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COM(2023) 206 final

2023/0100 (NLE)

Proposal for a

COUNCIL RECOMMENDATION

on improving the provision of digital skills in education and training

{SWD(2023) 205}

EXPLANATORY MEMORANDUM

1. CONTEXT OF THE PROPOSAL

In her 2022 State of the Union address, the President of the European Commission, Ursula von der Leyen, highlighted the shortage of skills as a major challenge and proposed that 2023 would be the **European Year of Skills**¹.

While digital transformation is pervasive and technology is increasingly becoming part of everyday life, many people still lack the digital skills needed in today's society and economy². The **COVID-19 crisis** showed the risk of exacerbating inequalities due to an insufficient level of digital skills³. It also revealed that technology, if not used wisely, can have a negative impact on personal well-being and mental health⁴. The ground-breaking potential of some emerging technologies, such as generative artificial intelligence (AI), has made it clear that digital skills are key to reap the opportunities offered by these tools while addressing possible risks. Demand for basic digital skills is growing, new specialist digital skills are emerging across sectors and occupations⁵, and ICT specialists are in short supply.

The Digital Compass⁶ and the European Pillar of Social Rights Action Plan⁷ set **ambitious targets** to support Member States in their digital transformation. They aim at ensuring that 80% of adults have at least basic digital skills and that 20 million ICT specialists are employed in the EU, with more participation from women. These targets are reflected in the decision establishing the Digital Decade policy programme 2030⁸ and are complemented by a target set in the European Education Area⁹ of reducing the rate of low-achievers in computer and information literacy to less than 15%.

As stated in the Declaration on digital rights and principles¹⁰, acquiring digital skills is a right¹¹. Recognised as a key competence for lifelong learning¹², digital skills involve the **confident, critical and responsible use of, and engagement with, digital technologies** for learning, work, and participation in society¹³. This also applies to personal finances, where the increased digitalisation of financial products and services has made digital skills essential for accessing financial services and making informed decisions. Digital skills also contribute to the resilience of the Union economy.

Digital skills development is one of the priorities of the **Digital Education Action Plan 2021-2027**, which sets Commission's long-term approach to the digital transformation¹⁴ in education

¹ https://state-of-the-union.ec.europa.eu/index_en.

² Centeno C., Karpinski Z., Urzi Brancati C. (2022). [Supporting policies addressing the digital skills gap. Identifying priority groups in the context of employment.](#)

³ Di Pietro G., Biagi F., Costa P., Karpiński Z., Mazza J. (2020). [The likely impact of COVID-19 on education: Reflections based on the existing literature and international datasets.](#)

⁴ 2022/C 469/04.

⁵ Manca F., Osés Arranz A. (2022). [Skills for the digital transition: assessing recent trends using big data.](#)

⁶ COM(2021) 118 final.

⁷ [COM/2021/102 final](#)

⁸ DECISION (EU) 2022/2481, 14.12.2022.

⁹ 2021/C 66/01.

¹⁰ <https://digital-strategy.ec.europa.eu/en/library/european-declaration-digital-rights-and-principles>.

¹¹ COM(2021) 118 final.

¹² 2018/C 189/01.

¹³ In this proposal, *digital skills* and *digital competences* are used as synonyms.

¹⁴ COM(2020) 624 final.

and training. Its vision was endorsed in the Council Conclusions on digital education in Europe's knowledge societies¹⁵, where Member States invited the Commission to launch a reflection on the digital transformation of education and training systems. In the 2021 State of the Union address, President von der Leyen stressed that digital education and skills need leaders' attention and launched a **structured dialogue** to support Member States with an integrated, coherent and more ambitious approach¹⁶. The European Council Conclusions of February 2023 state that more ambitious actions should be taken to further develop the skills that are required for the green and digital transitions¹⁷.

The **Recovery and Resilience Facility** (RRF), part of the EU's response to the COVID-19 pandemic, has been designed as a key instrument for accelerating the digital transition. National plans submitted by Member States include a wide range of reforms and investments in the area of digital skills, as for instance curriculum reforms and upskilling and reskilling opportunities, for teachers, trainers and the workforce¹⁸. At the same time, the structured dialogue confirmed the political importance that governments give to the need to take coordinated action. With regard to digital skills, three topics have featured prominently in Member States' discussions : 1) reforms in formal education settings; 2) new large-scale initiatives outside formal education; 3) ongoing efforts to improve monitoring, evaluation and assessment. The need for more guidance and support on digital skills at EU level emerged as a general request.

This proposal for a Council Recommendation aims to support Member States in addressing challenges related to digital skills development and the ability of education and training systems to support their provision¹⁹. The proposal acknowledges the importance of digital skills for all and takes into consideration all levels of education and training and calls for engagement by various stakeholders. Its implementation will support the attainment of the EU-level targets on digital skills, including by addressing the social and territorial dimension of existing skill gaps. The proposal is aligned with the results of the Report of the Conference on the Future of Europe.²⁰

This initiative complements the **proposal for a Council Recommendation on the key enabling factors for successful digital education and training** of the Digital Education Action Plan 2021-2027.

- **Challenges to be addressed by this proposed Council Recommendation**

The low level of basic digital skills and the growing need for both advanced and specialist digital skills are a major concern across Member States.

¹⁵ 2020/C 415/10.

¹⁶ <https://education.ec.europa.eu/focus-topics/digital-education/action-plan/action-1>.

¹⁷ <https://data.consilium.europa.eu/doc/document/ST-1-2023-INIT/en/pdf>.

¹⁸ Data on digital skills are available on the Recovery and Resilience Scoreboard: https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/. Thematic analyses on digital skills and education, as well as on adult learning and skills in the national recovery and resilience plans can be found here: [Recovery and Resilience Scoreboard \(europa.eu\)](https://recovery-and-resilience-scoreboard.europa.eu/)

¹⁹ In this proposal, the term *provision* refers to the education and training offer or the range of general and specialised courses for the development of digital skills.

²⁰ In particular, in relation to its Proposal 32 on Digital literacy and skills, which proposes to ensure 'access to formal and non-formal digital literacy and skills training and education, including in school curricula, during all stages of life by building on existing initiatives at European level, with special focus on the inclusion of vulnerable groups and elderly, enhancing digital skills of children in a manner that is compatible with their healthy development and tackling digital inequalities, including the digital gender gap.'

Only 54% of people (aged 16-74) have at least basic digital skills²¹ - against a EU-level target of 80%. There are wide differences between Member States and within countries due to a gap between rural areas and cities, and to the high impact that age, socio-economic background and education have on the level of digital skills²².

More than a third of the EU's labour force lacks the digital skills required in most jobs²³, despite a rising demand across occupations, especially in non-tech industries²⁴.

Digital skills level of European youth (aged 16-24) is higher than that of the overall population (54%). Still, fewer than four in five young people (71%) have at least basic digital skills²⁵. In 2018, on average across Member States participating in the International Computer and Information Literacy Study (ICILS), approximately 34% of students were rated as underachieving²⁶ in digital skills (against a target of 15%) with great differences linked to gender²⁷, socio-economic, migrant or Roma background²⁸.

The number of employed **ICT specialists** (9 million in 2021) is not enough to meet the needs of the labour market and is far below the EU-level target of 20 million. Leveraging legal migration channels and recognising skills and qualifications acquired in third countries can help in attracting more talents to the EU²⁹. The sector also suffers from a severe **gender imbalance** with 81% of employed ICT specialists being male³⁰. Encouraging more women to work in this field is of crucial importance to tackle gender segregation and address staff shortages.

The ongoing digital transformation requires education and training systems to adapt and respond to the learning needs of people using technologies that rapidly change, often in a disruptive manner. Long-term evidence and recent stakeholder consultations point to an inadequate provision of digital skills in education and training as the root cause of underachievement.

Early childhood education and care (ECEC) plays a fundamental role in supporting children to become active citizens and learners. Research shows that children are engaging with digital technologies from an increasingly younger age, and mostly from home, by mirroring adult behaviour and following a trial-and-error strategy that is not free from risks³¹. Digitally competent professionals at ECEC level can support children and their families in developing the skills needed for their safe interaction with technology whilst also ensuring equal opportunities.

