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COMMISSION STAFF WORKING DOCUMENT

Review of the Digital Education Action Plan (2021-2027) and Outlook on Digital Education

Accompanying the document

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

Stronger education foundations for all in the age of AI

{COM(2026) 770 final}

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Introduction and policy context

Digital technologies and competences have become deeply embedded in daily life and are increasingly intertwined with social and economic participation. **Digital education** — encompassing the use of digital technologies, tools, and content to support teaching, training, learning, and assessment processes — is essential to equipping learners of all ages with the digital competences needed for life, work, and active citizenship. At the same time, when properly designed and deployed, it supports teachers, trainers, and institutions in adopting innovative pedagogical approaches, thereby strengthening the quality, accessibility, inclusiveness, and resilience of education and training systems across Europe.

Digital skills and competences shape how people access information, use public and private services, navigate labour markets, communicate with others, and engage in civic and democratic processes. Their significance extends well beyond the digital sector itself, as they are needed across all sectors and are increasingly linked to productivity, creativity, innovation capacity, and the ability to adapt to changing forms of work and learning. Levels of digital preparedness can influence access to education, employment opportunities, and pathways for social mobility.

Across EU Member States, digital education has advanced markedly, with most countries now embedding it in national strategies, school reform plans, and broader digital transformation agendas. However, **implementation remains uneven**. Digital competences are increasingly integrated into curricula, often as cross-curricular skills and, in some systems, as dedicated subjects, yet the depth of integration, consistency, and assessment approaches still vary widely.

This uneven progress is reflected in outcomes: according to International Computer and Information Literacy Study (ICILS) 2023, **42.5% of eight-graders in the EU perform below the basic level of computer and information literacy**, far above the EU-level target of less than 15% of underachievers.[1] Among adults, 60% reported having at least a basic level of digital skills in 2025[2], which remains below the Digital Decade target of 80% by 2030.[3]

Teacher training has expanded through national frameworks, professional development programmes, and support tools, but many educators continue to report insufficient time, confidence, and pedagogical guidance for effective classroom integration. Infrastructure has improved in terms of connectivity, devices, and digital platforms, though important gaps persist between and within countries, particularly in rural, disadvantaged, and under-resourced schools. These disparities reinforce broader equity challenges affecting access, inclusion, and meaningful participation in digital learning.

In recent years, this transformation has been further shaped by the accelerating development and deployment of Artificial Intelligence (AI) across society, the economy, and public life. AI is no longer confined to specialised technological domains; it is increasingly present in the tools people use to learn, work, communicate, and create. Its growing integration into educational

[1] European Commission (2024). International Computer and Information Literacy Study (ICILS) in Europe, 2023 – Main findings and educational policy implications. Luxemburg: Publications Office of the European Union.
[2] Source: Eurostat [isoc_sk_dskl_i21] Individuals' level of digital skills (from 2021 onwards)
[3] European Commission (2026). Report on the State of the Digital Decade 2026. Luxembourg: Publications Office of the European Union.

environments is beginning to influence not only how knowledge is accessed and delivered, but also how learners engage with information, develop competences, and prepare for rapidly evolving labour markets and civic realities. As these changes unfold, AI literacy is emerging as an increasingly important foundation within the broader landscape of basic and future-oriented competences. Interest in AI in education and training is growing rapidly, with several Member States beginning to issue guidance, pilot tools, or adapt policies. Overall, however, AI readiness remains at an early stage and is constrained by uneven capacity, governance uncertainty, and limited evidence on effective use.

Digital distraction and the uncritical use of AI are increasingly cited as possible contributors to the underperformance of 15-year-olds in reading, science and mathematics, alongside low levels of parental engagement and persistent teacher shortages. At EU level, 30.5% of students report being frequently distracted by their use of digital devices during science lessons. Beyond the classroom, heavy or passive screen use during leisure time may further undermine concentration, reading stamina and well-being, while also affecting mental health.[4]

At the same time, young people are making increasing use of AI tools for educational purposes. However, their impact depends significantly on who uses AI tools and how they are used. Recent research suggests that generative AI tools can improve learning outcomes when used in ways that support productive cognitive struggle.[5] However, when used primarily for efficiency gains, such tools may encourage passive cognitive offloading and more superficial engagement with knowledge.[6]

The latest PISA results should be understood not merely as an education concern, but as a **broader strategic challenge**. While the EU has recently taken important steps to strengthen children's online safety and support healthy relationship with technology, including through the Commission proposal for an EU KIDS ACT[7] calling, these developments underline **the urgent need for a more coherent and ambitious approach to technology in education and training** – one that does not simply permit digital tools in the classroom, but integrates them in a selective and purposeful manner that strengthens learning outcomes, critical thinking, and Europe's long-term competitiveness.

The EU framework for digital education was established in 2018 with the first Digital Education Action Plan[8], as an integral part of the European Education Area (EEA), and was subsequently renewed in 2020 through the Digital Education Action Plan (2021–2027)[9] (hereafter DEAP), in the context of the recovery plan. The DEAP has provided a shared vision for high-quality, inclusive, and accessible digital education in Europe, structured around two strategic priorities: fostering a high-performing digital education ecosystem and strengthening digital skills and competences for the digital transformation.

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[4] European Commission: Directorate-General for Education, Youth, Sport and Culture, *Flash EU results from PISA 2025*, Publications Office of the European Union, 2026, https://data.europa.eu/doi/10.2766/1115282.
[5] European Commission (2026a). Friend or foe? Evidence from the use of generative artificial intelligence in learning and teaching. *European Education Policy Papers*. Luxembourg: Publication Office of the European Union.
[6] OECD (2026b). PISA 2025 Results (Volume I): Future-Ready Students. Paris: OECD Publishing.
[7] COM(2026) 681 final
[8] COM(2018) 22 final
[9] COM(2018) 22 final

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As part of the DEAP, the Commission committed to undertaking a comprehensive review in 2024 to gather the views and experiences of citizens, institutions, and organisations, highlighting both the progress achieved and the need for more targeted action. The review period ran from April 2024 to June 2025, beginning and concluding with stakeholder-focused events, namely a kick-off event in 2024 and the Digital Education Stakeholder Forum in 2025. Additional consultation activities, including the Youth Dialogue with Executive Vice-President Roxana Mînzatu, were carried out in the first half of 2026.

This staff working document outlines the progress achieved over the first five years of the Digital Education Action Plan (2021–2027) and presents the findings of its stakeholder-based review.

While the DEAP played a central role in supporting Europe's digital education transition — helping Member States respond to the pandemic, foster innovation, and strengthen collaboration — its findings also point to persistent structural challenges. These findings are consistent with large-scale reviews of the current state of play.

These findings have directly informed the Education and Skills Package and its Chapeau Communication on *Stronger education foundations for all in the age of AI*. It sharpens the DEAP's legacy by focusing on a smaller number of high-impact priorities: advancing AI literacy and the effective and safe use of AI in education, developing sovereign cross-border infrastructure, accelerating European EdTech innovation, and supporting children and young people in developing healthy online habits. In this way, the Education and Skills Package builds on the foundations laid by the DEAP, focusing on fewer actions with transformative potential, with the aim of ensuring that digital education in Europe is inclusive, resilient, and fit for the challenges ahead. It emphasises that a coordinated policy response is essential to ensure that education and training systems across the EU maximise the benefits of digital innovation and contribute to economic growth, social inclusion, and democratic resilience, while mitigating risks such as overreliance and AI-enhanced disinformation.

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Chapter 1: Governance of Digital Education and Skills

Digital education sits at the intersection of education, skills and digitalisation policies. It is both an essential element of the EU's **broader education agenda** as outlined in the European Education Area[10] and a contributor to the EU's **broader digitalisation agenda** as represented by the 2030 Digital Compass: the European way for the Digital Decade[11]. On the one hand, it supports education systems in their digital transformation, with the ultimate objective of enhancing the quality and inclusiveness of education as a whole and improving the achievement of learning outcomes in all subjects. On the other hand it aims to strengthen the role that education plays in supporting the digital transition by equipping citizens, from an early age, with the digital skills they need to live, learn, work and thrive in the digital era.

These objectives have been reflected in the two strategic priorities of the **Digital Education Action Plan (DEAP) (2021 – 2027)**: (1) fostering the development of a high-perfoming digital education ecosystem and (2) enhancing digital skills and competences for the digital transformation. Together, they presented a **common vision** of high-quality, inclusive and accessible digital education in Europe. The DEAP called for greater cooperation at EU level to address the challenges and opportunities arising from the accelerating digital transformation.

Such a dual role adds complexity to the Action Plan's implementation, especially as the policy areas of **education and digital transformation are guided by different approaches to EU-level cooperation**. In education, Member States are responsible for the content of teaching and the organisation of their education systems, while the EU has a supporting competence under Articles 165 and 166 of the Treaty of the Functioning of the European Union (TFEU)[12], exercised in line with the subsidiarity principle. Cooperation between the EU and the Member States in education is therefore voluntary and takes place primarily through dissemination of best practice and mechanisms such as peer learning activities, agreement on common qualitative and quantitative benchmarks, the use of guidelines, and periodic evaluations of progress.

By contrast, policies linked to the digital transition are governed by stronger legislative instruments. These include the Digital Decade Policy Programme (DDPP) 2030, which sets objectives and targets for the digitalisation of economies and societies on competitiveness, resilience, sovereignty, (cyber-)security and sustainability. It includes a commitment to achieve, by 2030, a digitally skilled population, where at least 80 % of those aged 16-74 having at least basic digital skills, and 20 million employed ICT specialists, with increased women's participation.[13] The DDPP is supported by legislative acts that are binding on Member States,

[10] European Education Area explained | European Education Area (europa.eu)
[11] Europe's Digital Decade: digital targets for 2030 (europa.eu)
[12] OJ C 115, 9.5.2008, ELI: http://data.europa.eu/eli/treaty/tfeu_2008/art_165/oj, and OJ C 202, 7.6.2016, ELI: http://data.europa.eu/eli/treaty/tfeu_2016/art_166/oj
[13] Digital Decade Policy programme | Shaping Europe's digital future

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such as the Data Governance Act[14], Data Act[15], Artificial Intelligence Act[16], Digital Services Act[17] and Digital Markets Act[18], as well as the Interoperable Europe Act[19].

1.1. Cooperation between the European Commission and Member States on digital education and skills

The **European Commission has a coordinating and supporting role** in the development of digital education and skills in the EU. This complements efforts at national level in each of the Member States.

The DEAP was implemented through 14 actions (Actions 1a and 1b to 13). Actions 1a and 1b are presented as distinct but closely connected measures because they translate into practice **the strengthened political commitment made by Member States in 2023** through the adoption of **two Council Recommendations** aligned with the two priorities of the Action Plan:

- the Council Recommendation on the key enabling factors for successful digital education and training[20]
- the Council Recommendation on improving the provision of digital skills and competences in education and training[21].

In these Recommendations, Member States called for a regular exchange of information and committed to providing guidance on strategic issues related to digital education and training and to digital skills and competences.

This reinforced cooperation has been implemented through a combination of established and innovative mechanisms and methods.

1.1.1. Established cooperation mechanisms

The Council Resolution on a strategic framework for European cooperation in education and training towards the **European Education Area** (EEA) and beyond (2021-2030)[22] established that, until 2025, cooperation in the context of the EEA strategic framework would be ensured through working groups composed of experts nominated by Member States and key stakeholders. As opposed to other sectors, such as higher education or schools, digital education and skills represented a relative new field of cooperation without yet established discussion for at strategic level.

As a result, a new **Working Group on Digital Education: Learning, Teaching and Assessment (DELTA)** was established. This group has offered a forum for the exchange of experiences and practices on digital education, while respecting the principle of subsidiarity and the diversity of EU Member States. It aimed at promoting mutual learning and sharing expertise to support countries in the implementation of policy reforms in line with the DEAP, focusing in particular on fostering high quality and inclusive digital education in the EU.

[14] OJ L 152, 3.6.2022, ELI: http://data.europa.eu/eli/reg/2022/868/oj
[15] OJ L, 2023/2854, 22.12.2023, ELI: http://data.europa.eu/eli/reg/2023/2854/oj
[16] OJ L, 2024/1689, 12.7.2024, ELI: http://data.europa.eu/eli/reg/2024/1689/oj
[17] OJ L 277, 27.10.2022, ELI: http://data.europa.eu/eli/reg/2022/2065/oj
[18] OJ L 265, 12.10.2022, ELI: http://data.europa.eu/eli/reg/2022/1925/oj
[19] OJ L, 2024/903, 22.3.2024, ELI: http://data.europa.eu/eli/reg/2024/903/oj
[20] OJ C, C/2024/1115, 24.1.2024, ELI: http://data.europa.eu/eli/C/2024/1115/oj
[21] OJ C, C/2024/1030, 23.1.2024, ELI: http://data.europa.eu/eli/C/2024/1030/oj
[22] OJ C 66, 26.2.2021, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021G0226(01)

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Members have included Ministries of Education from EU Member States, EFTA countries, candidate countries and education organisations.

Consequently, in the Council Recommendations on digital education and skills adopted in November 2023, Member States entrusted the **High Level Group on Education and Training**, which is part of the EEA governance framework, with the task of providing steering on the key strategic topics addressed in the Recommendations.

Since the adoption of the Council Recommendations, various High Level Group discussions on digital learning took place. Two were devoted to digital learning and on the implementation of DEAP and of the Council recommendation: one was organised during the Danish Presidency by the then incoming Cypriot Presidency of the Council on 1-2 December 2025. More recently, on 25 June 2026, the incoming Irish Presidency asked the Commission to present its plans for advancing next EU digital education plans through supporting the Member States in building sovereign, interoperable digital infrastructure for education and in fostering a trusted, inclusive and innovative digital learning ecosystems in the age of AI, including through the uptake of the EU-OECD AI literacy framework for primary and secondary education[23] launched in June 2026.

Discussions showed broad agreement on key priorities, such as the whole-of-government approach, inclusion, teachers' digital competence, AI readiness, digital well-being, and stronger evidence on best practices. Member States also called for further work on assessment and monitoring, age-appropriate guidance, secure and interoperable infrastructure, quality assurance for digital tools, and greater support for research, innovation and European cooperation. There was shared agreement that the next phase should take a more human-centred, lifelong learning approach, supported by clearer indicators, better data, stronger teacher support and continued stakeholder cooperation.

1.1.2. Innovative cooperation mechanisms

To address the specific challenges of the digital transformation of education, the European Commission has also tested a number of innovative cooperation mechanisms, including a **Structured Dialogue on Digital Education and Skills (Action 1a)** to support Member States in developng an integrated, coherent and more ambitious approach to digital education and skills.

In addition to these direct exchanges at national level, the Commission invested efforts in building the broader digital education stakeholder community at the European level. As part of this, the **two Digital Education Stakeholder Forums** represented key events on the EU digital education calendar. On 22 March 2022 the Commission organised the first Digital Education Stakeholder Forum: 'Making education and training fit for the digital age', bringing together high-level EU policy-makers including the then Commissioner for Innovation, Research, Culture, Education and Youth, Mariya Gabriel, Executive-Vice President of the Commission for a Europe fit for the Digital Age, Margrethe Vestager, the Presidency trio of the Council of

[23] European Union / OECD (2026). Empowering learners for the age of AI: An AI literacy framework for primary and secondary education. OECD Publishing, Paris. https://doi.org/10.1787/65cd27d4-en

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the European Union and Members of the European Parliament. A second flagship event was organised on 24 June 2025, titled ‘Tap into Europe’s digital potential’.

In parallel, as an example of increased sharing and coordination from the side of the Member States, the Belgian Presidency organised the **Digital Education Dialogues** in May 2024, bringing together political and technical-level representatives of Member States for strategic discussions. The event provided an opportunity for Member States, the European Commission, and various stakeholders to align on priorities for the future of digital education across Europe. The Digital Education Dialogues centred on three primary themes: balancing educational objectives with data privacy, aligning Member States’ digital skill programmes with Council Recommendations, and exploring the role of AI and extended reality (XR) in education. Facilitated discussion between educational bodies, local authorities, and private sector representatives focused on the opportunities and challenges that digital transformation brings to education. Participants exchanged successful approaches, particularly in teacher professional development initiatives, which are central to enhancing digital literacy and competence.

The **Education and Skills Package** marks a new milestone in Member States collaboration with the Commission Implementing Decision on the establishing of a European Digital Infrastructure Consortium on Education (EDU-EDIC). The EDU-EDIC will seek to pool resources, infrastructure and expertise to build digital capabilities that no single European country could deliver alone.

Chapter 2: DEAP Implementation and Impact

The introduction of digital technologies in education and training systems requires a whole-of-government approach and strong coordination between different departments of government. Reflecting this need at the level of the Commission, the DEAP was implemented with the Directorate-General for Education, Youth, Sport and Culture (DG EAC) in the lead and other services co-leading or contributing to its specific actions (Directorate-General for Communications Networks, Content and Technology – DG CONNECT, Directorate-General for Employment, Social Affairs and Inclusion – DG EMPL, European Commission Joint Research Centre – JRC).

The DEAP was implemented with the support of, and in close synergy, with relevant EU frameworks, funding programmes and instruments, including the European Education Area, the Digital Decade Policy Programme, Erasmus+, Digital Europe and others. Its funding landscape was **complex,** drawing on a **wide range of sources**. The non-exhaustive list of available EU instruments included Erasmus+, European Solidarity Corps, Digital Europe, Horizon Europe, the European Social Funds, the European Regional Development Fund, Recovery and Resilience Facility and the Technical Support Instrument. The EU support complemented **national funding** for digital skills and digital ecosystem development, further increasing the complexity of the funding landscape for **digital education and training in the European Union**.

DEAP Actions

2.1. Strategic Priority (SP) 1: Fostering the development of a high-performing digital education ecosystem

The digital transformation has the potential to support education and training not only by making them more resilient in times of crisis but also by enhancing their overall accessibility, quality and inclusiveness. Effective use of digital technologies for quality and inclusive education and training needs to be planned in a sustainable way, with sufficient support, resources and guidance. For this reason, providing infrastructure and digital devices is fundamental, but a critical and purposeful use of digital technologies for teaching and learning needs to be underpinned by strong digital capacity.

This was reflected in the first strategic priority of the DEAP, which aimed to *foster the development of a high-performing digital education ecosystem*. The reference to "ecosystem" clearly showed the need for integration of several diverse but inter-related elements which are at the core of successful digital education. These include infrastructure, teachers' professional development, governance arrangements and targeted policies. The European Commission supported the development of such a high-performing digital education ecosystem through the first six Actions of the DEAP, whose implementation and impact so far are presented below.

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Action 1a: Structured Dialogue with Member States on Digital Education and Skills

Accelerating the digital transformation of education systems requires coordinated engagement across sectors and levels of governance. As digital tools and skills became central to learning, employability, and civic participation, policy coherence between Member States and the European Commission was critical. Recognising this, President von der Leyen announced in the 2021 State of the Union address the launch of a **Structured Dialogue** with Member States to support a more integrated, ambitious, and strategic approach to digital education and skills. The dialogue aimed to raise political visibility and commitment, align efforts with the 2030 Digital Decade targets, and contribute to the delivery of the DEAP.

Implementation state of play

The Structured Dialogue was conducted over the course of 2022 and followed a **whole-of-government approach**, involving a wide spectrum of stakeholders including ministries of education, labour, finance, digitalisation, and industry. It was implemented through a series of bilateral meetings with all **27 Member States**, supported by internal coordination across Commission services (SG, DG EAC, DG EMPL, DG CNECT) and contributions from the ISSG (Inter-service steering group) on digital education and skills.

Each Member State nominated high-level representatives to participate in the **High-Level Group of National Coordinators**, ensuring cross-sectoral involvement at national level. These bilateral meetings and group discussions enabled for in-depth exploration of country-specific priorities, challenges, and reform needs. Topics ranged from digital skills development and teacher training to infrastructure gaps and public-private partnerships, including the role of EdTech and digital solution providers.

Stakeholder engagement was an integral part of the dialogue. It included consultations with civil society, educational institutions, the DELTA Working Group under the EEA governance structure, and social partners. The dialogue process focused on co-creation and shared diagnosis, aiming to map the current state of digital education, assess national strategies, identify best practices, and explore how the EU could further support national efforts.

The results of the Structured Dialogue directly informed the preparation of two Council Recommendations: one **on the key enabling factors for successful digital education and training**[24], and another **on improving the provision of digital skills and competences in education and training**[25], both adopted by the Council in **November 2023**. The dialogue also provided input for the **Digital Decade Policy Programme and national digital skills roadmaps**. A **thematic analysis conducted by the Joint Research Centre (JRC)**[26] synthesised the outcomes of the discussions.

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[24] OJ C, C/2024/1115, 24.1.2024, ELI: http://data.europa.eu/eli/C/2024/1115/oj
[25] OJ C, C/2024/1030, 23.1.2024, ELI: http://data.europa.eu/eli/C/2024/1030/oj
[26] The thematic analysis was prepared by the European Commission's Joint Research Centre and is based on presentations prepared by each Member State for the bilateral meetings and the notes of discussions that took place during the meetings. All findings are presented in a synthesised format reflecting common trends, without identifying any Member State

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Impact and future orientation

Stakeholders, including educators, policymakers, civil society organisations, and educational institutions, expressed broad support for the Structured Dialogue. It was described as an *"essential step to encourage the adoption of policies at national level"*, with many stakeholders recognising its value in addressing both short- and long-term digital education challenges. Its inclusive approach and capacity to foster exchange between Member States, EU institutions, and diverse stakeholder groups were particularly appreciated.

At the same time, several stakeholders raised concerns about the **need for more outcome-oriented processes**. Educational networks and NGOs pointed to the gap between discussion and tangible results and called for better tracking mechanisms and more detailed comparative analysis of national practices. One education network commented that *"strategic dialogue would be more effective if supported by a thorough analysis, comparison, and reflection of Member States' digital education policies, including third countries in Europe."* Stakeholders also stressed the need to translate dialogue outcomes into **actionable follow-up measures** and regularly monitored.

Inclusion and stakeholder diversity were also identified as areas for improvement. Civil society groups emphasised the need to involve **local authorities, marginalised communities, and smaller education providers** more consistently. They noted that inclusive models are crucial for designing digital education policies that respond to real-world disparities. Stakeholders also called for greater involvement of **private sector actors**, particularly in high-demand fields such as **AI, cybersecurity, and data science**, to ensure stronger links between education and labour market needs.

Looking ahead, stakeholders recommend transforming the Structured Dialogue into a **recurring, structured mechanism** to support **peer learning**, facilitate **implementation monitoring**, and enable for **dynamic policy updates** in response to emerging challenges. Future iterations should place greater emphasis on **measurable outcomes**, deeper analysis of national contexts, and stronger alignment between dialogue and funding opportunities.

Overall, the Structured Dialogue demonstrated the value of coordinated, cross-sectoral policy engagement in shaping digital education and skills strategies. It provided a high-level forum for policy exchange, strengthening synergies across Member States' education, labour, and digital strategies and supporting mutual learning. It also helped align national actions with EU-level objectives and reinforced collective commitment to achieving Europe's 2030 digital targets.

Besides providing the basis for developing the two Council Recommendations, the Structured Dialogue contributed to a more systematic and informed understanding of the enabling conditions for effective digital transformation, including leadership, infrastructure, teacher training, data use, and stakeholder collaboration.

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individually. The analysis was published as Annex III of the Staff Working Document accompanying the Proposals for Council Recommendations on the key enabling factors for successful digital education and training, and on improving the provision of digital skills and competences in education and training.

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Member States and Commission services generally considered the structured, collaborative format was useful in building trust and enhancing policy coherence across domains.

Action 1b: Council Recommendation on the Key Enabling Factors for Successful Digital Education and Training

Despite extensive investment and multiple national initiatives over recent decades, access, implementation, and outcomes in digital education in the EU remain fragmented. The COVID-19 pandemic starkly exposed the limitations of existing systems, as many countries relied on improvised digital solutions to ensure continuity of learning. These included the use of commercial videoconferencing platforms, the distribution of devices to disadvantaged learners, and the creation of informal digital training programmes for teachers. While these responses demonstrated adaptability, they also highlighted a broader need for a more systemic and sustainable digital transformation in education.

In response, the European Commission proposed a **Council Recommendation on the Key Enabling Factors for Successful Digital Education and Training**, adopted in **November 2023**. The Recommendation builds on the first strategic priority of the **DEAP**, which calls for the development of a **high-performing digital education ecosystem**. It reflects a shared understanding that effective digital education requires not only access to technology, but also on coherent governance, sustained investment, professional development for educators, and inclusive pedagogical practices.

Implementation state of play

The Recommendation was developed through extensive consultations and collaboration with Member States and stakeholders. It draws from multiple sources: the 2018 **Digital Education Action Plan**, the **Council Conclusions on digital education in Europe's knowledge societies**, and the outcomes of the **Structured Dialogue** held throughout 2022. The process also incorporated feedback gathered through stakeholder consultations held in the same year.

The Commission adopted the proposal in **April 2023**, following which the Council formally endorsed it in November 2023. The Recommendation was adopted as part of a broader package that also included a complementary Council Recommendation on **improving the provision of digital skills and competences in education and training**. Together, these instruments provide Member States with a clear policy framework to support accessible, high-quality, and inclusive digital education.

The Recommendation focuses on formal education and training, highlighting the strategic planning, investment, and cooperation required to harness digital technologies effectively. It also stresses the need for pedagogically meaningful integration of technology, ensuring digital tools enhance learning outcomes across all subjects and at all levels of education. The proposal aligns with broader EU objectives, including those set out in the **Digital Decade Policy Programme**, the **European Skills Agenda**, the **European Pillar of Social Rights Action Plan**, and the **Union of Equality strategies**. It also complements recovery and resilience initiatives, with Member States allocating **EUR 23 billion** to digital education and skills under the **Recovery and Resilience Facility**.

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Impact and future orientation

Stakeholders broadly welcomed the adoption of the Council Recommendation and acknowledged its contribution to strengthening Europe's digital education systems. It has been described as a necessary step to integrate digital skills and infrastructure planning into national education reforms. According to a civil society platform, *"the Council Recommendation recognises the importance of coherent strategies specifically addressing digital education and skills,"*, while noting that non-formal learning remains underdeveloped.

Multiple organisations, including DAAD and ALL DIGITAL, have called for **more inclusive consultation and implementation mechanisms**, noting that continuous engagement with a wider range of actors—such as cities, civil society, digital training organisations, and education trade unions—would strengthen both the scope and relevance of the Recommendation.

Some stakeholders expressed concern over the limited focus on **non-formal and informal learning environments**. While these are acknowledged in the text, they are not supported by specific implementation guidance. Others, such as the European Association for the Education of Adults, warned of over-reliance on commercial digital platforms and called for **more emphasis on data protection, accessibility, and public-sector digital tools**.

At national level, stakeholders stressed the need for a strong follow-up strategy. The **Lifelong Learning Platform** highlighted that the Recommendation has already shaped national digital education policies but stressed the importance of continued support for capacity building, particularly in schools and among teachers. A submission from Spain's Ministry of Education called for further reflection on the use of physical learning environments and the role of technology in reshaping them.

Overall, the Council Recommendation represents a critical milestone in establishing a shared vision for high-quality and inclusive digital education. It provides Member States with a policy compass to guide reform efforts and supports the implementation of existing EU strategies related to skills, digital transition, and social inclusion.

The Recommendation has helped to consolidate efforts across Member States by identifying common challenges and policy gaps. These include lack of a systemic whole-of-government approach, insufficient investment in infrastructure and digital content, limited teacher training in digital pedagogy, and weak monitoring and evaluation frameworks.

The Recommendation has further supported the alignment of national strategies with the EU's broader digital transformation goals. It reinforces the need for long-term capacity building and investment in education and training systems, particularly in the digital readiness of schools and teachers.

Going forward, successful implementation will depend on strengthening cooperation based on common standards for trusted, inclusive and innovative digital education infrastructure in Europe. The European Commission has committed to **reviewing progress of the Council recommendation within five years**, with further opportunities for alignment and updates expected as part of the evolving Digital Decade agenda.

