital transformation.

The Commission also conducts an annual Eurobarometer survey to monitor follow-up measures in the Member States. Second similar Eurobarometer survey [25] According to it, almost a third of Europeans (30%) do not feel adequately prepared for the Digital Decade, with the highest numbers of citizens of Greece (43%) and Cyprus (42%). The majority of Europeans (60%) believe they are receiving the necessary basic or advanced digital education, training and skills, with the best results in Malta (82%) and Luxembourg (75%).

*It is recommended that when developing various documents (competences, frameworks, curricula and curricula, etc.), people are put at the center, respecting the European Declaration of Digital Rights and Principles.*

## 1.7. Key competences for lifelong learning

In 2019, the EU published "Key competences for lifelong learning". Key competencies are a combination of knowledge, skills and attitudes.[26]

### ✓ Knowledge

Knowledge is made up of concepts, facts and figures, ideas and theories that have already been established and help to understand a certain area or subject.

### ✓ Skills

Skills are defined as the ability to carry out processes and use existing knowledge to achieve results.

### ✓ Attitudes

Attitudes describe the attitude and way of thinking to act or react to ideas, persons, or situations.

Key competences are developed throughout life, through formal and non-formal learning in a variety of settings, including family, school, workplace, neighborhood, and other communities. All key competences are considered equally important and aspects that are essential for one area will support the development of competence in another. For example, skills such as critical thinking, problem-solving, teamwork, communication, creativity, negotiation, analytical, and intercultural skills are embedded in key competencies.

Eight key competences **are defined:**

- 1) Literacy
- 2) Multilingual competence
- 3) Mathematics and Science, Technology and Engineering Competence
- 4) Digital competence**
- 5) Personal, social and learning competence
- 6) Civic competence
- 7) Entrepreneurial competence
- 8) Competence for cultural awareness and expression.

*It can be seen that one of the key competences here is digital competence, but both for it and for all others, conditions can be created for their construction, and subsequently development, from the first grade.*

## **1.8.Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 establishing harmonized rules on artificial intelligence (Artificial Intelligence Act)**

According to 2024/1689 REGULATION (EU) 2024/1689 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2024 establishing harmonized rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act), Art. (56) "The deployment of AI systems in education is important to promote high-quality digital education and training and to enable all learners and teachers to acquire and share the necessary digital skills and competences, including media literacy and critical thinking, to actively participate in

the economy, society and democratic processes. At the same time, AI systems used in education or vocational training, in particular to determine access or admission, to assign persons to institutions or programmes at all levels of education and vocational training, to assess learning outcomes, to assess the appropriate level of education for a person and to have a significant impact on the level of education and training, that individuals will receive or have access to, or to monitor and detect prohibited behavior of pupils and students during examinations, should be classified as high-risk AI systems, as they can determine a person's educational and professional path and thus affect that person's ability to earn a living. When not properly designed and used, these systems may be particularly invasive and may violate the right to education and training, as well as the right to non-discrimination, and continue to reproduce historically imposed discriminatory patterns, for example against women, certain age groups, persons with disabilities or with a particular racial or ethnic origin or sexual orientation." [27]

According to para. 26, Art. 5 Prohibited AI practices, Chapter III High-risk AI systems, in order to introduce a proportionate and effective set of mandatory rules for AI systems, a clearly defined risk-based approach should be applied. Under this approach, the type and content of the rules should be adapted to the intensity and scope of the risks that AI systems may pose. It is therefore necessary to ban certain unacceptable AI practices, to establish requirements for high-risk AI systems and obligations for the operators concerned, and to establish transparency obligations for certain AI systems.

High-risk AI systems pursuant to Article 6 (2) are artificial intelligence systems, including in the field of Education and Vocational Training, such as:

- ✓ AI systems designed to be used to determine the access, admission or referral of individuals to institutions at all levels of education and vocational training;
- ✓ AI systems designed to be used to assess learning outcomes, including where those outcomes are used to guide the learning process of individuals within institutions at all levels of education and vocational training;
- ✓ AI systems designed to be used to assess the appropriate level of education that a person will receive or access, in the context of or within institutions at all levels of education and vocational training;
- ✓ AI systems designed to be used to monitor and detect prohibited behavior of learners during examinations in the context of or within institutions at all levels of education and vocational training.

The AI Act (Regulation (EU) 2024/1689 laying down harmonized rules on artificial intelligence) provides AI developers and deployers with clear requirements and obligations

regarding the specific uses of AI. At the same time, the regulation aims to reduce the administrative and financial burden for businesses, in particular small and medium-sized enterprises (SMEs).

The AI Act is part of a broader package of policy measures to support the development of trustworthy AI, which also includes the for innovation in the field of AI and coordination [28] plan for AI . Together, these measures ensure the safety and fundamental rights of people and businesses when it comes to AI. They also boost AI deployment, investment and innovation across the EU.[29]

The AI Act is the first comprehensive legal framework for AI globally. The aim of the new rules is to promote trustworthy AI in Europe and beyond, by ensuring that AI systems respect fundamental rights, safety and ethical principles, and by addressing the risks of very powerful and impactful AI models.

#### Why do we need AI rules?

The AI Act ensures that Europeans can trust what AI has to offer. While most AI systems pose limited or no risk and can contribute to solving many societal challenges, some AI systems pose risks that we need to address to avoid undesirable outcomes.

