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From:	General Secretariat of the Council
To:	Delegations
No. prev. doc.:	9933/23
Subject:	Proposal for a Council Recommendation on improving the provision of digital skills in education and training - <i>Revised Presidency text</i>

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Delegations will find attached the compromise text of the draft Recommendation, as prepared by the Presidency for discussion during the Education Committee's next meeting on 19-20 July 2023.

**Bold** (for additions) and [...] (for deletions) are used to indicate changes to the text set out in document 9933/23.

Delegations are kindly invited to send their written comments to the Presidency (Educacion.Reper@reper.maec.es) and the Council Secretariat ([eycs@consilium.europa.eu](mailto:eycs@consilium.europa.eu)) by **20 July 2023 cob**.

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 and Article 166 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 growth<sup>1</sup>. All citizens need them to exercise their rights, to be informed, and to access online services, to communicate, to consume, create and disseminate digital content.
2. In particular, the European Council conclusions of 9 February 2023<sup>2</sup> stressed the need for bolder, more ambitious action to further develop the skills that are required for the green and digital transitions through education, training, upskilling and reskilling to meet the challenges of labour shortages and the transformation of jobs, including in the context of demographic challenges.

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<sup>1</sup> In the context of this Recommendation, *digital skills* and *digital competences* are used as synonyms.

<sup>2</sup> EUCO 1/23.

3. Through Decision (EU) 2023/936 of the European Parliament and of the Council<sup>3</sup>, 2023 was declared the European Year of Skills, whose overall objective is to further promote a mindset of reskilling and upskilling in accordance with national competences, law and practice.
4. The 2022 European Declaration on Digital Rights and Principles for the Digital Decade<sup>4</sup> 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 and inclusive society and economy, and that everyone [...] **should be able to acquire all basic and advanced** digital skills.
5. The first principle of the European Pillar of Social Rights<sup>5</sup> states that 'everyone has the right to quality and inclusive education, training and lifelong learning in order to maintain and acquire skills that enable them to participate fully in society and manage successfully transitions in the labour market. 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.

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<sup>3</sup> Decision (EU) 2023/936 of the European Parliament and of the Council of 10 May 2023 on a European Year of Skills (OJ L 125, 11.5.2023, p. 1).

<sup>4</sup> OJ C 23, 23.1.2023, p. 1.

<sup>5</sup> OJ C 428, 13.12.2017, p. 10.

6. The Union of Equality strategies<sup>6</sup> adopted by the Commission emphasise the important role of quality and inclusive education and training as an enabler 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, **persons with disabilities and** people living in rural and remote areas **and the outermost regions** [...]. Stereotypical expectations limit girls' and women's 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 girls' needs or specificities might not be adequately taken into account. In line with the declaration Commitment on women in digital, action is needed to achieve equal participation across sectors and in particular in the digital one.
7. The **Commission's** Digital Education Action Plan 2021-2027<sup>7</sup> 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 and other emerging technologies. This implies the need for education and training institutions to prepare people for a healthy, safe and meaningful use of technology, based on an understanding of its functioning.

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<sup>6</sup> Five equality strategies were adopted in 2020 and 2021 to make progress towards a Union of Equality: Gender Equality Strategy 2020-2025 (COM(2020) 152 final); LGBTIQ Equality Strategy 2020-2025 (COM(2020) 698 final); EU anti-racism action plan 2020-2025 (COM(2020) 565 final); EU Roma strategic framework for equality, inclusion and participation 2020-2030 (COM(2020) 620 final); Strategy for the Rights of Persons with Disabilities 2021-2030 (COM(2021) 101 final).

<sup>7</sup> COM(2020) 624 final.

8. In 2022 the Commission launched a structured dialogue with Member States on digital education and skills. 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, culture, industry and finance). The outcomes of the structured dialogue **highlighted a number of common challenges and** 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.
9. The Council Recommendation on key competences for lifelong learning<sup>8</sup> includes the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society, as one of the eight key competences for lifelong learning. The Digital Competence Framework for Citizens (DigComp)<sup>9</sup> 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.

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<sup>8</sup> Council Recommendation of 22 May 2018 on key competences for lifelong learning (OJ C 189, 4.6.2018, p. 1).