Action 2: Council Recommendation on Blended Learning Approaches for High-Quality and Inclusive Primary and Secondary Education

Blended learning refers to the use of more than one approach in the learning process, combining various physical environments such as schools, training centres, or cultural sites and a mix of both digital and non-digital tools. This flexibility enables more inclusive education, particularly for learners in remote or rural areas, those in hospitals or care centres, or those from traveller communities. The COVID-19 pandemic accelerated the large-scale adoption of digital learning practices, highlighting the need for effective, inclusive, and engaging approaches to distance, online, and blended learning.

In response, the European Commission proposed a Council Recommendation[27], adopted in **November 2021**, aimed at supporting learners, teachers, and schools in navigating this transition. While fully recognising the value of face-to-face learning, the Recommendation states that learning in different ways and in different environments -- including at school, at home, outdoors, in cultural sites, workplaces, and digital environments -- can motivate children and young people to enhance their broad competence development. It can also help them to understand the relevance of formal education and training to their lives in society and encourage more active engagement with local and global challenges, for instance those related to sustainability, the environment, and climate change.

The Recommendation provides strategic guidance to help Member States incorporate blended learning into school education systems, drawing on lessons learned during the pandemic. Its overarching goal is to support Member States in adapting their school education systems to be more flexible, inclusive, and better able to respond to a broad range of learner needs, changing circumstances, and pedagogical approaches. It is therefore both a response to specific lessons learned from the COVID-19 pandemic and an opportunity to work positively towards the longer-term preparedness of education systems.

Implementation state of play

Following the adoption of the Recommendation, the EEA Working Group Schools – Pathways to School Success made **blended learning for inclusion** a priority focus area throughout 2022. This resulted in the publication of the report *Blended Learning for Inclusion*[28], which outlined key messages and provided practical examples. The report was accompanied by a webinar and an expert video to further disseminate the findings.

To complement these efforts, the European Commission made a wide range of resources and training available on the **European School Education Platform (ESEP)**[29]. For example, six MOOCs focused on digital competence, aligned with the European Digital Competence Framework for Educators[30] and Selfie for Teachers[31], reached over 7,000 participants in 2024

[27] Proposal for a council recommendation on blended learning for high quality and inclusive primary and secondary education, COM (2021) 455 final.
[28] Working group on schools (2021-25) "pathways to school success" - Publications Office of the EU
[29] European School Education Platform | European School Education Platform
[30] DigCompEdu - Joint Research Centre - European Commission
[31] SELFIE for TEACHERS - European Education Area

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alone. These courses remain available for self-paced learning and form part of a European recognition scheme for teachers' digital competences, available to the eTwinning community since summer 2025.[32] In addition, between 2021 and 2024, other courses were delivered via the EU Academy[33], and more than 200 resources, including webinar recordings, articles, and case studies, were made available to support schools in implementing blended learning[34].

In **August 2024**, the European Expert Network on Economics of Education (EENEE)[35] published a report on *Digital Transformation in Blended Learning Environments*[36]. The report supported the implementation of the Council Recommendation by analysing how the digital dimension of blended learning had evolved across Member States and by identifying both the strengths and limitations of these approaches. It also explores the extent to which digital innovations had been integrated into educational practices and presented recommendations for further research on outcomes, satisfaction, teacher effectiveness, and the long-term impacts of blended learning.

Impact and future orientation

Stakeholders across the education, civil society, and policy sectors expressed broad support for the Council Recommendation's emphasis on blended learning, which is widely regarded as an effective means of enhancing accessibility, inclusion, and adaptability in education. One European academic network referred to blended learning as a *"flexible model that provides a richer learning experience and supports inclusivity, diversity, and equity in education."*

Civil society groups particularly underlined how blended learning can support personalised education for students from varied backgrounds, including those with special educational needs. Policymakers and education leaders also highlighted the value of enhanced EU collaboration to exchange effective practices and develop robust evaluation frameworks.

At the same time, stakeholders pointed to the need for **targeted professional development so that teachers are equipped to use digital tools effectively and to manage the pedagogical shifts that blended learning requires.** A European vocational education and training (VET) initiative noted that *"it is essential that teachers are trained in both using digital technologies and effectively implementing blended learning in their teaching practices."* Without this preparation, there is a risk that digital tools may not be used to their full potential.

Concerns were also raised about persistent inequalities in access to reliable internet and digital devices. As one civil society organisation observed, *"digital tools can enable students with special education needs to keep up with their peers and fully participate in the educational process."*

[32] Unlocking the power of digital competencies: a course series for teachers | European School Education Platform
[33] EU Academy
[34] Discover | European School Education Platform
[35] European Expert Network on Economics of Education
[36] European Commission, Directorate-General for Education, Youth, Sport and Culture (2024). Caplanova, A., Dunajeva, J. and Rodriguez, P., Digital transformation in blended learning environments – EENEE analytical report, Luxembourg: Publications Office of the European Union.

As such, **stakeholders strongly advocate for sustained investment in teacher training, digital capacity-building, and infrastructure** to ensure blended learning contributes meaningfully to inclusive, high-quality education across the EU.

Looking ahead, stakeholders stressed that further efforts are needed to establish blended learning as a core element of mainstream education policy. This includes embedding it more systematically in national strategies, with implications for teaching, learning and assessment, quality assurance processes, and school development plans. Continued investment in digital infrastructure, teacher professional development, and monitoring tools will be critical to support implementation and to ensure equity across regions.

Consultations also point to the need to build a stronger evidence base on the long-term impacts of blended learning. This would require more systematic data collection, longitudinal research, and collaboration across Member States to evaluate effectiveness and inform future adjustments, and more targeted support to schools facing the greatest barriers to adopting blended learning practices.

Positioning blended learning within the broader priorities of the Union of Skills and the Preparedness Union will help align education policy with the demands of digital transformation, future labour market needs, population preparedness and societal resilience. By reinforcing collaboration, sharing of good practices, and continuous evaluation, blended learning can become a catalyst for more resilient, inclusive, and future-ready school systems.

Action 3: European Digital Education Content Framework

A) European Digital Education Content Framework / Guidelines

Digital education content (DEC) has long been used in education but came under more scrutiny during the shift to emergency online learning during the COVID-19 pandemic. DEC refers to learning, teaching and assessment materials – ranging from interactive videos or quizzes to structured digital textbooks – designed or created by educational publishers, teachers and other creators (including learners) to achieve educational objectives, and made available in various formats using digital tools and platforms. Alongside the ongoing digital transformation, the production and use of DEC have increased rapidly.

While this action was initially designed to provide a **European framework for digital educational content,** implementation showed that **practical guidelines would be more effective** and easily adaptable to the different contexts and education systems across the EU. The original objectives nevertheless remained unchanged: to harness **Europe's cultural and creative diversity**, to ensure that digital resources meet high instructional design standards, and to address key challenges such as **accessibility, multilingualism, verification, and ethical considerations**.

Implementation state of play

The development of the **European Guidelines on Digital Education Content** was structured around three core objectives:

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- **Providing structured support** primarily to teachers and school leaders in their day-to-day efforts to select, create, acquire, use and assess high-quality digital education content, while remaining **sufficiently flexible to adapt to local contexts and different education systems**.
- **Improving understanding and clarity for all stakeholders in day-to-day decisions** on the selection, creation, use, and evaluation of digital education content, thereby facilitating decision-making at all levels on investing in, acquiring, using, and improving such content.
- Supporting **the convergence and coherence** needed to reduce fragmentation in supply, barriers to adoption and confident use of DEC, while ensuring its quality and diversity.

The **exploratory study**[37], published by the **European Commission in October 2023**, provided an analysis of the **supply and demand of DEC** and proposed a **common definition** based on extensive research and stakeholder consultations. The study identifies **pedagogical, technological, legal, and organisational challenges** in the development of a unified digital education content framework.

Input educators, content creators, and policymakers revealed a **high degree of fragmentation** in existing DEC standards, leading to inconsistencies in how **Member States** incorporate digital education content into their **national strategies and action plans**. The lack of a **common quality benchmark** had further hindered confidence in DEC adoption and development.

The **Council Recommendation on key enabling factors for successful digital education and training**[38], adopted in November 2023, welcomed the Commission's commitment to developing guidelines and quality standards for accessible and well-designed DEC. The overall aim is to help Member States' education and training systems to systematically assess the quality, safety, trustworthiness, reliability, utility, and inclusiveness of DEC.

To advance this work, the **Commission Expert Group (EG) on Digital Education Content**[39] was set-up in **July 2024** for a **14-month mandate**. The **24-member group,** consisting of **educators, public authorities, researchers, and digital content providers,** was tasked with:

- Establishing a common vocabulary and terminology to facilitate a shared understanding and transparency regarding DEC across stakeholders and Member States.
- Developing criteria and key considerations to help primarily teachers and school leaders systematically assess the quality of DEC.
- Developing guidelines to help educators and stakeholders apply quality criteria in the creation, selection, use and evaluation of DEC, and promote digital literacy and skills for DEC design and use.

[37] Digital Education Content in the EU: state of play and policy options – Final report COM (2023); Technical report COM(2023) ; Executive Summary (COM 2023)
[38] Council Recommendation on the key enabling factors for successful digital education and training, 2023 (C/2024/1115).
[39] Commission Expert group for Digital Education Content (E03942)

The publication *Making informed choices on digital education content: EU guidelines for teachers and educators*[40] was published in English in December 2025 and in all EU languages on 12 June 2026. It has so far recorded 1,754 downloads.

In addition, the 2026 Erasmus+ Programme launched a call for European policy experimentations on "Digital Education Content: success factors in decision making and use by teachers, trainers and school/institution leaders". The objective is to support the use and implementation of the DEC guidelines in real contexts and provide capacity building to teachers and school leaders in their day-to-day practice.

Impact and future orientation

The development of European Guidelines on Digital Education Content has been widely endorsed by stakeholders in education, civil society, and industry. It is regarded as a **critical tool** for standardising **quality and accessibility in digital education content**. One Ministry of Education noted, *"referencing digital content with respective curricula has facilitated the integration of digital content into everyday teaching practices, making education more adaptable and responsive to the needs of modern learners."*

A key benefit highlighted by stakeholders was the **potential to reduce disparities in digital education across Member States** by recognising DEC as a key part of the educational ecosystem. A more **cohesive and structured approach** is expected to improve **content alignment with national curricula**, making digital education more inclusive and responsive to diverse learner needs.

Some stakeholders stressed the **importance of adapting content** to **local educational contexts**, with a creative industry sector organisation cautioning, *"one size does not fit all."* Civil society groups emphasise the need for inclusivity, particularly for **learners with special needs and disadvantaged backgrounds**. It was also pointed out that similar guidelines are required for higher education, in addition for primary and second levels.

Another issue raised was the **fragmentation of digital education frameworks** across the EU, which creates inconsistencies in DEC evaluation and implementation. EdTech companies advocate for a **standardised metadata tagging system** to **streamline content assessment** and ensure compatibility across national education systems. The DEAP review also highlighted need for measurable impact assessments to ensure that DEC investment and uptake lead to tangible learning improvements.

Following the guidelines publications, a focus has been put on deepening collaboration with Member States to support national uptake of the guidelines. In parallel, consideration has been given to expanding the framework's application to higher education, ensuring continuity and coherence across all levels of education.

B) Working Group on European Higher Education Interoperability Framework

The **European Higher Education Interoperability Working Group** was established to address the growing need for seamless digital integration across teaching, learning and

[40] Making informed choices on digital education content: EU guidelines for teachers and educators - Publications Office of the EU

administrative systems in European higher education institutions. As universities increasingly rely on complex, and often custom-developed ICT systems, interoperability has become essential for enabling **transnational collaboration**, **joint education provision**, and **efficient digital learning environments**.

Implementation state of play

Developing the European Higher Education Interoperability Framework (HEIF)

Launched in **July 2023** under the **European Digital Education Hub (EDEH)**[41]**,** the Working Group developed a comprehensive **European Higher Education Interoperability Framework (HEIF)** through a collaborative and iterative process. The framework builds on the **European Interoperability Framework (EIF)**[42], which provided the methodological basis for achieving interoperability across legal, organisational, semantic, and technical dimensions, while also supporting broader system-level change.

The Working Group brought together over 300 members from higher education institutions, European University Alliances, public and private sector bodies, European institutions (DG DIGIT, DG CNECT, DG EMPL, DG RTD, and JRC), standardisation organisations, and national research and education networks (NRENs). It also drew on the experiences, input and steering of more than **55 European University Alliances**[43] and engaged a wide range of stakeholders through intensive collaboration.

The group organised regular **online and in-person workshops, webinars**, and **brainstorming sessions**, producing a series of technical and strategic outputs. These included a **Manifesto Paper**[44], articulating a shared vision for interoperability in higher education; a **preliminary high-level technology plan**[45] mapping current systems and identifying gaps; and a **synthesis report** offering targeted solutions. Practical implementation guidelines were also developed to support HEIs in connecting systems such as **learning environments**, **identity and access management**, and **dashboarding platforms**.

In March 2025, the HEIF was delivered in the form of comprehensive reports, **practical guidelines, technical tools, and a proposal for a governance model.** Together, these resources support institutions in connecting their systems in standardised ways and contribute to the broader goals of digital transformation and integration in higher education.

Impact and future orientation

Stakeholders welcomed the development of the Interoperability Framework in **enabling seamless collaboration and data exchange**, especially in areas such as **virtual mobility**, **student records**, **micro-credentials**, and **joint programme delivery**. Higher education institutions and alliances reported increased alignment of their digital infrastructure with

[41] European Digital Education Hub - European Education Area
[42] The European Interoperability Framework | ISA²
[43] European Universities initiative - European Education Area
[44] European higher education interoperability framework - Publications Office of the EU
[45] A technology plan is a strategic document that outlines how one or more organisations will use and manage technology to achieve its goals.

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European objectives and the enhancement **institutional readiness for cross-border cooperation**. The **European EdTech Alliance** welcomed the HEIF as "*a call to action for systemic change in education"*[46]. EU NRENs[47] and Member States[48] recommended to the HEIF to HEIs and European Universities alliances that want to achieve interoperability. The HEIF was also featured on the **Interoperable Europe Platform** as one of the first specialised versions of the EIF[49], as well as an interoperability success story[50] and best practice[51].

Participants have noted that the co-creation process has facilitated mutual learning and shared innovation across sectors. One university alliance representative observed that *interoperability is essential to support "cross-institutional collaboration and student mobility across borders".* The framework is seen as instrumental in helping institutions adopt **common standards** and **shared protocols**, reducing fragmentation in system architecture and increasing trust in data flows across institutions.

The Higher Education Interoperability Working Group will continue to collaborate within the EDEH to work on specific pilot projects and use cases to achieve interoperable European higher education infrastructures. To support the update, the HEIF is promoted in the Higher Education Interoperability Channel of the EDEH by an Early Adopters programme. Through this initiative, around 35 European Universities Alliances are implementing the HEIF as they develop shared learning and teaching systems. This work is supported by regular interoperability clinics and seminars. In addition, a multistakeholder governance group, (consisting of leading stakeholder and technology organisations from across Europe, including representatives from 1EdTech, EUNIS, EMREX, EUA, EUF, and GÉANT) supports further development and implementation of the HEIF. Three annual Task Forces help ensure the Framework remains relevant and up to date.

Action 4: Connectivity and Digital Equipment for Education and Training

High-speed internet access is a fundamental enabler of modern education as it provides schools with access to digital resources, collaborative platforms, and innovative pedagogical tools. Recognising the strategic importance of digital connectivity, the EU has set ambitious targets under the **Digital Decade Policy Programme**. By 2030, all EU households should have access to gigabit connectivity, and all populated areas should be covered by 5G.

To help achieve these goals, the **Connecting Europe Facility (CEF Digital)**[52] is supporting the rollout of Gigabit and 5G networks, with a dedicated budget of €2.1 billion over the period 2021–2027. This initiative prioritises 5G infrastructure deployment for smart communities,

46 https://www.edtecheurope.org/news/the-launch-of-the-higher-education-interoperability-framework
47 For example, https://csc.fi/en/blog/common-guidelines-for-smooth-european-cooperation-for-finnish-higher-education-institutions/
48 https://wiki.eduuni.fi/spaces/CSCKOOTUKI/pages/666272298/Policy+Recommendations+for+European+University+Alliances
49 https://interoperable-europe.ec.europa.eu/collection/iopeu-monitoring/european-interoperability-framework-eif
50 https://interoperable-europe.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/news/dg-eac-and-digit-strengthen-interoperability-education
51 https://interoperable-europe.ec.europa.eu/collection/digital-ready-policymaking/news/drpm-practice-heif-case
52 The Connecting Europe Facility - European Climate, Infrastructure and Environment Executive Agency

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including the education sector. A key objective is to accelerate 5G deployment in underserved regions, ensuring that schools and educational institutions benefit from enhanced connectivity. In addition to reducing the digital divide, this investment aims to improve essential services, foster innovation, and strengthen local competitiveness.

Reforms and investments to boost digital skills and infrastructure are furthermore rolled out in all EU Member States with the support of the **Recovery and Resilience Facility (RRF)**, with a total allocation of around **€29 billion**. **Under the RRF regulation**, each Recovery and Resilience Plan (RRP) must allocate at least 20% of its total funding to digital objectives. In the context of education most countries invest in the digital infrastructure and connectivity of schools (e.g. BE, BG, CY, CZ, DE, ES, FR, HR, IE, NL, PL, PT, RO, SK), often with a focus on disadvantaged schools to close the digital divide. Investments in digital infrastructure go hand in hand with measures to develop the digital competences of teachers (e.g. AT, BE, CY, PL, PT, LT, RO, SK), adaptation of the school curricula, and the development of digital resources and content (e.g. SI, CZ, EL, PT.). Member States also initiated measures to equip learners with digital competences, building on the DigComp (e.g. CZ, HU, PT, SK).

In close cooperation with ESF+ investments, ERDF supports the provision of digital education through access to internet, infrastructure, equipment, and digital education platforms. All education and training levels are targeted (with a high concentration of support in primary and secondary education and VET). Examples of relevant interventions included digital classroom equipment; STEAM learning environments that enable digital education pedagogies; specialised technological devices that facilitate social inclusion of students with special education needs; digital education platforms and applications that facilitate the digitisation of educational content; and digitalisation of management of education systems, personalised devices for staff and students, and internet connectivity.

Implementation state of play

Since its launch, the Commission has initiated **four calls for proposals under the 5G for Smart Communities**[53] framework. Notable selected projects include:

- **5G4ASSAC (Italy)**[54]**:** This initiative establishes a 5G Private Mobile Network (MPN) to enhance education and training in universities and hospitals, supporting new functional approaches to learning.
- **Flanders Smart Fields (Belgium)**[55]**:** By deploying standalone 5G in the Westhoek region, this project enables innovative applications in education and healthcare. Notably, it allows children experiencing prolonged illnesses to attend classes remotely, ensuring uninterrupted learning.
- **Hi5: High Connectivity via 5G (France)**[56]**:** Aiming to roll out 5G in the Toulouse metropolitan area by 2025, this project builds on existing fibre-optic networks to improve public services, including education.

[53] 5G for smart communities | Shaping Europe's digital future
[54] Available at: EU Funding & Tenders Portal
[55] Available at: EU Funding & Tenders Portal
[56] Available at: EU Funding & Tenders Portal

- **5GENIUS (Belgium)**[57]**:** At the University College of Ghent, this project is developing a high-speed 5G network to address the growing demand for digital connectivity on campus, facilitating cutting-edge learning experiences.
- **5G.RURAL (Portugal)**[58]**:** This project pilots Smart Community business models leveraging 5G in rural municipalities. One key education-focused use case integrates augmented and virtual reality (AR/VR) into classroom learning, enhancing student engagement.

Under the **RRF**, Member States have exceeded requirements, with around 24% of the total allocation of the plans supporting the digital transformation. Moreover, two third of this funding focused on digital skills development. Examples of measures supported by RRF funds to enhance digital education include:

- **Czechia** introduced a curricular reform that makes digital competence a horizontal competence in primary and secondary schools, alongside a new 'Informatics' subject centred on computational thinking. Over 4,000 schools received funding for digital devices to support distance learning. Schools also benefit from methodological and technical support, including a network of IT counsellors ("IT gurus") that provides tailored guidance to about one-fifth of all schools.
- **France** invested in the development of digital and hybrid education in primary and secondary schools. More than 45,000 classrooms were equipped with digital tools, and teachers received training in new digital education tools and services.
- **Germany** established competence centres for digital education, operating as a network to develop innovative solutions and content for initial teacher education, in-service training institutions, universities, and research institutes.
  In **Romania**, 61 universities used digitalisation grants to strengthen the digital ecosystem, facilitate curricular revision and improve digital skills among staff and students. RRF funding also supported the installation of at least 1,100 smart labs in schools.

Impact and future orientation

The expansion of high-speed access and investment in digital infrastructure are widely acknowledged as a key enabler of modern education. Stakeholders consistently acknowledged their importance in ensuring equitable access to technology. However, during stakeholder consultations, civil society organisations and educational institutions stressed that, despite EU initiatives, such as **Connecting Europe**, significant connectivity **discrepancies persist**, particularly in rural and marginalised areas. These disparities limit the ability of students and educators to fully benefit from digital learning opportunities.

In regions where infrastructure is already well-developed, stakeholders advocated **for additional investments** in advanced educational technologies, such as AI-powered learning tools and immersive digital environments. At the same time, they cautioned that these

[57] Available at: EU Funding & Tenders Portal
[58] Available at: EU Funding & Tenders Portal

innovations must be guided by equity considerations, so that less-resourced schools are not left further behind.

While EU funding plays a critical role in facilitating procurement and deployment, stakeholders highlight that sustainable digital transformation requires more than infrastructure. **Investments in** technical support and long-term maintenance are essential to maximise the benefits of high-speed connectivity. The review also highlighted the importance of **teacher training**, with stakeholders emphasising that without sufficient educator support, even the most advanced digital tools may fail to achieve their intended impact.

EU initiatives have made significant progress in expanding digital connectivity. According to the ICILS 2023 survey, 65% of teachers reported that their school has good connectivity, with fast and stable internet, while 68% of teachers agreed or strongly agreed that their school has enough ICT equipment (e.g., computers and peripheral devices).[59]

A key concern among stakeholders is the long-term sustainability of digital infrastructure which addresses usability and inclusion, and translates into **meaningful educational outcomes**. Continued investment from local and national governments, along with public-private partnerships, will be required to maintain and upgrade digital access. A particular focus is required to prevent resource-constrained schools from falling behind in technological advancements. Moving forward, stakeholders believe that the success of Action 4 will depend on an integrated approach and stronger alignment between infrastructure investment and broader digital education strategies. This includes **targeted support for underserved regions**, **long-term funding and sustainability models** that involve national governments and private sector partners, **enhanced digital literacy and teacher training**, and a **focus on equitable access to emerging technologies**.

Action 5: Digital Transformation Plans for Education and Training Institutions

To support education and training institutions in adapting to the demands of the digital age, Action 5 promotes the systematic development of digital transformation plans. Central to this action are the **SELFIE tools**, namely SELFIE[60] and SELFIE for TEACHERS[61], which help institutions and educators assess their digital maturity and identify areas for improvement. These tools support a whole-institution approach to embedding digital technologies effectively in teaching, learning, and assessment.

Implementation state of play

SELFIE: (Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies) is a free, research-based tool developed by the European Commission, in collaboration with key partners such as the European Training Foundation (ETF)[62],

[59] ICILS 2023 NOTE: Data is based on Croatia, Czech Republic, Finland, Greece, Hungary, Italy, Latvia, Portugal, Romania, Slovenia, Spain. The rest of the EU countries participating in ICILS did not meet the sample participation requirements
[60] SELFIE for schools
[61] SELFIEforTEACHERS
[62] European Training Foundation

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CEDEFOP[63], and UNESCO's Institute for Information Technologies in Education[64]. It is designed to help schools reflect on how they use digital technologies and to create a snapshot of their strengths and areas for development. Since its launch in 2018, SELFIE has grown rapidly, now used by over **7.5 million users** in **90 countries**, across more than **46,000 schools**.[65]

The tool adopts a whole-school approach, collecting anonymous feedback from students, teachers, and school leaders using structured questionnaires. This input is transformed into a personalised report to support planning and professional dialogue. SELFIE is distinct from SELFIEforTEACHERS, as it focuses on institutional practices rather than individual educator competence. The tool's development included collaboration with ministries of education, researchers, and schools across Europe, and has been integrated into several national digital education strategies, particularly in Portugal and Spain[66].

Pilot and scale-up projects supported by ETF have expanded SELFIE's use in neighbouring partner countries. Additionally, interest from public authorities beyond the EU, including in the Western Balkans and Georgia, has further promoted SELFIE as an instrument for supporting and monitoring digital education policies. The Commission has also encouraged integration of SELFIE into Erasmus+ and Horizon-funded initiatives such as SHERPA and the Digital Schools Award, which promote structured use of the tool in school development planning.

SELFIE has inspired wider engagement in the form of hackathons and a SELFIE Forum, where policymakers, teachers, school leaders, students, and researchers exchange experiences and good practices. In some projects, such as the Digital Schools Award, SELFIE is used to benchmark schools before and after project implementation.

An example of thematic expansion is **SELFIE for Work-Based Learning (WBL)**[67], launched in 2021 following a piloting phase in nine European countries. It adapts the original SELFIE tool to support VET schools and companies by including in-company trainers as a core user group. SELFIE WBL has now been used by over **44,700 users** in **18 countries**.

The tool has also evolved to support schools in responding to topical issues. During the pandemic, a module on blended learning was introduced to assist schools in the rapid transition to remote and hybrid models. A recent Science for Policy report[68] published by the JRC on provides a Model of Emerging Practices for well-being in digital education (WBDE) and a set of optional SELFIE questions on digital well-being.

Despite the steady growth in users, the uptake of SELFIE remains uneven across the EU. According to a 2023 European Court of Auditors report[69], many schools remain unaware of the tool or have not adopted it due to lack of integration in national digital strategies. Spain and

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[63] CEDEFOP | European Centre for the Development of Vocational Training
[64] UNESCO IITE – UNESCO Institute for Information Technologies in Education
[65] The number of users accounts for new and repeated SELFIE assessments.
[66] Castaño M. J., Weikert G. L. and Herrero R. C. (2021). Analysing the digital capacity of Spanish schools using SELFIE. Publications Office of the European Union: Luxembourg.
[67] SELFIE for work-based learning
[68] Centeno, C., Leipute, B., Langham, E., Kampylis, P., Monge Roffarello, A. et al., Promoting Well-being in Digital Education, Proposal for a Model of Emerging Practices, Publications Office of the European Union, Luxembourg, 2025, https://data.europa.eu/doi/10.2760/4054846, JRC144412.
69 European Court of Auditors (2023) Special report 11/2023: EU support for the digitalisation of schools: Significant investments, but a lack of strategic focus in the use of EU financing by member states, https://www.eca.europa.eu/en/publications/SR-2023-11

Portugal continue to lead in implementation with some Member States (Slovakia, Poland) slowly increasing their adoption of the tool as well. However, uptake in the Member States remains a point of attention. The report recommends further promotion and clearer differentiation between SELFIE and SELFIE for TEACHERS.

SELFIE for TEACHERS: Launched in all EU languages, SELFIE for TEACHERS is aligned with the European Framework for the Digital Competence of Educators (DigCompEdu)[70]. The tool offers early years, primary and secondary school educators personalised feedback and professional development suggestions based on teachers' self-reflections. It supports both individual and group use, and over **350,000 teachers** have registered up to date. The tool is available in 34 languages, including all official EU languages. The version for early childhood educators[71] was released in **October 2024**.

SELFIE for TEACHERS is embedded in several national digital education strategies, including those of **Ireland, Spain, Greece, Cyprus, Luxembourg, and Belgium (Flanders)**. It is also used in the Western Balkans, where recent exercises in **Albania and North Macedonia** identified digital skills levels and informed professional development planning. These exercises found that while teachers feel confident using digital tools for communication and information search, they need more support in areas like emerging technologies and computational thinking.

