EUROPEAN
COMMISSION

Brussels, 30.9.2020
COM(2020) 624 final

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

{SWD(2020) 209 final}

Resetting education and training for the digital age

1 Introduction

In her political guidelines, President von der Leyen highlighted the need to unlock the potential of digital technologies for learning and teaching and to develop digital skills for all. Education and training are key for personal fulfilment, social cohesion, economic growth and innovation. They are also a critical building block for a fairer and more sustainable Europe. Raising the quality and inclusiveness of education and training systems and the provision of digital skills for all during the digital and green transitions is of strategic importance for the EU.

Rapid digitalisation over the past decade has transformed many aspects of work and daily life. Driven by innovation and technological evolution, the digital transformation is reshaping society, the labour market and the future of work. Employers face difficulties in recruiting highly skilled workers across a number of economic sectors, including in the digital sector. Too few adults are up- and re-skilling to fill these vacancies, often because training is not available at the right time and in the right place.

The use of digital technologies is also crucial for achievement of the European Green Deal objectives and for reaching climate neutrality by 2050. Digital technologies are powerful enablers for the green economic transition, including for moving to a circular economy and decarbonising energy, transport, construction, agriculture and all other industries and sectors. In parallel, it is important to reduce the climate and environmental footprint of digital products and facilitate a move towards sustainable behaviour in both development and use of digital products.

The education and training system is increasingly part of the digital transformation and can harness its benefits and opportunities. However, it also needs to effectively manage the risks of the digital transformation, including the risk of an urban/rural digital divide where certain people can benefit more than others. The digital transformation in education is being driven by advances in connectivity; the widespread use of devices and digital applications; the need for individual flexibility and the ever-increasing demand for digital skills. The COVID-19 crisis, which has heavily impacted education and training, has accelerated the change and provided a learning experience.

Digital technology, when deployed skilfully, equitably and effectively by educators, can fully support the agenda of high quality and inclusive education and training for all learners. It can facilitate more personalised, flexible and student-centred learning, at all phases and stages of education and training. Technology can be a powerful and engaging tool for collaborative and creative learning. It can help learners and educators access, create and share digital content. It can also allow learning to take place beyond the walls of the lecture hall, classroom or workplace, providing more freedom from the constraints of physical location and timetable. Learning can happen in a fully online or a blended mode, at a time, place and pace suited to the needs of the individual learner. However, the type and design of technological tools and platforms, as well as the digital pedagogy used, impact directly on whether individuals are included or excluded from learning. Students with disabilities, for example, need tools that are fully accessible if they are to benefit from digital transformation.

There are two interrelated aspects to digital education to which the strategic priorities of this Action Plan will respond: firstly, the deployment of the vast and growing array of digital technologies (apps, platforms, software) to improve and extend education and training. Online, distance and blended learning are specific examples of how technology can be used to support teaching and learning processes. A second key aspect of digital education is the need to equip all learners with digital competences (knowledge, skills and attitudes) to live, work, learn and thrive in a world increasingly mediated by digital technologies. Addressing these two aspects of digital education requires policies and actions on several fronts, including infrastructure, strategy and leadership, teacher skills, learner skills, content, curricula, assessment and national legal frameworks. While Member States are responsible for the content of teaching and the organisation of their education and training systems, action at EU level can contribute to the development of quality and inclusive education and training by supporting cooperation, the exchange of good practice, frameworks, research, recommendations and other tools.

Recent data show a diverse situation of digital education across Member States. Evidence from the OECD's PISA exercise in 2018 showed that many low-income homes had no access to computers. Eurostat figures from 2019 indicated that access to broadband internet varies significantly across the EU, ranging from 74% of households for the lowest-income quartile to 97% in the highest-income quartile. On teacher preparedness, the OECD Teaching and Learning International Survey in 2018 showed that only 39% of educators in the EU felt well or very well prepared for using digital technologies in their daily work, with significant differences between Member States.

Over the past decades, many initiatives and investments have been undertaken in educational technology and digital skills development. Despite progress and excellent examples of innovation, these initiatives were often short-lived, or limited in scale and had marginal impact at system levels. This may, in part, be because the potential of digitising education was not widely visible and understood. The Covid-19 crisis put us for the first time in a situation where there was little choice but use digital technologies to provide education and training. We have learned a lot, and many teachers, students and parents faced a steep learning curve. At the same time, this pandemic also exposed the shortcomings that need to be tackled in order to have successfully integrate of digital technologies in education and training systems.

Efforts to curb the outbreak of COVID-19 led to the closure of education and training buildings, campuses and other sites and a forced shift to emergency modes of digital education. These emergency modes have included a wide uptake of online and distance learning[1]. This mass and unprecedented use of technology for learning revealed many opportunities for teachers to organise their teaching differently and to interact with students on a more personalised basis, focusing on their specific needs. At the same time, many Member States experienced shortcomings in the system and a widespread lack of digital readiness. Although digital technologies enabled many pupils, students and adult learners to continue learning, it also proved a major barrier for others when access, equipment, connectivity or skills were lacking. In some Member States, the vast majority of educators

[1] For a glossary of the terms used, see Staff Working Document accompanying this document.

and learners had little if any experience of teaching and learning online and the different pedagogical approaches needed for this mode of instruction. Not all tools or content were accessible, and learners with disabilities faced particular challenges.

The crisis requires us to rethink how education and training, in all disciplines, are designed and provided to meet the demands of a rapidly changing and increasingly digital world. Quality and inclusive education today should be informed by the needs of our current and future society. For this, it is important to consider how all phases and stages of education and training can purposefully and strategically embed digital technologies into educational practices.

The COVID-19 crisis shed light on the key enabling factors for effective digital education and training: connectivity and suitable digital equipment for learners and educators; teachers and trainers that are confident and skilled in using digital technology to support their teaching and adapted pedagogy; leadership; collaboration and the sharing of good practice and innovative teaching methods. Experiences from this period show that education and training systems and institutions that had previously invested in their digital capacity were better prepared to adapt teaching approaches, keep learners engaged, and continue the education and training process. In particular, the emergency confirmed the need for all educators to be skilled in using digital technologies effectively in their teaching and training process and to ensure that all children can participate in digital education. It has also confirmed that different pedagogical approaches are needed when teaching online. Teachers and learners also need to develop the skills and know-how for this different mode of learning. We are now moving beyond the unplanned and emergency phase imposed on education providers, teachers, students, families and the education system as a whole. A strategic and longer-term approach to digital education and training should be defined.