In formal education (primary and secondary), digital skills are developed in a variety of ways³². Many Member States recently changed or are currently reviewing their curricula: while half of the reforms mentioned in the structured dialogue are transversal, about a third of them

²¹ Eurostat (2021). Survey on ICT usage in households.

²² Centeno C., Karpinski Z., Urzi Brancati C. (2022). [Supporting policies addressing the digital skills gap. Identifying priority groups in the context of employment.](#)

²³ CEDEFOP (2018). Insights into skills shortages and skill mismatch.

²⁴ CEDEFOP (2021). [Second European skills and jobs survey.](#)

²⁵ Eurostat (2021). ICT usage in households.

²⁶ Fraillon J., Ainley J., Schulz W., Friedman T., Duckworth D. (2019). [Preparing for Life in a Digital World: International Computer and Information Literacy Study 2018 International Report.](#)

²⁷ ICILS 2018 further shows that girls outperformed boys in all participating Member States.

²⁸ Karpiński Z., Di Pietro G., Biagi F. (2023) [Non-cognitive skills and social gaps in digital skills: Evidence from ICILS 2018. Learning and Individual Differences](#), 102, 102254.

²⁹ https://ec.europa.eu/info/strategy/priorities-2019-2024/promoting-our-european-way-life/new-pact-migration-and-asylum/skills-and-talent_en.

³⁰ Eurostat (2021). ICT specialists in employment.

³¹ Chaudron S., Di Gioia R., Gemo M. (2017). [Young Children \(0-8\) and Digital Technology - A qualitative study across Europe.](#)

³² European Commission/EACEA/Eurydice (2019). [Digital Education at School in Europe.](#)

consists of introducing a separate subject in the curriculum. An emerging trend focuses on including learning outcomes on informatics for both lower and upper secondary education.

The *cross-curricular provision*, in which digital skills are taught in most subjects, helps to engage a greater number of teachers and students. The trend to develop digital skills through a *separate subject*, such as informatics, is confirmed by recent studies, which show various implementation methods with a provision that often starts at secondary level and is partly optional, thus failing to reach all students³³. Some countries include aspects of *digital skills or informatics within another subject* (like mathematics or science) to avoid creating a new subject and to improve the effectiveness of their educational offer.

A dedicated curriculum for digital skills (be it a separate subject or a topic embedded across all subjects or in another subject) needs to be complemented with a plan to make it understood, endorsed, delivered, supported and assessed by digitally competent teachers. Challenges arise in ensuring quality teaching, relevant resources, gender-balanced uptake, and proper assessment.

In recent years, major efforts have been made in fostering the digital transformation of **vocational education and training (VET)**. This will continue as part of the national plans to implement the 2020 VET Council Recommendation³⁴. However, many initiatives focus on the use of technology for teaching and learning, rather than strengthening digital skills development³⁵. While both aspects are important, policies in VET tend to group the digitalisation of the sector and actions focused on learners' digital skills. Evidence from a 2020 study shows that, in initial VET, digital skills are commonly integrated across subjects, rather than as a separate subject. Despite high demand for the development of specialist digital skills (which would include aspects of informatics), the VET sector faces challenges in responding to these demands, with notable disparity across contexts and among Member States³⁶.

The **higher education** learning offer needs to be both general and sector-specific³⁷. At university level, digital skills are developed mainly through programmes for ICT specialists, despite the importance they have for all professions. In 2019, less than 5% of young people opted to enrol in ICT-related programmes, with low participation of women³⁸. The structured dialogue highlighted Member States' concerns but also efforts to develop digital skills across a broad range of higher education courses and to increase the number of students, especially women, acquiring advanced digital skills. Available data shows that the EU suffers from a lack of expertise in teaching advanced digital technologies³⁹. Mutual recognition of qualifications between Member States suffers from differences arising from relevance and content of education and training for ICT specialists, thus hampering the mobility of ICT talents. In this context bodies like the ENIC-NARIC networks⁴⁰ or quality assurance agencies foster collaboration on academic recognition of qualifications.

Adult learning is the sector presenting the most diverse challenges. Despite the importance of upskilling and reskilling, the provision of digital skills for adults remains scattered. Even where there is a plethora of options, there is often no regional or national overview of the courses on

³³ European Commission/EACEA/Eurydice (2022). [Informatics education at school in Europe](#). 2020/C 417/01.

³⁴ CEDEFOP (2022). Evidence supporting the upcoming proposal for a Council Recommendation on improving the provision of digital skills in education and training. Draft working paper.

³⁵ Bocconi S. et al. (2022). [Reviewing Computational Thinking in Compulsory Education](#).

³⁶ COM(2022) 11 final.

³⁷ Eurostat (2020). Tertiary education statistics.

³⁸ Joint Research Centre (2022). Academic Offer of Advanced Digital Skills in 2020-21. International Comparison.

³⁹ <https://www.enic-naric.net/>

offer. In addition, the challenges related to its accessibility create further inequalities⁴¹. This situation is common across adult learning, rather than specific to digital skills. In this regard, short courses leading to micro-credentials help provide flexible learning opportunities for adults⁴².

The structured dialogue has indicated a trend of new large-scale digital skills initiatives for disadvantaged groups and unemployed people⁴³. Most Member States referred to major difficulties in improving adults' digital skills, due to a lack of funding but also of motivation and outreach. Some also mentioned that companies, especially SMEs, lack the financial and human resources to train and upskill their staff. In some cases, Member States flagged the need for more EU support to increase participation, reach vulnerable groups, scale up small or pilot initiatives, and monitor participation rates and outcomes. Despite the 60% EU headline target, adult participation in learning, including on digital skills, remains limited in most Member States⁴⁴.

Besides sector-specific issues, there are **general challenges** that are relevant for all levels of education and training:

- **Specialised teaching staff:** it is difficult to recruit, retain and train teachers, especially in informatics and other specific or advanced digital areas. There are multiple factors hindering developments: few people specialise in these domains and those that do are easily attracted by more competitive offers in the private sector. Upskilling/reskilling programmes and existing supporting measures are insufficient to satisfy the needs of teachers, especially when dealing with specific or advanced digital areas.
- **Progression of programmes⁴⁵:** while most Member States have developed strategies for digital skills, few take a comprehensive approach to ensure purposeful sequencing of programmes across all levels of education and training. There are challenges to ensure a consistent implementation of digital skills policies at all levels and in all sectors of education and training.

Member States highlight the need for EU support for peer learning and exchanges on the development and assessment of digital skills within and outside formal education and training. They also call for exchanges on how to coordinate efforts addressing the digital skills gap and see a role for the Commission in funding further research and providing technical support.

• **The objectives of the proposed Council Recommendation**

The proposal aims to:

- promote a quality, inclusive and consistent approach to the development of digital skills at all levels of education and training, with support from all sectors of society and the economy;
- enable cooperation among Member States in promoting and providing quality education in informatics at school;

⁴¹ Beblavý M., Bačová B. (2022). [Literature review on the provision of digital skills for adults. EENEE report.](#)

⁴² 2022/C 243/02.

⁴³ A second target group often mentioned is staff in SMEs and public administration.

⁴⁴ It was 37% in 2016 (the latest available data with the indicator over a 12-month reference period).

⁴⁵ In this proposal, the term *progression* refers to the purposeful sequencing of teaching and learning across multiple developmental stages, ages, or grade levels.

- support higher education in the development of digital skills across disciplines, address the need for specialist and advanced digital skills, foster expertise in developing multi-disciplinary courses in cutting-edge technologies;
- support the provision of digital skills in VET and for adults, and improve its accessibility;
- foster actions connected to digital skills certification and mutual recognition;
- support the recruitment, training and retention of specialised teachers and trainers.

- **International dimension**

The proposal is based on and complements work at the international level. It contributes to the **UN 2030 Sustainable Development Goals (SDGs)**⁴⁶, in particular SDG 4 and partially SDGs 5, 8 and 10.

The initiative is consistent with ongoing work of the **United Nations** Secretary-General’s roadmap for digital cooperation and aligned with the Call for Action on Digital Learning of the Global Transform Education Summit.

The proposal also contributes to the objectives of the EU’s **Global Gateway** strategy to build sustainable and trusted connections that work for the people and the planet.

The results of the **OECD** Programme for International Student Assessment (PISA) and Skills Toolkit and Outlook have been taken into consideration in preparing the proposal. The EU target on low-achieving eighth graders is based on **ICILS** which enables international comparability.