The Ministry of Education and Science and the Ministry of Digital Transformation of Ukraine, in collaboration with the European Commission and the EU agency's European Training Foundation, launched a study in June 2025 on the **digital competence of teachers in Ukraine.** The study is using the tool to collect anonymised data on teachers' digital competences to help the Ukrainian ministries make evidence-based decisions on digital competences training needs, design targeted professional development and strengthen digital education practices across the secondary and vocational education sectors.

Feedback gathered via exit surveys, expert networks, and user testing **confirms the value of SELFIE for TEACHERS as a mechanism for supporting teacher agency and continuous professional learning.** Many educators find group use particularly effective, with results used to identify training needs and facilitate digital pedagogy discussions. There is also growing interest in using anonymised data from the tool to support policy decisions.

Teachers were also supported through the **Erasmus+ Teacher Academies**, which help with their professional development through partnerships between initial and in-service teacher education providers. Since 2021, **61 Teacher Academy projects** have been launched, offering joint courses, online and in-person training, and virtual learning environments.

Impact and future orientation

Stakeholders across the education, civil society, and EdTech sectors consistently highlight the importance of SELFIE and SELFIE for TEACHERS in supporting digital transformation. They are recognised as practical tools that help institutions and educators evaluate their digital readiness and take informed steps towards improvement. One EU-wide NGO noted, *"we commend the Erasmus+ Teacher Academies and the SELFIE for TEACHERS tools under*

[70] DigCompEdu - European Commission
[71] SELFIEforTEACHERS for early childhood educators

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Action 5…, as they have significantly supported the digital upskilling of educators, fostering a collaborative environment for professional development."

The tools are valued not only for raising awareness but also for generating data to inform policy, resource allocation, and professional development planning. However, challenges remain. Stakeholders have emphasised the need for clearer guidance on interpreting results, translating findings into actionable strategies, and enhancing usability for different levels of digital competence.

A recent **Joint Research Centre report**[72] found that teachers appreciate the tool's role in benchmarking and reflection but require further support to act on their assessments. Teachers expressed the need for better alignment with local contexts, access to resources, and integration into training programmes. Ministries of Education also noted the need for enhanced monitoring mechanisms and greater access to anonymised data.

Action 5 has contributed significantly to equipping schools and educators with tools to reflect on and improve digital practices. SELFIE and SELFIE for TEACHERS are now firmly embedded in national and international strategies and supported through the Erasmus+ programme. However, wider adoption and sustained impact require greater integration into professional development systems, enhanced promotion, and clearer communication of the tools' purposes and differences.

Next steps will include updating the SELFIE and DigCompEdu frameworks to reflect emerging technologies, including AI and digital wellbeing. The Commission also aims to improve awareness of the tools, development more support and guidance materials for users and to create a Community of Practice (CoP) to share and exchange experience of using the tools. The tools will also be further improved, for example, by enhancing personalisation features, and exploring the possibility of extending the tools to additional education sectors. Building a compendium of Erasmus+ projects using SELFIE will further highlight its value and support replication.

At the same time, Erasmus+ Teacher Academies will continue to serve as a strategic vehicle for strengthening digital competence across Europe's teaching workforce, contributing to building inclusive and future-ready education systems in tandem with expanded calls and diversified focus areas.

Action 6: Ethical Guidelines on the Use of AI and Data in Teaching and Learning for Educators

AI is increasingly influencing various aspects of human activity, including education. As AI-driven tools become more prevalent in teaching and learning environments, it is essential that educators across the European Union (EU) are equipped with the necessary knowledge to use these technologies ethically.

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[72] Economou, A., Kyza, E., Georgiou, Y., Kapsalis, G., Gallagher, S., Galvin, C., Gonida, E., Hernandez-Leo, D., Ilomaki, L., Lakkala, M., Moustakas, D., Papadopoulos, P. and Ruiz- Garcia, A., Using self-reflection to support teacher professional learning and development of their digital competence: A multi-case study using SELFIEforTEACHERS, Publications Office of the European Union, Luxembourg, 2024

In response, the European Commission has developed *Ethical Guidelines on the Use of AI and Data in Teaching and Learning for Educators*[73]. These guidelines aim to support teachers and educational staff in understanding the opportunities and risks associated with AI and data use and promote responsible AI implementation in schools while safeguarding students' rights and educational integrity.

The Guidelines primarily target teachers and educational personnel in primary and secondary education, particularly those with limited or no prior experience in using AI-driven tools. They also serve as a resource for a broader audience, including students, parents, policymakers, and other stakeholders involved in digital education. Using generic examples, the Guidelines explain AI applications in educational settings, their potential to support learning and administrative functions, and the ethical considerations necessary for responsible usage.

Implementation state of play

To develop the Guidelines, an Expert Group was established in June 2021. The Expert Group comprised of **25 experts** from diverse fields, including AI and education researchers, legal professionals, educators, non-profit organisations, and representatives from international institutions. The Expert Group convened **four times** between June 2021 and June 2022, with additional intermediary workshops to refine content and ensure its relevance to educators.

The Guidelines and a summary of accompanying Report were officially published on **25 October 2022**. This was supplemented by additional resources, including a **factsheet, infographics, and an explanatory video**, to enhance accessibility and understanding. The Guidelines were translated into all **EU official languages** by the end of 2022. In alignment with the Commission's enlargement objectives, the Guidelines were further translated into **Western Balkan languages** and introduced at the **2024 Western Balkans Ministerial**. At the request of some **EU Delegations**, a **Georgian translation** was also made available.

Building on Action 6**)**, the Commission has also intensified efforts to support Member States and education and training stakeholders in addressing the opportunities and challenges posed by AI in education. With the rapid emergence of **generative AI** in November 2022 and the entry into force of the **AI Act**[74] in August 2024, these efforts have gained renewed urgency. The objectives of this work have been to enhance the capacity of education and training systems to integrate AI safely and effectively, develop the skills necessary to navigate AI's disruption, encourage innovative pedagogies, facilitate the exchange of best practices, and raise awareness of AI's broader implications for education and training.

Impact and future orientations

The Guidelines have been widely acknowledged within the education and training community. In **May and October 2025**, they were the most downloaded publication and ranked among the **top 3 publications from the Publication Office of the European Union.** As of September

[73] European Commission: Directorate-General for Education, Youth, Sport and Culture, Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators, Publications Office of the European Union, 2022
[74] OJ L, 2024/1689, 12.7.2024, ELI: http://data.europa.eu/eli/reg/2024/1689/oj

2026, the publication has been downloaded more than 62,500 times and has stimulated further discussions on the role of education in AI awareness and the ethical considerations necessary when integrating AI solutions in schools. This has been reflected in strong engagement across social media platforms and active participation in over **30 events** at both **EU and international levels**, including the **2023 European Education Summit**[75], as well as high-profile forums organised by **UNESCO and the Council of Europe**.

Stakeholders, including members of the expert group, have independently promoted the Guidelines through seminars, workshops, teacher training programmes, and national-level initiatives in France, Greece, Sweden, and Denmark. Additionally, Spain's National Institute of Educational Technologies and Teacher Training (INTEF) referenced the Guidelines in its **Guide on the Use of AI in Education**[76], published in **June 2024**.

Stakeholders widely **recognise the increasing significance of AI and data in education**, with many viewing the Guidelines as a critical step in promoting ethical AI use. One ICT organisation emphasised, *"while developing AI and data solutions, attention must be paid to their ethical use and to ensuring that individual learners always have the right to determine how their data is used."* Many stakeholders, including EdTech companies and educators, stress that **AI-powered tools should be embraced rather than restricted**, provided that strong ethical safeguards are in place. The Guidelines are seen as a necessary resource for encouraging their thoughtful use and protecting students, teachers, and schools from potential risks associated with AI and data-driven technologies.

Several concerns have been raised regarding their practical implementation. Educators are concerned about the **lack of transparency** in AI decision-making processes, particularly regarding how **AI systems (including generative AI) assess and adapt to students' learning**. Emphasis has been placed on algorithmic bias and discrimination, which is especially critical for vulnerable groups or those from disadvantaged backgrounds.

Educators and school leaders highlight the **need for greater investment in professional development and AI literacy training** to support teachers to effectively navigate ethical and legal complexities. Teacher representatives advocate for contextualising the Guidelines to account for varying levels of technological readiness across different regions. This includes calls for **use-case examples and flexible guidance** that can adapt to the rapid evolution of AI technologies. One educator remarked, *"there is a pressing need for more comprehensive ethical guidance on the use of AI in schools and higher education. Given the rapid pace of technological advancements, these guidelines must also be regularly updated to stay relevant."*

Industry stakeholders and data protection experts stress the importance of **adaptable ethical frameworks** that evolve alongside AI advancements. While there is broad support for robust ethical standards, some stakeholders caution that **overly rigid regulations could stifle innovation** in classrooms and want to see a balanced approach that ensures ethical AI use without hindering AI adoption in schools. Drafted prior to the adoption of the **AI Act**[77] and before the rapid uptake of **generative AI** by an increasing number of students and teachers,

[75] https://education.ec.europa.eu/news/insights-from-the-sixth-european-education-summit
[76] https://intef.es/Noticias/guidelines-on-the-use-of-ai-in-education/
[77] OJ L, 2024/1689, 12.7.2024, ELI: http://data.europa.eu/eli/reg/2024/1689/oj

these guidelines remain a foundational resource for education and training stakeholders in Europe.

Following recurrent requests by various stakeholders the Guidelines have been revised by a dedicated multi-stakeholder Working Group in **the European Digital Education Hub,** ensuring that the guidelines remain in step with evolving AI capabilities, the increased use by educators and students, and the regulatory frameworks (i.e. including the AI Act) and provide further practical guidance to educators. Offering ethical considerations and practical requirements for teachers both at an individual level and within the school community, including through concrete educational objectives and examples, the guidelines highlight the crucial role of securing pedagogically driven use of AI in education and developing digital skills, including in the field of AI. The updated Guidelines were published[78] in English on 5 March 2026 and in all EU official languages on 12 June 2026, currently with 8,523 downloads.

AI in education has been at the centre of **policy dialogues and strategic discussions** at both the EU and Member State levels. It featured prominently in the **Structured Dialogue on Digital Education and Skills** (see Action 1) and was recognised as a **strategic priority** in the two **Council Recommendations on Digital Education and Skills**, adopted in November 2023. In May 2024, Ministers of Education held a dedicated **Policy Dialogue on AI in Education**, emphasising the need for closer cooperation and structured exchanges at the EU level. This call was further reinforced during the **Digital Education Dialogues** hosted by the Belgian Presidency of the Council of the EU. Additionally, the **EEA Working Group on Digital Education (DELTA)** facilitated discussions on AI across multiple sessions, including a peer-learning activities and a joint meeting with the **EEA Working Group on Schools**. The 2026 Council Conclusions on Teachers in the era of AI called for ethical, safe and human-centred approach to AI in education that focuses on strengthening digital skills and AI literacy, promoting inclusion and fairness, empowering teachers, and supporting teachers' and learners' well-being.

Against the backdrop of increased use of AI among young people and in response to the C**ouncil Recommendations on Digital Education and Skills,** the abovementioned requests for greater cooperation on AI in education at EU level and the increased recognition of AI skills and talent as a driver for Europe's democratic and competitiveness goals in the age of AI, in June 2026 the Commission presented an **AI literacy framework for primary and secondary education**. The framework is developed in cooperating with the OECD and with international expertise and it aims at offering a common understanding of the competences young people need to understand AI, how it works and how to use it responsibly, as well as at supporting education and training systems in integrating AI literacy in primary and secondary education. The framework will also inform the 2029 PISA innovative component on Media and AI Literacy. The framework, available in all EU 24 official languages is informed by an extensive stakeholder consultation, reaching around 2000 stakeholders across more than 100 countries via events, an online survey and written input.

[78] European Commission: Directorate-General for Education, Youth, Sport and Culture, Guidelines on the ethical use of artificial intelligence and data in teaching and learning for educators, Publications Office of the European Union, 2026

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Beyond policy discussions, AI in education has been a key theme in high-level events organised by the Commission, including the **2023 European Education Summit**, the **2024 Digital Education Action Plan Review launch event**, the **Digital Education Hackathon Main Stage Event 2024**, the **2024 EU-Japan Seminar on Digital Education and the 2022, 2025 Digital Education Stakeholder Forum and the 2026 European Digital Education Hub event 'Collaborate for Impact'**. Further exchanges were also organised with Research labs focusing on AI in education. These engagements have reinforced the need for **strategic, coordinated, and evidence-based** approaches to integrating AI in education and training systems.

The **Erasmus+ programme** has also played a pivotal role in advancing AI-related initiatives. In **2022**, AI in education was designated a **priority** under the **Forward-Looking Projects** action, leading to the selection of **seven projects** with a combined budget of **€5.58 million**. Following this, the **2025 Erasmus+ Call** provides funding for large-scale projects focusing on the **ethical and effective use of generative AI in education and training**. Furthermore, two policy experimentation calls from the **2026 Erasmus+ Annual Work Programme** will fund respectively public private partnerships for ethical design, development and use of AI tools in education and training and AI-powered personalised Learning pathways for basic skills.

To build preparedness for the **AI-driven skills transformation**, the Commission updated **DigComp 2.2** in March 2022 and then further to DigComp 3.0 in November 2025, incorporating **AI-related competencies** across all the 21 competence areas of the framework (see Action 8). Further initiatives include the launch of a **dedicated public channel on AI in education** within the **European Digital Education Hub**. **Multi-stakeholder squads** also produced a **series of reports on AI in education[79] in 2023**, on E**xplainable AI[80] in 2025,** before carrying out practical work on **main drivers at the EU level for the effective adoption of AI in education** in 2025-2026. The Community also supported the practical implementation of the updated guidelines on the ethical use of AI and data for educators (Q2–Q3 2026).

In **June 2024**, a workshop with teachers gathered insights on classroom AI usage which highlighting the need for practical guidance and professional development. Additionally, with a view to developing an overview of the ethical and responsible use of AI in education in the EU and informing further policy initiatives, a mapping exercise of AI initiatives in education was carried out between January and October 2025 and published via the EDEH in April 2026. This mapping exercise identified 10 good practices from among 209 identified practices, relating to the use of AI at different levels of education, as well as the support mechanisms put in place by Member States to foster it.

Additionally, in July 2026, the Commission published a policy brief on the **implications of six flagship EU digital legislations** on education and training stakeholders (Digital Services Act,

[79] European Commission: European Education and Culture Executive Agency, *AI report – By the European Digital Education Hub's Squad on artificial intelligence in education*, Publications Office of the European Union, 2023.
[80] European Commission: European Education and Culture Executive Agency, *Explainable AI in education – Fostering human oversight and shared responsibility – By the European Digital Education Hub's Squad on artificial intelligence in education*, Publications Office of the European Union, 2025.

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Digital Markets Act, Data Act, Data Governance Act, Cybersecurity Act and Cyber Resilience Act)[81]. Further research on the implications on the **AI Act is underway.**

Other Activities contributing to Strategic Priority 1

Engagement with the Education Technology (EdTech) Sector

Although not a stand-alone action within the Digital Education Action Plan (DEAP) 2021–2027, engagement with the Education Technology (EdTech) sector has been an important part of the strategic implementation of the plan. The EdTech sector is playing an increasingly important role in Europe's digital education landscape, providing platforms, tools, and digital content solutions that support teaching and learning. With over **EUR** 54 **billion worth and** 0.75 billion investments in European EdTech[82] , the region is one of the fastest-growing globally. However, the sector remains highly fragmented, comprising primarily micro-enterprises and SMEs, many of which face challenges scaling across borders and establishing effective partnerships with public education systems.

To better understand the evolving EdTech landscape and strengthen its role in digital education, the European Commission has pursued a series of structured activities since 2021. These initiatives have aimed to build dialogue between the public and private sectors, foster visibility and quality standards, and ensure that EdTech solutions align with European values, priorities, and pedagogical needs.

Implementation state of play

From mid-2021 to mid-2023, four high-level roundtables were hosted by the then Commissioner for Innovation, Research, Culture, Education and Youth, Mariya Gabriel, bringing together representatives from approximately 12 leading European EdTech organisations. These discussions culminated in the development of a **common vision document** outlining the role of EdTech within Europe's digital education landscape. The outcomes of these roundtables were publicised through a series of op-eds and communications, such as *"Commissioner Mariya Gabriel hosts a Roundtable discussion on digital education with European Education Technology"* (July 2021), *"European Commission supports European EdTech to come of age"* (November 2022), and *"Making EdTech into Europe's next success story"* (May 2023).

Subsequently, on 15 April 2026, Executive Vice-Presidents Roxana Mînzatu and Henna Virkkunen hosted a **High-level European EdTech Dialogue**, gathering 14 EdTech founders and CEOs and a representative of the European EdTech Alliance to discuss how to strengthen EU EdTech sovereignty, scale, and global competitiveness, helping to inform digital education actions under the Education and Skills Package.

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[81] VILLAR ONRUBIA, D., BROWN, I., COLONNA, L., CRONIN, C., DE MARTIN, J.C. et al., EU Digital Legislation's Implications for Education and Training - Insights into the Digital Services Act, Digital Markets Act, Cybersecurity Act, Cyber Resilience Act, Data Governance Act and Data Act, CACHIA, R. and LOPEZ COBO, M. (eds.), Publications Office of the European Union, Luxembourg, 2026

[82] Havinga, B., Clary, A., Lindroos Cermakova, A., Jeppesen, J. (2025). European EdTech Startup Innovation Ecosystem. European EdTech Alliance. Bielefeld. Germany

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Building on this momentum, the **first EIT EdTech Conference** was held in **January 2024** in Brussels, organised by the EIT Community. The event gathered around 100 high-level representatives from EdTech companies, education institutions, EU institutions, and national governments. Participants explored the current state of EdTech in Europe and discussed how to boost cooperation, address fragmentation, and position Europe as a global leader in education technology. A second conference is planned for **October 2025**.

The recognition of EdTech's strategic importance was also reflected in the **2023 Erasmus+ Forward-Looking Projects call**, which prioritised public-private partnerships and quality assurance in the EdTech sector. The call, focused on scaling EU-based EdTech solutions, received 25 proposals. Four projects were selected and launched in **2024**, signalling increasing support for innovation and cross-border collaboration in the field.

EdTech providers have also contributed to EU-level policy development. During the stakeholder consultation for the **Preparatory Study on Digital Education Content in the EU** (supporting DEAP Action 3), EdTech companies participated through a dedicated Stakeholder Consultation Group. Their input helped map current trends and challenges in content development, delivery, and management.

In addition, the Commission's commitment to leveraging EdTech solutions was reflected in its response to the war in Ukraine. As part of the Communication *"Welcoming those fleeing war in Ukraine"* (March 2022), the Commission supported the launch of the **New Ukrainian School Hub**, a platform co-developed with European and Ukrainian EdTech providers to provide displaced learners with access to supplementary education resources.

The **Council Recommendation on the Key Enabling Factors for Successful Digital Education and Training** further highlighted the role of EdTech. It encouraged Member States to promote multi-stakeholder approaches and sustainable cooperation with technology providers. It called for the structural involvement of the private sector in the co-development and evaluation of digital education policies and standards.

Impact and future orientation

The Commission's sustained engagement with the EdTech sector has helped increase its visibility and recognition as a key actor in the digital education ecosystem. These initiatives have laid the groundwork for enhanced cooperation between EdTech companies and public institutions and have encouraged alignment with EU values, such as inclusion, accessibility, and data protection. The recognition of EdTech in Erasmus+, its involvement in policy consultations, and participation in crisis response efforts have all contributed to positioning the sector as a legitimate partner in shaping Europe's digital education future.

Stakeholders widely acknowledge the growing importance of EdTech but continue to highlight barriers to its full integration into national education systems. They point to significant obstacles in scaling EdTech solutions, including inconsistent procurement models, short-term funding cycles, and limited alignment with national curricula. Public sector representatives and educators often struggle to evaluate the quality and relevance of EdTech products, citing a lack of evidence and standardisation. Civil society groups highlight concerns about data privacy, commercial influence, and the risk of misalignment between private-sector innovation and educational needs.

Many emphasise the importance of greater collaboration between EdTech developers and educators to co-create tools that are pedagogically sound and contextually appropriate. There is strong support for the creation of **dedicated initiatives to stimulate EdTech start-ups and scale-ups**, facilitate cross-border cooperation, and promote quality assurance mechanisms.

The strategic engagement with EdTech has shown that the sector has considerable potential to support Europe's digital education goals and technological sovereignty. However, structural challenges remain, particularly around scalability, quality assurance, and integration with public education systems. Stakeholders see a role for the EU in fostering innovation by supporting cross-border collaboration, offering targeted funding for EdTech development, and creating spaces for structured dialogue and knowledge exchange.

2.2. Strategic Priority (SP) 2: Enhancing digital skills and competences for the digital transformation

Action 7: Common Guidelines for Teachers and Educators to Foster Digital Literacy and Tackle Disinformation

The increasing volume of digital content, the rise of social media, and the widespread use of algorithms in shaping online information have heightened the need for digital literacy. To navigate this evolving landscape, individuals must develop critical thinking skills that enable them to assess information, recognise bias, and make informed decisions. Education and training systems play a vital role in fostering these skills, equipping students with the competencies necessary to engage responsibly in the digital world.

Recognising the urgency of this challenge, the European Commission developed Guidelines **for Teachers and Educators on tackling disinformation and promoting digital literacy through education and training** [83]**,** providing structured support to educators in addressing these issues in classrooms. The Guidelines aim to:

- Strengthen the role of education and training in promoting digital literacy and resilience against disinformation.
- Equip teachers and educators with practical resources, including activity plans and materials for classroom use.
- Encourage responsible and safe digital engagement by increasing public awareness of disinformation and misinformation.

Implementation state of play

To develop the Guidelines, the Commission launched an **informal expert group in May 2021**, bringing together 24 specialists from diverse fields, including education, journalism, social

[83] European Commission, Directorate-General for Education, Youth, Sport and Culture (2022). Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training. Luxembourg: Publications Office of the European Union.

media, and academia. The group met five times between October 2021 and July 2022 to exchange best practices, exchange expertise compile evidence-based recommendations.

Following extensive consultations, the Guidelines and an accompanying **Report**[84] were published on **11 October 2022**, accompanied by a factsheet, infographics, and an explanatory video[85]. To ensure accessibility, the Guidelines were translated into all **EU official languages** by the end of 2022. Later, the Guidelines were further translated into the **Western Balkans languages** and opened to the region during the 2024 Western Balkans Ministerial. The Guidelines were translated into Georgian as well.

The Commission also promoted the Guidelines through a social media campaign, participation in EU and stakeholder-led events, and outreach initiatives such as webinars with **eTwinning teachers**. The Guidelines were further spotlighted during the **EU elections awareness campaign** and a dedicated **two-year anniversary campaign in October 2024**.

In addition to the Guidelines launch, the following activities were carried out to promote digital literacy and build resilience towards disinformation:

- In 2023, one of the priorities of the **Erasmus+ Forward-Looking project call** focused on 'Teacher training and curriculum development in tackling disinformation and promoting digital literacy' to encourage development of new disinformation supports.
- **The Council Recommendation on improving the provision of digital skills and competences in education and training** that supports Member States in their common challenges related to the level of digital skills.
- The work of the eTwinning community and the European School Education Portal supports teachers and educators across the EU daily.
- Erasmus+, alongside other programmes such as European Solidarity Corps, Creative Europe and CERV (Citizens, Equality, Rights and Values (CERV) also offer continuous digital and media literacy projects in formal and non-formal education. Since 2021, Erasmus+ has provided funding for more than 670 grass-root projects in the field (total budget of EUR 48.3 million). In addition, in 2024 six large-scale Forward-looking projects on teacher training and curriculum development kicked off with a total budget of EUR 8 million.

Impact and future orientation

Since their launch, the Guidelines have received **strong endorsement** from the education and training community. As of September 2026, they had been downloaded over 18,000 times from the Commission's Publication Office. They have also contributed to policy discussions and educational initiatives, featuring in events such as **Safer Internet Day 2023** and **EU Youth Week 2024**, as well as stakeholder-led conferences organised by the Lisbon Council and the City of Namur.

[84] European Commission, Directorate-General for Education, Youth, Sport and Culture (2022). Final report of the Commission expert group on tackling disinformation and promoting digital literacy through education and training. Luxembourg: Publications Office of the European Union.
[85] Available at: Digital Education Action Plan – Action 7 - European Education Area

Beyond institutional engagement, members of the **expert group** and other stakeholders have independently promoted the Guidelines through **seminars, teacher training programs, and journalist workshops** across EU Member States. A European youth advocacy organisation remarked about the importance of the Guidelines, *"In the face of information overload and rapid technological advancements, students need to develop critical thinking skills to evaluate information effectively, identify biases, and solve problems creatively."*

Despite this success, challenges remain in **broadening adoption** across Member States. Since implementation is voluntary, ensuring **systemic curriculum integration and widespread teacher training** remains a priority. One education organisation highlighted the need for ongoing updates, stating, *"Given the growing importance and urgent need for properly training and supporting teachers, these Guidelines must continue to evolve with emerging digital challenges."*

During consultations, stakeholders expressed wide support for the Guidelines as an important tool for equipping young people with **critical digital skills**. However, many emphasised the need for **stronger implementation strategies** to ensure long-term impact. Some civil society organisations argued that digital literacy must be embedded across **multiple subjects**, enabling students to apply **critical thinking in all areas of learning**.

In addition to education sector engagement, stakeholders stressed the importance of **collaborating with families and communities** to reinforce responsible digital practices beyond the classroom.

On 5 March 2026 the Commission published an **update of the Guidelines**[86] to address emerging challenges such as generative AI, prebunking, social media influencers and social media platforms, including the challenge of foreign information manipulation and interference (FIMI). Contributing also to the European Democracy Shield, the Guidelines offer enhanced practical support for teachers via a series of hands-on activities ready for use in the classroom, while a dedicated chapter for policymakers will promote broader systemic impact.

The Update was implemented through a dedicated Working Group under the European Digital Education Hub, bringing a diversity of expertise. Member States may require further encouragement and support to integrate the updated Guidelines into teacher training programmes and broader digital literacy strategies. In June 2026 the Guidelines were made available in all EU official languages with over 3,438 downloads. In parallel, the Commission will continue to monitor their adoption and effectiveness so that the Guidelines remain a relevant and practical resource for educators across Europe.

Finally, the topic of digital and media literacy and their contribution to resilience to disinformation was also highlighted by the European Citizen's Panel on Preparedness (May 2026), which identified the recognise disinformation and fact-check information among its 20 recommendations.[87] In addition, the **European Citizens' Panel on Democratic Resilience, to be held in the autumn of 2026 (September-November), will also address media literacy**

[86] European Commission: Directorate-General for Education, Youth, Sport and Culture, *Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training – Updated*, Publications Office of the European Union, 2026, https://data.europa.eu/doi/10.2766/5220136

[87] https://citizens.ec.europa.eu/european-citizens-panels/citizens-panel-preparedness_en

among its topics.[88] These issues are also being discussed d in the context of the EU Youth Dialogue in the period of 1 July 2026 – 31 December 2027, engaging young people on the topic at national level.[89]

Action 8: Updating the European Digital Competence Framework to Include AI and Data-Related Skills

As emerging technologies such as artificial intelligence (AI) and big data increasingly shape European society and economy, digital competence has become essential for all citizens—including students, jobseekers, workers, and educators. Education and training professionals must be equipped with the necessary skills and confidence to use these technologies effectively and responsibly. To support this, the European Commission updated the Digital Competence Framework (DigComp)[90] in March 2022 to better reflect AI and data-related skills, promoting critical, confident, responsible, and ethical engagement with new technologies.

This update, known as **DigComp 2.2**, was funded through the Erasmus+ programme and produced in consultation with a wide range of stakeholders, including members of the DigComp community of practice. The revision aligns with the broader objective of empowering citizens to navigate a rapidly changing digital landscape, particularly considering increased reliance on autonomous systems and data-driven decision-making.