In the first Digital Education Action Plan, adopted in 2018, the EU addressed digitalisation in education with a number of measures[2]. As digital transition continues and the public health crisis brings new challenges to the fore, the new Action Plan focuses on the longer-term digital change in education and training.

As announced in the European Skills Agenda and in the European Education Area Communication, the new Action Plan presents a vision for improving digital literacy, skills and capacity at all levels of education and training and for all levels of digital skills (from basic to advanced). The Action Plan will support the objective of the Skills Agenda of ensuring that 70% of 16 to 74 year olds should have at least basic digital skills by 2025. The new Action Plan also supports the goals of the recently adopted Commission proposal for a Council Recommendation on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience, which has a strong focus on digital transformation in the vocational education and training sector.

The Action Plan can benefit[3] from the Erasmus programme, the European Social Fund, the European Regional Development Fund and smart specialisation policies, the Connecting Europe Facility, the Digital Europe Programme, and Horizon Europe. In addition, the Action

[2] The first digital education action plan was adopted in January 2018 as a part of the vision to establish a European Education Area. It comprised of 11 actions. For more on this, see the staff working document.
[3] This is notwithstanding the final outcome of the interinstitutional negotiation process on the future EU programmes.

Plan forms part of the EU's response to the COVID-19 crisis, to guide the Member States in prioritising funding for digital education in the Recovery and Resilience Facility, where re- and upskilling as well as boosting very high-capacity broadband[4] connectivity are flagship investments, and other cohesion policy instruments. It will also inform monitoring under the European Semester. It will help to support Member States in their reform efforts, together with possible technical support for national policy reforms through the Technical Support Instrument[5]. The action plan identifies specific areas where action is particularly needed to support the recovery and resilience of education and training and to ensure that education in Europe enables the green and digital transitions and seizes the benefits of digital transformation while mitigating its risks.

Building on the work of the European Parliament[6], Council[7] and Commission, the Action Plan sets out measures for high-quality and inclusive digital education and training which will require a combination of actions and policies to be effective. It covers the next programming period (2021-2027) and sets out priorities and corresponding actions where the EU can bring added value.

2 Findings from stakeholder consultations

The Commission organised a wide range of stakeholder consultations to inform and gather evidence for this initiative[8]. Consultations took place from February to September 2020 and involved public- and private-sector organisations, education and training organisations and a wide variety of additional stakeholders, including research institutions and civil society.

In the process, education authorities highlighted the need to map, research and learn from responses to the COVID-19 crisis and identify strengths and weaknesses of the different approaches and measures taken. Education authorities and educational stakeholders also stressed the need for a forum to exchange practice and experience at EU level. In addition, they highlighted the need for guidance and support, both for responding to the immediate crisis and for the recovery period.

Stakeholders agreed that the crisis has increased the need to boost the digital skills of educators. In addition, they called for practical guidelines at European level – in particular for ministries and education and training institutions – on how to implement effective and inclusive distance, online and blended learning. They also highlighted the need for guidance in certain areas that are particularly challenging, such as assessment.

Stakeholders called for a more strategic and consistent approach by the EU on digital education, in view both of the crisis and the ongoing challenges of the digital transformation. Other key topics that emerged were the need to use EU funding programmes to support connectivity, infrastructure and access to digital technologies across Member States for both formal and non-formal settings. Stakeholders also stressed the need to promote digital literacy, manage the overload of information and fight disinformation, which in their view had become an even more serious problem during the crisis.

[4] Hereafter referred to as "broadband".
[5] COM(2020) 409 final
[6] For example, the work of the European Parliament's CULT committee, which has produced relevant reports on digital education, artificial intelligence and other related aspects.
[7] For example, the Council Conclusions on COVID in education under the Croatian Presidency of the Council of the European Union.
[8] See staff working document.

Key findings from the open public consultation

More than 2700 contributions were received in the open public consultation on the digital education action plan, which took place from 18 June to 4 September 2020[9]. Experiences of learning during the COVID-19 crisis were at the centre of the consultation, which targeted students; parents and carers; the wider public; employers and companies and educators and education and training institutions[10].