- **Tools for supporting the implementation**

The Commission’s intention is to set up a High-Level Group on Digital Education and Skills to take forward in a formal setting the informal coordination between National Coordinators under the Structured Dialogue. This would bring together expertise from the worlds of education and digital and could be used to develop guidelines or other tools to facilitate the further evolution of digital education.

The proposal will be supported by:

- the Working Group on Digital Education: Learning, Teaching and Assessment;
- EU instruments, such as the Technical Support Instrument, and EU funding, such as Erasmus+, European Social Fund Plus, Just Transition Fund, European Regional Development Fund, Digital Europe Programme, Horizon Europe, and NDICI-Global Europe;
- existing tools, platforms and communities such as DigComp, European Digital Education Hub, EU Code Week, Digital Skills and Jobs Coalition/Platform, Europass, EPALE, Digital Education Hackathon, Pact for Skills;
- improved evidence and analysis through the Learning Lab on Investing in Quality Education and Training;

⁴⁶ <https://sdgs.un.org>.

- international assessments on digital skills such as ICILS, PISA, and the Programme for the International Assessment of Adult Competencies (PIAAC);
- reporting and monitoring under the European Education Area strategic framework (including the Education and Training Monitor) and the Digital Decade.

- **Complementarity with other initiatives**

The proposal complements other EU actions presented under:

- the European Education Area Communication⁴⁷;
- the Digital Education Action Plan 2021-2027⁴⁸;
- the European Skills Agenda for Sustainable Competitiveness, Social Fairness and Resilience⁴⁹;

The proposal will also contribute to implementing:

- the Digital Decade Policy Programme⁵⁰
- the European Pillar of Social Rights and its action plan⁵¹;
- the Union of Equality strategies;
- the European Year of Skills⁵².
- the Cybersecurity Skills Academy
- the Harnessing Talent in Europe’s Regions Communication⁵³.

2. LEGAL BASIS, SUBSIDIARITY AND PROPORTIONALITY

- **Legal basis**

This proposal is in conformity with Articles 165 and 166 of the Treaty on the Functioning of the European Union (TFEU).

- **Subsidiarity (for non-exclusive competence)**

This proposal is in conformity with the principle of subsidiarity as provided for in Article 5(3) of the Treaty on European Union (TEU). It fully respects the responsibility of Member States for the content of teaching, the organisation of education systems and their cultural and linguistic diversity, while reflecting the supplementing and supporting role of the EU and the voluntary nature of European cooperation in education and training. The initiative does not propose any extension of EU regulatory power or binding commitments on Member States. Its European added value lies in the ability of the EU to mobilise political engagement and to support education and training systems through policy guidelines, common tools and instruments.

⁴⁷ COM(2020) 625 final.

⁴⁸ COM(2020) 624 final.

⁴⁹ COM(2020) 274 final.

⁵⁰ COM(2021) 118 final

⁵¹ https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/economy-works-people/jobs-growth-and-investment/european-pillar-social-rights_en.

⁵² COM(2022) 526 final.

⁵³ COM(2023) 32 final

- **Proportionality**

This proposal complies with the principle of proportionality as provided for in Article 5(4) TEU. Neither the content nor the form of this proposal exceeds what is necessary to achieve its objectives. The commitments Member States will make are of a voluntary nature and each Member State remains free to decide which approach to take.

- **Choice of the instrument**

To contribute to the achievement of the objectives referred to in Articles 165 and 166 of the TFEU, the Treaty provides for the adoption by the Council of recommendations, on a proposal from the Commission.

A Council recommendation is an appropriate instrument within the field of education and training, where the EU has a supporting responsibility. Recommendations have frequently been used for European action in these areas.

3. RESULTS OF *EX POST* EVALUATIONS, STAKEHOLDER CONSULTATIONS AND IMPACT ASSESSMENTS

- ***Ex post* evaluations and fitness checks of existing legislation**

The Commission will undertake a comprehensive review of the Digital Education Action Plan in 2024 to assess its outreach and impact.

An assessment of the opportunities and challenges that digital transformation brings to education and training was made in the staff working document accompanying the Digital Education Action Plan 2021-2027⁵⁴.

This proposal builds on those findings as well as on the outcomes of the structured dialogue, which provided a forum to discuss the readiness of existing national frameworks and legislation to respond to the needs related to digital education and skills. The proposal builds upon previous work done in the framework of the Digital Decade, including trends observed in the Digital Economy and Society Index (DESI).

- **Stakeholder consultations**

The proposal is based on the outcomes of the open public consultation organised in 2020 for the Digital Education Action Plan 2021-2027⁵⁵, the results of the structured dialogue, and the inputs gathered during an extensive consultation process⁵⁶.

- **Collection and use of expertise**

The proposal is based on:

- outcomes of the structured dialogue with Member States on digital education and skills;
- lessons learnt from the implementation of the European Education Area strategic framework, the Education and Training Monitor, and messages of various working groups, including the Working Group on Digital Education: Learning, Teaching and Assessment;

⁵⁴ SWD/2020/209 final

⁵⁵ https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12453-Digital-education-action-plan-update/public-consultation_en.

⁵⁶ Annex 2 of the staff working document accompanying this proposal.

- analysis of the results of the open public consultation on the Digital Education Action Plan 2021-2027 and the accompanying Staff Working Document;
- a wide range of reports and studies on relevant topics including the impact of the COVID-19 crisis, quality investments in education and training, and the digital skills gap. A literature review and two studies provided information on the provision of digital skills for young people and adults across Europe⁵⁷;
- evidence-based knowledge and advice from the European Expert Network on Economics of Education (EENEE) and the expert groups working on the guidelines on tackling disinformation and promoting digital literacy⁵⁸ and on the ethical use of AI and data in teaching and learning⁵⁹;
- evidence and input from Digital Economy and Society Index (DESI) and International Computer and Information Literacy Study (ICILS);
- ad hoc analysis of reports and studies from the OECD, UNESCO, the Council of Europe, the Joint Research Centre, CEDEFOP and Eurydice as well as projects from the Technical Support Instrument.

- **Impact assessment**

Given the activities' complementary approach to Member State initiatives, the voluntary nature of the proposed activities and the scope of the impacts expected, an impact assessment was not conducted. The development of the proposal was informed by previous studies, an open public consultation and targeted stakeholder consultations⁶⁰.

- **Regulatory fitness and simplification**

Not applicable.

- **Fundamental rights**

This proposal is in line with the fundamental rights and principles recognised by the Charter of Fundamental Rights of the European Union, notably the right to the protection of personal data laid down in Article 8, academic freedom in Article 13, the right to education in Article 14, the right to non-discrimination in Article 21 and right to integration of persons with disabilities in Article 26. The measures will be pursued in accordance with EU law on the protection of personal data, in particular Regulation (EU) 2016/679⁶¹ of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation).

4. BUDGETARY IMPLICATIONS

This initiative will not require additional resources from the EU budget.

⁵⁷ Beblavý M., Bačová B. (2022). [Literature review on the provision of digital skills for adults. EENEE report.](#) European Commission/EACEA/Eurydice (2022). [Informatics Education at school in Europe.](#)

Bocconi S. et al. (2022). [Reviewing Computational Thinking in Compulsory Education.](#)

⁵⁸ <https://op.europa.eu/en/publication-detail/-/publication/a224c235-4843-11ed-92ed-01aa75ed71a1/>.

⁵⁹ <https://op.europa.eu/en/publication-detail/-/publication/d81a0d54-5348-11ed-92ed-01aa75ed71a1/>.

⁶⁰ Annex 2 of the staff working document accompanying this proposal.

⁶¹ OJ L 119, 4.5.2016, p. 1-88.

5. OTHER ELEMENTS

- **Implementation plans and monitoring, evaluation and reporting arrangements**

To support implementation, the Commission proposes, in cooperation with Member States, to develop peer learning activities and the identification of good practices, as well as research, guidance material, handbooks and other concrete evidence-based deliverables. The Commission intends to report on the use of the Recommendation within the European Education Area strategic framework.

- **Explanatory documents (for directives)**

Not applicable.