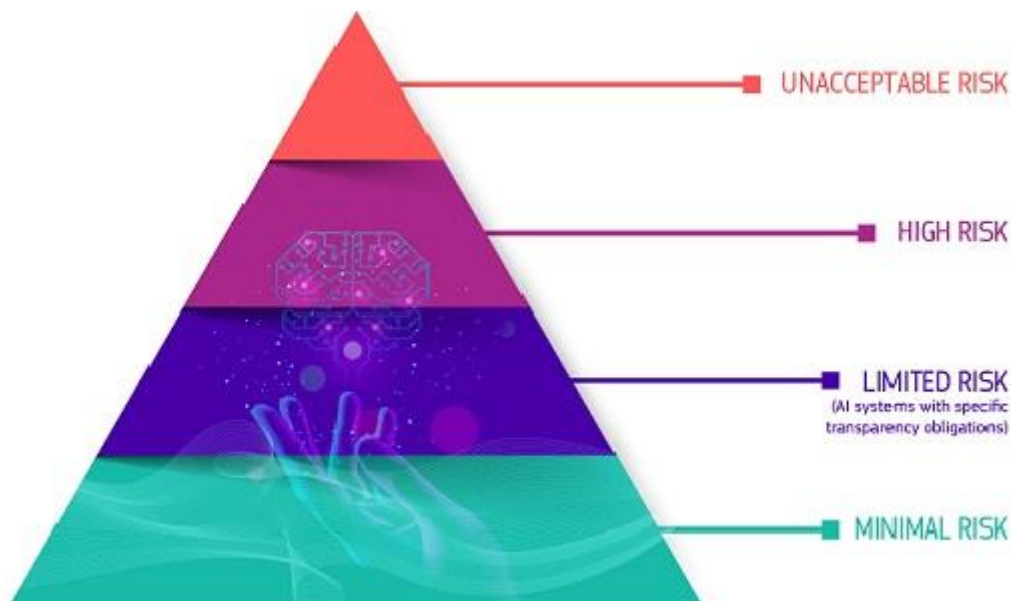
For example, it is often not possible to understand why an AI system made a decision or prediction and took a certain action. So it can become difficult to assess whether someone has been unfairly disadvantaged, such as in a recruitment decision or in an application for a public benefit scheme.

While existing legislation provides some protection, it is insufficient to address the specific challenges that AI systems can bring. This necessitates the creation of new rules:

- ✓ to address the risks specifically created by AI applications
- ✓ that prohibit AI practices that pose unacceptable risks
- ✓ to establish a list of high-risk applications
- ✓ setting clear requirements for AI systems for high-risk applications
- ✓ laying down specific obligations related to deployers and providers of high-risk AI applications
- ✓ that require a conformity assessment before an AI system is put into service or placed on the market
- ✓ to enforce once an AI system has been placed on the market
- ✓ for the establishment of a governance structure of the European and national level.[30]

#### Risk-based approach

The regulatory framework defines 4 levels of risk for AI systems (Fig. 4):



**Fig. 4.** Main levels of risk

All artificial intelligence systems considered a clear threat to people's safety, livelihoods and rights, such as social assessment, toys using voice assistance that encourages dangerous behavior, etc., are prohibited.

### High risk

AI systems identified as high-risk include AI technology used in:

- 1) critical infrastructures (e.g. transport) that could put citizens' lives and health at risk
- 2) **educational or vocational training that can determine access to education and the professional course of one's life (e.g. exam assessment)**
- 3) product safety components (e.g. application of AI in robotic surgery)
- 4) employment, worker management and access to self-employment (e.g. CV sorting software for recruitment procedures)
- 5) essential private and public services (e.g. a credit rating that deprives citizens of the opportunity to borrow)
- 6) law enforcement that may interfere with people's fundamental rights (e.g. assessing the reliability of evidence)
- 7) managing migration, asylum and border control (e.g. automated examination of visa applications)
- 8) justice and democratic processes (e.g. AI solutions for judicial decision-making)

High-risk AI systems are subject to strict obligations before they can be placed on the market:

- 1) adequate risk assessment and mitigation systems



- 2) high quality of the datasets feeding the system to minimize risks and discriminatory results
- 3) registration of the activity to ensure traceability of results
- 4) detailed documentation providing all necessary information about the system and its intended use to enable authorities to assess its compliance
- 5) clear and adequate information for the implementer
- 6) appropriate human oversight measures to minimize risk
- 7) High level of strength, security and accuracy

All remote biometric identification systems are considered high-risk and subject to strict requirements. The use of remote biometric identification in publicly accessible spaces for law enforcement purposes is generally prohibited.

Limited exceptions are strictly defined and regulated, such as where necessary to search for a missing child, to prevent a specific and imminent terrorist threat, or to detect, locate, identify or prosecute a perpetrator or suspect of a serious crime.

Those uses are subject to authorization by a judicial or other independent authority and to appropriate constraints on the time, geographical scope and databases sought.

### **Limited risk**

Limited risk refers to the risks associated with the lack of transparency in the use of AI. The AI Act introduces specific transparency obligations to ensure that people are informed where necessary, fostering trust. For example, when using AI systems like chatbots, people need to be informed that they are interacting with a machine so that they can make an informed decision to continue or back off. Providers also need to ensure that AI-generated content can be identified. In addition, AI-generated text published to inform the public on matters of public interest must be labelled as artificially generated. This also applies to audio and video content that is deepfakes.

### **Minimal or no risk**

The AI Act allows for the free use of AI with minimal risk. This includes applications such as AI video games or spam filters. The majority of AI systems currently in use in the EU fall into this category.

Plan [for action on digital education 2021-2027](#) D. aims to support the adaptation of Member States' education and training systems to the digital age. On the basis of the DEAP, the Council adopted two recommendations in November 2023: [31][Council Recommendation on the main enablers of successful digital education and training](#) [32]and [Council Recommendation on improving the provision of digital skills and competences in education](#)

and Training. While the first Council Recommendation proposes a modern framework for governance, capacity building and investment for effective and inclusive digital education and training, the second, linked to the second DEAP priority, i.e., enhancing digital skills and competences, will help Member States respond to the need to scale up the provision of digital skills.[33]

*The conclusions and recommendations that can be drawn when building a competence framework for teachers using AI in the educational process is to focus their attention on the risks described and to take into account the recommendations described, especially those related to educational or vocational training, which can determine access to education and the professional course of one's life (e.g., exam assessment).*

## 1.9. Green Education Initiatives

The European Union encourages and supports the education and training sector to take action for a greener and more sustainable future and to build learners' resilience competences.[34]

Supporting the green and digital transitions is a priority area for EU political cooperation in the field of education.