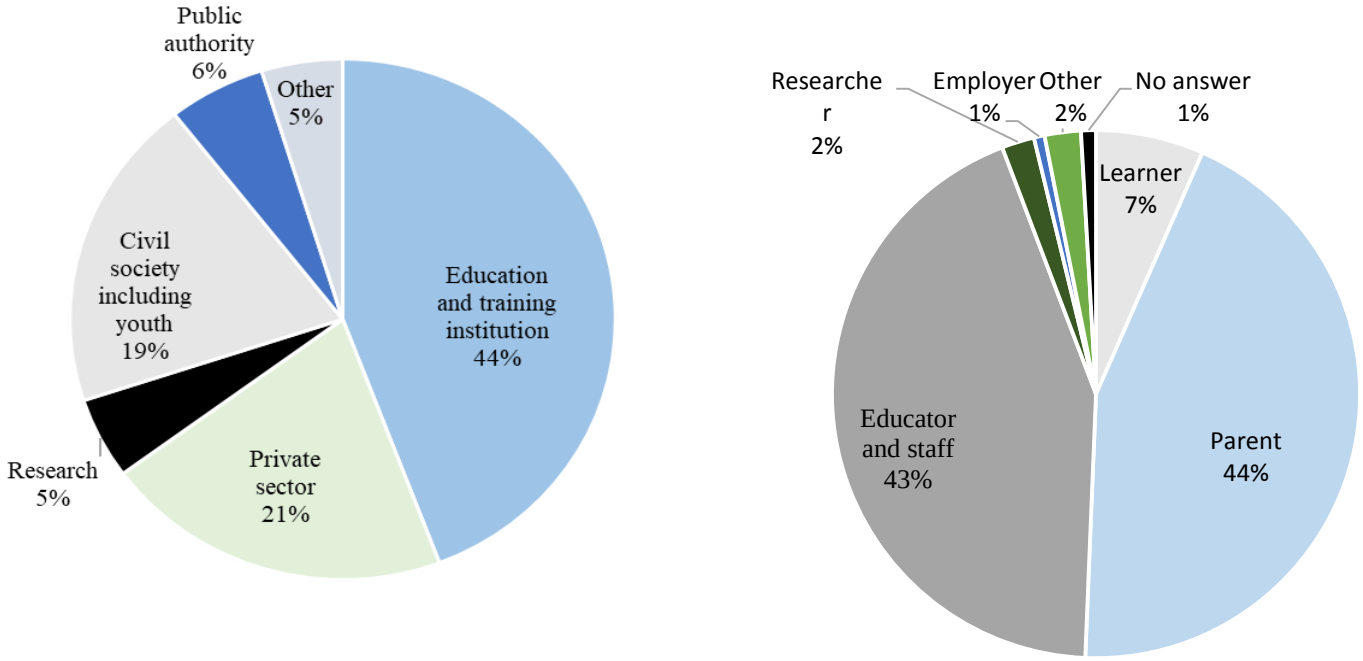


Figure 1: Contributions to Open Public Consultation divided by respondents replying in organisational capacity (left) and in personal capacity (right) along relevant sub-categories

According to the consultation, the COVID-19 crisis has led to the widespread use of digital learning practices in education and training across the EU. However, respondents from several Member States said that the difficult circumstances of the pandemic meant that this happened hastily and often in an unplanned manner. Measures put in place by Member States and institutions to ensure continuity of education ranged from televised lessons to online learning management systems to training using simulations. Approaches varied between and within countries, but also across levels and sectors of education and training. This reflected differing levels of digital maturity in different parts of the system. The main areas of concern for respondents were how to ensure access, equity and inclusion. They were worried about the emergence of digital divides.

[9] The results of the OPC are different according to category. To observe eventual differences in the replies, two analyses were therefore conducted: one including results from all respondents and the other excluding respondents from Romania. To transparently report OPC findings, in all instances the percentage included in the text refers to all respondents. In cases where a more limited sample without Romania is used this is clearly marked in a corresponding footnote. All percentages are rounded up.

[10] The questionnaire was divided in four different parts: collecting information about the respondents (1), questions on education and training during the COVID-19 crisis and the recovery period (2), respondents' visions for digital education in Europe (3), and an optional submission of a position paper (4). In some questions, respondents could select more than one option: in these cases (as opposed to those with only one answer option) percentages do not add up to 100%. In cases where, a 5-point Likert scale was applied, answers are distributed on five different categories (2 negative, 2 positive and 1 neutral).

Persons with disabilities also reported difficulties: on the accessibility of technology and digital educational material; availability of assistive technology; technical support provided to students with disabilities and the teacher competence on disability and accessibility matters.

Adult learning providers saw large numbers of students dropping out from courses, in some cases this was up to three quarters of the group. In some countries, regional or local governments provided digital equipment and tools to adult learners and providers. Although this helped, these measures did not match the significant needs of the sector. Some providers had to close all activities for several weeks and months, in particular when work-based learning was involved as it often requires physical presence.

'The situation at the moment is a patchwork. Online teaching must be the same quality for everyone and not be linked to the financial resources of a town or municipality.' Parent

This period of massive educational disruption has created a sense of urgency about digital education. 95% of respondents consider the COVID-19 crisis to be a 'turning point' for how technology is used in education and training. It has underlined the need for high quality digital content being readily available and affordable for learners and educators. It has also increased the need to engage every person and all parts of the education and training system in a common effort to ensure that technology is deployed in an effective way so that it becomes an enabler of – and not a barrier to – high quality, inclusive education.

'The key lesson of the COVID-19 crisis is that digital education should no longer be viewed as an island of its own but considered an integral part of all education and training.' Teacher

Respondents rated teachers' digital skills and competences as the most important component of digital education, followed by leadership and vision in the educational institution, suitable digital content and infrastructure. Learners expressed a need for more interaction and guidance from teachers, greater communication with peers, and more support for mental health and well-being. According to respondents, students in primary and lower secondary schools (and students who depend more on the physical presence of a tutor or teacher) were particularly affected during this period.

Parents played an important role in enabling learning, as learning and well-being suffered due to the lack of social interaction and guidance. When assessing what was needed and not available to them during the crisis, they indicated the importance of receiving more assistance on how to support their children for online and distance learning. Parents, from many Member States, expressed a more negative opinion on the measures taken to ensure continuity of education and training, compared to educators.

'My child is a pre-schooler. She is not able to do an activity by herself without my direct involvement and help. But I needed to work at the same time.' Parent

The socio-economic situation of parents played a crucial role in their ability to help pupils and students continue the learning process. Parents with higher education attainment were generally better placed to help learners with a supportive learning environment at home. Unengaging learning materials, the lack of guidance and structure for learning and assessment led to disengagement among some students, teachers and parents. According to respondents, online learning resources and content need to be more relevant, interactive and

easy to use. Respondents also think that these resources should provide relevant skills for the labour market, be of high quality, and be recognised by national authorities.

'Digital teaching offers many advantages, like flexibility and mobility. But there are risks. Using the screen all day impacts on concentration and can also be a burden on mental well-being.' Student

The crisis period showed how important it is for people to be digitally skilled. Around 62% of respondents felt that they had improved their digital skills during the crisis, and this percentage was higher for education and training staff. More than 50% of respondents plan to take action to further improve their digital competences in the future.

'Students have improved their digital skills, and for the most part grew to like online learning. Many said their communication and digital skills had improved in leaps and bounds.' Teacher

Respondents said it was critical to be able to manage the overload of information; and distinguish facts from false information and other false content online. Protecting personal data was also recognised as a particularly relevant skill by learners and parents. Digital content creation emerges as the area that education and training staff would like to improve in the near future, including being able to design and develop their own material.

'We live in a digital era and this is a huge advantage. Digital literacy and skills are essential and should no longer be ignored. These skills should be constantly developed hand-in-hand with the digital infrastructure. This is the only way that investment in technology will prove to be efficient.' Industry representative

According to respondents, digital technology should be integrated into the education and training system based on a consistent set of quality standards and guidelines, ensuring an appropriate mix of digital and face-to-face learning experiences. While they considered face-to-face interaction as vital, many respondents expect the crisis to accelerate the shift to blended or hybrid education and training.