- **Outline of the proposal for a Council Recommendation and staff working document**

In line with the European Year of Skills, the proposal recognises the role that digital skills have in the context of the twin transition, for active participation in society, social inclusion, equal opportunities for all, well-being, security and territorial cohesion, as well as employability, innovation, productivity, and growth.

By following up on the outcomes of the structured dialogue and considering the EU-level targets on digital skills, the proposal aims to improve the provision of digital skills at all levels of education and training, including by strengthening ongoing efforts and calling for greater cooperation between education and training, the private sector and civil society.

It proposes guidance and action that can be pursued by Member States to better develop all levels of digital skills (basic, advanced, specialist) in education, training and lifelong learning. It also sets out Commission's intention to supporting and complementing Member State actions in this area.

The accompanying staff working document sets out stakeholder opinions and provides examples of existing evidence, policies and practices that underpin the proposed Council Recommendation.

Proposal for a

COUNCIL RECOMMENDATION

on improving the provision of digital skills in education and training

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 165(4) and Article 166(4) thereof,

Having regard to the proposal from the European Commission,

Whereas:

- (1) **Digital skills** have become a must in almost every sector of society and the economy, and a cornerstone for people's social inclusion, well-being, active citizenship, employability, productivity, security and growth⁶². All citizens need them to be informed, to exercise their rights, to access online services, to communicate, and to consume, create and disseminate digital content.
- (2) In particular, the **European Council Conclusions** of 9 February 2023 stressed the need for more ambitious action to further develop the skills that are required for the green and digital transition through education, training, upskilling and reskilling to meet the challenges of labour shortages and the transformation of jobs, including in the context of socio-economic and demographic challenges⁶³.
- (3) Following the announcement of the President of the European Commission on making 2023 the **European Year of Skills**⁶⁴, political agreement between the European Parliament and Member States has been reached on the Commission's proposal to work together to further promote skills development⁶⁵.
- (4) The **2022 European Declaration on Digital Rights and Principles for the Digital Decade**⁶⁶ sets out how Europe's values and fundamental rights should be applied to the digital world. The declaration states, among its principles, that people are at the centre of the digital transformation, that the digital transformation should contribute to a fair society and economy, and that everyone has the right to acquire digital skills.
- (5) The importance of digital skills is also recognised in the first principle of the **European Pillar of Social Rights**⁶⁷. In this context, education and training systems have been called on to support the development of digital skills of all citizens. Non-formal providers are also addressing this need by supporting a rich and varied educational offer for young people and adults.

⁶² In the context of this proposal, *digital skills and digital competences* are used as synonyms.

⁶³ Available at: <https://data.consilium.europa.eu/doc/document/ST-1-2023-INIT/en/pdf>.

⁶⁴ [State of the Union Address by President von der Leyen \(europa.eu\)](https://www.europa.eu/presscorner/detail/en/ip_23_1501)

⁶⁵ https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1501

⁶⁶ OJ C 23, 23.1.2023, p. 1.

⁶⁷ [European Pillar of Social Rights \(europa.eu\)](https://www.europa.eu/presscorner/detail/en/ip_23_1501)

- (6) The **Union of Equality strategies**⁶⁸ emphasise the important role of quality and inclusive education and training for making progress towards a Union of equality for all, regardless of gender, racial or ethnic origin, religion or belief, disability, age or sexual orientation. Actions are needed to make this a reality and overcome the digital divide, in particular for vulnerable and socio-economically disadvantaged groups, people living in rural and remote areas, persons with disabilities.
- (7) The **Commission Communication on achieving the European Education Area by 2025**⁶⁹ outlines a vision to build education and training systems that are more resilient and inclusive.
- (8) Within this vision, the **Digital Education Action Plan 2021-2027**⁷⁰ sets out Europe's approach for education in the digital age and considers the development of digital skills as a strategic priority. The plan states that a sound understanding of the digital world should be part of formal and non-formal education. This is particularly important in the context of the ongoing digital transformation and the impact of emerging digital tools, based for instance on generative AI systems. This implies the need for education and training institutions to prepare people for a healthy, safe and meaningful use of technology.
- (9) In her 2021 State of the Union address, the President of the European Commission called for top leaders to give attention to digital education and skills, which led to the launch of a **structured dialogue on digital education and skills**⁷¹. In 2022, Member States nominated their representatives for the **high-level group of National Coordinators to the structured dialogue**, with the mandate to represent the relevant departments in their countries responsible for different aspects of digital education, training and skills (including education, labour, digital, industry and finance). Outcomes of the structured dialogue demonstrated Member States' need for greater guidance, support and cooperation to strengthen digital skills development and to improve the provision of digital skills in a lifelong learning perspective. The valuable work of this group should be continued in the future.
- (10) **Council Recommendation on key competences for lifelong learning**⁷² includes the confident, critical, responsible and sustainable use of, and engagement with, digital technologies, as one of the eight key competences for lifelong learning. The **Digital Competence Framework for Citizens (DigComp)**⁷³ sets out the key elements of digital competence in five interrelated areas with different proficiency levels. The framework is used by education, training and certification providers as a reference for the development and assessment of digital skills.

⁶⁸ [Five equality strategies were adopted in 2020 and 2021 to make progress towards a Union of Equality: Gender Equality Strategy 2020-2025; LGBTIQ Equality Strategy 2020-2025; EU anti-racism action plan 2020-2025; Roma strategic framework for equality, inclusion and participation 2020-2030; Strategy for the Rights of Persons with Disabilities 2021-2030.](#)

⁶⁹ 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 of 30.9.2020.

⁷⁰ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Digital Education Action Plan 2021-2027. Resetting education and training for the digital age', COM(2020) 624 final of 30.9.2020.

⁷¹ [Digital Education Action Plan – Action 1 | European Education Area \(europa.eu\)](#)

⁷² Council Recommendation of 22 May 2018 on key competences for lifelong learning (OJ C 189, 4.6.2018, p. 1).

⁷³ Vuorikari R., Kluzer S., Punie Y. (2022). DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes. Luxembourg: Publications Office of the European Union.

- (11) The relevance of digital skills for society and employability is supported by a series of targets on attainment levels of digital skills. With **Council Resolution on a strategic framework for European cooperation in education and training** towards the European Education Area and beyond (2021-2030)⁷⁴, the Council committed to a Union-level target on young people's digital skills, with the aim to reduce low-achievers to less than 15% by 2030. The **European Skills Agenda**⁷⁵ proposes fostering the development of digital skills and reaching a target of 70% of adults aged 16-74 having at least basic digital skills by 2025. The **Digital Decade policy programme**⁷⁶ includes commitment to cooperate with a view to achieving a digitally skilled population and highly skilled digital professionals, where at least 80% of those aged 16-74 have at least basic digital skills and at least 20 million ICT specialists are employed within the Union, while promoting the access of women to this field and increasing the number of ICT graduates.
- (12) However, **available data** shows that on average across Member States participating in the International Computer and Information Literacy Study, approximately 34% of eighth-grade students were rated as underachieving in digital skills in 2018⁷⁷ (against a target of 15%). In 2021, only 54% of people in the Union aged 16-74 had at least basic digital skills⁷⁸, over half of Union companies reported difficulties in filling the number of vacancies for ICT specialists⁷⁹, and only 9 million people worked as ICT specialists across the Union⁸⁰. In ICT-related professions, men account for 81% of the overall figure⁸¹. Figures confirm the need to further support digital skills development including by addressing the gap between rural areas and cities and the high impact that age, socio-economic background and education have on the level of digital skills.
- (13) Efforts are needed for basic as well as advanced digital skills. In this context, the **New European Innovation Agenda**⁸² stresses the need to focus on talent development in the deep tech sector. To this end, the European Institute of Innovation and Technology has been entrusted to coordinate the **Deep Tech Talent** initiative⁸³, which aims to train one million deep tech talents by 2025 across Member States. Other strategic initiatives include the **Cyber Skills Academy**, an umbrella instrument aiming to increase the number of cybersecurity professionals in Europe⁸⁴.
- (14) Bodies like the ENIC-NARIC networks⁸⁵ and quality assurance agencies support collaboration on recognition of qualifications which facilitates mobility, career

⁷⁴ OJ C 66, 26.2.2021, p. 1.

⁷⁵ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'European Skills Agenda for sustainable competitiveness, social fairness and resilience', COM(2020) 274 final of 1.7.2020.