Implementation

DigComp 2.2 introduces more than **250 new examples** of digital knowledge, skills, and attitudes. These updates were designed to help users understand the relevance of the 21 DigComp competences, including those relating to AI and data in their everyday lives. An appendix provides **over 70 examples** illustrating where individuals might encounter AI systems, alongside practical applications of emerging technologies. The aim was to ensure that all citizens can meaningfully engage with these tools

Research conducted in late 2023 by the JRC on the usage of DigComp in digital skills or digital education policies and in formal, non-formal and informal education and training shows that DigComp is used for these purposes in at least 22 Member States and in many regions.[91] DigComp is referenced in the **Council Recommendation on improving the provision of digital skills and competences in education and training**, adopted in **November 2023**. It is also cited by international organisations such as **UNESCO** and the **International Telecommunication Union (ITU)**[92] and underpins the **Digital Skills Indicator** of Eurostat[93], used to track progress toward the Digital Decade's basic and above-basic digital skills targets.

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[88] https://citizens.ec.europa.eu/citizens-panel-democratic-resilience_en
[89] https://youth.europa.eu/strategy/euyouthdialogue_en
[90] Vuorikari, R., Kluzer, S. and Punie, Y. (2022). DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes. Publications Office of the European Union: Luxembourg.
91 Centeno, C., Cosgrove, J., Cachia, R., Mora, T., Di Legge, A., Vivarelli, S., Bulian, G., Moyes Prellezo, N., Piña De Santisteban, P., Schulz, C., Hüsing, T., Cuartas-Acosta, A., and Troia, S., European Digital Skills Certificate (EDSC) Feasibility Study: Annexes to the report. Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/3966202, JRC138344
[92] International Telecommunication Union (ITU)
[93] Vuorikari, R., Jerzak, N., Karpinski, Z., Pokropek, A. and Tudek, J., Measuring Digital Skills across the EU: Digital Skills Indicator 2.0, Publications Office of the European Union, Luxembourg, 2022, doi:10.2760/897803, JRC130341.

Furthermore, DigComp is referenced as a key resource in the Commission's overarching **Union of Skills** strategy (**Action Plan on Basic Skills**).

DigComp has been translated into **20 EU official languages**, as well as into other languages, including Arabic or Ukrainian.[94] Since its publication until September 2026, DigComp 2.2 received **over 219,000 views**, **80,000 downloads**[95].. Recent work has involved reviewing the application of DigComp in education and training initiatives across Member States, and documenting use cases at international, European and Member State levels of how DigComp supports various stages of policies and initiatives in education, training and employment contexts[96].

At the end of 2025, DigComp's fifth iteration (**DigComp 3.0)** was published. Enhancements cover four aspects: updates to the wording of competence areas and competences; further integration of AI (including generative AI); updates to the proficiency levels; and the development of new learning outcomes, which provide concrete descriptions of knowledge, skills and attitudes for each proficiency level. Another significant novelty was the development of learning outcomes for DigComp, which was a key recommendation from the European Digital Skills Certificate (EDSC) feasibility study (see Action 9, below). This aligned to DigComp users' desire for further clarity in the application of DigComp for granular implementations, such as assessment.

The development of DigComp 3.0 included extensive consultation and engagement with a diversity of over 300 experts and stakeholders. As of September 2026 (10 months after publication), DigComp 3.0 has been viewed over 61,000 times and downloaded over 34,000 times. It has been translated into Dutch, German, Greek, Italian, Latvian, Polish, Portuguese, Spanish and Basque[97].

Impact and future orientation

Stakeholders across the education, policy, and civil society sectors consulted during the DEAP review strongly supported the inclusion of AI and data-related skills in DigComp 2.2. These skills are increasingly viewed as critical for career readiness and civic participation in a data-driven society. Many argue that school curricula must include these topics—accompanied by appropriate professional development for educators.

Stakeholders welcomed the 2022 update but have also called for continued responsiveness. One EU-wide digital inclusion network noted, *"it is crucial to implement frequent updates that promptly incorporate the latest innovations…to ensure that DigComp remains a relevant and effective tool,"* highlighting the lack of specific reference to generative AI as a gap in the

[94] CENTENO, C. and COSGROVE, J., Ten Years of DigComp: A Framework more essential than ever, European Commission, Seville, 2025, JRC143430.
[95] JRC Publications Repository
[96] Centeno, C., Cosgrove, J., Cachia, R., Mora, T., Di Legge, A., Vivarelli, S., Bulian, G., Moyes Prellezo, N., Piña De Santisteban, P., Schulz, C., Hüsing, T., Cuartas-Acosta, A., and Troia, S., European Digital Skills Certificate (EDSC) Feasibility Study: Annexes to the report. Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/3966202, JRC138344
Centeno, C. and Cosgrove, J., Ten Years of DigComp: A Framework more essential than ever, European Commission, Seville, 2025, JRC143430.
[97] COSGROVE, J. and CACHIA, R., DigComp 3.0: European Digital Competence Framework - Fifth Edition, Publications Office of the European Union, Luxembourg, 2025, https://data.europa.eu/doi/10.2760/0001149, JRC144121.

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previous version. Others emphasised the importance of ensuring that citizens are not only technically proficient, but also critically aware of the ethical implications of AI, including algorithmic bias and data privacy.

Education organisations, social justice groups, and regional authorities raised concerns about the challenges of implementing these updates in contexts with lower digital maturity or limited resources. Calls were made for targeted support, particularly in rural and underserved areas, to ensure equity of access to emerging technologies and professional development. As one EU agency put it, *"as AI systems continue to evolve rapidly and the datafication of education increases, there is a growing need for schools, educators and students to have a proper understanding of these technologies to use them responsibly and harness their full potential."*

Feedback also stressed the need to complement technical AI literacy with critical thinking and information evaluation skills. One European student organisation stated, *"as artificial intelligence becomes more prevalent in education and society, students need to understand its basics, potential applications, and ethical implications…equipping students with essential digital skills is no longer optional but fundamental,"* adding that education must *"go beyond technical proficiency and cultivate essential competencies."*

The 2022 update of DigComp marked a critical step forward in aligning digital competence frameworks with fast-moving technological trends. Its widespread adoption across Europe and international recognition affirm its central role in supporting digital upskilling. However, the rapidly evolving nature of AI and digital innovation requires a continuous and responsive approach.

The publication of **DigComp 3.0** has been guided by literature and policy review, expert input, stakeholder consultation, and consultation with the relevant Policy Directorates of the Commission. The update builds on five priority themes which reflect a combination of digital technological developments, policy priorities, and stakeholders' views: AI (and generative AI) competence; Citizen cybersecurity competence; Rights, choice and responsibility; Wellbeing in digital environments; and Competence to tackle misinformation and disinformation. The development of DigComp 3.0 also acknowledges the importance of lifelong learning; pre-requisites for the acquisition of basic digital skills; differences in digital skills needs across people and over time; and flexible, agile and adaptable applications of the framework. Furthermore, DigComp 3.0 is aligned to the European Declaration on Digital Rights and Principles for the Digital Decade (2023).

Equally, implementation support remains key. Bridging the gap between strategic frameworks and classroom realities will require investment in educator training, tailored resources, and accessible tools. The continued relevance and impact of DigComp in the years ahead will depend on its inclusivity, adaptability, and grounding in real-world practice.

Action 9: European Digital Skills Certificate (EDSC)

Digital skills are fundamental to learning, employment, and participation in society. Yet, the recognition of digital competences remains fragmented across Europe, with diverse frameworks and certification schemes making it difficult for individuals to demonstrate their abilities in a clear and consistent manner across Europe. To address this challenge, between 2022 and 2024,

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the European Commission explored the development of a European Digital Skills Certificate (EDSC). The certificate would help people have their digital skills quickly and easily recognised by employers, training providers and more. This initiative was meant to offer a quality label for existing or future digital skills certifications across Europe, based on the DigComp and a set of agreed minimum quality requirements to support the recognition of digital competences across the EU.

Implementation state of play

The development of the EDSC centred on two core activities: a feasibility study and a Member States pilot. The feasibility study[98], led by the JRC in close collaboration with DG EMPL and a dedicated inter-service Task Force, was carried out from **September 2022 to January 2024**, involved a consortium led by **NTT Data**[99], **empirica**[100], and **All Digital**[101], and engaged over 650 stakeholders and a **community of practice on Digital Skills Certification**[102] (1,000+ participants). It aimed to map the existing landscape of digital skills certification schemes across Europe, identify implementation gaps, and explore the added value and the feasibility of a European-level certificate. The study adopted a participatory approach through surveys, interviews, working groups, desk research, and consultation events.

Key findings from the feasibility study revealed that there are at least **27 different digital skills certification schemes** in use in the EU, showing some alignment to DigComp, with variations in many aspects: their geographical scope, alignment to DigComp, the sector of the issuing organisation, the provision of training material, provisions for inclusion and accessibility, assessment processes, and quality assurance processes and standards.

The **feasibility study** concluded as follows:

- The demand for an EDSC in the EU is limited.
- Digital skills certificates should be better adapted to labour market needs.
- There is a moderate level of readiness for an EDSC across EU countries indicating that substantial effort would be needed to implement and reap the benefits from an EDSC.
- An EDSC would entail significant implementation and permanent operational costs.

A complementary report on the landscape of **Digital Skills Certification Schemes in the EU – A perspective from the European Digital Skills Certificate**[103], was published in early 2025.

In parallel, a **pilot** involving national authorities from **five Member States**, Spain, France, Austria, Romania, and Finland, was conducted between **May 2023 and December 2023**. National authorities discussed the design of an EDSC quality label and explored common

[98] Centeno, C., Cosgrove, J., Cachia, R., Mora, T., Di Legge, A., Vivarelli, S., Bulian, G., Moyes Prellezo, N., Piña De Santisteban, P., Schulz, C., Hüsing, T., Cuartas-Acosta, A. And Troia, S. (2024). European Digital Skills Certificate (EDSC) Feasibility Study. Publications Office of the European Union: Luxembourg.
[99] Home | NTT DATA Group
[100] empirica
[101] ALL DIGITAL • Enhancing Digital Skills Across Europe
[102] Digital Competence Certification Community of Practice • ALL DIGITAL
[103] CENTENO, C., COSGROVE, J., SCHULZ, C., HÜSING, T. and CUARTAS-ACOSTA, A., Landscape of digital skills certification schemes in the EU: An analysis from the perspective of the Digital Competence Framework (DigComp), Publications Office of the European Union, Luxembourg, 2025, https://data.europa.eu/doi/10.2760/8324498, JRC139548)

challenges in the certification landscape. These discussions culminated in a final stakeholder event in **December 2023** with over **270 participants**.

Overall, the pilot showed diverging views on digital skills certification, namely:

- supporting digital skills development is of greater need than certifying them.
- the focus should be on comparability and transparency of digital skills rather than on the mutual recognition of their certification.

Impact and future orientation

Based on the outcomes of both the study and the pilot project, the European Commission concluded that, based on the gathered evidence, such a quality label would not bring enough added value to European citizens and that, at this stage, the costs of putting in place an EDSC quality label would outweigh its benefits. Rather, it was recommended to extend the DigComp framework with new learning outcomes to provide a greater level of clarity in implementation. In response to this recommendation, the European Commission's Joint Research Centre (JRC) developed a set of indicative learning outcomes, which have been published in DigComp 3.0 (described above under Action 8).

Action 10: Council Recommendation on Improving the Provision of Digital Skills in Education and Training

As digital technologies continue to reshape economies, workplaces, and societies, the demand for digital skills has grown exponentially. However, only **60%** of the EU population (aged 16-74) possesses basic digital skills[104], such as downloading or installing software or apps, or participating in social networks. This gap presents a major barrier to inclusion and competitiveness across the EU.

To address this challenge, the European Commission proposed a **Council Recommendation on Improving the Provision of Digital Skills in Education and Training**, adopted in **November 2023**. This initiative builds on the Digital Compass 2030 and the Council Resolution on a Strategic Framework for European Cooperation in Education and Training. It sets out a strategic approach to empower all learners—across ages and educational levels—to acquire **basic, intermediate, and advanced digital skills**, while supporting national and regional policy reform.

Implementation state of play

The Recommendation was informed by the Structured Dialogue with Member States and stakeholder consultations conducted throughout 2022. Following these exchanges, the Commission presented its proposal in April 2023, with formal adoption by the Council in November 2023. It aims to support Member States in reinforcing their digital skills strategies by outlining a clear framework for inclusive and high-quality provision of digital competences.

A key focus of the Recommendation is to promote digital skills development from early childhood through to adult learning, ensuring that all learners are prepared for digital demands

[104]European Commission (2026). Report on the State of the Digital Decade 2026. Luxembourg: Publications Office of the European Union.

in various sectors. It encourages the embedding of digital literacy across all subjects and supports the development of national strategies that address learners' needs at different levels. Professional development for educators is another major priority, with EU tools and funding mechanisms identified as essential to equipping teachers with the skills and resources they need.

The Recommendation further promotes collaboration with civil society and industry, recognising the need for education systems to remain responsive to evolving labour market demands. It supports improved gender balance in ICT careers and highlights the importance of high-quality informatics education at all levels of education.

As a key deliverable, the Commission launched an Expert Group in 2024 to develop EU-level guidelines on high-quality informatics education. The group's mandate includes articulating a shared understanding of informatics, identifying implementation challenges, and providing pedagogical guidance. Composed of 26 members from diverse professional backgrounds, the group has drafted guidelines through a collaborative process that includes teacher workshops and expert consultations. The mandate of the group ended in July 2025. The Guidelines for teaching informatics[105] have been published on 5 March 2026, followed by the translations in all EU languages in June 2026, currently with 2,200 downloads.

In the Council Recommendation, Member States are recommended to support cross-curricular development of digital skills across all levels and types of education and training, to promote the cross-curricular **assessment of digital skills**, with a means and frequency comparable to those used for other core skills in order to monitor progress.

Assessment of digital skills serves several interconnected purposes. It helps measure learners' digital competence, identify strengths and gaps, and provide feedback that supports more effective teaching and learning. At a broader level, assessment enables schools, education authorities, and policymakers to monitor the quality of digital education, evaluate progress, and inform curriculum development, policy decisions, and resource allocation. It also supports international benchmarking and the sharing of good practices.

To bring this action forward, in 2026 the Commission launched a working group tasked with developing a practical guidance on digital skills assessment. The working group's mandate includes providing a coherent understanding of digital skills assessment, outlining current practices, highlighting experiences and best practice examples, and providing practical guidance and pedagogical expertise for future developments in this area.

The working group is composed of 26 members from diverse fields, including teachers, experts on assessment and digital competences, educational technologies, teacher training, and representatives from UNESCO and Ministry of Education. The group will meet five times between April 2026 and January 2027 to exchange best practices, expertise and compile evidence-based recommendations. As part of the development of the guidance, consultations with teachers and policymakers and public authorities are planned to take place in Q4 of 2026. To ensure accessibility across all EU Member States, the practical guidance will be translated into all EU official languages in 2027.

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[105] European Commission: Directorate-General for Education, Youth, Sport and Culture, Guidelines for teaching informatics – Practical strategies for European classrooms, Publications Office of the European Union, 2026

The Recommendation has reinvigorated discussions across the EU about the centrality of digital skills in education systems. It directly contributes to the EU's broader goals under the Digital Compass 2030, the European Education Area (EEA), and the Digital Decade Policy Programme. The policy momentum has led to renewed national efforts to integrate digital skills more systematically into curricula and to improve the digital competence of teachers and learners.

The Recommendation has begun to influence the design of national policies and action plans. The emphasis on informatics and teacher training has helped set a direction for long-term reform and capacity-building.

Impact and future orientation

Stakeholders from across education, civil society, and industry have welcomed the Recommendation. Educators, in particular, value its emphasis on professional development and the creation of digital learning content. Many called for the use of blended learning models to expand accessibility and enrich training experiences. Ministries of education praised the focus on inclusive policy frameworks and the alignment with digital transition goals.

However, stakeholders also raised concerns about persistent inequalities in access to technology and digital infrastructure. Civil society organisations highlighted the challenges faced by low-income households and rural communities, warning that without targeted investment in affordable devices and internet connectivity, the digital divide will continue to undermine learning equity. There is also a growing call for stronger consideration of digital wellbeing and ethical technology use in policy implementation.

Additionally, several organisations noted that non-formal and informal learning providers are insufficiently addressed in the Recommendation. While the importance of these actors is acknowledged, there is a lack of concrete guidance or support mechanisms to help them contribute meaningfully to digital skills provision.

The Council Recommendation marks a significant step forward in embedding digital skills at the heart of education and training in Europe. It offers Member States a roadmap to reform their systems in a way that meets the needs of both learners and labour markets. The launch of the Expert Group on Informatics provided a concrete channel for advancing this agenda, and the guidelines will help operationalise the Recommendation's objectives.

To ensure sustained progress, stakeholders highlight that Member States will need to maintain momentum through consistent policy development, investment, and monitoring. This includes expanding teacher training, scaling support for underserved communities, and ensuring that digital skills are delivered through inclusive and pedagogically sound methods. Feedback from consultations emphasise that future actions should also strengthen the role of non-formal education, address digital wellbeing, and ensure that ethical, inclusive, and safe use of technology remains central to digital education reform.

As stated in the Council Recommendation, the Commission will review implementation progress within five years and will continue supporting Member States with practical tools, peer learning opportunities, and evidence-based guidance.

Action 11: Cross-National Collection of Data and an EU-Level Target on Student Digital Skills

Compared to other core competencies such as literacy, mathematics, and science, cross-national data on students' digital skills has historically been limited within the EU. This lack of robust, comparable evidence has constrained policy efforts to understand and address disparities in digital competence across Member States. Recognising this gap, the European Commission has prioritised the systematic collection and analysis of digital skills data, particularly among young people. In line with the **2021 Council Resolution on the Strategic Framework for European Cooperation in Education and Training**, the Council set a new EU-level target: to reduce the proportion of low-achieving eighth-grade students (ages 13–14) in **computer and information literacy (CIL)** to **below 15% by 2030**.

The target is monitored through the **International Computer and Information Literacy Study (ICILS)**, a global assessment conducted by the **International Association for the Evaluation of Educational Achievement (IEA)**. ICILS measures students' ability to navigate and apply digital technologies critically and effectively, evaluating not just basic ICT proficiency but also digital problem-solving, critical thinking, and contextual knowledge.

Implementation state of play

The ICILS study collects data on students' achievement in computer and information literacy and contextual information on their learning environments, including teacher practices and access to digital infrastructure. This enables meaningful cross-country comparisons and provides evidence for the development of national and EU-wide digital education policies.

Initial EU participation in ICILS was limited, with a small number of countries taking part in the 2013 and 2018 cycles[106]. To enhance participation and comparability, the Commission provided **financial support** for Member States' involvement in the **2023 ICILS cycle**, resulting in a significant increase in participation to **22 countries**[107]**.** This broad participation enabled the collection of more comprehensive data and supported Member States in evaluating the impact of their digital education strategies and investments.

The findings from ICILS 2023 were published in a dedicated **Commission report**[108], offering the first EU-wide assessment of school-aged students' digital literacy. The results revealed major disparities in digital skills performance across Member States, with notable gaps linked to **gender, socioeconomic status, and migrant background**. On average, **42.5% of students** in participating countries did not meet the basic CIL proficiency level. These findings

[106] Only seven EU countries participated in the 2018 round (Denmark, Germany, France, Italy, Luxembourg, Portugal, and Finland), and eight countries in the 2013 round (Czechia, Denmark, Poland, the Netherlands, Germany, Slovakia, Hungary, and Slovenia).

[107] The survey collected information on thirty-six education systems worldwide. The European Commission co-financed the participation of 22 EU countries, including Austria, Belgium (Flanders), Croatia, Cyprus, Czechia, Denmark, Finland, France, Germany (North Rhine Westphalia), Greece, Hungary, Italy, Latvia, Luxembourg, Malta, the Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. This broad participation marks a significant step forward with respect to previous cycles of the study, offering a much more comprehensive view of EU students' digital skills proficiency.

[108] European Commission/ Directorate-General for Education, Youth, Sport and Culture (2024). International Computer and Information Literacy Study (ICILS) in Europe, 2023 – Main findings and educational policy implications. Publications Office of the European Union: Luxembourg.

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underscore the urgency of closing the digital skills gap to achieve the 2030 target, particularly as digital competence becomes increasingly central to lifelong learning and workforce readiness.

The Commission continues to support Member States and Western Balkan countries in preparing for the **2028 ICILS study**, which will place greater emphasis on emerging technologies such as **artificial intelligence (AI)**, alongside traditional areas of CIL and **computational thinking**. ICILS results are also contextualised further as part of the Commission's annual reporting on digital skills in the **Education and Training Monitor**[109].

Impact and future orientation

The expansion of cross-national data collection on digital skills is widely recognised as a critical step in informing and improving digital education policy across Europe. Stakeholders from ministries of education, schools, EdTech organisations, and civil society emphasise the importance of data to identify weaknesses, monitor progress, and ensure targeted investments. As one EU education agency noted, *"Digital competences are assessed … only in half of the education systems in Europe,"* highlighting the persistent lack of standardised approaches across Member States.

The 2023 ICILS results provided a much-needed evidence base for national and EU policymakers, while also validating the rationale behind the EU-level target. Stakeholders agree that the data facilitates a clearer understanding of which regions, schools, and populations are most at risk of digital exclusion. The systematic approach to assessment is viewed as an essential tool to ensure that all students gain the digital competences necessary for their academic, personal, and professional development.

However, the results also point to the scale of the challenge ahead. With 42.5% of students falling below the basic level, significant investment in teacher training, school infrastructure, and inclusive pedagogies is needed to close the gap and ensure progress toward the 2030 target.

Despite the notable progress made in expanding data collection through ICILS, stakeholders continue to raise concerns about the **practicality and consistency** of gathering comparable data across Member States. Differences in curricula, digital infrastructure, and local assessment frameworks pose challenges to full alignment. Civil society organisations emphasised the need for **standardised methodologies** and data disaggregation to reflect the diversity of student experiences. As one stakeholder observed, *"There is a need to understand that education provision varies greatly across Europe, with further variation also in the level of digital skills, literacy, and technology."*

There are also persistent concerns about **data protection** and the need to ensure full **GDPR compliance** when collecting student information. A ministry from a digitally advanced Member State warned that, *"GDPR compliance is still a challenge for many big tech companies delivering digital solutions to European school systems,"* underlining the need for robust safeguards in future study cycles.

[109] Education and Training Monitor - European Education Area

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In addition, while the EU-level target is welcomed in principle, stakeholders caution that it may be **overly ambitious** for regions still building their digital capacity. Ensuring that the target is achievable and meaningful for all Member States will require a flexible, context-sensitive approach. Equity must be a guiding principle, ensuring that the push for improved digital skills does not exacerbate existing regional or socio-economic disparities.

Action 12: Digital Opportunity Traineeships

Digital skills are essential for employment and social inclusion in an increasingly technology-driven society. Yet, in 2025, only **60%** of adults in the EU report having at least basic digital skills[110], despite the growing demand for such competences across all sectors, particularly in non-ICT roles[111]. In response, the **Digital Opportunity Traineeships (DOTs)**[112] initiative was launched by the European Commission in **2018** as a pilot project to provide higher education students and recent graduates with practical experience in digital fields. The initiative was extended in 2021 and 2022 to include **vocational education and training (VET) learners**, recent graduates, and **education staff** from the higher education, school, and adult learning sectors.

DOTs are part of the **Mobility Action (Key Action 1)** of the **Erasmus+ Programme (2021–2027)** and support the objectives of **DEAP**. The programme enables participants to strengthen advanced digital competences through international mobility in areas such as cybersecurity, big data, digital marketing, software development, and AI-related fields.

Implementation state of play

The DOTs initiative facilitates short-term mobility opportunities for students, recent graduates, and education staff to enhance their digital skills through **job shadowing, work placements, study visits, and teaching assignments**. These opportunities span both academic and non-academic sectors and are designed to bridge the gap between education and labour market needs.

Since the launch of the extended action under Erasmus+, participation in DOTs has steadily increased. Since 2018 to date, the programme has reached **over 161,000 participants**. Among them, **more than 118,000 learners** have benefited from digital traineeships or staff training periods. In the current programming period, this includes **close to 74 300 student traineeships** and **34,200 training periods for higher education staff**. An additional **8,670 education staff** from other sectors (VET, adult learning, school education) have taken part to improve their digital competence. Erasmus+ 2024 Annual Report additionally states that 72% of participants in mobility activities have improved their digital competences.[113]

The DOTs mobility formats are designed to be flexible and practical, accommodating a wide range of digital skill levels and needs. Activities are implemented through the Erasmus+ general

[110] European Commission (2026). Report on the State of the Digital Decade 2026. Luxembourg: Publications Office of the European Union.
[111] CEDEFOP (2021). Challenging digital myths. First findings from Cedefop's second European skills and jobs survey.
[112] Digital opportunity traineeships - European Education Area
[113] Erasmus+ annual report 2024 - Publications Office of the EU

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call, offering funding to support travel, subsistence, and participation costs. The expansion of the DOTs scheme aligns closely with the growing demand for **workplace-ready digital competences**, particularly in fields undergoing rapid digital transformation.

Impact and future orientation

The Digital Opportunity Traineeships are recognised by stakeholders as an effective instrument for promoting hands-on digital learning, workforce preparedness, and cross-border collaboration. Participants gain relevant digital competences while fostering innovation and exchange between education and industry. Stakeholders from the education sector have praised DOTs for **bridging the gap between academic learning and real-world digital skills**, noting their contribution to the digital transformation of education systems.

Stakeholders also highlight the initiative's value in **strengthening collaboration between public and private actors** and in promoting digital upskilling across sectors. For example, EdTech companies and industry associations view DOTs as an opportunity to build stronger links between training systems and the evolving demands of the digital economy. There is general agreement that these placements help **equip participants with practical knowledge in areas such as AI, data science, and cybersecurity**, which are increasingly sought after in the labour market.

Nonetheless, equity remains a persistent concern. Civil society organisations and education authorities have raised issues regarding access to DOTs for **underrepresented and economically disadvantaged groups**, particularly in rural or remote areas. Stakeholders advocate for additional mobility funding and greater outreach and promotion of the action to ensure that all learners can benefit equally from the programme. There is also growing interest in expanding the thematic scope of DOTs to ensure continued relevance as technologies evolve.

While the DOTs initiative has made notable progress in scaling up digital skills development, challenges remain in terms of **ensuring equitable access and adapting to emerging labour market needs**. Moving forward, stakeholders encourage the Commission and Member States to prioritise strategies that promote inclusion, such as **targeted funding schemes and outreach to marginalised communities**, especially in regions with limited digital infrastructure.

To ensure the continued success of DOTs, stakeholders suggest enhancing partnerships with **industry, SMEs, and the public sector** to better align traineeship placements with market needs. Greater engagement with employers will help guarantee that the skills developed through DOTs are relevant and transferable.

In parallel, stakeholders point to needs of updating the scope of DOTs to more explicitly address fast-growing fields such as **AI, quantum computing, and green digital technologies**. This would enhance the long-term relevance of the initiative and ensure that it continues to contribute meaningfully to the EU's broader digital transition.

Looking ahead, the ongoing expansion of DOTs under the Erasmus+ framework provides an opportunity to **scale impact, close digital skills gaps, and foster a digitally capable workforce** equipped for the challenges of the future economy.

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Action 13: Women's Participation in STEM

Women remain underrepresented in the digital sector across education, employment, and entrepreneurship. Despite comparable early interest in science-related careers, girls are less likely than boys to pursue STEM (Science, Technology, Engineering, and Mathematics) and ICT subjects as they progress through their education. According to a 2021 European Commission study[114], women account for only **20% of ICT graduates** and **17% of the tech sector workforce**. More recent data from 2024[115] showed only limited progress, as: women still accounted for 21% of ICT graduates and 25% of the self-employed among scientists, engineers and ICT professionals. In response, the European Commission is working to increase women's participation in STEM studies and careers by supporting targeted interventions that equip young women with **digital and entrepreneurial skills**, particularly in high-demand fields such as AI, cybersecurity, engineering and sustainability.