<sup>9</sup> Vuorikari, R., Kluzer, S. and Punie, Y., DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes, Publications Office of the European Union, Luxembourg, 2022.

10. The relevance of digital skills for society and employability is supported by a series of targets on attainment levels [...]. With the Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030)<sup>10</sup>, 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 Digital Decade Policy Programme<sup>11</sup> includes a commitment to achieve by 2030 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.
11. However, available data show 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 2018<sup>12</sup> (against a target of 15%). In 2021, only 54% of people in the Union aged 16-74 had at least basic digital skills<sup>13</sup>, over half of Union companies reported difficulties in filling the number of vacancies for ICT specialists<sup>14</sup>, and only 9 million people worked as ICT specialists across the Union<sup>15</sup>. In ICT-related professions, men account for 81% of the overall figure<sup>16</sup>. 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.

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<sup>10</sup> OJ C 66, 26.2.2021, p. 1.

<sup>11</sup> 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).

<sup>12</sup> Fraillon, J., Ainley, J., Schulz, W., Friedman, T. and Duckworth, D., Preparing for Life in a Digital World: IEA International Computer and Information Literacy Study 2018 International Report, Springer Open, IEA, Amsterdam, 2019.

<sup>13</sup> Eurostat (2021). ICT usage in households.

<sup>14</sup> Eurostat (2021). ICT specialists - statistics on hard-to-fill vacancies in enterprises.

<sup>15</sup> Eurostat (2021). ICT usage in households and by individuals.

<sup>16</sup> Eurostat (2021). ICT specialists in employment.

12. Efforts are needed for basic as well as advanced digital skills. In this context, the New European Innovation Agenda<sup>17</sup> 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 initiative, which aims to train one million deep tech talents by 2025 across Member States. Other strategic initiatives **of the Commission** include the **foreseen establishment of the** Cybersecurity Skills Academy, an umbrella instrument aiming to **promote cybersecurity skills and to** increase the number of cybersecurity professionals in Europe<sup>18</sup>.

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<sup>17</sup> COM(2022) 332 final.

<sup>18</sup> COM(2023) 207 final.

13. The **Commission's** Digital Education Action Plan 2021-2027 proposed to develop a European Digital Skills Certificate to enhance the transparency and recognition of digital skills certifications. Bodies like the ENIC-NARIC networks [...] support [...] recognition of qualifications which facilitates mobility, career 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/CENELEC<sup>19</sup>, 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<sup>20</sup>, to remain globally competitive, the EU needs to become more attractive for talent from around the world. Action is also needed to make full use of the Blue Card Directive<sup>21</sup> 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 countries. 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.

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<sup>19</sup> The European e-Competence Framework (e-CF) is currently maintained by 'CEN/TC 428 - ICT Professionalism and Digital Competences'.

<sup>20</sup> COM(2022) 657 final.

<sup>21</sup> 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).

14. The Council conclusions on countering the COVID-19 crisis in education and training<sup>22</sup> invite Member States to examine possibilities for innovation, make further efforts to accelerate the digital transformation of education and training systems, and support the further development of digital skills. The Council conclusions on digital education in Europe's knowledge societies<sup>23</sup> 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, the Council conclusions on supporting well-being in digital education<sup>24</sup> 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.

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<sup>22</sup> OJ C 212I, 26.6.2020, p. 9.

<sup>23</sup> OJ C 415, 1.12.2020, p. 22.

<sup>24</sup> OJ C 469, 9.12.2022, p. 19.

15. In education and training, the development of digital skills is ensured through various approaches and each level of education and training faces different challenges. The Council Recommendation on High-Quality Early Childhood Education and Care Systems<sup>25</sup> 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<sup>26</sup>, 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<sup>27</sup>, this includes ensuring that children can safely navigate the digital environment and harness its opportunities. Considering that children are engaging with digital technologies from an increasingly younger age and mostly from home<sup>28</sup>, 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.

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<sup>25</sup> Council Recommendation of 22 May 2019 on High-Quality Early Childhood Education and Care Systems (OJ C 189, 5.6.2019, p. 4).

<sup>26</sup> Council Recommendation (EU) 2021/1004 of 14 June 2021 establishing a European Child Guarantee (OJ L 223, 22.6.2021, p. 14).

<sup>27</sup> COM(2021) 142 final.