### Why is green education important?

Moving towards a climate-neutral EU will have a significant social, economic and employment impact. Socially just transformation requires people to have the knowledge, skills, and attitudes to shape and deal with profound change. Education and training systems and institutions can act as catalysts and support the transition to a more sustainable society.

A wide range of environmental and sustainability initiatives and actions take place in education and training across Europe. They reflect progress and growing public interest, but more needs to be done to make sustainability learning a systemic feature of education policy and practice in the EU.

### What is the EU doing?

- ✓ The Climate Education Coalition is a growing community of pupils, students, teachers and organisations working in the field of climate change and sustainability, a [35]Council Recommendation on learning for the green transition and sustainable development supports Member States in integrating sustainability into education and training.[36]

- ✓ European competence framework in the field of Sustainability determines the knowledge, skills and attitudes that learners of all ages need to acquire for the green transition.[37]
- ✓ Special Task Force on Sustainability in School Education regularly prepares documents and key messages. The Working Groups on Vocational Education and Training, Adult Learning and Higher Education also deal with the green transition and sustainability.[38]
- ✓ Erasmus+ and [39]The European Solidarity Corps support various initiatives related to sustainability in education and training, including student and staff exchanges, research, volunteering.[40]
- ✓ Horizon Europe programme has Special Call for Climate Change and Sustainability Education .[41]
- ✓ InvestEU Programme enable Member States to access funding for sustainable educational infrastructure and skills development.[42]
- ✓ initiative 'Researchers in Schools' connects young researchers with teachers and students on climate change and sustainable development issues.[43]
- ✓ the Erasmus+ DiscoverEU Green Route inspires young people to plan and discover Europe in a sustainable way.[44]
- ✓ The European Prize for Innovative Teaching 2022 has chosen 50 outstanding projects focused on sustainability .[45]
- ✓ The EU Learning Corner includes Sustainability Learning Materials and the climate and environmental crisis for primary and secondary schools.[46]

*Although the use of AI is not explicitly mentioned in the initiatives and documents produced, the topic of a greener and more sustainable future is extremely important, which is why it is advisable to take into account the described initiatives when preparing a framework for the competences of teachers who will use AI in teaching on topics related to sustainability and green education and the achievement of the 12 Sustainable Development Goals.*

## **1.10. Digital Economy and Society Index (DESI)**

From 2014 to 2022 the Digital Economy and Society Index (DESI) summarizes Europe's digital performance indicators and tracks the progress of EU countries. During the COVID-19 pandemic, Member States have advanced their digitalization efforts, but are still struggling to

address digital skills gaps, the digital transformation of SMEs and the deployment of advanced 5G networks. The results are summarized in the following main areas: human capital, connectivity, digital integration and digital public services [47].

The Digital Skills Indicator is the tool that will monitor Member States' performance in achieving the skills targets in the Digital Decade proposal and will provide useful insights into citizens' online behavior and people's skills and competences in different digital domains.

The European Commission's Digital Competence Framework 2.0 was used to update the methodology for the Digital Skills Indicator (DSI) in the period 2020-2021.

1. Information and data literacy;
2. Communication and collaboration;
3. Digital content creation;
4. Safety;
5. Problems.

*It is recommended that not only the curricula be developed in the best way and with the most effective use of ICT, but also when assessing students, it should be able to measure knowledge and skills according to the described indices.*

### **1.11. Digital Decade 2030 Programme Bulgaria Roadmap**

In the SWOT analysis of the Digital Decade Program until 2030 Roadmap of Bulgaria, one of the strengths in digital skills are Strong traditional technical skills and STEM professionals, and among the weaknesses are [48]:

- ✓ Large gaps in digital skills and literacy and internet use by populations, especially in rural areas and among older people;
- ✓ Insufficient awareness of online safety and cybersecurity;
- ✓ Shortage of skilled IT workforce at all levels of management and business sector, especially at the regional level.

The Digital Decade Policy Programme 2030 sets as its **pan-European objective** the growth of the population with digital skills and highly qualified professionals in the ICT sector, as well as achieving gender balance in each of the following **five areas**: 1) information, 2) communication, 3) problem-solving, 4) digital content creation and 5) online safety skills.

### **1.12. Guidelines of the Ministry of Education and Science for Artificial Intelligence**

At the beginning of 2024, the Ministry of Education and Science prepared and published guidelines for the use of artificial intelligence in the training process. Document is published on the website of the Ministry of Education and Science and is distributed to educational institutions, aiming to support them in the use of new technologies, without being mandatory or binding.[49]

## 2. Overview of organizations' experiences

### 2.1. U.S. Department of Education

**U.S. Department of Education** is committed to supporting the use of technology to improve teaching and learning and to support innovation in education systems. In this regard, a report has been published that examines the clear need to share knowledge and develop policies for "artificial intelligence", a rapidly evolving class of core capabilities that are increasingly embedded in all types of educational technology systems and are also available to the public. We will consider "edtech" to include both (a) technologies specifically designed for educational use and (b) common technologies that are widely used in the educational environment. The recommendations in this report aim to engage teachers, education leaders, policy makers, researchers and innovators, and educational technology providers as they work together on pressing policy issues that arise from the use of artificial intelligence (AI) in education.[50]

Educators are also aware of the new risks. Useful, powerful functionality can also be accompanied by new risks to data privacy and security. Educators recognize that artificial intelligence can automatically produce results that are inappropriate or wrong. They are wary that associations or automation created by AI may increase unwanted biases. They have noticed new ways in which students can present the work of others as their own. They are well aware of the "learning moments" and pedagogical strategies that a human teacher can address, but are not discovered or misunderstood by AI models. They worry about whether the recommendations offered by an algorithm will be fair.