'We need to develop better online platforms for learning. The ones we had to use were acceptable but still had massive limitations. We really need to develop better tools.' Student

According to respondents, action at EU level should support professional development for teachers; guidance on digital education; enhance Member States' efforts to improve connectivity and infrastructure, provide support to education and training institutions for the development of digital education strategies and specific measures for disadvantaged groups. Respondents from several Member States consider it essential to invest in infrastructure, digital skills, digital literacy, and secure online environments (platforms/tools) with high-quality content. Respondents said that educational institutions should do this by making the most of innovative solutions offered by private education providers and technology developers.

One of the key results of the consultation process was that while there is some indication of the wider impact of COVID-19 on education and training, it is still too early to conclude on

its long-term consequences. Gathering more experience and conducting research into the lasting effects over a longer time period is therefore necessary.

3 Making education and training systems fit for the digital age: guiding principles

With digital change accelerating, it is essential **that education and training systems adjust accordingly**. While responsibility for content of teaching and the organisation of education systems lies primarily with Member States, recent years have seen a growing momentum to share and exchange best practices on digital education; and develop common tools and frameworks at EU level. Combining forces and working together on digital education has never been more vital. The EU can play a more active role in identifying, sharing and scaling good practice and supporting Member States and the education and training communities as a whole with tools, frameworks, guidance, technical expertise and research.

The COVID-19 crisis has brought greater awareness of the need to improve the use of technology in education and training; to adapt pedagogies and develop digital skills. The following guiding principles are essential to ensure that education and training adjust to the digital transformation and further improve the quality and inclusiveness of education in Europe.

- **High quality and inclusive digital education, which respects the protection of personal data and ethics,** needs to **be a strategic goal of all bodies and agencies active in education and training**. Before the pandemic, digital education was often the responsibility of a team or division within educational institutions, ministries or public bodies. The crisis has demonstrated that digital education is not a marginal issue but a central component of learning, teaching and assessment in the 21st century. All players in education need to strategically reflect on how digital technologies can be embedded into education and training.

- **Transforming education for the digital age is a task for the whole society**. This transformation should include an enhanced dialogue and stronger partnerships between educators, the private sector, researchers, municipalities, and public authorities. Parents, companies, civil society and learners themselves, including younger learners, should be more closely involved in efforts to make high quality, accessible and inclusive digital education and training a reality for all. This should be underpinned by evidence and data to monitor progress and improve our understanding of the challenges and opportunities of the digital transformation in education.

- **Appropriate investment in connectivity, equipment and organisational capacity and skills should ensure that everybody has access to digital education**. Education is a fundamental human right and access to it has to be guaranteed, independent of the environment in which it takes place – physical, digital or a combination of both. The right to quality and inclusive education and training and lifelong learning is the first principle of the European Pillar of Social Rights, while the fifth principle of the Pillar gives workers a right to training.

- **Digital education should play a pivotal role in increasing equality and inclusiveness**. Digital skills are essential to be able to develop and deploy digitally accessible and inclusive systems. Likewise, lack of digital skills and lack of

accessibility has meant that many disadvantaged groups, teachers, and families were unable to continue work and learning during lockdown. Not only has this increased the risk of poverty and disadvantage but also it has widened inequality in education and training.

- **Digital competence should be a core skill for all educators and training staff** and should be embedded in all areas of teacher professional development, including initial teacher education. Educators are highly knowledgeable and skilled professionals that need the confidence and skills to use technology effectively and creatively to engage and motivate their learners, support the acquisition of digital skills by learners and to ensure that digital tools and platform used are accessible to all learners. Teachers and trainers should have access to ongoing opportunities for professional learning and development tailored to their needs and their discipline. Digital teaching methods and innovation in digital education should be embedded throughout all initial teacher education programmes and promoted in the education and training of youth workers.

- **Education leaders play a key role in digital education.** They need to understand how and where digital technologies can enhance education; provide appropriate resources and investment; empower educators; learn from best practice and support relevant organisational change and a culture that values and rewards innovation and experimentation. Education and training systems need to evolve and adapt and this requires all players, including institutional leadership and decision makers in policy, to lead this change.

- **Digital literacy is essential for life in a digitalised world**. With computers and algorithms mediating many daily activities, it is important to educate people at all ages about the impact of digital technology on well-being and the way technology systems work. This is instrumental to developing an understanding of the risks and opportunities of digital technology and encouraging healthy, safe and meaningful uses of digital technology. Information overload and the lack of effective ways to verify information make it all the more necessary for individuals to be able to critically approach, assess and filter information and be more resilient against manipulation. Digital education and skills should also take into account environmental and climate impacts of the development and use of digital equipment and services.

- **Basic digital skills** should become part of the core transferable skills that everyone should have to be able to develop personally; engage in society as an active citizen; use public services; and exercise basic rights. A sound understanding of the digital world should be part of the formal and non-formal education provided in every education and training institution. Essential public services are increasingly delivered through e-government making basic digital skills indispensable for everyday life.

- To support competitiveness, we need people to have the latest **advanced digital skills** to support the twin digital and green transitions of society, public services, and all parts of the economy. The deployment of technologies is affecting jobs and everyday life. This makes it even more important to invest in lifelong learning by promotion, provision and recognition of upskilling and re-skilling for the digital economy.

- There is a need for **high-quality education content to boost the relevance, quality and inclusiveness of European education and training at all levels.** Education institutions have an increasingly important role as providers of lifelong learning. Digital technology should be harnessed to facilitate the provision of flexible, accessible learning opportunities, including for adult learners and professionals, helping them to re-skill, upskill or change careers. More ambitious efforts are needed in the areas of digital education content, tools and platforms[11]. These efforts should encourage the uptake, quality assurance, validation, and recognition of courses and learning opportunities in all sectors of education and training. Promoting short learning courses that are recognised can play an instrumental role in upskilling and re-skilling. This can be supported through micro-credentials which capture the learning outcomes of short-term learning. In this regard, the Commission is developing a European approach for micro-credentials.