<sup>28</sup> European Commission, Joint Research Centre, Chaudron, S., Di Gioia, R., Gemo, M., Young Children (0-8) and Digital Technology - A qualitative study across Europe, Publications Office of the European Union, Luxembourg, 2017.

16. The Council Recommendation on Pathways to School Success<sup>29</sup> aims to increase school inclusiveness and well-being while the Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education<sup>30</sup> 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 approaches<sup>31</sup> 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 informatics<sup>32</sup> (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 quality education in informatics, supported by age- and developmentally appropriate teaching methods, quality resources, gender-balanced uptake, representation, and proper evaluation<sup>33</sup>.

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<sup>29</sup> 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).

<sup>30</sup> 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).

<sup>31</sup> For example, *cross-curricular approach*, *separate subject within another subject*. For further details see the staff working document SWD(2023) 205 final.

<sup>32</sup> In this Recommendation, 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.

<sup>33</sup> European Commission, European Education and Culture Executive Agency, Informatics education at school in Europe, Publications Office of the European Union, Luxembourg, 2022.

17. The Council Recommendation on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience<sup>34</sup> proposes a renewed Union policy vision for VET, including major efforts on its digitalisation. The Council Conclusions on the inclusion of persons with disabilities in the labour market<sup>35</sup> invite 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 Declaration<sup>36</sup> 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.
18. The [...] **Council conclusions on a European strategy empowering higher education institutions for the future of Europe<sup>37</sup> identify bolstering Europe’s recovery and response to the digital and green transitions as one of the key objectives to be pursued as part of a joint effort at institutional, national and European level and underline that higher education institutions are instrumental to accelerating the digital transition in Europe. The importance of adopting [...] a whole-institution approach [...] in this respect is emphasised in the Council Recommendation on learning for the green transition and sustainable development<sup>38</sup>. [...] In a similar vein, education and training institutions have an important role in effectively integrating digital skills across all their activities, for instance by providing a learning offer that addresses ICT specialists and provides digital skills in sector-specific curricula.**

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<sup>34</sup> 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).

<sup>35</sup> 15134/22.

<sup>36</sup> Osnabrück Declaration on vocational education and training as an enabler of recovery and just transitions to digital and green economies.

<sup>37</sup> **OJ C 167, 21.4.2022, p. 9.**

<sup>38</sup> Council Recommendation of 16 June 2022 on learning for the green transition and sustainable development (OJ C 243, 27.6.2022, p. 1).

19. The Council Recommendation on a European approach to micro-credentials for lifelong learning and employability<sup>39</sup> sets a framework to support the provision of flexible, accessible learning opportunities for a variety of students, including young people and lifelong learners which can be used as leverage to address current digital skills learning needs.
20. The European Pillar of Social Rights Action Plan<sup>40</sup> proposes clear targets for adult participation in training (60% by 2030), including on digital skills. The Council Resolution on a new European agenda for adult learning 2021-2030<sup>41</sup> identifies the need to foster skills connected to the digital transformation, and the Council Recommendation on Upskilling Pathways: New Opportunities for Adults<sup>42</sup> recognises digital skills as one of the three basic skills that all adults should develop. Despite policy attention, participation of adults in training is low, including on digital skills, and provision of digital skills for adults is scattered and uneven<sup>43</sup>. Member States are trying to address this through existing and new initiatives planned in their recovery and resilience plans and by involving various stakeholders such as the social, voluntary, non-governmental sector as well as institutions of non-formal education. Individual learning accounts as set in the related Council Recommendation<sup>44</sup> may support the increase of the number of people engaging in training each year with a combination of incentives, including financial ones.

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<sup>39</sup> 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).

<sup>40</sup> COM(2021) 102 final.

<sup>41</sup> OJ C 504, 14.12.2021, p. 9.

<sup>42</sup> Council Recommendation of 19 December 2016 on Upskilling Pathways: New Opportunities for Adults (OJ C 484, 24.12.2016, p. 1).

<sup>43</sup> Beblavý, M., Bačová, B., Literature review on the provision of digital skills for adults, EENEE report, Publications Office of the European Union, Luxembourg, 2022. Righi, R., Lopez Cobo, M., Papazoglou, M., Samoili, S., Cardona, M., Vazquez-Prada Baillet, M. and De Prato G., Academic Offer of Advanced Digital Skills in 2020-21. International Comparison, Publications Office of the European Union, Luxembourg, 2022.