The concerns of the teachers are numerous. Everyone in education has a responsibility to use the good to serve educational priorities while protecting against the dangers that can arise as a result of integrating AI into educational technology. To develop guidelines for educational technologies, the Ministry works closely with the educational constituents (components). These constituents (constituent parts) include educational leaders – teachers, lecturers, support staff, and other research teachers; policymakers; advocates and sponsors; technology developers; community members and organizations; and especially learners and their families/carers.

Recently, through its constituency activities, the ministry has noticed a sharp increase in interest and concern about AI. For example, a 2021 field scan found that developers of all types of technology systems – for student information, classroom learning, school logistics, parent-teacher communication, and more – expect to add artificial intelligence capabilities to their systems. Through a series of four hearing sessions held in June and August 2022 and attended by more than 700 participants, it became clear that voters believe action is needed now to stay ahead of the expected increase in AI in educational technology – and want to roll up their sleeves and start working together. In late 2022 and early 2023, the public became aware of the new generative AI chatbots and began exploring how AI could be used to write essays, create lesson plans, create images, create custom assignments for students, and more. From public expression on social media, at conferences and in the news media, the ministry learned more about the risks and benefits of AI chatbots. Yet, this report will not focus on a specific AI tool, service, or message, as AI systems evolve rapidly. Finally, the Ministry engaged the education policy expertise available internally and in its relations with AI policy experts to shape the findings and recommendations in this report.

The recommendations that have been made have a political focus and are aimed at leaders in the field of education, namely:

**Recommendation No. 1:** Focus on the people in the cycle

**Recommendation No. 2:** Bring AI models to a shared vision of education

Suggestions on AI models and their use in educational tools and systems are shown in Fig.5.



**Fig. 5.** Recommendation on the desired qualities of AI tools and systems in education

In Fig. 5 shows that the focus is on teaching and learning in all considerations regarding the suitability of an AI model for educational use. Humans remain in the cycle of defining, refining, and using AI models. The six desirable characteristics of AI education models are highlighted (developing from the principles in the AI Rights Act plan to suit the specifics of education systems), namely:

- 1) **Aligning the AI model with educators' vision for learning:** When choosing to use AI in education systems, decision-makers prioritize educational goals, aligning with everything we know about how humans learn, and aligning with evidence-based best practices in education.
- 2) **Data privacy:** Ensuring the security and privacy of data for students, teachers, and other human data in AI systems is essential.
- 3) **Note and Explanation:** Educators can inspect edtech to determine if and how AI is incorporated into edtech systems. Educators' pursuit of AI models can explain the basis for pattern discovery and/or making recommendations, and people retain control over these suggestions.
- 4) **Algorithmic protections against discrimination:** AI developers and implementers in education are taking decisive steps to minimize bias and promote equity in AI models.

- 5) **Safe and effective systems:** The use of AI models in education is based on evidence of efficacy (using already established standards in education for this purpose) and work for different learners and in different educational settings.
- 6) **Human alternatives, attention, and feedback:** AI models that support transparent, responsible, and responsible use of AI in education by including humans in the cycle to ensure that educational values and principles are prioritized.

**Recommendation #3:** Design using modern learning principles

**Recommendation #4:** Prioritize Building Trust

**Recommendation #5:** Inform and Involve Educators

**Recommendation #6:** Focus R&D on addressing the context and increasing trust and safety

**Recommendation #7:** Develop education-specific safety guidelines and recommendations.

*It can be seen that the recommendations of the US Department of Education are the result of a long and in-depth study of the field related to the application of ICT, in particular AI in educational processes. To a large extent, they coincide with the recommendations described in the European documents.*

*Noteworthy Recommendation #6 Focus R&D on addressing the context and increasing trust and safety, which guides collaborative activities with R&D teams, which can be taken into account when designing different programs.*

## 2.2. AI Competence Framework for Teachers developed by UNESCO

In 2023, at a digital learning conference hosted by UNESCO, much of the focus was on artificial intelligence and education, especially around UNESCO's publication of what they said was the first of its kind globally Generative Artificial Intelligence Guide in education and research, designed to address the disruption caused by generative AI technologies. Recent [51]UNESCO Global Survey Among more than 450 schools and universities, it shows that less than 10% of them have institutional policies and/or official guidelines on the use of generative AI applications, largely due to the lack of national regulations. The UNESCO Guidelines define "[52]**seven key steps**, that governments should take to regulate generative AI and establish policy frameworks for its ethical use in education and research, including through the adoption of global, regional or national data protection and privacy standards. It also sets an age limit of 13 years for the use of AI tools in the classroom and calls for teacher training on this issue."



Perhaps more significant for those of us who work on the competences of teachers and trainers in the use of AI for teaching and learning (as in the European project of the Pioneers of Artificial Intelligence), was the publication of the UNESCO's AI Competence Framework for Teachers and Students [53]. In the draft document for discussion they say that "AI CFT (AI Competency Frameworks for Teachers) addresses the stated gap in knowledge and experience globally and offers initial guidance on how teachers can be prepared for a growing AI-powered education system." They explain that AI CFT is aimed at a broad community of teachers, including pre- and on-the-job teachers, teacher trainers, and trainers in formal, non-formal educational institutions, policymakers, officials, and staff involved in teacher professional training ecosystems from early childhood development, primary education, to higher education. The goal of the AI CFT is to provide an inclusive framework that can guide teachers, teaching communities, and teacher training systems around the world to harness the educational opportunities of AI and develop the critical knowledge, skills, attitudes, and values needed to manage AI-related risks and threats. The implementation of this framework promotes the responsible, ethical, fair and inclusive design and use of AI in education.