4 Priority areas and actions

The EU should ambitiously address the opportunities and challenges of digital transformation in education and training. The guiding principles above underpin two strategic priorities to be taken forward at the EU level, while fully upholding the principle of subsidiarity:

4.1 Strategic priority 1: Fostering the development of a high-performing digital education ecosystem

Promoting high-quality and inclusive digital education must be a common endeavour across society. Governments, education and training institutions, the private sector and the public all need to be engaged in this endeavour in order to develop a high-performing digital education ecosystem. Policies relevant for digital education need to be better connected and the EU can contribute to this work at all levels. The Annual Sustainable Growth Strategy 2021[12] has, in fact, highlighted the need for unprecedented investments in skills and connectivity and made each of them one of the seven flagship investments for the Recovery and Resilience Facility. Key players, in particular teachers and trainers, should be better equipped and trained to participate more effectively in the digital transformation of education and understand the opportunities this can bring, when used effectively.

Effective digital capacity planning and development is vital for education and training systems. This requires the development and ongoing review and updating of digital strategies addressing technology gaps in infrastructure, devices and developing relevant organisational capabilities in education, including the capacity to deliver hybrid modes of learning and teaching (remote and on-site). Capacity should be developed to ensure accessibility to assistive technologies and accessible digital content and more generally address unequal access, e.g. on socio-economic or rural-urban grounds. Institutionalised support is essential for such planning and development, as are interdisciplinary teams including management, technologists and instructional designers, with the needs and experience of education and training staff at the centre.

[11] Centres of Vocational Excellence, funded by Erasmus foster excellence in vocational education and training, and can act as a technology diffusion centre for companies, including on digital learning tools.
[12] COM(2020) 575 final.

Very high-capacity internet connectivity is critical for education. Demand for connectivity is increasing due to bandwidth-heavy applications such as video streaming, video conferencing, cloud computing, and other emerging applications (such as virtual and augmented reality). Bringing fast and reliable internet to educational institutions and learners plays an important role in ensuring effective and engaging learning experiences. This means ensuring that internet access is not confined to a specific classroom or computer lab. Moreover, educators consider reliable Wi-Fi access as a pre-requisite if they are to use technology with confidence in their teaching. The recent period of educational disruption and closure of physical sites has underlined the need for learners to be able to access devices and the internet to continue with their learning at home or in other settings.

Digital education content and training in digital skills – including digital teaching methods – will be essential for staff. They will benefit from stronger support for online, in-person or blended teaching, depending on the context and needs of the learner. Educators should be empowered to adopt innovative methods; have the awareness of environmental and climate impact of digital technologies and services to make most sustainable choices collaborate; engage in peer learning and share their experiences. A trusted digital education ecosystem requires high-quality content, user-friendly tools, value-adding services and secure platforms that maintain privacy and uphold ethical standards. Accessibility, inclusiveness and learner-centred design are vital. The development of European digital educational content should promote the highest pedagogical and educational quality and respect the diversity and cultural richness of the Member States.

To support a high-performing digital education ecosystem, the European Commission will pursue the following actions[13]:

1. **Launch a strategic dialogue with Member States in order to prepare a possible proposal for a Council Recommendation by 2022 on the enabling factors for successful digital education**, including:
   - tackling connectivity gaps (using EU funding as well as Member State and private funding);
   - tackling equipment gaps (using EU funding as well as Member State and private funding and setting up schemes to reuse suitable hardware from public administration and enterprises in schools);
   - supporting education and training institutions with know-how on how to adapt and digitise in an inclusive manner (using relevant EU tools and instruments);
   - addressing accessibility and availability of assistive technologies;
   - encouraging Member States to foster closer dialogue on digital education between stakeholders in the economy and education institutions;
   - encouraging Member States to develop guidelines for digital pedagogy, drawn from best practice and experience, and upskilling their teachers;

2. Drawing on lessons from the COVID-19 crisis, propose a **Council Recommendation on online and distance learning for primary and secondary education by the end of 2021.** This would help develop a shared understanding at EU level of the approaches needed for distance, online and blended learning that is

[13] The financing of certain initiatives may be subject to the adoption of the basic acts of the respective programmes and will be implemented in accordance with their rules.

effective, inclusive and engaging.

3. Develop a **European Digital Education Content Framework** that will build on European cultural and creative diversity and include guiding principles for specific sectors of education and their needs (such as high-quality instructional design, accessibility, recognition and multilingualism) while reflecting the need for the interoperability, certification, verification and transferability of content. Launch **a feasibility study on the creation of a European exchange platform**[14] to share certified online resources (such as massive, open online courses) and link existing education platforms.[15]

4. Support, where necessary, Gigabit connectivity of schools, as well as **connectivity in schools**[16] under the Connecting Europe Facility Programme. Carry out Connectivity4Schools awareness raising actions on funding opportunities. Encourage Member States to include **broadband in investment and reform projects in national recovery and resilience plans under the Recovery and Resilience Facility**, in line with the European Connect flagship. **Make the most of EU support** with regard to internet access, purchase of digital equipment and e-learning applications and platforms for schools and in particular for students from disadvantaged groups and for students and educators with disabilities.

5. **Use Erasmus cooperation projects[17] to support the digital transformation plans** of primary, secondary, vocational education and training (VET), higher[18], and adult-education institutions. Support **digital pedagogy and expertise in the use of digital tools** for teachers, including accessible and assistive technologies and digital content, through Erasmus Teacher Academies and launch an online self-assessment tool for teachers, SELFIE for Teachers[19], based on the European Framework for Digital Competence of Educators to help identify strengths and gaps in their digital, technical and teaching skills.

6. To promote understanding of emerging technologies and their applications in education, develop **ethical guidelines on artificial intelligence (AI) and data usage in teaching and learning for educators** and support related research and innovation activities through Horizon Europe[20]. This will build on the Ethics Guidelines for Trustworthy Artificial Intelligence[21]. The guidelines will be accompanied by a **training programme for researchers and students** on the ethical aspects of AI and include a

[14] This European Exchange Platform reflects proposals for a MOOC (massive open online course) platform by different stakeholders during the stakeholder consultation process. See Staff Working Document pp. 39-40.
[15] This will take into account the ongoing work on Europass learning opportunities and the development of the Digital Skills and Jobs Platform.