⁷⁶ Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 establishing the Digital Decade Policy Programme 2030 (OJ L 323, 19.12.2022, p. 4).

⁷⁷ Fraillon J., Ainley J., Schulz W., Friedman T., Duckworth D. (2019). Preparing for Life in a Digital World: International Computer and Information Literacy Study 2018 International Report. Amsterdam: IEA.

⁷⁸ Eurostat (2021). ICT usage in households.

⁷⁹ Eurostat (2021). ICT specialists - statistics on hard-to-fill vacancies in enterprises.

⁸⁰ Eurostat (2021). ICT usage in households and by individuals.

⁸¹ Eurostat (2021). ICT specialists in employment.

⁸² Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'A New European Innovation Agenda', COM(2022) 332 final of 5.7.2022.

⁸³ [The Deep Tech Initiative | \(eitdeeptechtalent.eu\)](https://eitdeeptechtalent.eu)

⁸⁴ COM(2022) 548 final

⁸⁵ <https://www.enic-naric.net/>

opportunities and further learning. While there is already work done to establish standards for the ICT profession, which covers all ICT sectors with a well-established body of knowledge that has been adopted by CEN/CENELEC⁸⁶, further work is needed to attract a larger and more diversified pool of talents into the digital sector. As stated in the **2022 skills and talent package**⁸⁷, highly qualified workers from third countries play a crucial role in strengthening the competitiveness of the Union. In this context, action is needed to make full use of the **Blue Card Directive**⁸⁸ which was adopted in 2021. The directive makes it easier for highly skilled migrants to join the EU's workforce, including by facilitating the recognition of their professional skills. Moreover, the Commission is launching, together with interested Member States, **Talent Partnerships** with key partner countries⁸⁹. They combine direct support for mobility schemes with capacity building and investments in human capital. Talent Partnerships are open to all skill levels and could concern various labour market sectors, such as ICT.

- (15) The **EU Gender Equality Strategy 2020-2025**⁹⁰ underlines the importance of closing gender gaps and tackling gender stereotypes and biases. Stereotypical expectations based on fixed norms for women and men, girls and boys, limit their aspirations to choose a field of study or training and to pursue a professional career in the digital sector. This in turn influences the design of digital products where women's and girl's needs or specificities might not be adequately taken into account. In line with the declaration **Commitment on Women in Digital**⁹¹, action is needed to achieve equal participation across sectors and in particular in the digital one.
- (16) **Council Conclusions on countering the COVID-19 crisis in education and training**⁹² invite Member States to examine possibilities for innovation, accelerated digital transformation, and further development of digital skills. **Council Conclusions on digital education in Europe's knowledge societies**⁹³ call for digital education that covers media, digital and data literacy, critical thinking and the fight against mis- and disinformation, hateful and harmful speech, and cyberbullying and addiction. Furthermore, **Council Conclusions on supporting well-being in digital education**⁹⁴ reflect upon the need to consider the key role that digital skills play to ensure the well-being of all players involved in the teaching and learning process.
- (17) The national **Recovery and Resilience Plans** show the political impetus of Member States for further developing digital skills for learners, teachers and the workforce and for ensuring an adequate legal framework and the required equipment and infrastructure.⁹⁵ In

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[CEN - CEN/TC 428 \(cencenelec.eu\)](https://www.cenelec.eu/)

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Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Attracting skills and talent to the EU', COM(2022) 657 final of 27.4.2022.

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Directive (EU) 2021/1883 of the European Parliament and of the Council of 20 October 2021 on the conditions of entry and residence of third-country nationals for the purpose of highly qualified employment, and repealing Council Directive 2009/50/EC (OJ L 382, 28.10.2021, p. 1).

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https://home-affairs.ec.europa.eu/policies/migration-and-asylum/legal-migration-and-integration/talent-partnerships_en

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Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'A Union of Equality: Gender Equality Strategy 2020-2025', COM(2020) 152 final of 5.3.2020.

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[EU countries commit to boost participation of women in digital | Shaping Europe's digital future \(europa.eu\)](https://ec.europa.eu/digital-affairs/en/news/eu-countries-commit-boost-participation-women-digital-shaping-europe-digital-future)

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OJ C 212I, 26.6.2020, p. 9.

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OJ C 415, 1.12.2020, p. 22.

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OJ C 469, 9.12.2022, p. 19.

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OJ C 469, 9.12.2022, p. 19.

this context, it is of utmost importance that Member States proceed with the efficient and effective implementation of their national plans, including by addressing the need to strategically address digital skills development.

- (18) In education and training, the development of digital skills is ensured through various approaches and each level of education and training faces different challenges. **Council Recommendation on high-quality early childhood education and care**⁹⁶ underlines the importance of early childhood education and care to support children's development and reduce socio-economic and territorial inequalities and support parents, especially women, in (re)integrating in the labour market. As stated in the **Council Recommendation establishing a European Child Guarantee**⁹⁷, Member States are invited to guarantee effective and free access to education for children at risk of poverty or social exclusion and, as stated in the **EU strategy on the rights of the child**⁹⁸, this includes ensuring that children can safely navigate the digital environment. Considering that children are engaging with digital technologies from an increasingly younger age and mostly from home⁹⁹, digitally competent teachers in early childhood education and care play a key role in supporting families and young children in better understanding the opportunities and risks of the digital world in a more equal and inclusive way. In this context, it is particularly important to anticipate and counter the misuse by learners of artificial intelligence (AI) and other emerging technologies, by favouring a good understanding of these technologies and explaining how to safely exploit their potential.
- (19) Council Recommendation on pathways to school success¹⁰⁰ aims to increase school inclusiveness and well-being while Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education¹⁰¹ specifically calls for efforts in boosting the development of digital skills of learners and teachers by taking into account the digital divide and the digital gender gap. In this context, the structured dialogue confirmed that in primary and secondary education digital skills are developed with a combination of approaches¹⁰² and that many Member States are reviewing their curricula to better promote digital skills (both as a dedicated subject and integrated within or across subjects). An emerging trend is the introduction of informatics¹⁰³ (also variously referred to as computer science or computational thinking) as a separate subject on its own or incorporated into an existing core curricular area such as mathematics or science. Regardless of curricular choices, it is necessary to promote

⁹⁶ Council Recommendation of 22 May 2019 on High-Quality Early Childhood Education and Care Systems (OJ C 189, 5.6.2019, p. 4).

⁹⁷ Council Recommendation (EU) 2021/1004 of 14 June 2021 establishing a European Child Guarantee (OJ L 223, 22.6.2021, p. 14).

⁹⁸ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'EU strategy on the rights of the child', COM(2021) 142 final of 24.3.2021.

⁹⁹ Chaudron S., Di Gioia R., Gemo M. (2015). Young Children (0-8) and Digital Technology - A qualitative study across Europe, Luxembourg: Publications Office of the European Union.

¹⁰⁰ Council Recommendation of 28 November 2022 on Pathways to School Success and replacing the Council Recommendation of 28 June 2011 on policies to reduce early school leaving (OJ C 469, 9.12.2022, p. 1).

¹⁰¹ Council Recommendation of 29 November 2021 on blended learning approaches for high-quality and inclusive primary and secondary education (OJ C 504, 14.12.2021, p. 21).

¹⁰² For example, *cross-curricular approach*, *separate subject within another subject*. For further, details see the staff working document accompanying this proposal.

¹⁰³ In this proposal, informatics, also known as computer science, is considered as 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.

quality education in informatics, supported by age- and developmentally appropriate teaching methods, quality resources, gender-balanced uptake, representation, and proper evaluation¹⁰⁴.