Project of the discussion paper provides a diagram of the high-level structure of the proposed AI competence framework for teachers.[54]

<b>Aspects</b>	<b>Progression</b>		
	<b>Understand</b>	<b>Apply</b>	<b>Create</b>
<b>Human-centred Mindset</b>	<b>Critical Views of AI</b>	<b>Contextual adoption strategies</b>	<b>Steering long-term impact</b>
<b>Ethics of AI</b>	<b>Human agency</b>	<b>Human-centred use</b>	<b>AI society skills</b>
<b>Foundation AI knowledge</b>	<b>"Algorithm and data literacy" or AI literacy</b>	<b>Use AI analytics</b>	<b>Coding and data models</b>
<b>AI skills</b>	<b>Test and use</b>	<b>Infusing uses</b>	<b>Integrating AI tools</b>
<b>AI pedagogy</b>	<b>AI for teaching</b>	<b>AI to deepen learning</b>	<b>AI for co-creation</b>
<b>Professional development</b>	<b>AI to assist administrative tasks</b>	<b>AI for curriculum design and delivery</b>	<b>AI empowering teachers</b>

Additional charts provide pathways for progress and more detailed content about the framework. The main criticism on social media was not so much the content of the framework, but that the framework is based on Bloom's taxonomy, with some arguing that the taxonomy is outdated and doubts being raised about whether teachers will be able to follow an orderly path of development around AI. (In 1956, Benjamin Bloom, a psychologist at the University of Chicago, published a taxonomy of educational goals for cognition; a taxonomy was developed to teach educators how to classify a learning task and how to define and rank learning goals; for example, memorizing scientific facts, however important they are, is on a lower level than the ability to analyze or evaluate.) In this regard, UNESCO has been asked for feedback on both the Framework for Teachers and the Framework for Students in an [online form](#).

**The two AI competence frameworks will be officially announced during Digital Learning Week in early September 2024.**

*The development of the two competence frameworks should take into account the fact that they were developed by representatives of UNESCO, who concentrated on extensive international experience and took into account studies in which representatives from all over the world participated. Taking into account these facts, as well as the free labor market, it is recommended that both frameworks be taken into account when designing curricula, as there is a correlation between teachers' competencies and those of their students.*

### **2.3. Generative AI Guidelines in Education and Research**

In 2023, UNESCO published Guidelines on Generative AI in Education and Research. These Guidelines were initiated after the launch of ChatGPT, the first easy-to-use AI generation tool. [51]

Generative AI (GenAI) is an artificial intelligence (AI) technology that automatically generates content in response to questions written in conversational interfaces in natural language. Instead of simply copying existing web pages by drawing from existing content, GenAI actually creates new content. Content can appear in formats that include all the symbolic representations of human thinking: texts written in natural language, images (including photographs, digital pictures, and cartoons), videos, music, and software code. GenAI is trained using data collected from web pages, social media conversations, and other online media. It generates its content by statistically analyzing the distributions of words, pixels, or other elements in the data it has accumulated and identifying and repeating common patterns (for example, which words usually follow other words).

GenAI is widely available, continues to evolve and improve, and is likely to have a major impact on education and research. It has both specific negative and unique positive potential, but potential long-term consequences in these areas are not yet clear, and therefore further in-depth review is needed. They are described in the following categories:

- ✓ Unexplored ethical issues - Access and justice, Human connection, Human intellectual development, Psychological impact, Hidden prejudices and discrimination;
- ✓ Copyright and Intellectual Property;
- ✓ Content sources and training;
- ✓ Homogenized responses against diverse and creative results;
- ✓ Rethinking Assessment and Learning Outcomes – Values, Basic Knowledge and Skills; Higher-order thinking skills, Professional skills needed to work with AI;
- ✓ Thought processes.

*The Guidelines conclude by saying that from a human-centric approach, AI tools should be designed to expand or enhance human intellectual abilities and social skills, and not to undermine, conflict with, or usurp them. While GenAI should be used to serve education and research, we should all be aware that GenAI can also change established systems and their foundations in these areas. The transformation of education and research that will be driven by GenAI, if any, must be rigorously reviewed and guided by a human-centric approach. Only in this way can we ensure that the potential of AI in particular, and all other categories of technologies used in education more broadly, improve human capabilities to build an inclusive digital future for all.*

## 2.4.OECD Principles for Trustworthy AI

The OECD Principles for AI are [55] Originally adopted in 2019 and updated May 2024 d., taking into account new technological and policy developments to ensure that they remain robust and fit for purpose. The Principles guide AI actors in their efforts to develop trustworthy AI and provide policymakers with recommendations for effective AI policies.

**The principles are based on the following values:**

1) Inclusive growth, sustainable development and well-being

Stakeholders should proactively engage in responsible governance of trustworthy AI in pursuit of beneficial outcomes for people and the planet, such as increasing human capabilities and increasing creativity, promoting the inclusion of under-represented populations, reducing economic, social, gender and other inequalities and protecting

the natural environment, thereby fostering inclusive growth, well-being, sustainable development and environmental sustainability.

## 2) Human rights and democratic values, including fairness and privacy

AI actors should respect the rule of law, human rights, and democratic and human-centric values throughout the lifecycle of an AI system. These include non-discrimination and equality, freedom, dignity, the autonomy of people, privacy and data protection, diversity, justice, social justice, and internationally recognized labor rights. This also includes tackling AI-fuelled disinformation and disinformation, while respecting freedom of expression and other rights and freedoms protected by applicable international law.

To that end, AI actors should implement mechanisms and safeguards, such as human activity and oversight capacities, including to address risks arising from off-purpose uses, intentional misuse, or unintentional misuse in a manner appropriate to the context and line with state-of-the-art technologies.

## 3) Transparency and explainability

AI actors should commit to transparency and responsible disclosure regarding AI systems. For example:

- ✓ fostering a common understanding of AI systems, including their capabilities and limitations,
- ✓ inform stakeholders about their interaction with AI systems, including in the workplace,
- ✓ where feasible and useful, provide clear and easy-to-understand information on the data sources/inputs, factors, processes and/or logic that led to the prediction, content, recommendation or decision, in order to enable those affected by an AI system to understand the outcome, and
- ✓ to provide information that allows individuals adversely affected by an AI system to challenge its outcome.