<sup>44</sup> Council Recommendation of 16 June 2022 on individual learning accounts (OJ C 243, 27.6.2022, p. 26).

21. The Council conclusions on European teachers and trainers for the future<sup>45</sup> 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 development<sup>46</sup>. 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).
22. The Erasmus+ Teacher Academies 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<sup>47</sup> and those on the ethical use of artificial intelligence and data in teaching and learning<sup>48</sup>. 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.

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<sup>45</sup> OJ C 193, 9.6.2020, p. 11.

<sup>46</sup> OECD, TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners, OECD Publishing, Paris, 2019.

<sup>47</sup> 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, Publications Office of the European Union, 2022.

<sup>48</sup> European Commission, Directorate-General for Education, Youth, Sport and Culture, Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators, Publications Office of the European Union, 2022.

23. Various initiatives by Member States and the Commission, for instance the EU Code Week and the Digital Education Hackathon, aim at promoting stakeholder engagement and grass-roots innovation in digital education and skills. Similarly, the new European strategy for a better internet for kids (BIK+)<sup>49</sup> promotes engagement with stakeholders including through the network of Safer Internet Centres 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.
24. Companies play a crucial role in upskilling and reskilling their staff, but large discrepancies exist. **According to 2022 Eurostat data<sup>50</sup>**, only a small proportion of SMEs (20.9%) provided training to all their staff to enhance their ICT-related skills, compared with 69.5% of large companies<sup>51</sup>. The Pact for Skills invites business, social partners and public organisations to join forces and take concrete action to upskill and reskill the workforce across the Union. Furthermore, the Digital Skills and Jobs Coalition brings together Member States, companies, social partners, non-profit organisations and education providers, to work together to address the lack of digital skills in Europe.

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<sup>49</sup> COM(2022) 212 final.

<sup>50</sup> **Eurostat (2022). Enterprises that provided training to develop/upgrade ICT skills of their personnel by size class of enterprise.**

<sup>51</sup> Eurostat (2022). Enterprises that provided training to develop/upgrade ICT skills of their personnel by size class of enterprise.

25. 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. While most Member States have developed strategies for digital skills, few take a comprehensive approach towards the progression of programmes throughout the different levels **and types** of education and training<sup>52</sup>. A recent report from the Commission on Quality investments on education and training<sup>53</sup> highlights the need for impact assessment of the various programmes on learners' learning outcomes. The issue is general and applies equally to digital skills. Findings also underline that the use of digital technologies for teaching and learning can offer huge opportunities to boost educational outcomes, if properly planned and designed. At the same time, mitigating the risks of digital exclusion or inappropriate use of technology is vital.
26. This Recommendation fully respects the principles of subsidiarity and proportionality. Member States will decide, according to their national circumstances, how to implement the Recommendation,

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<sup>52</sup> In this Recommendation, the term *progression* refers to the purposeful sequencing of teaching and learning across multiple developmental stages, ages, or grade levels.

<sup>53</sup> European Commission, Directorate-General for Education, Youth, Sport and Culture, Investing in our future: Quality investment in education and training, Publications Office of the European Union, Luxembourg, 2022.

RECOMMENDS THAT MEMBER STATES:

1. Agree, through a whole-of-government approach, and involving key stakeholders, on a national, **and where appropriate regional**, strategy for digital education and skills, developed, **further strengthened** or updated in line with the principles of this Recommendation, and monitor its effectiveness and impact **in a meaningful way**. In [...] **pursuit of their national strategies**, Member States [...] **are recommended to:**
  1. Set or review national objectives for the provision of digital skills and ensure their regular review and update taking into account the Digital Competence Framework for Citizens (DigComp).
  2. Align, **where relevant**, those national objectives with the strategic priorities of the **Commission's** Digital Education Action Plan 2021-2027 and reflect them, **where possible**, in the national roadmaps to be adopted by Member States in accordance with the Digital Decade 2030 policy programme.
  3. Identify 'priority or hard-to-reach groups'<sup>54</sup> and set up appropriate measures to facilitate their participation, taking into account accessibility, territorial<sup>55</sup> and socio-economic gaps in digital skills.
  4. Ensure a [...] **coherent** approach to the provision of digital skills throughout all [...] levels **and types** of education and training, **with a lifelong learning perspective**, 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 [...] **and training levels and types**.