- (20) Council Recommendation on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience¹⁰⁵ proposes a renewed Union policy vision for VET, including major efforts on its digitalisation. The European Council Conclusions of 8 December 2022¹⁰⁶ invites Member States to support the vocational education and training of persons with disabilities. An analysis of the national implementation plans of the recommendation and the Osnabrück Declaration¹⁰⁷ shows that more than half of Member States plan to integrate digital skills and competences into VET curricula. Nevertheless it is necessary to further promote excellence in digital skills development for all VET students.
- (21) **Communication on a European strategy for universities**¹⁰⁸ encourages higher education institutions to adopt a whole-institution approach with a learning offer that addresses ICT specialists and provides digital skills in sector-specific curricula. As stated in **Council Recommendation on learning for the green transition and sustainable development**¹⁰⁹ this applies to both green and digital skills. The **European Universities initiative**¹¹⁰, through its pioneering deep institutional and transnational cooperation, is a powerful driver for the development of innovative digital skills learning and contributes to accelerating the digital transformation of the higher education sector. Learning from this experience is key to address the lacks of expertise that Europe shows in teaching advanced digital technologies (such as AI, cybersecurity and high-performance computing) and integrating these technologies across higher education curricula and in specialised courses¹¹¹.
- (22) **Council Recommendation on a European approach to micro-credentials for lifelong learning and employability**¹¹² sets a framework to support the provision of flexible, accessible learning opportunities for a variety of students, including young people and lifelong learners which needs to be leveraged to address current digital skills learning needs.

¹⁰⁴ European Commission/EACEA/Eurydice (2022). Informatics education at school in Europe. Luxembourg: Publication Office of the European Union.

¹⁰⁵ Council Recommendation of 24 November 2020 on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience (OJ C 417, 2.12.2020, p. 1).

¹⁰⁶ Available at: [pdf \(europa.eu\)](#)

¹⁰⁷ [Osnabruck declaration 2020: on vocational education and training as an enabler of recovery and just transitions to digital and green economies | CEDEFOP \(europa.eu\)](#)

¹⁰⁸ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a European strategy for universities, COM(2022) 16 final of 18.1.2022.

¹⁰⁹ Council Recommendation of 16 June 2022 on learning for the green transition and sustainable development (OJ C 243, 27.6.2022, p. 1).

¹¹⁰ [European Universities initiative | European Education Area \(europa.eu\)](#)

¹¹¹ Righi R., Lopez Cobo M., Papazoglou M., Samoili S., Cardona M., Vazquez-Prada Baillet M., De Prato G. (2022). Academic Offer of Advanced Digital Skills in 2020-21. International Comparison, Luxembourg: Publications Office of the European Union.

¹¹² Council Recommendation of 16 June 2022 on a European approach to micro-credentials for lifelong learning and employability (OJ C 243, 27.6.2022, p. 10).

- (26) **Council Conclusions on European teachers and trainers for the future**¹²³ highlight that teachers are a driving force who need to be involved in the creation of education and training policies but who also need to be supported with a comprehensive approach to initial education, induction and continuing professional development. The area of digital competence is the one where most teachers feel a strong need for professional development¹²⁴. Moreover, the structured dialogue highlights the challenges most Member States face in recruiting, retaining and preparing teachers, especially in informatics (for primary/secondary education and VET) or other specific/advanced digital areas (for higher education).
- (27) The **Erasmus+ Teacher Academies**¹²⁵ aim to support competent, motivated and highly qualified teachers, trainers, educators and school leaders, and promote their continuing professional development, including in the area of digital skills. Recent relevant initiatives include the **guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training**¹²⁶ and those on the **ethical use of artificial intelligence and data in teaching and learning**¹²⁷. These two sets of guidelines need to be further promoted to support teachers dealing with specific aspects of digital technology and digital skills development, especially in the context of pressing social issues.
- (28) Various initiatives by Member States and the Commission, for instance the **EU Code Week**¹²⁸ and the **Digital Education Hackathon**¹²⁹, aim at promoting stakeholder engagement and grass-roots innovation in digital education and skills. Similarly, the **European Strategy for Better Internet for Kids (BIK+)**¹³⁰ promotes engagement with stakeholders including through the network of Safer Internet Centres¹³¹ to create a safer internet for children. These initiatives support the development of digital skills in the non-formal sector and should be further promoted as a mean to support the development of digital skills.
- (29) This Recommendation fully respects the principles of subsidiarity and proportionality. Member States will decide, according to their national circumstances, how to implement the Recommendation,

RECOMMENDS THAT MEMBER STATES:

1. Agree, through a whole-of-government approach, and together with key stakeholders, on a national strategy for digital education and skills, developed or updated in line with the principles of this Recommendation, and monitor its effectiveness and impact. In particular, Member States should:

¹²³ OJ C 193, 9.6.2020, p. 11.

¹²⁴ OECD (2019). TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners. Paris: OECD Publishing.

¹²⁵ Erasmus+ Teacher Academies, available at: <https://erasmus-plus.ec.europa.eu/programme-guide/part-b/key-action-2/teacher-academies>.

¹²⁶ [Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training | European Education Area \(europa.eu\)](#)

¹²⁷ [Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators | European Education Area \(europa.eu\)](#)

¹²⁸ [Europe Code Week](#)

¹²⁹ <https://digieduhack.com/en/>

¹³⁰ COM(2022) 212.

¹³¹ <https://digital-strategy.ec.europa.eu/en/policies/safer-internet-centres>

- 1.1. Set national objectives for the provision of digital skills and ensure their regular review and update.
- 1.2. Align the national objectives referred to in point 1.1 with the strategic priorities of the Digital Education Action Plan 2021-2027 and reflect these national objectives in the national roadmaps to be adopted by Member States in accordance with the Digital Decade 2030 policy programme.
- 1.3. Identify ‘priority or hard-to-reach groups’¹³² and set up appropriate measures to facilitate their participation, taking into account accessibility, territorial¹³³ and socio-economic gaps in digital skills.
- 1.4. Ensure a consistent approach to the provision of digital skills throughout all sectors and levels of education and training by structuring it from early childhood education and care (ECEC), through primary, secondary and vocational education and training (VET) to higher education and adult learning in a progressive way, in close consultation with relevant stakeholders and social partners reaching a joint understanding on key aspects to be covered in developing digital skills for specific age groups and education sectors.
- 1.5. Develop a specific and coherent approach that tackles the full spectrum of digital skills, from basic to advanced digital skills in all labour market sectors, including for ICT professionals.
- 1.6. Ensure relevant and methodologically sound monitoring, evaluation and assessment of educational initiatives and training programmes on digital skills at local, regional and national levels to prove and improve the effectiveness and quality of the actions taken.
- 1.7. Contribute to peer learning, exchange of practices and coordination, including across policy sectors, at European and global level, so as to find common solutions to cross-continental, -national and -regional challenges.
2. Start early to guide learners in the digital world and offer equal opportunities to develop digital skills. In particular, Member States should:
 - 2.1. Consistent with overall priorities of early childhood education and care, ensure that pre-primary students and especially their parents, carers and families are given support to develop digital skills, and are aware of and better understand the opportunities and risks that come with digitalisation.
 - 2.2. Use age- and developmentally-appropriate activities, for example in ECEC unplugged digital education activities¹³⁴ and play-based learning of digital skills¹³⁵.
 - 2.3. Further strengthen the provision of digital skills in primary and secondary education, including VET. Special attention should be paid to the provision of skills needed to enable appropriate understanding and meaningful, healthy, safe, and sustainable engagement with digital technologies, including generative AI systems.

¹³² For instance, those living in rural areas, disadvantaged or marginalised groups such as persons with disabilities, Roma and third-country nationals with limited knowledge of the host country, and those having a low or medium-level of education, or not in education, employment or training. .

¹³³ E.g. urban/rural, remote and outermost regions, cross-border territories.

¹³⁴ For example, educational activities that promote the development of digital skills without using digital devices.

¹³⁵ For example, pedagogical approaches on digital skills where young children can explore, experiment, discover, and solve problems in imaginative and playful ways.