## 4) Strength, security, and safety

AI systems should be robust, secure, and safe throughout their life cycle so that, under normal use, foreseeable use or abuse, or other adverse conditions, they function appropriately and do not pose a safety and/or security risk.

Where appropriate, mechanisms should be put in place to ensure that if AI systems risk causing undue harm or exhibiting undesirable behavior, they can be canceled, repaired, and/or decommissioned safely if necessary.

Where technically feasible, mechanisms should also be put in place to strengthen the integrity of information while ensuring respect for freedom of expression.

#### 5) Liability

AI actors should be responsible for the proper functioning of AI systems and for complying with the above principles, based on their roles, context and in line with state-of-the-art technologies.

To that end, AI actors should ensure traceability, including about datasets, processes, and decisions taken during the lifecycle of an AI system, to allow for analysis of the results of the AI system and responses to queries appropriate to the context and in line with the latest developments.

AI actors should, based on their roles, context, and ability to act, apply a systematic risk management approach to each stage of the AI system's lifecycle and adopt responsible business behavior to address the risks associated with AI systems, including, where appropriate, through cooperation between different AI actors, AI knowledge providers and AI resources, AI Users and other stakeholders. Risks include risks related to harmful prejudices, human rights, including safety, security, and privacy, as well as labour and intellectual property rights.

*The application of the principles described is important and should be taken into account at different stages of the life cycle of information systems using AI. Also, when developing terms of reference for information systems for assessing students, they should also be taken into account in order to comply with the European Declaration of Digital Rights and Principles.*

### **3. Proposal for updating teachers' competencies to work with AI based on the European Digital Competence Framework**

The analysis shows that there is a connection between the individual documents, with some documents referring to others. In this way, their updating is achieved at a faster pace, and the measures and recommendations in them are better since a wider range of studies have been founded, in which experts with extensive international experience have been involved.

The analysis draws attention to key documents related to the competencies of teachers and students, the most important of which are:

- ✓ Digital Competences Framework for Educators (DigCompEdu);
- ✓ Citizens' Digital Competence Framework (DigComp);

- ✓ Key competences for lifelong learning;
- ✓ AI Competence Framework for Teachers and Students.

The DigCompEdu framework, which identifies 22 key competences and describes in detail what it means for educators to be digitally competent, can be used as a starting point for the preparation and delivery of training for all teachers and complemented by the latest published document on the topic. The AI Competence Framework for Teachers and Students [53] was developed by UNESCO. This Framework addresses the stated gap in knowledge and experience globally and offers initial guidance on how teachers can be prepared for a growing AI-powered education system. **The main objective of the AI Competence Framework for Teachers is to guide teachers, teaching communities, and teacher training systems around the world to leverage the educational opportunities of AI and develop the critical knowledge, skills, attitudes, and values needed to manage AI-related risks and threats.** At the same time, responsible, ethical, fair, and inclusive design and use of AI in education is promoted.

**Therefore, it is recommended that the Framework for AI Competences for Teachers, developed by UNESCO, be used for the project.**

In the affirmation of the teacher-student relationship, the **recommendations in the Final Report of the Commission Expert Group on Tackling Disinformation and Promoting Digital Literacy through Education and Training**, are described in item 1.2. on this document.

In the development of a modern and effective framework for the competence of a teacher in ... (but on ICT), it is important to take into account Council Recommendation of 22 May 2018 on promoting common values, inclusive education and the European dimension of teaching [56], as well as respect for human dignity, freedom, democracy, equality, the rule of law, as well as respect for human rights, including the rights of persons belonging to minorities, values that EU countries share and are set out in the Treaty of Lisbon [57].

Despite our constant striving for the digitalization of education, regulations to protect human freedom of choice and the well-being of children must be implemented, and well-trained teachers must not be replaced by machines.[58]

## 4. Conclusion

For the implementation of the tasks, a study was made on the Internet of **the current regulatory framework at European level and of the world experience by reviewing current publications** in the field of the use of AI in the field of education.

In connection with the implementation of activities from work packages W2 and W3 under the project 101132955 - Preparing teachers for the AI Development in Education as an Innovative Asset, PAIDEIA, the tasks set are as follows:

**On Task No. 1.** a review and analysis of the documents related to the knowledge and skills of the teacher in ... (except for ICT teachers) for the application of AI in the educational process;

**On Task No. 2.** A proposal has been made to update the competences of teachers to work with AI based on the European Digital Competence Framework, in accordance with the conclusions and recommendations of Task No. 1.

The competency framework consists of different aspects of knowledge and skills that teachers in different academic disciplines must have. It is the set of reference points necessary to prepare a training plan that will outline the complex knowledge that the student will receive during his training and what skills he will have after completing the relevant educational degree. Therefore, it is recommended that when developing new, or when updating already ready-made curricula, fundamental to be, the presented by UNESCO in September 2024, the Framework for AI Competences for Teachers and the Framework for AI Competences of Students. Competence frameworks should guide all participants in the educational process, teachers and students, towards the safe, equitable and effective use of AI in education. During the entire learning process, the student should be in the center and his well-being and health should be monitored.