[16] As one of the socio-economic drivers, the coverage of schools with Gigabit symmetric links is foreseen in the EU's strategic objectives for 2025 and is eligible under the Connecting Europe Facility 2.
[17] This will include in particular Erasmus Key Action 2 projects.
[18] In higher education, this can be implemented through a series of strategic reviews on digital transformation for higher education institutions (HEIs), building on the HEInnovate initiative, targeting the innovation capacity development of HEIs.
[19] This initiative will build on the Commission's highly successful tool, SELFIE for schools, which has been used by more than 670 000 teachers, students and school leaders to review how technologies are used in their school and plan for improvement. SELFIE (Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies) can be used by any primary, secondary or VET school anywhere in the world and is available in 32 language versions. New features and support material for schools are added on an ongoing basis: https://ec.europa.eu/education/schools-go-digital_en
[20] Focus areas include artificial intelligence, data, virtual reality, augmented reality etc.
[21] https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai

target of 45% of female participation in the training activities.

4.2 Strategic priority 2: Enhancing digital skills and competences for the digital transformation

A changing society and the transition to a green and digital economy require solid digital competences. Boosting digital skills at all levels helps increase growth and innovation and build a fairer, more cohesive, sustainable and inclusive society. Being digitally skilled and acquiring digital literacy can empower people of all ages to be more resilient, improve participation in democratic life and stay safe and secure online. Equipping Europe's workers and job seekers with digital skills will be critical for economic recovery in the coming years. In addition to digital skills, the digital economy requires also complementary skills such as adaptability, communication and collaboration skills, problem-solving, critical thinking, creativity, entrepreneurship and readiness to learn.

Digital literacy has become essential for everyday life. A sound understanding of digital information, including personal data, is vital to navigate a world increasingly infused with algorithms. Education should more actively help learners to develop the ability to critically approach, filter and assess information, notably to identify disinformation and to manage overload of information as well as develop financial literacy. Education and training institutions can help build resilience to information overload and disinformation, which becomes more widespread in times of crisis and major societal upheaval. Countering disinformation and harmful speech through education and training is crucial for effective participation in society and democratic processes, especially by young people. More than 40% of young people consider that critical thinking, media and democracy are not 'taught sufficiently' in school. The challenge is particularly relevant for younger students, nearly all of whom are online every day.

Computing education[22] in schools allows young people to gain a sound understanding of the digital world. Introducing pupils to computing from an early age, through innovative and motivating approaches to teaching, in both formal and non-formal settings, can help develop skills in problem-solving, creativity and collaboration. It can also foster interest in STEM-related studies and future careers while tackling gender stereotypes. Actions to promote high quality and inclusive computing education can also impact positively on the number of girls pursuing IT-related studies in higher education and, further on, working in the digital sector or digital jobs in other economic sectors.

A solid and scientific understanding of the digital world can build on, and complement, broader digital skills development. It can also help young people to see the potential and limitations of computing for solving societal challenges. Yet, many young people in Europe still leave school without any exposure to computing education[23]. Efforts to improve

[22] Also known as informatics or computer science in many countries.
[23] Work will begin in October 2020 to update the study by the European Commission on computational thinking from 2016. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC104188/jrc104188_computhinkreport.pdf. This will be accompanied by a

computing education in schools require a partnership approach, involving higher education, non-formal education, including libraries, Makerspaces and Fablabs[24], as well and industry and education research. EU Code Week[25], which grows year on year, is an excellent initiative to introduce a wide and diverse audience to coding, programming and digital creativity more widely.

In 2019, a fifth of young persons in Europe reported not to have basic digital skills, with young people with low education levels more than three times as likely to underachieve in digital skills than their peers with higher levels of education. This is preventing many young people from participating fully in the labour market. For this reason, the Commission proposal for a **reinforced Youth Guarantee** recommends an assessment of digital skills of NEETs registering in the Youth Guarantee, and on the basis of gaps identified, to offer them a dedicated preparatory digital training.

To thrive in a technology-driven economy, **Europeans need digital skills.** Everyone, including students, job seekers and workers, will need to be digitally skilled and confident to succeed in a rapidly changing environment and adapt to new and emerging technologies. Levels of digital skills in the EU are still low, albeit gradually improving, while the digital transformation is accelerating. 90% of jobs in all sectors in the future will require some form of digital skills, yet 35% of Europe's workers lack these skills. Demand for digital skills will grow with skills in demand ranging from basic to advanced, and including AI, data literacy, supercomputing and cybersecurity.

Advanced digital skills[26] are in high demand. The Digital Opportunity Traineeship initiative, which has been running since 2018, has provided students and recent graduates with the opportunity to acquire hands-on digital experience in industry. This scheme, which has trained over 12 000 students with both basic and advanced digital skills, will be scaled up to include teachers, trainers and other educational staff by offering them professional development opportunities in digital education. The scheme will also be extended to include traineeships for learners and apprentices from the VET sector, as VET systems are well placed to respond to the skills challenges of digitalisation. The development of advanced digital skills is also one of the objectives of the Digital Europe programme. In addition, the SME Strategy contributes through the Digital Volunteers and the Digital Crash Courses, targeting specifically the current workforce.

All Member States face shortages of digital experts, including data analysts, cybersecurity analysts, software developers, digital accessibility specialists and machine-learning experts. 58% of companies that wish to hire digital specialists report difficulties in recruiting, and 78% of companies cite a lack of appropriate skills as the main barrier to new investment[27]. Research by the Commission shows that there is scope for increasing the EU-based Master's

mapping of computer science education in compulsory education to identify trends and shared challenges, with a view to proposing a common set of principles to improve the overall quality and inclusiveness of computer science education in the EU.

[24] For more on the role of Makerspaces and Fablabs see the Commission's report https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117481/makerspaces_2034_education.pdf

[25] https://codeweek.eu

[26] The Commission proposal for a digital Europe programme defined them by saying: 'Advanced digital skills are specialised skills, i.e. skills in designing, developing, managing and deploying technologies such as high performance computing (HPC), artificial intelligence and cybersecurity' COM/2018/434 final - 2018/0227.

[27] EIB investment report 2019

programmes in artificial intelligence and cybersecurity.[28]. This will give access to high-quality and relevant learning opportunities in advanced digital areas throughout the EU. More needs to be done to promote professions and careers in the digital sector. Although many efforts and initiatives are underway, including by professional computer societies and the European Committee for Standardisation on IT professionalism and digital competences[29], on-going efforts must be recognised, promoted and scaled-up.