3. Expand the cross-curricular approach (i.e. digital skills taught transversally in different subjects) and improve its assessment and teacher training. In particular, Member States should:
 - 3.1. Support cross-curricular approaches for the provision of digital skills in formal education (ECEC, primary and secondary, including VET).
 - 3.2. Ensure cross-curricular assessment of digital skills, with means comparable to those applied to other basic skills, at least at the end of each cycle for primary, secondary and VET (summative assessment).
 - 3.3. In line with the proposal for a Council Recommendation on the key enabling factors for successful digital education and training, address barriers to the cross-curricular approach by providing quality training on the use of digital technology for teaching and learning purposes (digital pedagogy) in teachers' and trainers' initial teacher training and continuing professional development.
 - 3.4. Take greater action to close the gender gap in the digital skills levels between female and male teachers.
 - 3.5. Promote the use of the Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training¹³⁶ and the toolkit on how to spot and fight disinformation,¹³⁷ as well as the Guidelines on the ethical use of AI and data in teaching and learning¹³⁸ in classrooms.
4. Support high-quality education in informatics at school. In particular, Member States should:
 - 4.1. Cooperate at EU level on curriculum development, delivery and assessment.
 - 4.2. From the start of compulsory education, ensure all students have the opportunity to develop their digital skills through exposure to the core elements of informatics.
 - 4.3. Consider setting up a separate subject on informatics, to deliver a more targeted provision that has clear education and training goals, dedicated time, and structured assessment.
 - 4.4. Ensure that teaching and learning on informatics is supported by qualified and specialised teachers, with access to quality and accessible learning resources and taking into account school sizes, and appropriate assessment of learning outcomes.
 - 4.5. Promote diversity and a gender-balanced uptake and reduce any possible stereotype in the teaching and learning of informatics. This should be supported by research, firstly on cultural, socio-economic and institutional barriers to girls' aspirations and access to the digital sector (including girls with a minority racial or ethnic background) and secondly on the impact of textbooks and other resources that teach digital subjects in a more inclusive way.
 - 4.6. Make use of opportunities to develop quality informatics pedagogies through the Erasmus+ Teacher Academies.

¹³⁶ [Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training | European Education Area \(europa.eu\)](#)

¹³⁷ [Spot and fight disinformation \(europa.eu\)](#)

¹³⁸ [Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators | European Education Area \(europa.eu\)](#)

- 4.7. Encourage all schools, in particular those teaching hard-to-reach groups, to participate in the EU Code Week as an icebreaker to lower the barriers to integrating elements related to informatics (such as coding) in everyday teaching practices in an innovative and engaging way. This participation should be leveraged to support new school or local/regional strategies and policies.
- 4.8. Facilitate access to and participation of schools in the Digital Education Hackathon and link informatics teaching and learning to hands-on, innovative digital education solutions.
5. Set up and improve measures to recruit and train specialised teachers in the area of informatics and advanced digital technologies. In particular, Member States should:
 - 5.1. Build upon ongoing initiatives such as the Pact for Skills and the Digital Skills and Jobs Coalition, to support a two-way exchange and collaboration between education and training institutions and the private sector¹³⁹ in order to allow:
 - 5.1.1. professionals working in the digital sector (for instance in informatics) to support classroom teachers at primary or secondary level (including VET); and
 - 5.1.2. specialised teachers to acquire specific skills in the field of informatics and specific digital technology domains (for instance AI, cybersecurity).
 - 5.2. Review the continuing professional development offer on digital skills for specialised teachers by setting up specific learning opportunities to enable further professionalisation in informatics, including by using micro-credentials and individual learning accounts.
6. Ensure the development of advanced and specialist digital skills in vocational education and training, including on deep tech and in other key capacity areas. In particular, Member States should:
 - 6.1. Strengthen the provision of digital skills and ease access to learners (both in initial and continuing VET) to acquire advanced and specialist digital skills that are increasingly required for many vocational profiles, including through work-based learning and apprenticeship placements, interdisciplinary programmes or short courses leading to micro-credentials.
 - 6.2. Expand vocational programmes in areas such as AI, cybersecurity and software development and attract more learners to choose such programmes, in line with labour market needs. Cooperate at EU level on curriculum development, delivery and assessment.
 - 6.3. Support VET students in acquiring the digital skills required to use immersive technologies such as virtual reality, augmented reality, simulation and gaming as well as adaptive learning
7. Foster the development of a wide range of digital skills in higher education and address ongoing and emerging digital skills mismatches. In particular, Member States should:
 - 7.1. Cooperate at EU level on curriculum development, delivery and assessment and encourage higher education institutions to promote a provision of digital skills that is both general and sector-specific. This should include:

¹³⁹ Primary, secondary and tertiary sector.

- 7.1.1. Digital skills courses across levels and disciplines with the objective to strengthen the provision for all students, regardless of the sector of their professional career;
- 7.1.2. Flexible, tailored, and digitally accessible learning opportunities on advanced and specialist digital skills, including through short courses leading to micro-credentials.
- 7.2. Facilitate exchanges between industry or professional groups and higher education institutions for developing interdisciplinary courses and further embedding advanced and specialist courses on digital skills across degrees.
- 7.3. Provide appropriate incentives to industry, including small and medium enterprises (SMEs), to assist higher education institutions in the design and delivery of programmes responding to specific labour market needs.
- 7.4. Ensure quality and recognition of qualifications and micro-credentials (in line with the European approach to micro-credentials).
- 7.5. Reward and recognise efforts of teaching staff and higher education institutions to strengthen the provision of digital skills to all students. Encourage, promote and reward the mobility of teaching staff across higher education institutions and, when relevant, between academia and the private sector.
- 7.6. Support higher education institutions in attracting students, and particularly women, to enrol in and complete studies focusing on developing advanced skills in a number of digital domains (e.g. hardware, software, digital design, digital integration, data science, AI or cybersecurity) and promote dual degree tracks where digital skills are integrated with another discipline.
8. Support the development of digital skills of adults and offer equal opportunities. In particular, Member States should:
 - 8.1. Mainstream digital skills opportunities across the adult learning system, for instance by integrating them into national skills strategies. Ensure adequate attention and support to the implementation of measures at all levels of digital skills.
 - 8.2. Promote public-private partnerships, including among actors such as social partners, national and local authorities, local schools and community centres, industry and other sectors, to design, develop, deliver, monitor and evaluate new programmes and initiatives addressing specific adult learning needs, including for work-based learning. Cooperate at EU level on curriculum development, delivery and assessment.
 - 8.3. Run targeted awareness raising campaigns on the importance of digital skills and ensure specific support for adults most in need of developing their digital skills including access to career guidance.
 - 8.4. Introduce individual learning accounts, in accordance with the related Council Recommendation¹⁴⁰, to promote regular training for adults on digital skills. Include, among the available courses, quality assured training opportunities on different levels of digital skills in line with labour market and society needs. Strengthen legislation on paid training leave and encourage employers to prioritise upskilling and reskilling of employees during working time.

¹⁴⁰ Council Recommendation of 16 June 2022 on individual learning accounts (OJ C 243, 27.6.2022, p. 26).

- 8.5. Strengthen efforts to better embed companies, particularly SMEs and start-ups, in the existing sectoral, industrial and national ecosystems to provide them with the necessary support, including knowledge sharing, guidance and learning opportunities.
- 8.6. Encourage and promote the creation of additional local and regional Digital Skills and Jobs Coalitions to develop concrete measures for digital skills aligned to the local and regional needs.
9. Promote the development of certification on digital skills and its recognition. In particular, Member States should:
 - 9.1. Support and promote the certification of digital skills of all citizens across all sectors of education and training, including those gained through training provided via the individual learning accounts. Support education and training institutions in delivering trusted certification of digital skills.
 - 9.2. In cooperation with competent authorities, support the recognition of digital skills certificates and qualifications, including micro-credentials, as well as when working towards fulfilling the commitment to take steps to introduce automatic mutual recognition¹⁴¹ of qualifications by 2025. Set up a list of recognised and trusted certifiers, as well as training providers to support delivering high quality training provision, as well as certification.
 - 9.3. Provide incentives and give visibility to digital skills for learning or career progression by facilitating their identification, documentation, assessment, and certification whether acquired through formal, non-formal or informal learning. Help recruiters and third country nationals on all steps related to recognition and certification of skills and qualifications, including by leveraging the European Digital Skills Certificate.
 - 9.4. Contribute to the pilot, development and uptake of the European Digital Skills Certificate.
10. Develop a strategic and systematic approach to address the shortage of ICT specialists. In particular, Member States should:
 - 10.1. Use forecasting to assess the future needs for digital skills of different target groups of the market, particularly those of SMEs and conduct research to better understand the digital skills gaps.
 - 10.2. Design, and integrate in national strategies and action plans, initiatives addressing specific digital skills shortages (for instance on cybersecurity, AI) that are relevant at national level. Actively contribute to the implementation of the Cyber Skills Academy.
 - 10.3. Attract and retain talents from abroad by making full use of the Blue Card Directive and Talent Partnerships. Enhance cooperation with other Member States to exchange practices and solutions to attract digitally talented individuals to the Union and facilitate their mobility, where applicable.
 - 10.4. Pursue a more strategic and systematic approach to train and attract ICT specialists also from third countries, for example by implementing fast-track ICT profession visa schemes and study incentives, with a particular focus on SMEs.