## 5. Sources

- [1 EC, "European Declaration on Digital Rights and Principles," 2022. [Online]. Available:  
] <https://digital-strategy.ec.europa.eu/en/library/european-declaration-digital-rights-and-principles>.
- [2 EC, "Digital Education Action Plan (2021-2027)," 2020. [Online]. Available:  
] <https://education.ec.europa.eu/focus-topics/digital-education/action-plan>.
- [3 EU, "A Europe fit for the digital age Empowering people with a new generation of  
] technologies," 2024. [Online]. Available: [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age_en).
- [4 "NextGenerationEU," 2024. [Online]. Available: [https://next-generation-eu.europa.eu/index\\_en](https://next-generation-eu.europa.eu/index_en).
- [5 EU, "The Recovery and Resilience Facility," 2024. [Online]. Available:  
] [https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility\\_en](https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en).
- [6 EC, "European Education Area explained," 2024. [Online]. Available:  
] <https://education.ec.europa.eu/about-eea/the-eea-explained?>.
- [7 EC, "Employment, Social Affairs & Inclusion," 2023. [Online]. Available:  
] <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>.
- [8 EC, "Employment, Social Affairs & Inclusion," 2017. [Online]. Available:  
] <https://ec.europa.eu/social/main.jsp?catId=1607&langId=en>.
- [9 EC, "Europe's Digital Decade: digital targets for 2030," 2024. [Online]. Available:  
] [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en).
- [1 EU, "Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and  
0] learning for educators," 2022. [Online]. Available: <https://op.europa.eu/en/publication-detail/-/publication/d81a0d54-5348-11ed-92ed-01aa75ed71a1/language-en>.
- [1 EU, "Guidelines for teachers and educators on tackling disinformation and promoting  
1] digital literacy through education and training," 2022. [Online]. Available:  
<https://op.europa.eu/en/publication-detail/-/publication/a224c235-4843-11ed-92ed-01aa75ed71a1/language-en>.
- [1 EU, "Final report of the Commission expert group on tackling disinformation and  
2] promoting digital literacy through education and training," 2022. [Online]. Available:  
<https://op.europa.eu/en/publication-detail/-/publication/72421f53-4458-11ed-92ed-01aa75ed71a1/language-en>.



- [1 EC, "Commission Expert Group on Tackling Disinformation and Promoting Digital Literacy Through Education and Training (E03781)," 2021. [Online]. Available: <https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&groupID=3781>.
- [1 EC, "DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes," 2022. [Online]. Available: <https://publications.jrc.ec.europa.eu/repository/handle/JRC128415>.
- [1 EC, "European Digital Education Hub," 2022. [Online]. Available: <https://education.ec.europa.eu/focus-topics/digital-education/action-plan/european-digital-education-hub>.
- [1 EC, "<https://publications.jrc.ec.europa.eu/repository/handle/JRC107466>," 2017. [Online]. Available: [https://joint-research-centre.ec.europa.eu/digcompedu\\_en](https://joint-research-centre.ec.europa.eu/digcompedu_en).
- [1 EC, "European Framework for Digitally Competent Educational Organisations - DigCompOrg," [Online]. Available: [https://joint-research-centre.ec.europa.eu/european-framework-digitally-competent-educational-organisations-digcomporg\\_en](https://joint-research-centre.ec.europa.eu/european-framework-digitally-competent-educational-organisations-digcomporg_en).
- [1 EC, "European Declaration on Digital Rights and Principles," 2022. [Online]. Available: <https://digital-strategy.ec.europa.eu/en/library/european-declaration-digital-rights-and-principles>.
- [1 EC, "DESI dashboard for the Digital Decade (2023 onwards)," 2023. [Online]. Available: <https://digital-decade-desi.digital-strategy.ec.europa.eu/datasets/desi/charts>.
- [2 EC, "Second report on the State of the Digital Decade calls for strengthened collective action to propel the EU's digital transformation," 2024. [Online]. Available: [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_24\\_3602](https://ec.europa.eu/commission/presscorner/detail/en/ip_24_3602).
- [2 EC, "National Digital Decade strategic roadmaps," 2024. [Online]. Available: <https://digital-strategy.ec.europa.eu/en/policies/national-strategic-roadmaps>.
- [2 EC, "European Digital Infrastructure Consortium (EDIC)," 2024. [Online]. Available: <https://digital-strategy.ec.europa.eu/en/policies/edic>.
- [2 EC, "Communication establishing the Union-level projected trajectories for the digital targets," 2023. [Online]. Available: <https://digital-strategy.ec.europa.eu/en/library/communication-establishing-union-level-projected-trajectories-digital-targets>.
- [2 EC, "Digital Rights and Principles: Presidents of the Commission, the European Parliament and the Council sign European Declaration," 2022. [Online]. Available: [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_7683](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7683).
- [2 EC, "Digital Decade 2024: Special Eurobarometer report," 2024. [Online]. Available: <https://digital-strategy.ec.europa.eu/en/library/digital-decade-2024-special-eurobarometer-report>.

- [2] EU, "Key competences for lifelong learning," 2019. [Online]. Available:  
6] <https://op.europa.eu/en/publication-detail/-/publication/297a33c8-a1f3-11e9-9d01-01aa75ed71a1/language-en>.
- [2] EU, "Regulation establishing harmonised rules on artificial intelligence and amending  
7] Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 202," 2024. [Online]. Available: [https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=OJ:L\\_202401689](https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=OJ:L_202401689).
- [2] EC, "Commission launches AI innovation package to support Artificial Intelligence  
8] startups and SMEs," 2024. [Online]. Available:  
[https://ec.europa.eu/commission/presscorner/detail/en/ip\\_24\\_383](https://ec.europa.eu/commission/presscorner/detail/en/ip_24_383).
- [2] EC, "Coordinated Plan on Artificial Intelligence," 2018. [Online]. Available:  
9] <https://digital-strategy.ec.europa.eu/en/policies/plan-ai>.
- [3] EC, "European AI Office," 2024. [Online]. Available: [https://digital-](https://digital-strategy.ec.europa.eu/en/policies/ai-office)  
0] [strategy.ec.europa.eu/en/policies/ai-office](https://digital-strategy.ec.europa.eu/en/policies/ai-office).
- [3] EC, "Digital Education Action Plan (2021-2027)," 2020. [Online]. Available:  
1] <https://education.ec.europa.eu/focus-topics/digital-education/action-plan>.
- [3] EC, "Digital Education Action Plan – Action 1," 2020. [Online]. Available:  
2] <https://education.ec.europa.eu/focus-topics/digital-education/action-plan>.
- [3] EC, "Digital Education Action Plan – Action 10," 2020. [Online]. Available:  
3] <https://education.ec.europa.eu/focus-topics/digital-education/action-plan/action-10?>.
- [3] EC, "Green education initiatives," 2021. [Online]. Available:  
4] <https://education.ec.europa.eu/focus-topics/green-education/about-green-education>.
- [3] EC, "Education for Climate," 2023. [Online]. Available: [https://education-for-](https://education-for-climate.ec.europa.eu/community/)  
5] [climate.ec.europa.eu/community/](https://education-for-climate.ec.europa.eu/community/).
- [3] EU, "Council recommendation of 16 June 2022 on learning for the green transition and  
6] sustainable development," 2022. [Online]. Available: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022H0627%2801%29>.
- [3] EC, "Learning for the green transition and sustainable development," 2022. [Online].  
7] Available: <https://education.ec.europa.eu/focus-topics/green-education/learning-for-the-green-transition>.
- [3] EC, "Working Group on higher education," 2022. [Online]. Available:  
8] <https://education.ec.europa.eu/about-eea/working-groups>.
- [3] EU, "Erasmus+ Programme Guide," [Online]. Available: [https://erasmus-](https://erasmus-plus.ec.europa.eu)  
9] [plus.ec.europa.eu](https://erasmus-plus.ec.europa.eu). [Accessed 2024].