The Commission's **Analytical Report on the Gender Gap in STEM Education**[116] identifies digital skills as an enabler for girls and women to pursue STEM careers and calls for coordinated efforts across formal, non-formal, and informal education sectors. This aligns with the political priorities set out in the **2024–2029 Political Guidelines** of the President of the European Commission, which underscore the importance of fully integrating women into the digital and innovation economy. A key outcome of this renewed political focus is the development of a **STEM Education Strategic Plan**117.

Implementation state of play

The Commission has advanced several initiatives to foster women's participation in STEM. **Girls Go STEM (formerly Girls Go Circular)**[118], led by the EIT [119], provides digital and entrepreneurial training for girls aged 14–19. Building on the success of Girls Go Circular, which has trained 80,000 girls across 36 countries, Girls Go STEM has set the target to train 100,000 girls by 2028. Through its online learning platform, Circular Learning Space, which now has over 100,000 users, learners can explore topics such as AI, robotics, climate change, rethinking plastics, e-waste and urban mobility.

ESTEAM Fests[72] (Entrepreneurship, Science, Technology, Engineering, Arts and Mathematics) offer interactive events designed to boost girls' and women's confidence in their digital and entrepreneurship competences. These workshops focus on creative problem-solving and networking. Since launch, 23 ESTEAM Fests have been organised across 14 EU countries, reaching 2,720 participants, with an extended online community of over 2,444 girls and women from 38 countries.

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[114] European Commission /Directorate-General for Research and Innovation (2021). She figures 2021 – Gender in research and innovation – Statistics and indicators. Luxembourg: Publications Office of the European Union.
[115] European Commission /Directorate-General for Research and Innovation (2025). She figures 2024 – Gender in research and innovation – Statistics and indicators. Luxembourg: Publications Office of the European Union.
[116] European Commission /Directorate-General for Education, Youth, Sport and Culture (2024). Addressing the gender gap in STEM education across educational levels – Analytical report. Luxembourg: Publications Office of the European Union.
117 COM(2025) 89 final
[118] Girls Go STEM | Digital and Entrepreneurial Skills for the Circular Economy
[119] Home | EIT RawMaterials - Developing raw materials into a major strength for Europe

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The Commission has also supported the creation of interdisciplinary higher education programmes in engineering and ICT, based on a STEAM approach[120]. These efforts build on the EU STEM Coalition, which aims to foster national STEM platforms and share best practices developed under Erasmus+.

These interventions are complemented by initiatives under Erasmus+ that promote gender balance in STEM, such as **STEAM+**[121] and **ArtIST**[122], which integrate entrepreneurship and the arts into technical education, encouraging more inclusive and diversified learning environments. Horizon Europe also contributed to fund research on STE(A)M education with project as STEAMbrace,[123] the ST(R)E(A)M IT project[124], SENSE[125], Road-STEAMer[126], and the SEER[127]. For example, the ST(R)E(A)M IT project[128] supported the development of a manifesto on gender-inclusive STE(A)M education and careers by working with STEM-oriented high schools, academia, public authorities, and industry stakeholders.

Impact and future orientation

Initiatives under Action 13 have made significant progress in reaching young women and girls across Europe. The **Girls Go Circular programme met its 2027 target of training 40.000 girls three years ahead of schedule**. Similarly, **ESTEAM Fests** have offered interactive learning formats that are widely appreciated for their capacity to build confidence and digital competence.

At the Digital Education Action Plan in Review event (April 2024), participants shared how these initiatives shaped their learning and aspirations. One teenage participant in Girls Go Circular spoke of developing a wildfire-predicting drone robot, stating that *"teenagers like me are capable of proposing solutions to real-world problems."* Another advocate, active in the Women in Tech initiative and a contributor to ESTEAM Fests, highlighted the importance of bringing **entrepreneurship and art perspectives into STEM**. She underlined the value of a *"safe environment where different age groups could collaborate and learn from one another,"* noting that ESTEAM created space for *"attraction, retention and growth of women"* in tech fields. She emphasised the **importance of visible role models and engaging parents to inspire confidence and ambition among girls**.

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[120] STEAM is an educational approach to learning that uses Science, Technology, Engineering, the Arts and Mathematics as access points for guiding student inquiry, dialogue and critical thinking.
[121] About – steamtalent.eu
[122] ArtIST and Innovation | Erasmus+
[123] European coordination network and activities to embrace a sustainable and inclusive STEAM educational system: the blend of artistic and creative approaches in STEM education, research & innovation | STEAMbrace | Project | Fact Sheet | HORIZON | CORDIS | European Commission
[124] ST(R)E(A)M IT/STREAMING GIRLS AND WOMEN INTO STEAM EDUCATION, INNOVATION AND RESEARCH | STREAM IT | Project | Fact Sheet | HORIZON | CORDIS | European Commission
[125] SENSE. The New European Roadmap to STEAM Education | SENSE. | Project | Fact Sheet | HORIZON | CORDIS | European Commission
[126] Developing a STEAM Roadmap for Science Education in Horizon Europe | Road-STEAMer | Project | Fact Sheet | HORIZON | CORDIS | European Commission
[127] The STE(A)M Education European Roadmap | The SEER | Project | Fact Sheet | HORIZON | CORDIS | European Commission
[128] ST(R)E(A)M IT/STREAMING GIRLS AND WOMEN INTO STEAM EDUCATION, INNOVATION AND RESEARCH | STREAM IT | Project | Fact Sheet | HORIZON | CORDIS | European Commission

Although formal evaluations of impact remain limited, the growth in participation and personal testimonials indicate the perceived value of these programmes. The scale of uptake and qualitative feedback from beneficiaries support the case for further investment and expansion.

While initiatives like Girls Go Circular and ESTEAM Fests have produced promising results, scaling their impact will require a more coordinated and systemic approach. Stakeholders recommend expanding successful models such as EUSTEAM – Towards a European STE(A)M Platform, which promotes collaboration between public authorities, education institutions, and the private sector. Developing country-specific strategies and disseminating best practices across Member States will be essential to tailoring interventions to diverse national contexts.

Stakeholders emphasise that future priorities should include deepening Erasmus+ support for transdisciplinary STEM projects, such as STEAM+ and ArtIST, and exploring joint degrees and technical university partnerships under the European Universities alliances. Stakeholders also advocate for stronger links between STEM education and labour market needs, particularly in fast-evolving sectors like AI and green tech.

European Digital Education Hub

The **European Digital Education Hub (EDEH)**[129] is a cross-cutting initiative under the Digital Education Action Plan, addressing its strategic priorities. It aims to overcome fragmentation in digital education by fostering collaboration between policymakers, researchers, educators, and innovators across sectors and countries. The Hub acts as a Community of Practice, promoting peer learning, sharing of best practices, collaboration and access to data and research.

Since its launch in June 2022, the Hub focussed on four main areas of activity: **community engagement; monthly knowledge-building activities; data gathering and curation of information; and the acceleration and upscaling of innovative solutions**. Over the last **four years,** the Hub has established a dynamic and growing community, attracting over **7,400 users** from 146 **countries.** Its **members** cover the entire spectrum of education and training, from early childhood education and care to adult education. Their professional background is diverse, from policy makers to researchers and practitioners, from the public to the private sector.

Implementation state of play

A key strength of the Hub lies in its community-building efforts. Over 40% of members actively engage in activities such as online meetings, moderated discussions, and collaborative initiatives. An annual innovation funnel invites members to propose and vote on emerging topics of interest, many of which evolve into working groups known as "squads", webinars, articles or inspiring practices. To date, **31 squads** have been launched on topics ranging from AI in education to digital wellbeing and inclusion, digital skills, immersive learning, safety and security, and digital citizenship education. These groups have produced widely consulted outputs such as the Digital skills playbook for educators [130]**,** an artificial intelligence in

[129] European Digital Education Hub
[130] European Commission/ EACEA (2024). Digital skills playbook for educators. Luxembourg: Publications Office of the European Union. Digital skills playbook for educators - Publications Office of the EU

education **report**[131]**,** and a European maturity model for micro-credentials in higher education [132].

The Hub also hosted the **Higher Education Interoperability Working Group**[133]**,** with over 300 members contributing to the development of a European interoperability framework[134] (see Action 3). Other support activities included online clinics and mentorship programmes, where members received guidance on challenges such as integrating AI, developing micro-credentials, or assessing digital tools for teaching and learning.

In 2025, two working groups were established with the task of updating the Ethical Guidelines on the Use of AI and Data in Teaching and Learning for Educators (see Action 6) and the Common Guidelines for Teachers and Educators to Foster Digital Literacy and Tackle Disinformation (see Action 7).

In 2026, another working group was launched under the Hub with the aim of developing practical guidance on digital skills assessment for schools across the EU. The practical guidance is developed in the context of the 2023 Council Recommendation on improving the provision of digital skills and competences in education and training (see Action 10).

About 80 monthly webinars and hands-on workshops have been instrumental in building capacity across the community, exploring themes such as immersive learning, AI in education, data and security, disinformation, and inclusion. These interactive sessions offer valuable opportunities for educators to find inspiration, share good practices, and address common challenges. Knowledge dissemination is further supported by over **150 publications**, including long reads, best practices, and thematic reports. Members stay informed with upcoming activities through the monthly newsletter and regular updates on the European Education Area portal.

The **Digital Education Accelerator**[135], the Hub's innovation strand, has played a vital role in supporting the development and scaling of forward-looking digital education solutions. From 2022 to 2024, the Accelerator supported **21 pioneering solutions**, selected for their innovative potential, educational value, and technological readiness through an intensive six-month programme. Participating teams benefitted from mentoring, field testing, and networking opportunities designed to upscale promising digital solutions.

To ensure responsiveness and continuous improvement, feedback mechanisms have been integrated into the Hub's operations. **Member surveys are conducted three times per year.** They have been complemented by targeted consultations to inform the review of the Digital Education Action Plan.

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[131] European Commission/ EACEA (2023). AI report – By the European Digital Education Hub's Squad on artificial intelligence in education. Luxembourg: Publications Office of the European Union. AI report - Publications Office of the EU
[132] European Commission/ EACEA (2024). Den Hertog, P., Wylie, N., Widger, L., Brande, L. et al. A European maturity model for micro-credentials in higher education – Whitepapers and guidelines for a strategy workshop. Luxembourg: Publications Office of the European Union. A European maturity model for micro-credentials in higher education - Publications Office of the EU
[133] European Higher Education Interoperability
134 European Commission/ EACEA (2024). *European higher education interoperability framework.* Luxembourg: Publications Office of the European Union. European higher education interoperability framework - Publications Office of the EU
[135] Accelerator programme: unlocking innovation in digital education

Flagship event 'Collaborate for Impact: Advancing European Digital Education and Skills'

For the Hub's four-year anniversary, the **first major gathering of the EDEH community** took place on **18 June in Brussels** which hosted 150 digital education representatives on-site and more than 300 participants joining online. The event's objectives were to bring together selected digital education experts from the European Digital Education Hub and to showcase the Hub's achievements to date, to identify concrete ways for the community to support the successful delivery and implementation of the Education and Skills Package, focussing on topics such as AI in education, European Ed-tech and digital education infrastructure, digital literacy and wellbeing.

The event also marked the launch of the **EU-OECD AI Literacy Framework for primary and secondary education** and the **DigiEduHack Awards Ceremony**, where the 2025 Global Winners presented their most innovative solutions in digital education.

Impact and future orientation

Members surveys and consultations confirm the Hub's role in enabling members to expand their networks, co-create solutions, transfer knowledge, and address shared challenges. Community structures such as squads and expert groups are widely valued, though suggestions for improvement include increasing opportunities for joint projects, better engaging national authorities, and ensuring continued relevance and inclusivity.

The Hub has become a trusted space for cross-sectoral exchange, policy dialogue, and innovation. As one advocacy organisation noted, *"the European Digital Education Hub is now in place to support a vibrant community of practice and cross-sectoral exchange."* The Hub is seen as a bridge between research and practice, public and private sectors, and national and European levels.

Overall, the European Digital Education Hub is proving to be an effective enabler of the EU's digital education goals. By continuing to expand its reach, diversify participation, and promote innovation, it can further strengthen its role as a driver of systemic digital transformation in education across Europe.

As a dynamic community of practice, the Hub has demonstrated its value in fostering collaboration, innovation, and knowledge sharing across sectors and education levels. The diversity of its activities and stakeholders has helped bridge gaps between policy, practice, and research, while promoting the digital transformation of education across Europe.

Since its establishment in 2022, digital education priorities have shifted from post-pandemic discussions to increasing emphasis on new thematic priorities such as AI, foreign information manipulation and interference and disinformation or interoperability. In such a fast-paced and competing ecosystem, benefitting from the Hub as a "sandbox" for knowledge-sharing and piloting activities that flexibly evolves and adapts over time is invaluable. Within it, the power of the CoP, its mutually reinforcing thematic and cross-sectoral expertise and its strong potential to serve as multiplier within and outside the Hub are rather unique. This will be preserved and nurtured moving forward.

Over the years, the Hub evolved from a mostly bottom-up community towards piloting new activities aimed at supporting EC initiatives in digital education and related policy areas.

Leveraging the Hub for the first time ever in supporting the revision of the two existing EU Guidelines on Disinformation and Ethical AI is a tangible example in the area and a development that was welcomed by the CoP. Beyond its potential for strengthening the credibility and exposure of the Hub, this paves the way to new avenues for leveraging the Hub to inform and support Commission actions, notably in the remit of the Education and Skills Package.

Going forward, the richness of this CoP, the diversity of views and breadth of knowledge it offers through bottom-up and top-down activities will be deepened and maximised, to be mutually reinforced.

The Hub will equally focus on deepening engagement with underrepresented education sectors and countries and ensuring that its outputs remain practically relevant to educators and decision-makers.

Education professionals are increasingly engaging with a growing wealth of materials, projects, and tools in the field of digital education. While this abundance reflects strong momentum and innovation, it also highlights the need for greater clarity and guidance. The Hub is uniquely positioned to serve as a trusted space where these resources are carefully mapped and made easily accessible, helping users find what they need quickly and confidently, regardless of their time constraints or level of digital expertise. Continued emphasis on user-driven content, inclusive participation, and co-creation will be key to maintaining momentum and achieving broader systemic impact across the European Education Area.

Digital Education Hackathon (DigiEduHack)

The **Digital Education Hackathon (DigiEduHack)** is a cross-cutting initiative under the Digital Education Action Plan. Since its launch in 2019, DigiEduHack has established itself as one of the EU flagship grass-root initiatives on digital education, encouraging user-driven innovation and providing insights on trends for education and training in the digital age. This action was part of the first Digital Education Action Plan 2018-2020 and continued with increased ambition under the Digital Education Action Plan 2021-2027. The final edition took place in 2025.

DigiEduHack consists of a **series of 24-hour grass-root hackathons** (in-person, online and hybrid) organised by education and training institutions at different levels and other digital education stakeholders. The objective is to identify key challenges and co-create solutions for the future of education in the digital age. The contest is open to participants of all ages and backgrounds, regardless of their technical knowledge.

Following the hackathon days, local winners are selected and their solutions submitted to the DigiEduHack Steering Group for evaluation. Out of this evaluation process, 12 finalists are identified, whose solutions are then voted upon publicly through an online voting period. Out of this public voting, four Global winners are announced based on two main categories, each offering two different levels of experience and expertise:

2) **Disruptive technology** (solutions that introduce novel tools or technologies, challenging the existing practices and incorporating cutting-edge technology) – levels: ‘Beginners’ and ‘Experienced’.

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2) **Social impact** (solutions aiming to benefit society and the community by promoting inclusion and diversity) – levels: 'Beginners' and 'Experienced'.

A range of different **prizes** (i.e., mentorship, coaching, software subscription) are offered to the winning teams, to support their further growth and capacity building.

Implementation state of play

DigiEduHack is an all-year-round initiative: recruitment of hosts starts in spring and continues until one month before the hackathon days. In the summer, the recruitment of participants begins. This period is constellated by so-called "learning opportunities" meant to promote knowledge building among the DigiEduHack community on topics of common interest. After the hackathon days (which take place in November) a Main Stage Event is organised to wrap-up the experience and reflect on its achievements. In December, the evaluation period starts and ends at the beginning of March, when the winners are publicly announced. Follow-up with the finalists and winners is ensured via regular check-in sessions on their progress and addressing emerging needs during the year. With the announcement of the winners, the new edition is officially kicked off, the annual theme announced, and the new recruitment phase begins. Throughout the year, three networking opportunities are organised to further promote engagement with the initiative.

Learning opportunities and community building

Addressing the needs of the community, and especially newcomers, to provide guidance and support in preparation of the local Digital Education Hackathons, the initiative proposes learning opportunities and community building activities to ensure a year-long engagement and a comprehensive learning journey.

The webinar series in the months leading to the DigiEduHack Days consists of six interactive sessions, in which previous hosts or participants will share their experience and explain how to run a local hackathon, motivating future participation. Each webinar is followed by an Ask me Anything (AMA) session allowing the audience to engage further and have their questions addressed.

Communication

Throughout the year, the DigiEduHack rollout is supported by a targeted communication campaign. Several communication channels are leveraged to promote and raise the visibility of the initiative throughout the year.

Social media is a central pillar of the communication strategy, reaching out and engaging audiences from different ages and backgrounds. The initiative has own channels that are managed by the consortium in charge and supported by relevant EAC social media. The involvement of a limited number of micro influencers ensures the further engagement of the younger audiences. Organic content is complemented by paid promotion on selected channels to raise further awareness and promote engagement around key milestones for the initiative, such as recruitment, the DigiEduHack Days, the finalists and winners' identification.

Furthermore, the DigiEduHack podcast offers another channel for communicating on the initiative and reaching new audiences. This is complemented by a promotional video with footage from the previous editions to attract further participation through storytelling. The

website continues being the single gathering point, sharing latest news on the initiative, offering registration for hosts and participants, submission of local solutions, as well as voting.

Impact

Since its launch, the DigiEduHack ran for **six successful editions between 2019 and 2025**, engaging more than **12.600 participants** across **56 countries globally**. **303 hackathons** have been organised over the six years of the initiative.

2023 marked the fourth edition of the DigiEduHack and the first one DG EAC implemented through a service contract funded by Erasmus+. The initiative took place between 6 and 13 November 2023 under the annual theme *'Putting people at the centre of digital education'*, resulting in 39 local grass-root events organised across 22 countries in the EU and beyond. Over the eight days of hacking, almost 1700 people from different ages and background were engaged in the creation of 225 innovative solutions.

2024 marked the fifth edition of DigiEduHack and the second one DG EAC implemented through a service contract funded by Erasmus+. The initiative took place between 8 and 17 November 2024 under the annual theme *'Imagining the digital education of the future'*, resulting in 51 local grass-root events organised across 27 countries in the EU and beyond. Over ten days of hacking, more than 1700 people from different ages and background were engaged in the creation of 455 innovative solutions.

2025 marked the sixth edition of DigiEduHack and the third DG EAC implemented through a service contract funded by Erasmus+. The initiative took place between 7 and 16 November 2025 under the annual theme *'Rethinking education in the age of digital skills'*, resulting in 74 hackathons organised across 31 countries in the EU and beyond. Over ten days of hacking, almost 2,500 people from different ages and background were engaged in the creation of 792 innovative solutions.

2.3 Communication and International Outreach

2.3.1 Communication activities

Communication and outreach activities were central to the implementation of DEAP, facilitating the exchange of good practices, deepening engagement with stakeholder communities, and promoting closer cooperation across the EU at European, national, regional, and local levels. At EU level, cooperation was maintained through established channels, including regular exchanges with the Education Committee of the European Union as well as the Working Group on Digital Education: Learning, Teaching and Assessment (DELTA) and other services of the Commission, EU delegations and the Artificial Intelligence and Disinformation expert groups. Broader outreach was reinforced through a targeted communication campaign designed to raise awareness among end beneficiaries, in particular teachers and educators, of practical resources developed under the DEAP.

Dissemination activities included the production and distribution of articles, infographics, and **accessible explanatory audiovisual materials**. These materials were shared through organic channels, notably the Commission websites, such as the European Education Area portal, eTwinning, European School Education Platform, as well as social media, newsletters, and the

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local network of Commission's Representations. Paid promotion included partnership with online influencers through campaigns addressing teachers and the use of AI in classrooms, as well as initiatives showcasing the achievements of young women pursuing studies and careers in STEM. These efforts were further supported by several multi-week media buying campaigns in selected EU countries, each of which reached an average of 20 million users.

2.3.2 Stakeholder engagement

Outreach also played a significant role in involving stakeholders in both policy implementation and development, with **the stakeholder forum** serving as the flagship engagement tool. The first Digital Education Stakeholder Forum, *Making education and training fit for the digital age*, was held as a hybrid event on 22 March 2022, attracting 800 viewers and reaching 4,500 people on social media. The second stakeholder forum, *Tap into Europe's Digital Potential*, took place on 24 June 2025 as a full-day event in Brussels, bringing together over 220 participants on site and further 1,400 online attendees.

The forum convened policymakers, industry, researchers, educators, and civil society to review progress, shape future policy directions, and strengthen a shared sense of ownership. These events also highlighted the Commission's political leadership on digital education and its support for Member State's policies and activities at national, regional and local level. In this context, outreach activities also supported the **kick-off event for the DEAP Review** in April 2024 and the online **launch of the draft EU-OECD AI literacy framework** in May 2025 and its official launch by the Executive Vice-President Roxana Mînzatu on 18 June 2026 in Brussels.

2.3.2 International outreach

International dimension of the Digital Education Action Plan 2021-2027

High-quality international cooperation in digital education has an essential role in addressing existing and **emerging global challenges** as relates to the strengthening of digital skills and competences, sharing of knowledge and promoting best practices in what is a quickly evolving **digital landscape**.

The Digital Education Action Plan has an international dimension which reflects the global nature of the digital challenge. It aims to promote international **cross-sectoral cooperation** in digital education and underscores the notion that digital education initiatives have the potential to **strengthen relations between international partners** and help promote a true **global partnership** in digital education. It aims to foster the development of high-performing digital education ecosystem and boost the digital skills and competences of all citizens, while also addressing new skills gaps and forms of exclusion.

The Action Plan focuses on the Western Balkans, Southern Mediterranean, Eastern Partnerships and Africa as priority regions, building on the success of initiatives already in place (i.e. such as the Digital Agenda for the Western Balkans, SELFIE or the Digital Education Hackathon) and contributing to policy initiatives, such as the Western Balkans agenda.

Likewise, the Action Plan addresses some of the **most pressing societal challenges** linked to the digital transformation, such as tackling FIMI disinformation through issuing guidelines on promoting digital literacy in education and training, as well as ethical guidelines on AI and data use for educators. Given the international dimension of the digital eco-system, such initiatives

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have the potential to **deliver real expertise across borders**, support a safer experience online, and promote further the European values of democracy, ethics and privacy.

Initiatives such as **Digital Education Hackathon** provide a platform to bring together participants from across the globe as they work together to propose solutions to challenges in digital education. The **European Digital Education Hub** brings together experts and enthusiasts in digital education from outside of Europe and promotes dialogue on innovative digital learning and teaching. Likewise, **Working Group DELTA** (Digital Education, Learning, Teaching and Assessment) facilitates mutual learning and the sharing of best practices both inside and outside of Europe. Lastly, hands-on assessment tool such as **SELFIE** currently account for around 6 million users worldwide and have been translated into 31 languages.

Lastly, due to the shift to distance and online learning across the globe in 2020, the Council Recommendation **on blended learning in primary and secondary education** provided an overview of lessons learned and best ways forward for educators, teachers and learners. And, as such, offered **valuable insight for Europe's international partners.** Likewise, the **international dimension of Erasmus+** will continue to provide for the sharing and scaling up of good digital education practice with Europe's international partners.

A snapshot -- Digital Education Action Plan

The International Dimension

- ✓ **Digital Education Hackathon**: Since 2019, 12,676 participants took part in Digital Education Hackathons across 56 countries.
- ✓ **Guidelines** for Teachers and educators on Tackling Disinformation and promoting digital literacy: Translated into all EU languages as well as the languages of the Western Balkans and Georgian
- ✓ **Ethical Guidelines on the use of AI** and data in teaching and learning: Translated into all EU languages as well as the languages of the Western Balkans and Georgian
- ✓ **SELFIE**: SELFIE with over 7 million users worldwide, SELFIE for Work-based learning with around 44 000 users worldwide and SELFIE for Teachers with around 324 000 users worldwide

International Cooperation

International cooperation in digital education is key as it can help address shared challenges, improve learning outcomes, and promote more equitable access to digital education. Cooperation is central to the EU's Global Gateway strategy and the "Team Europe"

approach[136], which promotes mutual learning and knowledge exchange within and beyond Europe.

International dimension of the Council Recommendations on digital education and skills

The **Council Recommendation on improving the provision of digital skills and competences in education and training** is based on and complements work at international level. It contributes to actions supporting the **UN 2030 Sustainable Development Goals** (SDGs)[137] , in particular SDG 4, quality education, and partially SDG 5, gender equality, and SDG 8, decent work and economic growth.

The initiative is consistent with and complements ongoing work of the **United Nations** Secretary-General's Roadmap for Digital Cooperation[138] which aims at strengthening digital capacities and skills to meet the demands of the digital world. The initiative also resonates with the importance that **UNESCO** attaches to supporting digital education and skills mainly through three different lines of work: digital competences of teachers and educators[139], media and information literacy[140], and youth coding and digital skills for entrepreneurship[141]. The results of the **OECD** Programme for International Student Assessment (PISA) and the OECD Digital Skills Toolkit and Outlook contribute to inform the proposal. The proposal considers the work of **UNICEF** on digital skills[142]. Moreover, the target on low-achieving eight-graders is based on the **ICILS study** which allows for international comparability.

The initiative acknowledges the interconnected nature of efforts on digital education and skills development and the importance of working together across the global education and training community to ensure that no one is left behind and that every person has the right to high quality and inclusive digital education.

The **Council Recommendation on the key enabling factors for successful digital education and training** is based on and complements work at international level. It contributes to actions supporting the **UN 2030 Sustainable Development Goals** (SDGs) , in particular SDG 4, quality education. The initiative is consistent with ongoing work of the **United Nations Office** of the Secretary General Envoy on Technology and its aims of promoting holistic and inclusive approaches to digital capacity development. The initiative also resonates with the work of **UNICEF** and the "Gateways to Public Digital Learning"[143] which aims to ensure that everyone can access high-quality **digital education content** to advance their learning. Likewise, the proposal considers the ongoing effort of **UNESCO[144]** in strengthening digital policy and digital governance in an inclusive manner.

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136 https://international-partnerships.ec.europa.eu/policies/team-europe-initiatives_en

137 https://sdgs.un.org/

138 https://www.un.org/techenvoy/content/digital-capacity-building

139 https://unesdoc.unesco.org/ark:/48223/pf0000265721

140 https://www.unesco.org/en/communication-information/media-information-literacy

141 https://en.unesco.org/youthmobile

142 See https://www.unicef.org/lac/en/digital-skills-development and in particular, F. Nascimbeni and S. Vosloo, 2019, Digital literacy for children: exploring definitions and frameworks, https://www.unicef.org/globalinsight/media/1271/file/%20UNICEF-Global-Insight-digital-literacy-scoping-paper-2020.pdf

143 Gateways to Public Digital Learning | United Nations

144 https://www.unesco.org/en/communication-information/digital-policy-capacities-inclusion

Furthermore, the initiative takes into account the **Declaration of G20 Ministers** *on Leveraging Research, Higher Education and Digitalisation for a Strong, Sustainable, Resilient and Inclusive Recovery*[145] which focuses on the importance of working to achieve a common understanding of digital spaces and, more specifically, maintaining and strengthening this diverse ecosystem of national and international digital infrastructures.

Lastly, this proposal notes the added value of working across borders to exchange expertise, inspire and cooperate in building accessible and inclusive digital education ecosystems that reflect the EU's democratic values and principles.