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<sup>54</sup> 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.

<sup>55</sup> E.g. urban/rural, remote and outermost regions, cross-border territories.

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.
  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 **to** improve the effectiveness and quality of the actions taken.
  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 [...] **competences that are appropriate to their age and promoting their well-being, paying particular attention to vulnerable groups**. In particular, Member States [...] **are recommended to :**
1. Consistent with overall priorities of early childhood education and care, ensure that pre-primary [...] **pupils** and especially their parents, carers and families are given support to develop **relevant** digital [...] **competences**, and are aware of and better understand the opportunities and risks that come with digitalisation.

2. Use age- and developmentally-appropriate activities, for example in ECEC unplugged digital education activities<sup>56</sup> and play-based learning of digital skills<sup>57</sup>.
3. Further strengthen the provision of digital skills in primary and secondary education, as well as in 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 **and other relevant** technologies **as well as their functioning**, including generative AI systems.

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<sup>56</sup> For example, educational activities that promote the development of digital skills without using digital devices.

<sup>57</sup> 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 [...] **are recommended to:**
  1. Support cross-curricular approaches for the provision of digital skills [...] **in all levels and types of education and training.**
  2. Ensure cross-curricular assessment of digital skills, with means **and frequency** comparable to [...] **the assesment of other** basic skills, [...] **to keep track of progress.**
  3. [In line with the [...] 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.]
  4. Take greater action to close the gender gap in the digital skills levels between female and male teachers.
  5. Promote the use of the Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training and the toolkit on how to spot and fight disinformation, as well as the Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators in classrooms.

4. Set up and improve measures to recruit and train specialised teachers in the area of informatics and advanced digital technologies **while acknowledging their need for a varied range of pedagogical and didactical skills**. In particular, Member States [...] **are recommended to:**
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 sector<sup>58</sup> in order to allow:
    - a) professionals working in the digital sector (for instance in informatics) to support classroom teachers at primary or secondary level (as well as in VET); and
    - b) specialised teachers to acquire specific skills in the field of informatics and specific digital technology domains (for instance AI, cybersecurity).
  2. Review the continuing professional development offer on digital skills for specialised teachers **and support** [...] setting up specific learning opportunities to enable further professionalisation in informatics, including by using micro-credentials and individual learning accounts **and other funding measures in line with national practices and needs**.
5. Support high-quality education in informatics at primary and secondary level. In particular, Member States [...] **are recommended to:**
1. Promote cooperation **and exchange of good practices** at EU level on curriculum development, delivery and assessment.
  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.

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<sup>58</sup> Primary, secondary and tertiary sector.

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. Ensure that teaching and learning on informatics, **in a cross-curricular way or through a specific subject**, is [...] **provided** 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.
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.
6. Make use of opportunities to develop quality informatics pedagogies through the Erasmus+ Teacher Academies.
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.
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.

6. Ensure the development of advanced and specialist digital skills in vocational education and training, including on AI, deep tech and in other key capacity areas. In particular, Member States should:
  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.
  2. [...] **Take the necessary steps to attract more learners to** vocational programmes in areas such as AI, cybersecurity and software development, [...] in line with labour market needs. Cooperate at EU level on curriculum development, delivery and assessment.
  3. Support VET students in acquiring the digital skills required to, for example, recognise the use of AI and 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, **and with due regard to academic freedom and the autonomy of higher education institutions**, Member States [...] **are recommended to:**
1. Promote cooperation to share knowledge 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:
    - a) [...] **Learning opportunities and courses for the development of digital competence** across levels and disciplines with the objective to strengthen the provision for all students, regardless of the sector of their professional career;
    - b) Flexible, tailored, and digitally accessible learning opportunities on advanced and specialist digital skills, including through short courses that may lead to micro-credentials.
  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.
  3. Encourage 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.
  4. Provide **transparency and** quality assurance, and ensure recognition of qualifications and micro-credentials on digital skills (in line with the European approach to micro-credentials).