- [4 EU, "European Solidarity Corps," 2024. [Online]. Available:  
0] [https://youth.europa.eu/solidarity/mission\\_en](https://youth.europa.eu/solidarity/mission_en).
- [4 EU F&T Portal, "Improving the evidence base regarding the impact of sustainability and  
1] climate change education and related learning outcomes," EU, 2023. [Online].
- [4 EU, "InvestEU," 2024a. [Online]. Available: [https://investeu.europa.eu/index\\_en](https://investeu.europa.eu/index_en).  
2]
- [4 EC, "Researchers at Schools: researchers meet children to show the wonders of science,"  
3] 2022a. [Online]. Available: <https://marie-sklodowska-curie-actions.ec.europa.eu/news/researchers-at-schools-researchers-meet-children-to-show-the-wonders-of-science>.
- [4 EU, "Discover EU," 2024a. [Online]. Available:  
4] [https://youth.europa.eu/discovereu/green-routes\\_en](https://youth.europa.eu/discovereu/green-routes_en).
- [4 EC, "European Innovative Teaching Award," 2022a. [Online]. Available:  
5] [https://innovative-teaching-award.ec.europa.eu/projects\\_en?f%5B0%5D=oe\\_project\\_title%3Asustainability&f%5B1%5D=project\\_s\\_year\\_project\\_year%3A6&page=4](https://innovative-teaching-award.ec.europa.eu/projects_en?f%5B0%5D=oe_project_title%3Asustainability&f%5B1%5D=project_s_year_project_year%3A6&page=4).
- [4 EU, "Learning materials," 2024a. [Online]. Available: [https://learning-corner.learning.europa.eu/learning-materials\\_en?f%5B0%5D=topics\\_topics%3A11](https://learning-corner.learning.europa.eu/learning-materials_en?f%5B0%5D=topics_topics%3A11).  
6]
- [4 EC, "The Digital Economy and Society Index (DESI)," 2024a. [Online]. Available:  
7] <https://digital-strategy.ec.europa.eu/en/policies/desi>.
- [4 MEG, "Digital Decade 2030 Agenda," 2024. [Online]. Available:  
8] <https://egov.government.bg/wps/wcm/connect/egov.government.bg-2818/b9b8e778-8168-41be-b47f-510339df189c/Roadmap+BG.pdf?MOD=AJPERES&CVID=oWZjyyU>.
- [4 MES, "Guidelines for the Use of Artificial Intelligence in the Education System," 2024.  
9] [Online]. Available: [https://www.mon.bg/nfs/2024/02/nasoki-izpolzvane-ii\\_190224.pdf](https://www.mon.bg/nfs/2024/02/nasoki-izpolzvane-ii_190224.pdf).
- [5 USA Dept. of Education, "Artificial Intelligence and the Future of Teaching and  
0] Learning," 2023. [Online]. Available: <https://www2.ed.gov/documents/ai-report/ai-report.pdf>.
- [5 UNESCO, "Guidance for generative AI in education and research," 2023. [Online].  
1] Available: <https://unesdoc.unesco.org/ark:/48223/pf0000386693>.
- [5 UNESCO, "UNESCO survey: Less than 10% of schools and universities have formal  
2] guidance on AI," 2023. [Online]. Available: <https://www.unesco.org/en/articles/unesco-survey-less-10-schools-and-universities-have-formal-guidance-ai>.
- [5 UNESCO, "AI competency frameworks for school students and teachers," 2024.  
3] [Online]. Available: <https://www.unesco.org/en/digital-education/ai-future-learning/competency-frameworks>.

- [5 UNESCO, "Draft AI competency frameworks for teachers and for school students," 2024.  
4] [Online]. Available:  
<https://www.unesco.org/sites/default/files/medias/fichiers/2024/04/UNESCO-Draft-AI-competency-frameworks-for-teachers-and-school-students.pdf>.
- [5 OECD, " OECD AI Principles overview," 2019. [Online]. Available: <https://oecd.ai/en/ai-5>  
5] principles.
- [5 EUR-Lex, 'Council Recommendation of 22 May 2018 on promoting common values,  
6] inclusive education and the European dimension of teaching', 2018. [Online]. Available:  
<https://eur-lex.europa.eu/legal-content/BG/TXT/?uri=CELEX%3A32018H0607%2801%29>.
- [5 EUR-Lex, 'Treaty of Lisbon amending the Treaty on European Union and the Treaty  
7] establishing the European Community, signed at Lisbon on 13 December 2007', 2007.  
[Online]. Available: <https://eur-lex.europa.eu/legal-content/BG/TXT/?uri=celex%3A12007L%2FTXT>.
- [5 UNESCO, "Education in the age of artificial intelligence," 2023. [Online]. Available:  
8] [https://unesdoc.unesco.org/ark:/48223/pf0000387029\\_eng](https://unesdoc.unesco.org/ark:/48223/pf0000387029_eng).