Moreover, as agreed at the EU Japan Policy Dialogue meeting (April 2024), the European Commission hosted an online EU-Japan Seminar on Digital Education (October 2024) bringing together policymakers, educators, teachers and practitioners in Europe and Japan with a view to promote further cooperation and exchanges of practices in this area, considering the growing impact of digital tools on teaching and learning, as well as on the governance of education systems.

Cooperation with international organisations

International cooperation in digital education helps shape the EU's relationship with other countries and regions and is key to helping address global challenges such as tackling disinformation, the ethical use of AI and the need to work together across borders to find solutions to the digital divide. The Commission has worked closely with international organisations with a view to strengthen the evidence-base, share what works, exchange best practices and propose solutions to emerging challenges.

As relates to **cooperation with the G20**, the Commission contributed to the *G20 Toolkit for Designing and Introducing Digital Upskilling and Reskilling Programs* in 2023 under the Indian Presidency, which aims to guide the design and implementation of digital upskilling and reskilling programmes at a global scale[146].

With regards to the G7, the Commission contributed to the *Draft Ministerial Declaration put forth by the G7 Science and Technology Ministers' Meeting* in July 2024 which highlights the role science, technology, innovation and higher education play in building a sustainable future for all[147]. Also, the *Issue Note on the Future Tech Forum* in 2021 brought to light how best the digital revolution can empower citizens and drive forward innovation and growth.[148]

Under UN and UNESCO cooperation, the Commission participated in the *UN-EU Dialogue on Digital Skills* through panel discussions in 2024 which focused on digital skills and education. Moreover, the Commission is represented regularly at the *EU-UNESCO Senior Officials Meeting* to discuss digital aspects such as AI and tackling disinformation.

Lastly, the Commission contributed to the Ministerial Declaration of the Union for the Mediterranean (UfM) Ministers in charge of Employment and Labour in 2022.[149] As relates to

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[145] https://www.g20.org/wp-content/uploads/2021/08/G20-Ministerial-Declaration.pdf
[146] G20 Digital Economy Ministers Meeting Annex 3 - Toolkit for Designing and Introducing Digital Upskilling and Reskilling Programs - Roadmap to Facilitate Cross Country Comparison of Digital Skills (19/08/2023) - G7/G20 Documents Database
[147] G7 Ministerial Declaration: 11 July 2024 - GOV.UK
[148] Future Tech Forum Chair's report - GOV.UK
[149] Final-UfM-Ministerial-Declaration-EN.pdf

digitalisation, the Declaration emphasises the need to tackle the digital skills and accessibility gap between and within the shore of the Mediterranean region.

Expansion of initiatives to the Western Balkans

In this context, there are plenty of opportunities for the region, as the Commission is expanding initiatives such as Girls Go Circular or the Digital Education Hackathon, leveraging the DigiEduHack National Ambassadors Network to broaden geographical coverage. The initiative, piloted with 12 members, aims to cover all 27 EU Member States, the Western Balkans, Ukraine, Moldova, and Georgia by 2025.

Moreover, the Community of Practice of the Digital Education Hub has opened its doors for stakeholders from the region.

Also, SELFIE for schools and SELFIE for teachers are key for the Western Balkans as they help schools and teachers assess and improve their digital readiness. By providing insights into strengths and areas for growth, SELFIE supports the region's digital education efforts, ensuring that both educators and students are better prepared for the digital future.

The participation by many Western Balkans partners in international tests, such as PISA and PIRLS is welcomed as these comparative tools are essentials to track progress and to align education system with a view to EU accession.

Lastly, the Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training as well as the Ethical Guidelines on the use of AI in education and training originally published in 2022 are available (as of October 2024) in all Western Balkan languages.

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Chapter 3: Persisting Challenges and Emerging Trends

The review of the Digital Education Action Plan (DEAP) has highlighted key themes and challenges that will be critical in shaping digital education across Europe in the future. While there is a shared vision for digital education, priorities vary: some focus on basic frameworks and local challenges such as infrastructure gaps and low digital skills, while others are progressing in the consolidation phase, concentrating on sustaining and refining their digital infrastructures and educator development programmes. At the same time, some Member States are reassessing the role of technology in education, questioning its scale, added value and impact. Across these different stages, there is a collective endeavour to ensure equitable access and development, aligning each Member State's objectives with the overarching DEAP vision.

Chapter 3 aims to highlight persisting challenges and key themes for future actions as highlighted by stakeholders consulted during the DEAP review. These insights and takeaways are further backed by additional evidence and research data.

3.1. Strengthening Digital Skills for a Changing Society and Economy

3.1.1 Digital skills for all

Digital skills emerged as a key priority throughout the consultations, with stakeholders highlighting the importance of equipping individuals of every age with the competencies needed for personal and professional advancement. Many also stressed that digital competence should be viewed as a lifelong objective, that continuously evolves to meet new technological advances as well as shifting workplace and everyday realities.

Respondents in the *Future needs in digital education study* share similar views. 92% agree that digital skills should be taught to everyone at all levels of education. At the same time, most citizens believe that digital skills should receive the same amount of attention at school as reading, mathematics, and science (78%).[150]

However, recent evidence shows that **improving the digital competences of students and adults remains a major challenge across Europe**. Current data indicate that **42.5% of 13–14-year-olds in the EU have none or limited basic digital skills**, meaning the EU is still far from its target of reducing underachievement to below 15% by 2030.[151] The development of digital skills among adults is also progressing slowly. The EU has set a target of ensuring that at least 80% of adults have at least basic digital skills by 2030. However, **in 2025, only 60% of those aged 16-74** reported having at least basic digital skills, up from 56% in 2023.[152] Significant disparities also persist across socio-demographic groups, particularly by age and educational attainment.

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[150] Flash Eurobarometer 564 –Future needs in digital education Fieldwork: 7.5.2025-14.5.2025 / (%) Base: n=25 781 –All respondents

[151] European Commission (2024). International Computer and Information Literacy Study (ICILS) in Europe, 2023 – Main findings and educational policy implications. Luxemburg: Publications Office of the European Union

[152] European Commission (2026). Report on the State of the Digital Decade 2026. Luxembourg: Publications Office of the European Union.

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Beyond technical competencies, **digital literacy and media literacy** are becoming increasingly important in an era of growing disinformation. In the context of the DEAP review, representatives from lifelong learning platforms and professional development networks emphasised that digital literacy must remain a focal point in education policy, reflecting society's broader need for adaptability in a rapidly evolving, techno-centric landscape. Stakeholders would like to see more comprehensive strategies to **combat disinformation and FIMI**, particularly as digital and social media platforms play an ever-growing role in education and society. Stakeholders suggest that the **ability to critically assess online content needs be embedded into digital skills assessment** frameworks to ensure that individuals are not only proficient users of technology but also informed and responsible digital citizens.

Contributors to the 2026 Call for Evidence[153] stress that digital skills and literacy must extend beyond operational skills and include **critical thinking, media literacy, data awareness, and an understanding of how AI systems work** and where their limits lie. Many stakeholders underlined the importance of linking digital education to real-world challenges and practical learning, supporting the development of **STEM and citizenship skills**.

The gender gap in digital skills remains a persistent issue, particularly in STEM fields and emerging technologies, where women and girls continue to be underrepresented. Stakeholders identify several contributing factors, including cultural stereotypes, the lack of visible role models, and unequal access to digital tools and education opportunities. As digital skills become increasingly essential in the labour market, there is a strong call for targeted initiatives and gender-sensitive approaches to encourage greater female participation in digital education and careers. This includes mentorship programmes, inclusive curriculum design, and policies that address structural barriers to participation.

3.1.2 Assessment and Certification of Digital Skills

Ensuring a robust and standardised approach to assessing and certifying digital skills remains a key challenge, according to stakeholders. **Micro-credentials** offer a flexible way to recognise digital competencies, but stakeholders highlight the absence of a universally recognised system, leading to inconsistencies in the value and applicability of various certifications. Without clear, standardised frameworks, learners and employers face difficulties in understanding and trusting these credentials. The need for **comprehensive assessment systems** is also evident, as current approaches lack consistency across regions and education levels. Stakeholders call for more **data-driven and standardised evaluation methods** to ensure that digital competencies are assessed in a reliable and comparable manner. **Tracking progress and evaluating impact** remains a challenge, and more robust mechanisms will be required to monitor the long-term personal, social and economic impact of digital skills development across different education systems and workforce sectors.

[153] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/18873-Quality-education-for-all-a-2040-roadmap_en

3.2 Digital Education Infrastructure

3.2.1 Digital infrastructure: access, interoperability and the capacity to use it

Unequal access to digital tools continues to persist in many regions, particularly in rural and underserved areas and places with less-developed infrastructure, contributing to a significant digital divide. These disparities reduce the effectiveness of digital learning initiatives and highlight the need for comprehensive strategies that go beyond hardware provision alone. Stakeholders stress the importance of ensuring that every teacher and student has access to essential technologies, including devices, fast and reliable internet, high-quality digital education content, and the support services needed to use them effectively. At the same time, infrastructure challenges in schools continue to hinder implementation. Sufficient funding and robust technical support are therefore crucial to ensuring that digital education content, tools, and practices can reach their full potential in all communities.

The 2026 Eurydice report *Digital Education at School in Europe: Bridging gaps in access, teaching and learning* maps different governance arrangements for connectivity, hardware, software and interoperability, often involving responsibilities shared across governance levels (see Chapter 1, Section 1.1, European Commission / EACEA / Eurydice, 2026).[154] The study highlights a consistent pattern: '***policy development has advanced rapidly, but the implementation of policies in schools is complex and the outcomes are variable***'.[155] Evidence from the ICILS 2023 indicates that although **access to digital infrastructure is widespread, the conditions for its effective use remain uneven**.[156]

Furthermore, effective digital education relies on seamless integration among various tools, platforms, and systems. However, stakeholders' testimonials point to the fact that differences in technology standards and policies across Member States continue to limit the potential for collaboration, resource-sharing and knowledge transfer. Streamlined **interoperability** is essential for cohesive digital ecosystems that can adapt and scale. Differences in how responsibilities for digital infrastructure and interoperability are shared across governance levels highlight the importance of aligning technical interoperability with national governance arrangements (see Chapter 1, Section 1.1, European Commission / EACEA / Eurydice, 2026).

Feedback received via the **2026 Call for Evidence** sheds further light on stakeholders' views regarding greatest, as well as challenges, for European-scale, digitally sovereign and accessible solutions. They broadly support the development of secure, interoperable and accessible European digital infrastructure. Many called for open standards, interoperability, data portability and EU safeguards as basic conditions for trustworthy educational technology.

The most common view is that the **digital transition succeeds only when investment in infrastructure is matched by investment in people, pedagogical capacity and sustained implementation support**. In this context, several respondents argued that schools and local authorities often lack the expertise to assess technical services and platforms properly. They

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[154] European Commission / EACEA / Eurydice (2026), Digital Education at School in Europe 2026: Bridging gaps in access, teaching and learning. Eurydice Report. Luxembourg: Publications Office of the European Union.
[155] European Commission / EACEA / Eurydice (2026), Digital Education at School in Europe 2026: Bridging gaps in access, teaching and learning. Eurydice Report. Luxembourg: Publications Office of the European Union.
[156] ICILS 2023

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therefore called for European reference checklists, certification schemes or procurement criteria covering hosting, model transparency, exit conditions, accessibility, privacy, interoperability as well as pedagogical suitability. At the same time, some respondents argued that digital literacy and AI literacy training should extend beyond teachers and students to school leaders and school authorities to ensure informed procurement decisions.

3.2.2 Growing pressure on data protection, transparency and cyber resilience

The increasing use of digital tools in education has amplified concerns about **data privacy and security**, particularly with the rise of AI and data-driven technologies. Stakeholders highlight the ongoing need for **robust data protection frameworks and procedures** to safeguard student information and prevent misuse of personal data. However, schools require support in implementing regulations governing data collection and usage so that student data is handled ethically, securely, and in compliance with existing laws**.** Educators are finding it increasingly difficult to discern when and where personal and learning data is being used in AI powered digital tools and learning management systems. Stakeholders highlight the importance of alignment with GDPR and the AI Act and advocate stronger coordination across Member States to uphold privacy protections at all levels of digital education.

Transparency and accountability in data use remain key priorities. Stakeholders stress that students, parents, and educators must have clear and accessible information on what data is being collected, how it is used, and how it is protected**.**

Further strengthening of **privacy safeguards, enhanced user awareness, and ethical data management** are highlighted as essential in building **trust in digital education** and fostering a **secure and responsible learning ecosystem**. Educational institutions have been targeted by cyber-attacks**,** which pose significant risks to sensitive student and institutional data. Stakeholders emphasise the urgent need for strengthened security measures**,** ensuring that digital education platforms are equipped with robust protections against potential threats. In a recent Eurobarometer study, 88% of respondents agree that schools need more support to safeguard students' privacy and prevent cybersecurity threats. [157]

EdTech companies and educational institutions will need to **increase transparency** in their data practices so that users have control over their personal information. Civil society organisations emphasise the need for **stronger oversight and regulatory enforcement**, particularly as digital tools become more embedded in learning environments.

Training for educators and students is seen as a critical component of improving cybersecurity in education. Stakeholders stress that awareness and preparedness are essential to preventing security breaches and data misuse. Many advocate for integrating cybersecurity education into school curricula, ensuring that both students and teachers develop basic cyber hygiene skills and can recognise potential threats, such as phishing, malware, and data privacy risks. By embedding cybersecurity awareness into digital literacy programs, institutions can foster a culture of security that protects learners and educators in an increasingly connected learning environment.

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[157] Flash Eurobarometer 564 –Future needs in digital education Fieldwork: 7.5.2025-14.5.2025 / (%) Base: n=25 781 –All respondents

There is also a strong push for **collaboration on cybersecurity standards** at the EU level to ensure consistent and effective security practices across Member States. Stakeholders advocate for a unified framework that strengthens the resilience of digital education tools and promotes coordinated efforts between governments, educational institutions, and technology providers. Establishing shared security protocols will help mitigate risks and enhance trust in digital learning environments. A collective approach to cybersecurity is seen as necessary in ensuring the long-term safety and sustainability of digital education across Europe.

3.3 Ensuring Human-Centred and Effective AI Transformation in Education

The **integration of Generative AI (GenAI) in education** is progressing rapidly, with applications ranging from AI-driven content creation and adaptive learning platforms to tools that support personalised learning. Stakeholders, particularly from EdTech companies and higher education institutions, recognise the **potential of AI and learning data analytics** to enhance educational experiences and tailor instruction to individual student needs. However, they also highlight **critical concerns** regarding the **lack of clear policy guidelines** and the **ethical implications** of AI adoption in classrooms.

3.3.1 AI literacy

As AI adoption in education expands, there is also a growing emphasis on **AI literacy training** not only for students but also for educators and citizens in general. More than six in ten respondents (63%) in the Eurobarometer study on Future need in Digital Education agree that, in 2030, everyone will need to be AI-literate (know how to use and work with AI). While many initiatives focus on equipping students with AI-related skills, stakeholders stress the need to **upskill teachers** so they can effectively integrate AI tools into their pedagogy while remaining aware of their limitations and risks, particularly in the context of declining basic skills**.** Training programmes should help educators understand **how AI functions, where it can add value, and what ethical challenges it presents**. The risk that stakeholders point to is that without sufficient **professional development opportunities**, teachers may struggle to **harness AI's full potential** while ensuring responsible and fair use within and beyond the classroom. The EU-OECD AI Literacy framework for primary and secondary education developed between the Commission and the OECD and presented in June 2026 has been welcomed by stakeholders who emphasised the need for further support in practical implementation and rollout.

3.3.2 Institutional readiness

The **ethical use of AI in education has emerged as a primary concern** among stakeholders, particularly in relation to assessment, grading, and personalised learning. While many acknowledge that AI and data-driven tools can significantly enhance learning experiences, they also emphasise the importance of responsible and transparent implementation. This perspective underscores the need for **ethical frameworks that offer clear guidelines for AI usage** in educational contexts and are regularly updated to keep pace with swift technological advancements.

Equally pressing is the potential impact of AI on educators and students. Some stakeholders fear that AI could undermine the teacher's role by promoting automation over human interaction, potentially leading to a more impersonal learning environment. Although AI-powered tools can effectively support instruction, over-reliance on automation risks

diminishing the vital interpersonal element of education. Consequently, stakeholders advocate for **guidelines and policies which stress the use of AI and technology as an enhancement** that supports teacher expertise and guidance rather than a standalone substitute. Stakeholders generally welcome the **Ethical Guidelines on the Use of AI and Data in Teaching and Learning for Educators** as a valuable starting point, but further measures will be needed to address the continuous evolution of Generative AI.

These needs are further underpinned by the results of the Eurobarometer study on Future needs in Digital Education. Respondents were asked what, in their view, would be necessary to ensure that AI (including generative AI) is used appropriately in education. The two most frequently mentioned necessities, each cited by about four in ten respondents (41%), are that schools and universities should have clear guidance on how and when to use AI, and that teachers should be given support to know how and when to use AI tools.

The needs for clear guidance emerge also in the context of the 2026 Call for Evidence where stakeholders stress that **the use of AI in education should remain human-centred**. They argued that AI can support lesson planning, feedback, differentiation, accessibility and administration, but should not replace teacher judgement, the intellectual effort required from students in throughout the learning process, or the educational relationship between teachers and learners. Respondents also raised concerns about privacy, data protection, bias, transparency, over-reliance on automated systems, and possible negative effects on students' autonomy, creativity and social development. Many therefore called for **clear guidance, ethical safeguards and age-appropriate rules** for the use of AI in education, as well as stronger public oversight of the tools introduced into schools.

3.3.3 Educational AI tools for equitable education

Ensuring AI systems remain aligned with fundamental educational values, fairness, and ethical considerations is widely regarded by stakeholders as an urgent priority. They continue to emphasise the importance of preventing AI integration from worsening existing educational disparities.

This risk is particularly pronounced for students from diverse socio-economic, cultural, or linguistic backgrounds. To address these concerns, stakeholders call for transparent and fair AI models that actively promote inclusivity, diversity, and accessibility. Suggested strategies include rigorous bias-detection mechanisms and increased human oversight of AI decision-making so that education technology can continue to deliver more equitable opportunities for all learners. Civil society organisations also highlighted the need for **robust data privacy regulations** to protect both students and teachers, particularly as AI-powered digital content and assessment tools become increasingly embedded in classroom settings.

Continuous support, training and guidance will be required to align the use of new and emerging technologies with transparent, ethical, and equitable practices, so that education systems can continue to safeguard core educational values.

3.4 Teachers' Digital Competences and Professional Development in the Digital Era

A rapidly evolving digital environment requires educators to continuously update their skills. While DigCompEdu, SELFIE and SELFIEforTEACHERS are recognised by stakeholders as providing solid frameworks for digital competence development, there are persistent challenges

in ensuring that teachers acquire and maintain those competences essential for 21st century teaching and assessment practices. Stakeholders consulted in the DEAP review highlight that professional development programmes must be ongoing and robust, so that educators can leverage emerging technologies and integrate them seamlessly into classroom instruction. They point to a growing need to reimagine how teacher support and training is delivered, to provide just-in-time professional development that directly addresses immediate classroom challenges.

In line with these takeaways, nearly one in two respondents (47%) in the 2025 Eurobarometer on Future needs in digital education attribute the lack of basic digital skills among 8th graders mainly to schools not being well equipped (e.g. they do not have enough computers/tablets, or the internet connection at school is very slow). About four in ten respondents (41%) report as a main reason that teachers are not adequately prepared to teach digital skills.

At the same time, DEAP consultations point to a notable **gap between available digital tools and effective pedagogical approaches**. While technology has the potential to enrich instruction, stakeholders have called for greater efforts to provide teacher guidance and well-aligned methodologies to achieving meaningful integration. Concerns persist that existing teacher learning opportunities are not preparing educators for the unique demands of increasingly digital classrooms which can lead to **inconsistencies in implementation and achievement of learning outcomes**.

A Eurydice study highlights that nearly two thirds of the education systems define digital competences for in-service teachers and their professional development. This is typically done through guidance or suggested competence frameworks rather than binding requirements. The frameworks aimed at continuing professional development (CPD) generally cover a wider range of areas than those for initial teacher education (ITE), addressing most of the main domains. Of all the topics covered, the responsible and ethical use of AI receives the least attention.[158]

European citizens assign an important role for teachers when it comes to addressing recent challenges of using AI for education and equipping students with skills to recognise disinformation. 81% believe that teachers should be equipped with the skills to use and understand AI, including Generative AI. About nine in ten respondents (89%) ‘strongly’ or ‘somewhat’ agree that all teachers should be equipped with the skills to help students in recognising various forms of disinformation online (i.e. fake online content, AI-generated false text/videos/images).[159]

At the same time, the 2024 TALIS study shows that about one in three teachers in the EU report having used AI in their teaching or to support student learning, primarily for preparatory work and planning. Among teachers who do not use AI in teaching, the main obstacle is a lack of knowledge and skills (74.3%). At the same time, participation in training on AI for teaching

[158] European Commission / EACEA / Eurydice (2026), Digital Education at School in Europe 2026: Bridging gaps in access, teaching and learning. Eurydice Report. Luxembourg: Publications Office of the European Union.
[159] Flash Eurobarometer 564 –Future needs in digital education Fieldwork: 7.5.2025-14.5.2025 / (%) Base: n=25 781 –All respondents

remains relatively low across the EU, while 25.2% report professional development needs in this area the highest share across all content areas surveyed. [160]

In the context of the 2026 Call for Evidence**, teachers were repeatedly described as central to an effective digital transformation** of European schools as professionals who need the autonomy, confidence and support to integrate it meaningfully into classroom practice. Many stakeholders, including individual teachers, called for sustainable and accessible investment in teachers' digital competence and continuous professional development, which should cover not only technical digital skills, but also the critical, pedagogical and ethical aspects of using these tools for teaching and administrative tasks.

In this same consultation many respondents noted that teachers lack training together with dedicated time to learn how to use digital technologies effectively, and that this challenge has become even greater with the emergence of generative AI. They argued that one-off courses are not enough and that effective professional learning should **combine training, classroom application, mentoring, peer exchange** and follow-up over time. Others pointed to active approaches, such as hackathons, co-design sessions and peer-to-peer support formats as more effective methods than top-down awareness training in engaging teachers.

3.5 Increasing Focus on Digital Well-being

The impact of technology on **mental health has been an increasing concern** among DEAP stakeholders as digital learning tools become more prevalent in education. Recent data shows that European adolescents averaging 4.5 hours of screen time on school days and 6.1 hours on weekends[161] and evidence links high screen time - specifically, more than three hours daily on social media - with poorer mental health among adolescents, particularly girls[162].

Extended screen time, the pressures of social media platforms, and the expectations of constant connectivity on the one hand, and the risks young people can encounter online on the other, have raised questions about the use of digital technologies and the impact on well-being, safety and mental health. Education stakeholders highlight the need for **supportive measures and balanced approaches** so that the increased reliance on digital technology for learning does not come at the expense of learner well-being and emotional health.

Some stakeholders stress the need for a more **comprehensive approach to digital well-being** that **considers not only students but also teachers and parents**. Eurobarometer data shows that 92% of citizens agree that schools should teach their students how to manage the impact of digital technologies (including social media) on their mental and physical health. Most of respondents agree that teachers (88%) and parents and families (87%) also play a key role in teaching and supporting children in developing skills needed for interacting safely and responsibility with technology.

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[160] European Commission: Directorate-General for Education, Youth, Sport and Culture and Gambi, L., The teaching profession in the EU – A comparative analysis building upon the TALIS 2024 results, Publications Office of the European Union, 2026,

[161] Flash Eurobarometer 579 – Impact of excessive screen time and social media on young people's mental health

[162] Bertoni, E., Centeno, C. and Cachia, R., Social media usage and adolescents' mental health in the EU, European Commission, Ispra, 2025, JRC141047.

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Maintaining a **balance between technology and human interaction** is a key priority for DEAP stakeholders. Rather than relying solely on asynchronous learning, well-designed online and blended approaches should integrate teacher-led instruction where educators guide discussions, provide real-time feedback, and create opportunities for collaboration and peer interaction and meaningful engagement.

Contributions to the 2026 Call for Evidence mention **digital well-being, online safety, conflict resolution, self-regulation and emotional resilience** as necessary complements to digital skills. These contributions argued that schools should not be left to address digital risks alone and that **cooperation with families, civil society and youth organisations** can help create safer and more meaningful learning environments.

3.6 Scaling and Long-Term Impact through Collaboration

The consultations highlighted scalability and sustainability as essential priorities for digital education initiatives. Today's school systems have to be capable of adapting and quickly responding to evolving technological demands and educational needs. Discussions revealed that achieving long-term impact requires more than short-term project success; **sustained planning, investment, and collaboration are fundamental to advancing digital education across Europe**. The role of **public-private partnerships** in driving innovation and offering sustainable models was a focal point, as was the importance of continuous evaluation to ensure digital education policies remain responsive to future challenges. The 2026 Eurydice report *Digital Education at School in Europe: Bridging gaps in access, teaching and learning* identifies a gap between school-level digital planning and systematic quality assurance. While digital planning is widely addressed through top-level frameworks, mandatory quality assurance of digital education is reported in only 13 education systems.[163]

Collaboration with EdTech was consistently identified during consultations as instrumental in scaling digital education initiatives, with examples of collaborations with Member States to provide critical infrastructure and digital education content for schools. While these partnerships present opportunities for innovation, civil society participants raised concerns about potential risks, citing issues related to over-commercialisation, data privacy, and the importance of public accountability to prevent education systems from becoming overly influenced by corporate interests.

Moreover, stakeholders consulted in the preparation of the 2026 Education package, consistently called for **stronger links between research, policy and practice**, especially in digital education. A frequent concern was that schools are often expected to adopt tools or methods without sustained support, while evidence on what works remains fragmented, local or overly focused on short-term outputs. Some stakeholders argued for a curated list of European providers and compliant companies that schools could use. At the same time, contributors highlighted that **teachers are often absent from the development stages of digital education solutions**. Several submissions therefore recommended context-specific

[163] European Commission / EACEA / Eurydice (2026), Digital Education at School in Europe 2026: Bridging gaps in access, teaching and learning. Eurydice Report. Luxembourg: Publications Office of the European Union

pilots, communities of practice, structured cooperation between schools and researchers, and independent evaluation before large-scale deployment.

Calls for long-term investment strategies came from several ministries and education networks, advocating for DEAP related projects to be structured as sustainable models rather than short-term actions or solutions. Stakeholders recommended continuous monitoring and evaluation mechanisms to assess the adaptability of DEAP related projects to emerging technological and societal needs, so that digital education initiatives remain effective, sustainable and relevant over time.

3.6 From diagnosis to action – the Education and Skills Package response

The digital transformation of education systems in Europe is held back by unequal access to infrastructure and support, fragmented and insufficiently interoperable systems, limited local capacity for effective implementation and procurement, and growing pressures around data protection, transparency and cyber resilience. Moreover, the impact of the AI revolution on the education sector made it clear the Europe needs European-made AI capabilities for education, that are safe and based on EU-values.

A **European Digital Infrastructure Consortium** can build the foundations for cross-border cooperation and innovation in education and serve as a direct response to stakeholders calls for open standards, interoperability, data portability and EU safeguards as basic conditions for trustworthy educational technology. Together, these building blocks **tackle today's fragmented national approaches** and create the base for practical solutions in schools — from classroom tools and child-safe communication channels to age-appropriate, curriculum-aligned, EU-based AI with built-in pedagogical safeguards.

The EDIC will be grounded in security, safety, data protection and privacy by design. By governing the underlying infrastructure, it will help keep children's data within the EU and protected to EU standards, reducing dependence on foreign clouds and jurisdictions. In this way, privacy and child-appropriate safety-features are built in from the start — not added later.

The **EDIC**, led by Member States, will help turn the objectives of the upcoming Education and Skills Package to future-proof Europe's schools into reality.