5. 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.
  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 [...] **are recommended to** :
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.
  2. Promote public-private partnerships, including among actors such as social partners, national and local authorities, local schools and community centres, **associations, organisations and groups of digital civil society**, 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. Promote cooperation at EU level on curriculum development, delivery and assessment.
  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.

4. Promote and incentivise regular training for adults on digital skills [...], **namely within existing education and training provisions, and by using, where applicable**, individual learning accounts, in accordance with the related Council Recommendation<sup>59</sup>. 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.
  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.
  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[...] **are recommended to:**
1. Support and promote the certification of digital skills of all citizens across all [...] **levels and types** of education and training, including those gained through training provided via the individual learning accounts **or other funding measures**. Support education and training institutions in delivering trusted certification of digital skills.

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<sup>59</sup> Council Recommendation of 16 June 2022 on individual learning accounts (OJ C 243, 27.6.2022, p. 26).

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 recognition<sup>60</sup> 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.
  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.
  4. Contribute to **the development of the European Digital Skills Certificate, taking into account the results of the the pilot [...]**.
10. Develop a strategic and systematic approach to address the shortage of ICT specialists. In particular, Member States [...] **are recommended to:**
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.
  2. Design, and integrate in national strategies and action plans, initiatives addressing specific digital skills shortages (for instance on cybersecurity [...], **AI and robotics**) that are relevant at national level. Actively contribute to the implementation of the Cybersecurity Skills Academy

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<sup>60</sup> 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 (OJ C 444, 10.12.2018, p. 1).

3. Attract and retain talents from abroad by making full use of the Blue Card Directive<sup>61</sup> 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.
4. Pursue a more strategic and systematic approach to train and attract ICT specialists also from third countries [...], with a particular focus on SMEs.
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.
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.
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.

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<sup>61</sup> **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).**

8. Create opportunities for schools, VET providers and higher education institutions 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 Platform, EU Code Week, the Digital Education Hackathon, and extracurricular activities).
11. Provide necessary funding for digital skills development. In particular, Member States [...] **are recommended to:**
  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.
  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.
  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:
  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.
  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 **and training** in informatics and developing informatics competence indicators, in line with existing competence and curricular frameworks.
  3. Support peer learning and cooperation **to share knowledge** on curriculum development, delivery and assessment **by the Member States** via Union programmes such as Erasmus+ and tools like the European Digital Competence Framework, for both citizens and educators.
  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:
  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. 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:
  1. Promote initiatives such as the Pact for Skills and the Digital Skills and Jobs Coalition, to join forces to offer **upskilling and** re-skilling opportunities for adults to improve their digital skills.
  2. Support and encourage the development of accessible digital skills training courses, where possible leading to micro-credentials, addressing specific adult learning needs, for example, through the Technical Support Instrument and Union funding opportunities. A particular focus may be put on the provision of advanced digital skills to SME staff.

3. 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 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:
  1. Pilot and roll out, in cooperation with the Member States and stakeholders<sup>62</sup>, a European Digital Skills Certificate aimed at enhancing the trust in and acceptance of digital skills certification across governments and industries. 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 could enable every European citizen to indicate in a reliable and transparent manner their level of digital skills corresponding to the DigComp framework.
  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.
  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.

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<sup>62</sup> Stakeholders from education and training, social partners, digital skills certification providers.

5. Support efforts aiming at increasing the number and diversity of ICT specialists. In particular, the Commission intends to:
  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 **and to promote advanced digital skills development and careers for women in the digital sector.**
  2. **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.**
  3. [...] Maintain and where needed enhance efforts towards digital inclusion ensuring that all individuals and communities, including the most disadvantaged ones (**vulnerable and socio-economically disadvantaged groups, persons with disabilities and people living in rural and remote areas**), can contribute to and benefit from the digital transformation.  
  
[...]
6. Support the implementation of this Recommendation through the High Level Group on Digital Education and Skills, to be set up by Commission Decision:
  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.

7. Monitor progress, disseminate good practices and increase exchanges with stakeholders. In particular, the Commission intends to:
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, **without increasing the administrative burdens for them.**
  2. Strengthen international cooperation on digital education and skills.
  3. Review the progress made in implementing this Recommendation and report to the Council no later than 5 years after its adoption.

Done at Brussels,

*For the Council*

*The President*

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