¹⁴¹ Council Recommendation of 26 November 2018 on promoting automatic mutual recognition of higher education and upper secondary education and training qualifications and the outcomes of learning periods abroad

- 10.5. Provide comprehensive career and study guidance at school, VET and higher education level to stimulate young people’s interest, particularly that of girls and young women, in taking up studies in ICT and/or pursuing a career as ICT specialists. Run targeted campaigns to address preconceptions on the accessibility of tech careers (particularly addressing those not having an ICT background) and the different possible career paths when studying ICT. Use various communication channels to reach out to different segments, and to highlight the possibility of having a meaningful ICT career that is beneficial for society.
- 10.6. In line with the declaration Commitment on Women in Digital and in synergies with relevant initiatives by European Institute of Innovation and Technology and the European Innovation Council, prioritise efforts aiming at tackling the gender bias to close the gender and pay gap in ICT and provide targeted up- and reskilling opportunities to girls and women at all levels of education and training, so recognising the value of their contribution and talent.
- 10.7. Increase the attractiveness of the digital sector for women, for instance by working with the national Digital Skills and Jobs Coalitions to develop awareness-raising campaigns and tailor national messages.
- 10.8. Create opportunities for schools, VET providers and technical universities to attract students to digital careers (for instance by organising open days, family days, seminars and by promoting participation in initiatives such as the Innovation Talent Platform¹⁴², EU Code Week, the Digital Education Hackathon, and extracurricular activities).
11. Provide necessary funding for digital skills development. In particular, Member States should:
 - 11.1. Implement the various aspects of this Recommendation by using national and Union funds, including Erasmus+, European Social Fund Plus, Just Transition Fund, European Regional Development Fund, European Agricultural Fund for Rural Development, Digital Europe Programme, Horizon Europe, and proceed with implementing the national Recovery and Resilience plans.
 - 11.2. Use the Technical Support Instrument, including its multi-country approach, to design and implement reforms to strengthen the provision of digital skills in a lifelong learning perspective in line with this Recommendation.
 - 11.3. Encourage private investment in digital skills development and consider blending different sources of funding to upscale initiatives and increase their impact and sustainability.

WELCOMES THE COMMISSION’S INTENTION TO:

Build upon existing initiatives, including the European Year of Youth and the European Year of Skills, to support and complement Member States’ actions in the area of digital skills. In particular, the Commission intends to:

1. Support reform efforts for digital skills development and high-quality informatics. In particular, the Commission intends to:

¹⁴² <https://euraxess.ec.europa.eu/euraxess/innovation-talent-platform>

- 1.1. Facilitate Member State reforms, via Union instruments such as the Technical Support Instrument, including by facilitating exchanges on national approaches on the development of digital skills and skills related to informatics. The Commission will promote the use and upscaling of existing tools for the evaluation of skills, and successful teacher-training initiatives on informatics.
- 1.2. In close cooperation with Member States and stakeholders, support quality education in informatics by developing common guidelines for teachers and educators to foster quality education in informatics and developing informatics competence indicators, in line with existing competence and curricular frameworks¹⁴³.
- 1.3. Support peer learning and cooperation on curriculum development, delivery and assessment via Union programmes such as Erasmus+ and tools like the European Digital Competence Framework, for both citizens and educators.
- 1.4. Support Member States in monitoring the development of digital skills through their participation in international surveys (such as ICILS, PISA, TALIS, PIAAC) and other European initiatives (such as Eurograduate), which have complementary purposes and can strategically complement national efforts.
2. Promote excellence in advanced and specialist digital skills courses in higher education and VET. In particular, the Commission intends to:
 - 2.1. Support Member States in creating conditions conducive to developing advanced and specialist digital skills of students, researchers and lifelong learners, to be provided by higher education institutions and VET providers. This would be done both in interdisciplinary programmes and programmes focused on advanced ICT skills, considering the need to permanently upgrade these skills to follow the rapid innovation pace, as well as the necessity to make such programmes inclusive and accessible to diverse learners.
 - 2.2. Sustain the support for academic offer in advanced digital skills in digital technology areas and other trans- or multi-disciplinary areas, and their applications in strategic sectors not sufficiently covered by previous adopted Digital Europe work programmes.
3. Support efforts on the provision of digital skills to adults. In particular, the Commission intends to:
 - 3.1. Promote initiatives such as the Pact for Skills and the Digital Skills and Jobs Coalition, to join forces to offer up re-skilling opportunities for adults to improve their digital skills.
 - 3.2. Promote (through the Technical Support Instrument and Union funding opportunities) the development of accessible digital skills training courses, where possible leading to micro-credentials, addressing specific adult learning needs.
 - 3.3. Promote the development of accessible digital skills training courses, including on advanced digital skills, where possible leading to micro-credentials, addressing specific adult learning and labour market needs, with a particular focus on SME staff.
 - 3.4. Facilitate exchanges on best practices for adult learning on digital skills through the Public Employment Services network, the Pact for Skills, the European Education Area

¹⁴³

working group on adult learning, the national coordinators on adult learning and other relevant fora.

4. Facilitate the recognition of certification of digital skills. In particular, the Commission will:
 - 4.1. Pilot and roll out, in cooperation with the Member States and stakeholders¹⁴⁴, a European digital skills certificate aimed at enhancing the trust in and acceptance of digital skills certification across governments and industries¹⁴⁵. The pilot project aims to identify and test minimum quality requirements that any certificate and certification process on digital skills should have. The European digital skills certificate would enable every European citizen to indicate in a reliable and transparent manner their level of digital skills corresponding to the DigComp framework.
 - 4.2. In close cooperation with Member States, support the development of guidelines and facilitate exchanges on best practices on the assessment and evaluation of digital skills.
 - 4.3. Support the European competent bodies in quality assurance and/or standardisation in developing a recognition mechanism for certifications of digital skills, including micro-credentials, and continue providing support to the Member States for putting in place the conditions that will make automatic mutual recognition of those digital skills possible by 2025.
5. Support efforts aiming at increasing the number and diversity of ICT specialists. In particular, the Commission intends to:
 - 5.1. In close cooperation with the Member States, build on the declaration **Commitment** on Women in Digital, to further encourage women to play an active and prominent role in the digital technology sector.
 - 5.2. Promote advanced digital skills development and careers in the digital sector to women. Maintain and where needed enhance efforts towards digital inclusion ensuring that all individuals and communities, including the most disadvantaged ones, can contribute to and benefit from the digital transformation.
 - 5.3. Support Member States in promoting gender-sensitive teaching of digital skills in primary and secondary education by identifying innovative scalable teaching practices to address institutional and cultural barriers to girls' aspirations and their access to ICT studies and careers in the Union.
6. Support the implementation of this Recommendation through the High Level Group on Digital Education and Skills, to be set up by Commission Decision:
 - 6.1. Support effective continuation and functioning of the High-level Group set up for the Structured Dialogue with Member States with a view to provide steering on key strategic topics addressed in this Recommendation. The group may establish technical subgroups, notably on assessment and certification of digital skills, curriculum development, and quality requirements for digital education tools and content. This work should ensure consistency and complementarity with the work carried out by the High Level Group on Education and Training and the Digital Decade Board.

¹⁴⁴ Stakeholders from education and training, social partners, digital skills certification providers.

¹⁴⁵ This will contribute to the setting up of a European digital skills certificate, which is one of the actions of the Digital Education Action Plan 2021-2027 and is currently under development to provide support to existing and future digital skills certifications and their alignment to DigComp.

7. Monitor progress, disseminate good practices and increase exchanges with stakeholders. In particular, the Commission intends to:
 - 7.1. Monitor progress in the implementation of this Recommendation, taking into account Member States' national strategies, and including the specific outcomes and impacts on the provision of digital skills. This should be done within the European Education Area and its Education and Training Monitor, and as part of the Member States' reporting through the Digital Decade.
 - 7.2. Strengthen international cooperation on digital education and skills.
 - 7.3. Review the progress made in implementing this Recommendation and report to the Council no later than 5 years after its adoption.

Done at Strasbourg,

For the Council

The President