Women accounted for 54% of all tertiary students in the EU in 2017, yet they are particularly underrepresented in the digital sectors. Women hold only 17% of tech sector jobs. Although girls generally perform better than boys in the Programme for International Student Assessment (PISA) and International Computer and Information Literacy Study (ICILS) international skills tests, they can veer away from STEM subjects with age. This affects their participation in higher education, where only one in three STEM graduates is a woman. Teachers, parents, and STEM professionals need to engage, motivate and inspire female students as greater inclusion of women in the digital economy and increased diversity in the labour market can bring social and economic value for Europe's competitiveness, growth and innovation. Efforts to tackle gender stereotypes and gender bias in the digital sector are also much needed for improved gender balance in the sector. Initiatives such as the 'Women in Digital' strategy and WeGate[30] already work towards achieving these objectives but efforts need to be stepped up in order to make more progress. On top of these strategies to attract more women to ICT jobs, there is also a need to understand better why more women do not take jobs ~~to~~ in the ICT domain, and making these curricula and careers more attractive to girls and women. Such insights can only benefit the teaching and development of digital technologies, as well as the objective of the SME Strategy to increase women entrepreneurship.

Everyone should acquire a basic understanding of new and emerging technologies including AI. This will help them to engage positively, critically and safely with this technology, and be aware of potential issues related to ethics, environmental sustainability, data protection and privacy, children rights, discrimination and bias, including gender bias and disability and ethnic and racial discrimination. Stronger representation and participation of young people, women and underrepresented groups in AI research and the AI industry should also be encouraged by supporting existing initiatives and promoting knowledge sharing and collaboration. To understand the applications and implications of AI for education, both educators and students need new skills, including basic AI and data literacy skills. Education and training institutions need to be aware of the opportunities and challenges created by AI. The Commission will launch an awareness campaign for learners and education and training institutions (secondary, VET and higher education) to promote awareness of the opportunities and challenges created by AI[31].

To improve the development of digital competences, the European Commission will pursue the following actions:

[28] JRC (2019): Academic offer and demand for advanced profiles in the EU: Artificial Intelligence, High Performance Computing and Cybersecurity.
[29] CEN Technical Committee 428
[30] See https://wegate.eu/ and https://ec.europa.eu/digital-single-market/en/news/women-digital
[31] With a view to reaching 1% of EU learners and teachers by 2022 and 1% of the EU population by 2024 or 2027.

7. Develop **common guidelines for teachers and educational staff to foster digital literacy and tackle disinformation through education and training**. This should be done in close cooperation with stakeholders through a multi-stakeholder group, bringing together civil society organisations, European technology companies and carriers, journalists, media and broadcasters, the Media Literacy Expert Group and the European Digital Media Observatory, national authorities, education and training institutions, Safer Internet Centres, educators, parents and young people. This will be done in line with the upcoming Media Action Plan.

8. Update the **European Digital Competence Framework**[32] with a view to including AI and data-related skills. Support the development of AI learning resources for schools, VET organisations, and other training providers. Raise awareness on the opportunities and challenges of AI for education and training.

9. Develop a **European Digital Skills Certificate (EDSC)** that may be recognised and accepted by governments, employers and other stakeholders across Europe. This would allow Europeans to indicate their level of digital competences, corresponding to the Digital Competence Framework proficiency levels[33].

10. Propose a **Council recommendation on improving the provision of digital skills in education and training.** This will include using EU tools to invest in teacher professional development; exchange of best practice on instructional methods, including through a focus on inclusive high-quality computing education (informatics) at all levels of education and fostering dialogue with industry on identifying and updating new and emerging skills needs, in synergy with the Skills Agenda.

11. Improve monitoring and support the **cross-national collection of data on student digital skills** through participation in the ICILS[34] to better understand gaps and strengthen the evidence base for actions to address these gaps. This will include introducing an **EU target for student digital competence** to reduce the share of 13-14 year old students who underperform in computer and information literacy to under 15% by 2030.

12. **Incentivise advanced digital skills development** through targeted measures including scaling up the Digital Opportunity traineeships by extending them to VET learners and apprentices, and offering professional development opportunities for teachers, trainers and other educational staff in school, VET, adult and higher education.

13. **Encourage women's participation in STEM**, in cooperation with the European Institute of Innovation and Technology (EIT)[35]; support the EU STEM Coalition to develop new higher education curricula for engineering and information and

[32] See digital competence framework for citizens, with eight proficiency levels and examples of use. https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digcomp-21-digital-competence-framework-citizens-eight-proficiency-levels-and-examples-use.

[33] The EDSC will be supported by a self-assessment approach.

[34] The assessment will be performed by the International Association for the Evaluation of Educational Achievement (IEA), which is responsible for the ICILS study. The ICILS, or International Computer and Information Literacy Study (ICILS), directly measures students' computer and information literacy, but does not yet cover all Member States. It is already used in seven Member States.

[35] With a view to reach up to 40 000 female students in areas such as health; food; urban mobility; added-value manufacturing; climate change; sustainable energy; digital technologies; raw materials.

communications technology based on the STEAM approach[36] to be more attractive for women and increase their participation and career development in STEM subjects and IT.

5. Strengthening cooperation and exchange in digital education at EU level

The Action Plan sets out a co-ordinated policy response at EU level with actions, investment, and support measures designed to have greater impact than isolated initiatives at Member State level. Its implementation will be ensured as part of the enabling framework for the European Education Area and will involve relevant working groups and arrangements. This will involve actors at various levels (EU, national, regional, local) and engage the public more closely through direct communication channels and opportunities for co-creation.