To ensure an effective transformation of education in the age of AI, the EDIC actions to support the uptake of safe, educational AI solutions, should go **hand in hand with equipping every learner and educator with AI literacy**. **AI literacy** gives young people the power to question, create and thrive in a world shaped by algorithms. It helps them develop their critical thinking, understand how AI works, spot misinformation and bias, protect their privacy, and use digital tools with confidence and responsibility. More than a technical skill, it is a life skill — essential for learning, work and active citizenship in the digital age.

The Education package will prioritise mainstreaming AI literacy in primary and secondary education building on the EU-OECD AI Literacy Framework, and foster capacity building of education and training authorities, institutions and actors to leverage ethical, effective and evidence-based usage of AI tools in education, in line with the EU AI Act.

The EDIC and the uptake of AI literacy across education systems in Europe will form a **comprehensive strategy towards embracing the opportunities of AI in education and society while protecting our learners from the risks**.

Risks, however, are rising. Education systems must equip students to navigate the digital world safely and confidently. But many of these threats go beyond the classroom. Educators, parents, platforms, policymakers and communities all share responsibility for building the skills, safeguards and support young people need online. As DEAP stakeholders have stressed, the response must strike the right balance: between technology and human interaction, and between protection and empowerment. In line with the **2026 Communication on an EU approach to online child safety**, the next steps to support children's wellbeing in digital environments will rely on meaningful cooperation between schools and families through a **European Healthy Screen Pledge**. This Education Package action will empower parents, teachers and educators to actively strengthen children's digital and media literacy through a mutually reinforcing, whole-school approach to ensure well-being in the digital world.

Teachers are the driving force behind the digital transformation of education: technology only improves learning when educators have the confidence, skills and freedom to use it well and with purpose. They do far more than introduce new tools — they turn them into meaningful teaching, foster critical thinking and help learners navigate an increasingly digital world safely and responsibly. To make this transformation succeed and respond to stakeholders calls for **matching investment in infrastructure *and* people**, the Education Package will support teachers through **high-quality training and easy access to reliable digital infrastructure and resources**. The Teachers Agenda, part of the Education package, recognises investing in teachers as the essential condition for a more inclusive, effective and future-ready education system.

Together, these actions aim to ensure that digital education ecosystems are grounded in human-centred approach to technology and particularly AI enabling teaching practices that effectively tackle the declining basic skills trends while ensuring learners are ready for a fast-changing world.

3.7 Conclusion

While respecting the principle of subsidiarity, the **challenges of digitalisation have led to a clear need and increased calls for reinforcing EU-level cooperation on digital education**, between the European Commission, Member States and various stakeholders, including the private sector. The digital transformation of education requires coordinated governance beyond national boundaries. While education remains the responsibility of Member States, both Member States and stakeholders recognise that addressing digital challenges requires EU-level coordination and action. An example of this is the issue of **AI**. Acknowledging AI's unprecedented nature and wide-scale applications for education, in the framework of the Council Recommendation on key enabling factors for successful digital education and skills, the May 2024 Education Council Policy Debate and the Digital Education Dialogues under the Belgian Presidency, the Member States called for strengthened and more coordinated EU efforts on AI in education.

This example serves to emphasise the urgent need for targeted actions to ensure Europe's education systems meet the challenges of a digital future. The DEAP review and following consultations have helped shape the Education Package into a portfolio of limited number of highly scalable, impactful initiatives with clear EU added value, supporting the priorities of the

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Strategic framework for European cooperation in education and training towards the European Education Area and beyond.

Building on the progress of the Digital Education Action Plan, Commission actions will aim to reduce infrastructure gaps and foster a trusted and interoperable infrastructure by supporting Member States collaboration in the context of the **European Digital Infrastructure on Education** (**EDU-EDIC)**. It will bring added value by fostering a human-centred approach to technology, supporting safe and pedagogically sound European solutions, compliant with EU values.

The Package will promote a **comprehensive, foundational understanding and broad adoption of AI literacy and skills** to empower informed citizenship and improve talent pipelines, building on the AI literacy framework for primary and secondary education.

It will equally focus on digital well-being, media literacy and online safety as core components of modern education by emphasising a joint societal responsibility and bridging efforts of education institutions, families and support circles via the **European Healthy Screen Pledge.**

Technologies in education are not seen as a goal in themselves, but as a means to empower and support teachers and enhance learning. That is why supporting teachers in boosting their competences and confidence will be a core element of the Education and Skills Package and its **Teachers Agenda**.

By supporting teachers, learners, and institutions, these actions will foster more inclusive, high-quality, resilient, and adaptive education systems, helping Europe build a stronger foundation for digital resilience, population preparedness, societal well-being, and competitive future in the context of the fast-paced AI transformation.

ANNEX 1: DEAP STAKEHOLDER CONSULTATION SYNOPSIS REPORT

In 2024, at the midpoint of the DEAP, the Commission initiated a comprehensive review to evaluate the impact of the actions taken, and to adapt future strategies in response to emerging challenges and opportunities. This review provided an opportunity to reflect on the lessons learned and to recalibrate the DEAP's objectives to better meet current and future needs. As part of this review, several stakeholder consultations took place. The objectives of the consultations were to:

- Get feedback on the relevance of EU digital education policies, particularly the Digital Education Action Plan.
- Inform about gaps or areas of further strengthening in the EU digital education policies, also in view of the developments since the Digital Education Action Plan's launch in 2020.

Consultation activities and methodology

The stakeholder consultations were conducted in two ways:

- Targeted stakeholder consultations (3rd June – 24th October 2024)
- Submission of Position Papers (24th May – 15th September 2024)

1.1. Targeted stakeholder consultations

The stakeholder consultations were mainly conducted in a virtual manner. The collected data was analysed using qualitative methods.

On **3rd June 2024**, the Commission hosted the first Digital Education Action Plan (DEAP) Review stakeholder consultation online, focusing on gathering insights from the **private sector**. Out of the 16 stakeholders invited through a targeted process, 12 attended the session. The consultation brought together a diverse range of representatives from Big Tech, European EdTech, ICT companies, connectivity providers, publishers, and the broader business community.

On **3rd July 2024**, the Commission hosted the second Digital Education Action Plan (DEAP) Review stakeholder consultation online, focusing on gathering insights from the **civil society sector**. Out of the 14 stakeholders invited through a targeted process, 11 attended the session, with an additional stakeholder joining from the European Federation of Education Employers. The total number of attendees was 12. This stakeholder consultation saw representation from a diverse array of organisations, including student unions, lifelong learning platforms, education employers' federations, municipal networks, trade union committees, university foundations, disability forums, social justice organisations, school student unions, digital education platforms, and parental associations.

On **2nd October 2024**, the Commission hosted the third Digital Education Action Plan (DEAP) Review stakeholder consultation online, focusing on gathering insights from **education professionals**, teachers, educators and wider education and training community. The total

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number of attended participants was 51. The stakeholder consultation saw representation from a diverse array of countries and levels of education, as well as educational associations.

Two further **thematic consultations** took place; namely, 'Promoting Digital literacy and Tackling Disinformation through Education and Training' and 'Gender Equality in Digital', held on **30th September 2024**, and **3rd October 2024**, respectively. The first consultation focussed on disinformation and was attended by 18 stakeholders, representing digital and media literacy experts, academia, teachers, education employers, civil society, social partners, disinformation researchers, international organisations, young people and others. The second consultation was concerned with gender inequality was attended by 11 stakeholders, representing civil society, academia and the private sector.

From **22 to 24 October 2024**, the **Digital Education: Learning, Teaching, and Assessment (DELTA) Working Group participated in** a **Peer Learning Activity (PLA)** in Espoo, Finland, which focussed on the DEAP Review. The event was hosted by the Finnish Ministry of Education and was co-organised with the Commission. Those in attendance were primarily drawn from ministries of education in the Member States and other European countries, and a number of stakeholder organisations actively involved in digital education. A central focus of the PLA over the first two days was to share their views on the impact of the Digital Education Action Plan (DEAP) and its future priorities, as part of the final consultation event of the DEAP Review. In advance of the PLA DELTA WG members were surveyed to gather their views on the impact of the DEAP actions on digital education policies and practices in their country or organisation. Participants also heard how DEAP has impacted on digitalisation plans in Finland and Italy during the PLA, and they had several opportunities to discuss the impact of DEAP to date and areas that should be considered for additional action over the coming 3 years.

A consultation of the European Digital Education Hub (EDEH) members on the DEAP review took place online, on 25 September 2024. The meeting was attended by 21 EDEH members representing 15 Member States, including researchers, policymakers, teachers, professors, representatives of school organisations, and school inspectors.

On 20 January 2025 **Executive Vice-President Mînzatu** hosted a Youth Policy Dialogue in Warsaw focused on building resilience to disinformation online by promoting digital and media literacy through education. The event brought together 18 young people from diverse backgrounds - youth workers, social activists, young professionals in NGOs, Erasmus+ and European Solidarity Corps beneficiaries, members of Youth Parliament, high-school and HEI students, coming from different parts of Poland, including villages and rural areas.

In **May 2025**, the Commission conducted a **Flash Eurobarometer on future needs in digital education**. The survey results, published on 11 December 2025, revealed citizens' views on the importance of digital skills in education, including the role of teachers, the integration of AI, the benefits and challenges of technology in teaching and learning and the role of EU support in digital education.

On 1-2 December 2025, the **High-Level Group on Education and Training** organised in Nicosia held a plenary session dedicated to DEAP's implementation **'Improving the Provision of Digital Skills in Education and Training: Implementation, Lessons Learned and Next Steps'.** Besides a discussion on the implementation of the two 2023 Council Recommendations on digital education and skills, the session included a 60-minute roundtable discussion with Member States on priorities for the future digital education policies.

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On 15 April 2026, **Executive Vice-President Mînzatu and Executive Vice-President Virkkunen** co-hosted a **High-level Dialogue** with 14 CEOs of European EdTech companies and a representative of the European EdTech Alliance. The dialogue provided an opportunity to discuss the opportunities and challenges the EdTech sector faces in Europe and seek their views on how to strengthen EU's EdTech sovereignty and leverage education-business cooperation to ensure scale and competitiveness globally

On **12 June 2026**, around 80 young people and youth representatives met in Brussels for a **Youth Check on the Education Package**, including a presentation of key digital priorities.

On **18 June 2026**, **around 100 members of the European Digital Education Hub** (EDEH) contributed stakeholders' insights at **the flagship event, Collaborate for Impact.** Stakeholder input informed discussions on digital sovereignty, AI in education, digital literacy and well-being. The event reinforced the Hub's role as a platform connecting practitioner knowledge with European policymaking. At the occasion of the event, the **AI Literacy Framework for primary and secondary education** was launched, marking an important step in the next phase of the system-level uptake of AI literacy.

1.2. Stakeholder Submissions

As part of the DEAP review process, stakeholders were invited to submit their opinions. The call aimed to gather insights from a diverse range of contributors, including educational institutions, government agencies, private sector companies, and civil society organisations, on the current challenges and opportunities in digital education. Altogether, **68 contributions** were received that provide a comprehensive overview of opinions and proposals regarding the implementation, impact, and future direction of DEAP, reflecting the growing importance of digital transformation in education across Europe.

Out of the 68 total submissions, the majority came from the **Social and Economic Networks** (17 submissions) and **EdTech & ICT** (14 submissions) categories. This reflected a strong interest from organisations focused on social inclusion and digital equity, as well as technology providers who play a crucial role in facilitating digital education. The high number of submissions from **Social and Economic Networks** suggested a significant emphasis on using digital education to promote equal opportunities and address social justice issues across Europe. At the same time, the strong representation of **EdTech & ICT** organisations indicated a major focus on educational technologies, including AI-based tools, adaptive learning, and the future of digital classrooms.

In terms of geographical representation, most submissions came from Western and Northern European countries, with a particularly strong presence from Germany, France, Spain, and the Nordic countries.

These submissions typically involved national ministries of education, vocational training organisations, and research institutions, focusing on topics such as teacher training, AI in education, and addressing the digital divide. In contrast, fewer contributions were seen from Southern and Eastern European countries, such as Bulgaria, Romania, and the Baltic states, reflecting less engagement from these regions. This pattern highlighted **regional differences**

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in engagement with the DEAP review process, with a **concentration of input from countries with well-established digital education systems**.

Further submissions were received during a **Call for Evidence**[164] which the Commission launched as part of the preparation process of the Education Package to gather stakeholder input in four main areas: strengthening basic skills, enhancing the teaching profession, building digital education capacity, and supporting effective preparedness for the use of AI in education and training. Open from **30 July to 8 September 2026**, the consultation gathered **440 submissions** from all interested parties, including educators, EdTech representatives, trade unions, employers, researchers, civil society, citizens, and public authorities at local, regional, and national levels.

2. Summary of the consultation results: Key insights and themes

2.1 Targeted stakeholder consultations: Key insights

Stakeholders highlighted **DEAP's success in aligning national policies with EU digital education goals**, fostering digital skills, and addressing systemic inequalities, such as access to devices, connectivity, or support and learning opportunities. However, its **uneven implementation** across Member States and limited focus on non-formal and lifelong learning were flagged as key limitations. Advanced digital nations like Finland and Portugal showcased how DEAP-inspired initiatives, such as Finland's Digital Compass and Italy's School 4.0 Plan, address digital readiness and territorial disparities. Meanwhile, participants from less developed countries focused on challenges and shortfalls.

The **private sector** underscored DEAP's role in driving innovation and collaboration between technology providers and educational institutions. However, private sector stakeholders expressed frustration over **fragmented collaboration** with public bodies and called for streamlined engagement processes and clearer pathways for co-investment. Concerns about data privacy, algorithmic biases, and the ethical use of AI tools were also raised, with a strong emphasis on the need for robust governance frameworks to guide technological integration.

Civil society stakeholders praised DEAP's emphasis on inclusion and digital citizenship but criticised its limited focus on non-formal and informal learning, particularly for underserved and marginalised groups. Organisations stressed that lifelong learning opportunities and community-based education play a critical role in engaging those excluded from traditional systems. Additionally, civil society called for a stronger focus on **equity**, urging more targeted investments to bridge the **digital divide** in rural and low-income regions. Efforts to foster gender equality through mentorship and STEM initiatives for young women were welcomed, though stakeholders emphasised the need for systemic interventions to address persistent barriers.

Educators reported persistent challenges were noted in resource allocation, particularly in rural areas where access to high-speed internet and digital tools remains limited. Educators also

[164] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/18873-Quality-education-for-all-a-2040-roadmap_en

expressed concerns about the rapid pace of technological change, which often outstrips their ability to integrate new tools effectively. Teacher training programs like Finland's Teacher Education Forum and Italy's Scuola Futura were highlighted as promising models, emphasising continuous professional development and peer learning.

Young participants stressed that education must adapt to the growing role of AI and digital technologies in how young people access, interpret, and process information. They emphasised that digital tools should reduce administrative burden but not replace teacher-student relationships or encourage excessive use. They also called for a human-centred approach to AI tools in education and more provision for AI literacy, combining technical skills with ethical and environmental awareness.

Looking ahead, stakeholders called for an **expanded and more inclusive DEAP**. Priorities included greater support for non-formal education and lifelong learning, ensuring equitable access to digital tools, and addressing ethical challenges associated with AI and other emerging technologies. Civil society advocated for stronger integration of digital wellbeing and mental health considerations into education, while the private sector highlighted the need for sustained public-private partnerships to drive innovation. Educators emphasised the importance of structured training and collaborative platforms to prepare for future challenges. Strengthening multistakeholder collaboration and fostering knowledge exchange was also highlighted as vital for equitable and inclusive digital education in Europe.

1.2. Stakeholder Submissions: Key insights

A central theme across submissions was the critical importance of digital skills development, particularly in areas such as AI, data literacy, and coding, to prepare learners for future careers. Stakeholders emphasise the need for **teacher training and continuous professional development** to equip educators with the tools and competencies required to implement digital technologies effectively. **Digital inclusion** also emerged as a key priority, with a strong focus on bridging the **digital divide**. This involves ensuring equitable access to high-speed internet, digital devices, and targeted support for marginalized groups, such as rural communities, low-income households, and learners with disabilities. Stakeholders across sectors stressed that without such measures, the benefits of digital education would remain unevenly distributed.

The DEAP was widely recognised for its alignment with broader EU policy goals, such as digital and green transitions, and for initiatives like the European Digital Education Hub, which has fostered collaboration and knowledge exchange. Progress in improving digital infrastructure in schools and promoting teacher training were seen as notable achievements. However, **fragmented implementation** of DEAP initiatives across Member States and the lack of sustained funding to ensure long-term impact were highlighted as persistent weaknesses. Furthermore, stakeholders highlighted the need for more emphasis on lifelong learning, informal education, online schooling and the validation of skills gained outside traditional educational settings.

Key **divergences in stakeholder perspectives** centred on several issues. Ministries and formal education institutions prioritised integrating digital tools into national curricula, while lifelong learning networks advocated for a broader approach that includes non-formal and adult education. Similarly, EdTech companies pushed for rapid adoption of AI technologies to personalise learning, while research institutions and social organisations cautioned against

unregulated implementation, citing ethical concerns around data privacy and potential biases. Tensions also arose around the centralisation of educational tools at the EU level versus adapting solutions to local cultural and educational needs. Additionally, there was debate over balancing investments in digital infrastructure with pedagogical innovation and the development of high-quality educational content.

Looking ahead, stakeholders called for a **more inclusive and comprehensive approach** to digital education. This included **expanding the DEAP's scope** to better support non-formal education and lifelong learning, addressing gaps in digital infrastructure and pedagogy, and ensuring that digital education fosters inclusivity and equity. Collaboration across public, private, and civil society sectors was seen as essential for achieving sustainable progress. Moreover, stakeholders stressed the need for **ethical frameworks** to guide the integration of AI and digital tools, ensuring that technological advancements benefit all learners without compromising privacy or fairness.

2.3. Key themes from all consultations (targeted stakeholder consultations and submissions)

Relevance and Impact of DEAP

The DEAP established itself as a pivotal framework for advancing digital education across Europe. By aligning national strategies with EU-wide objectives, DEAP fostered digital skills development, addressed systemic inequalities, and encouraged the ethical integration of emerging technologies. Examples such as Finland's Digital Compass and Italy's School 4.0 Plan illustrate how DEAP-inspired initiatives can incorporate sustainability, digital security, and innovative pedagogies into national education systems. However, the extent of DEAP's impact varies, as its success depended heavily on Member States' prioritisation of digital education. Addressing these disparities is critical to ensuring equitable progress across the EU.

The DEAP focus on fostering collaboration and ethical use of technology was widely welcomed. Platforms like the European Digital Education Hub established a dialogue among stakeholders, enabling knowledge-sharing and cooperation. Nonetheless, stakeholders emphasised the need for future digital education policies to provide clearer guidance on how digital technologies can be integrated sustainably and effectively into educational systems. This clarity would help Member States demonstrate the tangible benefits of digital transformation to learners, educators, and policymakers.

Sectoral Contributions and Limitations

Inclusive Digital Education and Bridging the Digital Divide

DEAP highlighted the persistent challenges of unequal access to digital tools, particularly for rural communities, low-income households, and individuals with disabilities. Civil society organisations called for targeted investments to close the digital divide, advocating for tailored, region-specific strategies to ensure underserved populations can meaningfully engage with digital resources. Initiatives such as Italy's School 4.0 Plan and Finland's Digital Compass were recognised as effective models, but stakeholders emphasised the need for more expansive efforts to address disparities in digital literacy and engagement.

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Lifelong Learning and Non-Formal Education

The importance of lifelong learning and non-formal education pathways was a recurring theme in consultations. Civil society and lifelong learning networks stressed the value of recognising and validating skills acquired outside traditional education. Successful examples, including Finland's digital Bildung initiatives and micro-credential systems, demonstrate how digital education policies can supported workforce adaptability. Further promotion of lifelong learning would help address the growing demand for reskilling and upskilling, particularly in sectors undergoing digital transformation. Flexible learning pathways tailored to adult learners' needs were identified as important for fostering inclusive digital education.

Ethical Integration of Emerging Technologies

The integration of advanced technologies like AI and XR has transformative potential but also presents ethical challenges. Stakeholders, particularly from civil society, raised concerns about data privacy, algorithmic bias, and the risk of exacerbating inequalities. They called for clear governance frameworks to ensure technologies align with educational priorities, rather than commercial interests. Greater transparency and accountability in the use of AI are critical for building trust among educators, learners, and parents, so that these tools serve to enhance learning experiences equitably.

Gender Equality in Digital Education

Stakeholders highlighted the need for targeted interventions to address gender disparities in STEM and ICT fields. Initiatives such as "Girls Go Circular" were praised for their impact, but systemic changes are needed to sustain women's participation in these areas. Addressing biases in educational content, improving career guidance, and fostering supportive environments were identified as key measures to encourage more women to pursue careers in digital and technological sectors.

Enhancing Cooperation and Synergies

Collaboration and Governance

Effective collaboration across sectors is essential for future digital education policies at the EU level. Stakeholders stressed the importance of strengthening public-private partnerships to drive innovation and sustain digital education initiatives. Platforms such as the European Digital Education Hub have played a critical role in facilitating dialogue and knowledge-sharing, but stakeholders recommended expanding these platforms to include more actionable tools and practical guidance. Improving governance mechanisms and ensuring transparency and accountability in partnerships were also highlighted as priorities, as these efforts can align diverse contributions with overarching educational objectives.

Digital Skills and Teacher Training

Equipping educators with digital competencies is fundamental. Stakeholders underscored the need for continuous professional development programmes that combine technical and pedagogical training. Such programmes would empower teachers to integrate digital tools effectively, fostering a culture of innovation in classrooms. Initiatives like Erasmus+ and eTwinning have been instrumental in supporting transnational collaboration, but gaps in rural areas highlight the need for more equitable resource distribution.

The consultations emphasised the importance of addressing the mental health implications of digital education for both students and teachers. Concerns around teacher stress, excessive screen time, and the broader effects of digital tools on wellbeing were highlighted. Stakeholders called for tackling digital wellbeing to encourage balanced technology use and the provision of supportive environments for learners and educators alike.

Challenges in Implementation

One of the main barriers to DEAP's success is its uneven implementation across Member States, with less-developed regions struggling to meet its objectives. Rural and underserved areas face significant challenges, including inadequate access to high-speed internet, digital tools, and teacher training resources. DEAP has provided an important impetus in making resources available to address challenges, but further efforts and funding will be required.

The rapid pace of technological advancement also poses challenges for educators and institutions. Stakeholders expressed concerns about the preparedness of existing frameworks to adapt to innovations like AI and XR. The underutilisation of advanced tools often stems from insufficient training and a lack of institutional support. Additionally, the ethical implications of these technologies, including data privacy and algorithmic transparency, require robust governance mechanisms to ensure their equitable and responsible integration.

3. Analytical Reflections and Future Directions

3.1. Analytical reflections

The combined insights from the DEAP review consultations, and DED provide a comprehensive understanding of DEAP's achievements and limitations. These engagements highlight that while DEAP has provided a robust framework for advancing digital transformation in education, successful implementation is very much dependent on how much countries prioritise digital education. Future policy work should strengthen the rationale for continued investment in digital education, facilitate consistent approaches across Member States, and showcase the tangible impacts of these efforts on teaching, learning, and assessment.

Stakeholders have emphasised the need to articulate more clearly what digital education looks like, delving deeper into how digital technologies can be embedded into educational systems and practices in sustainable, safe, and meaningful ways. There is a call for a **more balanced narrative, underpinned by stronger evidence and concrete ideas on sustaining investment.** They also seek answers to pressing concerns, such as managing the role of big business and EdTech in education and preparing learners of all ages to live and work in an increasingly digital world. There is a growing sentiment that these efforts need to go beyond schools, linking digital education more closely to broader societal needs and ensuring its relevance across lifelong learning contexts.

Ongoing sustained dialogue is seen as essential to that evolving needs of Member States are addressed. This dialogue can help align priorities, refine strategies, and ensure that Member States collectively address challenges such as the digital divide, workforce development, data privacy, disinformation and the integration of emerging technologies. Platforms such as the

Digital Education Hub should be leveraged and expanded to facilitate regular knowledge exchange, mutual learning, and cross-border collaboration.

Stakeholders recognised DEAP's critical role in helping education stakeholders and in particular Member States to **articulate the value of funding digital education initiatives**. Efforts should continue to support the development of compelling arguments for sustained investment through evidence-based insights and best practices. Clear case studies and examples of successful implementation can help national governments and stakeholders demonstrate the importance of digital transformation in education and its alignment with broader economic and social objectives. It is important for Member States to be able to support funding decisions with robust data so that they can continue to validate the need for long-term investment in this area while also demonstrating meaningful impact on learning.

A **consistent approach to digital education** is seen as important for achieving equitable and cohesive outcomes across the EU. The Commission should continue to provide structured guidelines and competence frameworks, such as DigComp, DigCompEdu and SELFIE, that enable Member States to align their efforts while allowing flexibility for local adaptation. Standardised benchmarks and evaluation tools can help measure progress, identify gaps, and ensure that Member States can work toward shared objectives. However, the lack of reliable and valid data on digital skills remains a significant challenge. Similarly, there is a need for comprehensive data on teacher digital competences, as these are critical to advancing digital education. Greater consistency in data collection and reporting can also facilitate cross-border collaboration and support the creation of a more integrated European digital education ecosystem. Submissions also highlighted the potential of AI and data analytics to enhance monitoring efforts, providing real-time insights into policy efforts.

There should be a renewed focus on **demonstrating the real-world impact of digital education initiatives**. Stakeholders want access to reliable metrics and evaluation methods to showcase the return on investment in terms of educational outcomes, workforce readiness, and societal benefits. The sharing of success stories and quantifiable results can help validate current efforts and make the case for sustained innovation and funding. Digital education should be positioned as a high-impact area that delivers long-term value for Member States and their citizens.

3.2. Priorities for the Future

Several key priorities have emerged and feed into future policies.

Bridging the Digital Divide
Addressing disparities in digital access remains a pressing priority. To ensure equitable opportunities, Member States must focus on targeted interventions for underserved communities, particularly in rural and economically disadvantaged areas. Beyond infrastructure, the further policy actions should encourage the adoption of innovative solutions that make digital tools and resources accessible and practical for all learners.

Strengthening Educator Competence
Empowering teachers and school leaders with the skills to confidently navigate digital tools and emerging technologies is crucial for effective implementation. Tailored professional

development programmes should go beyond technical training to include pedagogical strategies that integrate technology into everyday teaching. There is a growing recognition that the current models are not delivering sufficiently and there is a desire to find new ways to develop teacher and school leader digital competences. Member States need support in designing initiatives that promote ongoing learning and adaptability, enabling educators to keep pace with technological advancements and prepare students for the demands of a digital society.

Promoting Ethical and Legal Technology Use

As AI and data-driven technologies become more prominent in education, digital education policy should prioritise the development of robust ethical guidelines. Member States require guidance on clear governance frameworks to manage issues such as data privacy, GDPR, algorithmic transparency, screentime, and the responsible use of AI in classrooms. Supporting the creation of EU-wide guidelines and standards can ensure ethical considerations are consistently applied and help foster trust in digital innovations.

Expanding Collaborative Platforms

To sustain momentum, digital education should continue to strengthen multistakeholder collaboration. Networks such as the European Digital Education Hub should be sustained and developed to include more actionable tools, real-world examples, and tailored guidance for Member States. This dialogue can facilitate the exchange of knowledge and best practices, enabling countries to learn from one another and adopt innovative approaches that are scalable and contextually relevant.

Embracing a Holistic Vision for Digital Education

Digital education policies success hinge on their ability to integrate digital education into broader societal and educational contexts. Lifelong learning pathways should be prioritised to ensure citizens of all ages can benefit from digital advancements, while digital wellbeing initiatives should address the balance between technology use and personal health. There is a need to critically consider where and how digital technologies can support engaging educational approaches across the EU, at all levels and ages. There is also a need for a more critical approach, one that looks at the entire society, and not just schools. DEAP can support Member States in exploring non-formal and informal learning approaches that complement traditional education and foster a culture of continuous and inclusive digital engagement.

ANNEX 2: GLOSSARY AND LIST OF ABBREVIATIONS/ACRONYMS

TERM	DEFINITION
Artificial Intelligence (AI), including generative AI	Information technology systems, either software or hardware based, that display intelligent behaviour by analysing their environment and taking actions - with some degree of autonomy - to achieve specific goals. AI-based systems can be purely software-based (e.g. voice assistants, search engines, speech and face recognition systems, etc.) or embedded in hardware devices (e.g.

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	advanced robots, autonomous cars, drones, etc.)[165]. Traditional AI systems are designed to recognise patterns and make predictions, whereas generative AI can generate new content based on the data they have been trained on[166].
Assistive Technologies (AT)	Technologies, either advanced (e.g. Braille applications, smart canes, haptic computers) or relatively low-tech (e.g. glasses, crutches, hearing aids), designed to support people with disabilities[167].
Blended learning	Pedagogical approach mixing face-to-face and online learning, with some element of learner control over time, place, path, and pace[168]. In the formal education sector, the term refers to when a school, educator or learner takes more than one approach to the learning process[169].
Critical infrastructure	Include power grids, the transport network and information and communication systems. Protection of these infrastructures is vital for the security of the EU and the well-being of its citizens[170].
Computational thinking	Shorthand for 'thinking as a computer scientist', the term refers to the ability to understand the underlying notions and mechanisms of digital technologies to formulate and solve problems[171] .
Computer Science	See Informatics.
Connectivity (fibre, 5G, satellite)	The ability of a computer, program, device, or system to connect with one or more others. There are different connection types that use different technologies, such as fibre, 5G and satellite. Each technology offers a different level of speed or bandwidth (e.g. the speed that data is transferred between a device and the internet)[172].
Cybersecurity	Measures adopted to defend information systems from external unauthorised access as well as user actions that compromise the confidentiality, integrity and availability of both information and systems[173].
Data protection	The processes and mechanisms designed to protect individual privacy rights regarding the collection, storing, handling, processing and the dissemination of data[174].
Data standards	A technical specification that describes how data should be stored, managed and/or exchanged to ensure the accessibility,

[165] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: Artificial Intelligence for Europe. COM(2018) 237 final.
[166] Technopedia (2022). Generative AI. Available at : https://www.techopedia.com/definition/34633/generative-ai
[167] European Parliamentary Research Service - Scientific Foresight Unit (2018). Assistive technologies for people with disabilities.
[168] Lifelong Learning Platform (2022). Review of Lifelong Learning Terminology. Available at http://lllplatform.eu/resources/lexicon/.
[169] Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education - 2021/C 504/03.
[170] EU Science Hub (2022). Critical infrastructure protection.
[171] European Commission (2016). Developing computational thinking in compulsory education. JRC Science for Policy Report.
[172] European Commission (2019). 2nd Survey of Schools: ICT in Education. Luxembourg: Publications Office of the European Union.
[173] ENISA (2018). Cybersecurity culture guidelines: behavioural aspects of cybersecurity.
[174] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), OJ L 119, 4.5.2016.

	retrievability, accessibility, sustainability and interoperability of these data across different systems, tools, platforms, etc.[175]
Deep Tech	An institution, an organisation or a start-up company, with the expressed objective of providing disruptive solutions built around unique, protected or hard-to-reproduce technological or scientific advances. These solutions are defined by their complexity, both in terms of the science that underpins them and the IP they generate, often having a long development time, significant capital requirements and challenging regulatory barriers to overcome.[176]
Digital capacity/ preparedness/readiness	Ability to integrate, optimise and transform digital technologies in different processes and activities, including planning for organisational change, ongoing monitoring and adaptation, and a strong focus on learning driven pedagogy.[177]
Digital citizenship	Set of values, skills, attitudes, knowledge and critical understanding citizens need in the digital era A digital citizen knows how to use technologies and can engage competently and positively with them. He/she participates actively and responsibly in both on- and offline communities at all levels.[178]
Digital competence	Ability to confidently, critically and responsibly use and engage with digital technologies for learning, work, and participation in society[179]. The European Digital Competence Framework has identified the key components of digital competence in five areas: information and data literacy; communication and collaboration; digital content creation; safety; and problem solving[180].
Digital divide/gap	Differences between individuals, households, businesses and geographic areas at different socio-economic levels regarding both access and use of technology[181].The term is also used to indicate differences in the level of digital skills and the mismatch between the demand-supply of digital skills[182]
Digital education	Digital education comprises of two different but complementary perspectives: 1) the pedagogical use of digital technologies to support and enhance teaching, learning and assessment and 2) the development of digital competences by learners and education and training staff [183].
Digital education content	Pedagogical content created, produced and delivered in different digital formats and by using digital tools with the explicit

[175] Common Education Data Standards Common Education Data Standards (CEDS)
[176] Romasanta A., Ahmadova G., Wareham J. D., Pujol Priego L. (2021). Deep tech: Unveiling the foundations. For further details see also: What is Deep Tech?
[177] Commission Staff Working Document accompanying the Digital Education Action Plan 2021-2027- SWD(2020) 209 final.
[178] Council of Europe (2019). Digital Citizenship Education Handbook.
[179] Council Recommendation of 22 May 2018 on Key Competences for Lifelong learning - 2018/C 189/01
[180] COSGROVE, J. and CACHIA, R., DigComp 3.0: European Digital Competence Framework - Fifth Edition, Publications Office of the European Union, Luxembourg, 2025, https://data.europa.eu/doi/10.2760/0001149, JRC144121
[181] OECD (2001). Understanding the digital divide. *OECD Digital Economy Papers*, No. 49, OECD Publishing, Paris https://doi.org/10.1787/236405667766.
[182] Centeno C., Karpinski Z., M.C. Urzi Brancati (2022). Supporting policies addressing the digital skills gap. Luxembourg: Publications Office of the European Union.
[183] European Commission / EACEA / Eurydice (2019), Digital Education at School in Europe. Eurydice Report. Luxembourg: Publications Office of the European Union.

	intention of supporting learners and teachers' educational activities[184].
Digital Education Hackathon (DigiEduHack)	One of the flagship initiatives of the European Commission on digital education. DigiEduHack engages educational institutions and other organisations working in the education field in a 'contest' to identify key challenges and co-create solutions across disciplines and organisations on digital education matters[185]
Digital Education Hub	Open online collaborative community on digital education for stakeholders from all levels and sectors of education and training in Europe and beyond. It is part of the Digital Education Action Plan 2021-2027 and aims for reinforced cooperation and dialogue between stakeholders in digital education[186]
Digital inclusion	Activities necessary to ensure that all individuals and communities, including the most disadvantaged ones, can contribute to and benefit from the digital transformation[187]. It requires strategies and investments to reduce and eliminate historical, institutional and structural barriers to access and use of technology[188].Concerning digital education, it centres around leveraging digital tools to widen access and enhance the quality of teaching and learning for the purpose of delivering a fair and equitable education [189]
Digital infrastructure	Digital infrastructure refers to the structures (physical or virtual) that act as enablers for technological developments and access to ICT. Includes hardware, software as well as digital equipment.[190]
Digital literacy	The ability to access, manage, understand, integrate, communicate, evaluate, create, and disseminate information safely and appropriately through digital technologies. It includes competences that are variously referred to as information literacy, media literacy, computer, and ICT literacy. Digital literacy involves a dimension of active and civic engagement with the digital world, promotes active citizenship[191] and is part of being digitally competent.[192]
Digital Pedagogy	The meaningful use of digital technologies in the teaching and learning practices with the intent to support personalised learning, contribute to the design of new modes of learning, enrich existing learning experiences and improve learning outcomes[193]

[184] Commission Staff Working Document accompanying the Digital Education Action Plan 2021-2027- SWD(2020) 209 final.
[185] https://digieduhack.com/Homepage - DigiEduHack 2025
[186] European Digital Education Hub - European Education Area
[187] Digital inclusion | Shaping Europe's digital future
[188] European Commission (2019). Digital Inclusion & Web Accessibility in the European Union: Essential for some, useful for all. Luxembourg: Publications Office of the European Union
[189] European Commission (2021). Enhancing learning through digital tools and practices: how digital technology in compulsory education can help promote inclusion : final report, Luxembourg: Publications Office of the EU.
[190] Digital Compass: the European way for the Digital Decade - COM(2021) 118 final.
[191] European Commission (2022). Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training, Publications Office of the European Union.
[192] Joint Research Centre (2017). DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use. Luxembourg: Publications office of the European Union.
[193] Commission Staff Working Document accompanying the Digital Education Action Plan 2021-2027- SWD(2020) 209 final

Digital skills (basic, advanced, specialist)	Set of skills that enable individuals to understand how technology can support communication, creativity and innovation, and be aware of their opportunities, limitations, effects and risks. Basic digital skills allow a basic ability to use digital devices and online applications (for instance to access, filter and manage information, create and share content, communicate and collaborate), and are considered a critical component of a new set of literacy skills in the digital era, with reading, writing, and numeracy skills[194]. At the advanced end of the spectrum of digital skills are the higher-level abilities that allow individuals to make use of digital technologies in empowering and transformative ways.[195]
Digital transition/ transformation	The terms are often used as synonymous. However, digital transition (digitisation) refers to the conversion of information or data from analogue to digital format, whereas digital transformation (digitalisation) refers to the adoption or increase in use of digital technology by an organisation, an industry, or a country and therefore describes more generally the way digitisation is affecting economy and society[196]
Digital well-being	Digital well-being refers to the overall well-being in digital environments, with the aim to safeguard and ensure a culture of a meaningful and ethical use of digital tools with a view to ensure that technology is used in a positive way and with the aim to act safely and responsibly in digital environments[197]
Disinformation/misinformation	Disinformation is verifiably false or misleading information that is created, presented, and disseminated for economic gain or to intentionally deceive the public. Misinformation is verifiably false information that is spread without the intention to mislead, and often shared because the user believes it to be true[198] FIMI is a mostly non-illegal pattern of behaviour that threatens or has the potential to negatively impact values, procedures and political processes. Such activity is manipulative in character, conducted in an intentional and coordinated manner. Actors of such activity can be state or non-state actors, including their proxies inside and outside of their own territory. FIMI often seeks to stoke polarisation and divisions inside and outside the EU while also aiming to undermine the EU's global standing and ability to pursue its policy objectives and interests.[199]
Educational Technology (EdTech)	The industry that combines education and technological advances as well as the scientific field, which involves the interdisciplinary knowledge informing the use of digital tools and devices,

[194] Council Recommendation of 22 May 2018 on key competences for lifelong learning. 2018/C 189/01.
[195] UNESCO (2018) Digital skills critical for jobs and social inclusion
[196] OECD (2017). Going Digital: Making the Transformation Work for Growth and Well-Being. Paris: OECD publishing.
[197] Council conclusions on supporting well-being in digital education, 2022 O.J. (C 469/04)
[198] European Commission (2022). Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training. Luxembourg: Publications Office of the European Union.
[199] https://www.eeas.europa.eu/eeas/information-integrity-and-countering-foreign-information-manipulation-interference-fimi_en

	processes and procedures, resources and strategies to improve learning experiences in a variety of learning settings[200]
Education and Training Monitor	A comparative report that presents the European Commission's annual analysis of how education and training systems evolve across the EU.[201]
Enabling Factors	The term is used to reference elements that are necessary for the development of a high-performing and inclusive digital education and training ecosystem that serves the needs of all learners. They include elements of technological capacity, human resources, as well as strategies and policies.
Formal, non-formal and informal education	Formal education is education that is intentional, organised and structured. It is usually provided in schools, colleges, universities and other formal education and training institutions, and leads to recognised diplomas and qualifications. Non-formal education takes place through planned activities (in terms of learning objectives and learning time) where some form of learning support is present, but which is not part of the formal education and training system. Informal education results from daily activities related to work, family or leisure which is not organised or structured in terms of objectives, time or learning support.[202]
Hybrid learning	Educational approach where students can choose how to attend a specific class or learning opportunity, either in-person or online. Educators teach remote and in-person students at the same time using tools like video conferencing hardware and software.[203]
ICT specialist	Workers who have the ability to develop, operate and maintain ICT systems, and for whom ICT constitutes the main part of their job [204]. A narrower definition includes only those whose jobs solely concern ICTs (programmers, software engineers, etc.)[205]
Individual learning accounts	Virtual individual accounts in which training rights are accumulated over time They can be used for further training, guidance or validation.[206]
Informatics/computer science	A distinct scientific discipline, characterised by its own concepts, methods, body of knowledge, and open issues. It covers the foundations of computational structures, processes, artefacts and systems, and their software designs, their applications, and their impact on society.[207]
Information and Communication Technology (ICT)	Diverse set of technological tools and resources used to transmit, store, create, share or exchange information. These technological tools and resources include computers, the internet, live

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[201] Education and Training Monitor - European Education Area
[202] Erasmus + Programme Guide (2020). Annex III- Glossary of terms
[203] Hybrid Learning In Education: Benefits And Tips - eLearning Industry
[204] Eurostat (2022): Statistic explained - Eurostat (europa.eu): ICT specialists in employment.
[205] OECD (2004). OECD Information Technology Outlook. Paris: OECD publications
[206] Council Recommendation of 16 June 2022 on individual learning accounts - 2022/C 243/03
[207] CECE (2017). Informatics Education in Europe: Are we all in the Same Boat

	broadcasting technologies, recorded broadcasting technologies and telephony.[208]
Interoperability	The ability of two or more distinct systems or components to exchange information and to use the information that has been exchanged seamlessly, securely and in a controlled manner.[209]
International Standard Classification of Education (ISCED)	A statistical framework for organising information on education. It has nine levels: ISCED 0 refers to early childhood education, ISCED 1 to primary education, ISCED 2 to lower secondary education, ISCED 3 to upper secondary education, ISCED 4 to post-secondary non-tertiary education, ISCED 5 to short-cycle tertiary education, ISCED 6 to bachelor's or equivalent level, ISCED 7 to master's or equivalent level, ISCED 8 to doctoral or equivalent level.[210]
Learning analytics	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.[211]
Learning Management System (LMS)	A web-based software platform made for delivering, tracking and managing online and blended learning. Its main features allow handling all aspects of the learning process beyond content delivery (e.g. course management, learners' enrolment, online activity tracking, etc.).[212]
Learning outcomes (Including learning objectives)	Statements of what a learner knows, understands and can do on completion of a learning process in formal, non-formal or informal education. Learning outcomes indicate actual attainment levels, while learning objectives define the competences to be developed in general terms.[213]
Lifelong learning	All activities undertaken throughout life, with the aim of improving knowledge, skills and competences for personal, civic, social and/or professional reasons[214]. It covers education and training across all ages and in all areas of life - be it formal, non-formal or informal.[215]
Metaverse	A conceptual term that captures a mix of virtual reality and other technologies. It is a world of interconnected physical and virtual communities where users can develop professionally, socialise, entertain, commerce and trade with virtual properties.[216]
Micro-credentials	The record of the learning outcomes that a learner has acquired following a small volume of learning. Learning experiences leading to micro-credentials are designed to provide the learner with specific knowledge, skills and competences that respond to societal, personal, and cultural or labour market needs. Micro-

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[209] Bates DW, Samal L. (2018). Interoperability: What Is It, How Can We Make It Work for Clinicians, and How Should We Measure It in the Future? Health Serv Res. 2018 Oct;53(5):3270-3277
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[211] Joint Research Centre (2016). Research Evidence on the Use of Learning Analytics - Implications for Education Policy. Hilbig R., Renz A., Schildhauer T. (2019). Data Analytics: The Future of Innovative Teaching and Learning
[212] Watson W., Watson S. L. (2007). An Argument for clarity: what are learning management systems, what are they not and what should they become. TechTrends, 51(2), 28–34.
[213] European Commission / EACEA / Eurydice (2019), Digital Education at School in Europe. Eurydice Report. Luxembourg: Publications Office of the European Union..
[214] CEDEFOP (2003). Quality in education and training. Glossary. Paris: OECD publishing.
[215] Lifelong Learning Platform (2019). Lexicon available at http://lllplatform.eu/resources/lexicon/
[216] O'Brien, M. & Chan, K. (2021). Explainer: What is the metaverse and how will it work? Los Angeles Times

	credentials can be used to complement and enhance education, training, lifelong learning and employability ecosystems.[217]
Online learning	Also known as ICT-based learning, virtual learning and e-learning, the term indicates a methodology involving the use of ICTs to support both teaching and learning.[218]
Play-based Learning	Pedagogical approaches where children can explore, experiment, discover, and solve problems in imaginative and playful way.[219]
Reality: Augmented (AR) - Virtual (VR) - Mixed (MR) – Extended (XR)	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[220]. VR is a computer-generated scenario that simulates a real-world experience that can be experienced by using special electronic equipment, such as a VR headset or gloves fitted with sensors. MR features elements of both AR and VR. Its key characteristic is that the objects and content from both the virtual and real-world are able to react to each other in real time.[221] XR is a catch-all term for Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR).[222]
Remote or distance education	Method of delivery, which involves teaching and learning activities where educators and learners are not physically present in one location at the same time. Learning happens instead away from the physical site of an educational provider with educators and learners using different means to engage with a programme, course or educational activity.[223]
Student information system	A software that enables education and training institutions to digitise and consequently manage student information more efficiently, including but not limited to grades, attendance records, and more.[224]
Technological sovereignty	The ability of a country (or a group of countries) to generate autonomously technological and scientific knowledge or to use technological capabilities developed outside by using reliable partnerships.[225]

[217] Council Recommendation on a European approach to micro-credentials for lifelong learning and employability.
[218] Lifelong Learning Platform (2022) Review of Lifelong Learning Terminology. Available at http://lllplatform.eu/resources/lexicon/.
[219] Parker, R., Thomsen, B. S., & Berry, A. (2022). Learning Through Play at School: A Framework for Policy and Practice.
[220] European Commission (2022). Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators. Luxembourg: Publications Office of the European Union.
[221] European Commission (2022). Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators. Luxembourg: Publications Office of the European Union.
[222] ECORYS (2021). XR and its potential for Europe. Available at: xreuropepotential.com/assets/pdf/ecorys-xr-2021-report.pdf
[223] QAA Guidance (2020). Building a Taxonomy for Digital Learning. Available at: xreuropepotential.com/assets/pdf/ecorys-xr-2021-report.pdf
[224] EDUCASE (2022). Student Information Systems.
[225] Crespi F., Caravella S., Menghini M., Salvatori C. (2021). European Technological Sovereignty: An emerging framework for policy strategy. Intereconomics, 56(6), 348-354.

Virtual administration/management system	Web-based software that interfaces with virtual environments and the underlying physical hardware to simplify resource administration, enhance data analyses, and streamline operations.[226]
Upskilling/reskilling	Short-term targeted training typically provided following initial education or training, and aimed at supplementing, improving or updating knowledge, skills and/or competences acquired during previous training. Reskilling enables individuals to acquire new skills giving access either to a new occupation or to new professional activities. [227]
Virtual Learning Environment (VLE)	A learning situation that is supported by Internet-enabled technologies to provide virtual tools for students to learn specific content, communicate and submit work, while providing components for an instructor to manage the learning process, collect input, and provide feedback to students.[228]

List of abbreviations and acronyms

- AI – Artificial Intelligence
- CDP - Continuous Professional Development
- CR - Council Recommendation
- DELTA - Working Group on Digital Education: Learning Teaching and Assessment
- DG CNECT - Directorate-General Communications Networks, Content and Technology
- DG EAC - Directorate-General for Education, Youth, Sport and Culture
- DG EMPL - Directorate-General for Employment, Social Affairs and Inclusion
- ECEC - Early Childhood Education and Care
- GDPR - General Data Protection Regulation
- ICILS - International Computer and Information Literacy Study
- ICT - Information and Communication Technology
- ISCED - International Standard Classification of Education
- ITE - Initial Teacher Education
- JRC - Joint Research Centre
- PISA – Programme for International Student Assessment
- SMEs- Small and Medium Enterprises

[226] Sutherland L., Janene-Nelson K. et al. (2018). Work Together Anywhere: A Handbook on Working Remotely Successfully for Individuals, Teams, and Managers.
[227] CEDEFOP (2008). Terminology of European education and training policy. A selection of 100 key terms.
[228] Spector J. M. (2015). The SAGE Encyclopaedia of Educational Technology. SAGE Publications.

- TALIS - Teaching and Learning International Survey
- TSI - Technical Support Instrument
- VET - Vocational Education and Training

ANNEX 3: LITERATURE AND SOURCES

The present Annex presents recent policy reports and literature on digital education and skills. The full list of resources used to write the Staff Working Document is provided in the document's footnotes.

Castaño M. J., Weikert G. L. and Herrero R. C. (2021). Analysing the digital capacity of Spanish schools using SELFIE. Publications Office of the European Union: Luxembourg.

CEDEFOP (2021). Challenging digital myths. First findings from Cedefop's second European skills and jobs survey.

CEDEFOP (2018). Insights into skills shortages and skill mismatch.

Centeno, C., Cosgrove, J., Cachia, R., Mora, T., Di Legge, A., Vivarelli, S., Bulian, G., Moyes Prellezo, N., Piña De Santisteban, P., Schulz, C., Hüsing, T., Cuartas-Acosta, A. And Troia, S. (2024). European Digital Skills Certificate (EDSC) Feasibility Study. Publications Office of the European Union: Luxembourg.

Centeno, C., Cosgrove, J., Cachia, R., Mora, T., Di Legge, A., Vivarelli, S., Bulian, G., Moyes Prellezo, N., Piña De Santisteban, P., Schulz, C., Hüsing, T., Cuartas-Acosta, A., and Troia, S., (2024). European Digital Skills Certificate (EDSC) Feasibility Study: Annexes to the report. Publications Office of the European Union, Luxembourg.

Centeno, C., Cosgrove, J., Schultz, C., Hüsing, T. and Cuartas-Acosta, A., (2025). Landscape of digital skills certification schemes in the EU: An analysis from the perspective of the Digital Competence Framework (DigComp), Publications Office of the European Union, Luxembourg.

Commission Staff Working Document accompanying the document Proposal for a Council Recommendation on blended learning for high quality and inclusive primary and secondary education, SWD(2021) 219 final.

Commission Staff Working Document accompanying the document Proposal for a Council Recommendation on the key enabling factors for successful digital education and training, SWD(2023) 205 final

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions European Interoperability Framework – Implementation Strategy, COM/2017/0134 final

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on achieving the European Education Area by 2025, COM/2020/625 final.

www.parlament.gv.at

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Action Plan on Basic Skills COM(2025) 88 final

Communication accompanying the 2030 Digital Compass: the European way for the Digital Decade, COM (2021) 118 final.

Communication from the Commission accompanying the Digital Education Action Plan 2021-2027. Resetting education and training for the digital age, COM/2020/624 final.

Council Conclusions on digital education in Europe's knowledge societies, 2020 (C 415/10)

Council Conclusions on supporting well-being in digital education, 2022 (C 469/04).

Council Recommendation on blended learning for high quality and inclusive primary and secondary education**,** 2021 (C 504/03).

Council Recommendation on the key enabling factors for successful digital education and training, 2023 (C/2024/1115).

Council Recommendation on improving the provision of digital skills and competences in education and training, 2023 (C/2024/1030).

Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030) 2021/C 66/01.

Economou, A., (2023). SELFIE for teachers – Toolkit Using SELFIEforTEACHERS – Supporting teachers in building their digital competence, Publications Office of the European Union.

Economou, A., Kyza, E. A., Georgiou, Y., Kapsalis, G., Gallagher, S. et al., (2024). Using self-reflection to support teacher professional learning and development of their digital competence – A multi-case study using SELFIEforTEACHERS, Publications Office of the European Union.

European Commission: Directorate-General for Education, Youth, Sport and Culture, Making informed choices on digital education content: EU guidelines for teachers and educators, Publications Office of the European Union, 2025

European Commission, Directorate-General for Education, Youth, Sport and Culture (2022). Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training. Luxembourg: Publications Office of the European Union.

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European Commission, Directorate-General for Education, Youth, Sport and Culture, Working group on schools (2021-25) "pathways to school success" – Blended learning for inclusion – Exploring challenges and enabling factors – Key messages and illustrative examples, Publications Office of the European Union

European Commission: Directorate-General for Education, Youth, Sport and Culture, Guidelines for teaching informatics – Practical strategies for European classrooms, Publications Office of the European Union, 2026

European Commission: Directorate-General for Education, Youth, Sport and Culture, European higher education interoperability framework – Under the umbrella of the European Digital Education Hub, Publications Office of the European Union

European Commission, Directorate-General for Education, Youth, Sport and Culture (2022). Final report of the Commission expert group on tackling disinformation and promoting digital literacy through education and training. Luxembourg: Publications Office of the European Union.

European Commission/ Directorate-General for Education, Youth, Sport and Culture (2024). International Computer and Information Literacy Study (ICILS) in Europe, 2023 – Main findings and educational policy implications. Publications Office of the European Union: Luxembourg.

European Commission, Directorate-General for Education, Youth, Sport and Culture (2024). Caplanova, A., Dunajeva, J. and Rodriguez, P., Digital transformation in blended learning environments – EENEE analytical report, Luxembourg: Publications Office of the European Union.
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European Commission: European Education and Culture Executive Agency (2024), Digital skills playbook for educators, Publications Office of the European Union.

European Commission: European Education and Culture Executive Agency (2023), AI report – By the European Digital Education Hub's Squad on artificial intelligence in education, Publications Office of the European Union.

European Commission/ EACEA (2024). Den Hertog, P., Wylie, N., Widger, L., Brande, L. et al. A European maturity model for micro-credentials in higher education – Whitepapers and guidelines for a strategy workshop. Luxembourg: Publications Office of the European Union.
European Commission / European Education and Culture Executive Agency / Eurydice (2026), Digital Education at School in Europe 2026: Bridging gaps in access, teaching and learning. Eurydice Report. Luxembourg: Publications Office of the European Union.

European Commission: Joint Research Centre (2024). ECONOMOU, A., KAPSALIS, G. and BROLPITO, A. Supporting national strategies on teachers' digital competence through the

use of SELFIEforTEACHERS: the case of Albania and North Macedonia. Publications Office of the European Union: Luxembourg.

European Commission /Directorate-General for Education, Youth, Sport and Culture (2024). Addressing the gender gap in STEM education across educational levels – Analytical report. Luxembourg: Publications Office of the European Union.

European Commission (2024). Report on the State of the Digital Decade 2024. Luxembourg: Publications Office of the European Union.

European Commission/ Directorate-General for Education, Youth, Sport and Culture (2023). Day, L., Colonnese, F., Gasparotti, A., Batura, O. et al. Digital education content in the EU – State of play and policy options – Final report. Publications Office of the European Union: Luxembourg.

European Commission/ EAC (2022). Final report of the Commission expert group on artificial intelligence and data in education and training – A executive summary. Luxembourg: Publications Office of the European Union.

European Commission /Directorate-General for Research and Innovation (2021). She figures 2021 – Gender in research and innovation – Statistics and indicators. Luxembourg: Publications Office of the European Union.

European Court of Auditors (2023) Special report 11/2023: EU support for the digitalisation of schools. Significant investments, but a lack of strategic focus in the use of EU financing by member states.

Havinga, B., Clary, A., Lindroos Cermakova, A., Jeppesen, J. (2025). European EdTech Startup Innovation Ecosystem. European EdTech Alliance. Bielefeld. Germany.

Proposal for a council recommendation on blended learning for high quality and inclusive primary and secondary education, COM(2021) 455 final.

Redecker, C. and Punie, Y., European framework for the digital competence of educators – DigCompEdu, Punie, Y.(editor), Publications Office, 2017

Vuorikari, R., Kluzer, S. and Punie, Y. (2022). DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes. Publications Office of the European Union: Luxembourg.

Vuorikari, R., Jerzak, N., Karpinski, Z., Pokropek, A. and Tudek, J., (2022). Measuring Digital Skills across the EU: Digital Skills Indicator 2.0, Publications Office of the European Union, Luxembourg
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