In response to the lessons learnt from the COVID-19 crisis and the longer-term objectives of this action plan, the Commission will support Member States and their education and training systems through closer cooperation and a more focused discussion and exchange on digital education at the EU level. This is necessary to enable strategic collaboration with relevant stakeholders across regions, Member States and the EU. In order to improve cooperation on digital education at the EU level, the Commission will:

14. Establish a **European Digital Education Hub** to:

- support Member States by setting up a network of national advisory services on digital education to exchange experience and good practice on the enabling factors of digital education; link national and regional digital-education initiatives and strategies; and connect national authorities, the private sector, experts, education and training providers and civil society through various activities;
- monitor the implementation of the Action Plan and the development of digital education in Europe including through results from EU-supported projects[37] and share good practice by contributing to research experimentation and systematic collection and analysis of empirical evidence, in part through peer learning;
- support cross-sector collaboration and new models for the seamless exchange of digital learning content, addressing issues such as interoperability, quality assurance, environmental sustainability, accessibility and inclusion and common standards for digital education;
- support the agile development of policy and practice by being a think-and-do-tank for digital education and engaging stakeholders in user-driven innovation through the Digital Education Hackathon.

Monitoring and evaluation will be ensured as part of the European Education Area governance framework. This will provide transparency and accountability in the

[36] The STEAM approach for learning and teaching links STEM and other fields of study. It promotes cross-cutting, 'transversal' skills such as digital skills, critical thinking, problem-solving, management, and entrepreneurship. It also promotes cooperation with non-academic partners and responds to economic, environmental, political and social challenges. STEAM encourages the blending of knowledge that is required in the real world and natural curiosity.

[37] In particular those funded under Erasmus, Digital Europe, InvestEU and Horizon Europe

implementation of the Action Plan. Key performance indicators will apply for each action to help assess progress and – where necessary – adjust and adapt. The Commission will undertake a comprehensive review of the Digital Education Action Plan in 2024 to assess its outreach and impact. On the basis of this review, the Commission will propose additional or new measures if necessary.

As digitalisation advances, the Action Plan provides the policy context and strategic guidance to increase the digital impact of the Erasmus programme. Blended mobility will be 'mainstreamed' (i.e. integrated) into the Erasmus programme by introducing a 'virtual learning' component to Erasmus and further strengthening successful initiatives such as e-Twinning for schools. This will help bring together learners and teachers from different countries to work online collectively on common projects. This will complement physical mobility and help improve the digital skills of educators and learners. It will also improve the quality of the overall digital learning experience. In addition, greater use will be made of virtual exchanges between young people and education institutions in Europe, and around the world, to further engage young people in intercultural dialogue and improve their soft skills.

In higher education, the **European Universities initiative** will develop virtual and face-to-face EU inter-university campuses. In so doing, this initiative will implement innovative models of digital higher education. The European Student Card Initiative will play a key role to facilitate the secure electronic exchange and verification of student data and academic records, becoming a real differentiator for higher education institutions by simplifying the management of their students' mobility. It will allow students to identify and authenticate themselves online in a secure and trusted manner based on the EU's electronic identification rules (eIDAS regulation)[38] when carrying out online learning activities at a host institution in another Member State. By connecting universities' various IT systems, we will achieve a paperless Erasmus mobility in full respect of General Data Protection Rules.

6. Outreach and international cooperation

Successful implementation of the Action Plan will include working in close partnership and cooperation with the European Parliament and Member States, with the active involvement of the Committee of the Regions and local authorities. For Member States, closer cooperation will help to overcome policy fragmentation that can undermine effective digital education policies. It is also necessary to strengthen and coordinate work across sectors and policy areas. The Commission will therefore support collaboration and networking at EU level between national entities dedicated to digital education. This will help to promote the exchange of good practice through peer learning and support a more consistent and structured approach to digital education policies.

The Commission will also organise outreach events, in the form of **a stakeholder forum,** with the aim of increasing participation – and creating a sense of ownership – by a wide range of stakeholders. The events will bring together Member States, EU institutions, and education stakeholders (including teacher and parent organisations, local authorities, civil

[38] Regulation (EU) N°910/2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS Regulation) adopted on 23 July 2014 provides a predictable regulatory environment to enable secure and seamless electronic interactions between businesses, citizens and public authorities. Currently, there is an ongoing review of the Regulation.

society groups, and businesses – including companies committed to the digital education agenda) to exchange best practice and discuss emerging challenges and opportunities.

Digital education can be an important tool for the EU internationally, through sharing and scaling up good practice and building communities of practice through collaboration and EU-supported projects. A well-functioning education system is at the heart of the European way of life and is essential for the prosperity and stability of the EU, Member States and our partner countries. Digital education initiatives have the potential to help strengthen relations between the partner countries and the EU, but also to strengthen relations within different non-EU regions. An open and high-performing digital education ecosystem in the EU can help attract and nurture excellence from around the world as the global competition for talent and innovation accelerates. This can help increase the innovation performance of the EU and its Member States.

The COVID-19 pandemic has exposed the global digital divide. Strengthening international cooperation on digital education must be an integral part of the EU as a global partner on education. This will be reflected in EU international cooperation programmes at global, regional and bilateral level, including in the international dimension of Erasmus+. In particular, the EU, under a Team Europe approach, will promote global cooperation, while simultaneously addressing its strategic goals in priority regions, notably the western Balkans, Africa, and the Neighbourhood regions of the Eastern Partnership and the South Mediterranean, based, amongst others, on the experience gained in the context of the Digital4Development Hub. Digital transformation will play a central role in relaunching and modernising the economies of the Western Balkans in line with the **digital agenda for the Western Balkans**[39]. Similarly, the Commission supports the efforts of the Eastern Partnership countries through the EU4Digital Initiative and its facility. It will foster sustainable development and deliver concrete benefits to African partners while exchanging best practices within the framework of the Africa Europe Alliance.

7. Conclusion

The COVID-19 pandemic is impacting heavily on education and training systems. In highly difficult circumstances it has accelerated the digital transformation and triggered rapid, large-scale change. Developments that could have taken years happened in just a few weeks. We are now faced with both challenges and opportunities. This means we need to use the lessons of recent months to step up our efforts and gradually evolve from temporary, emergency-focused remote education to more effective, sustainable and equitable digital education, as part of creative, flexible, modern and inclusive education and training. This process should be informed by contemporary teaching practices and research.

Member States should build on the momentum of recent months to develop higher quality, more accessible and more inclusive digital teaching, learning and assessment. In particular, Member States should make full use of the European Union's Recovery and Resilience Facility for adapting their education and training systems to the digital age. This will help to ensure that all Europeans, whether they live in urban or rural areas, in the periphery or in capital regions, and regardless of their age, have the digital skills they need to live, work,

[39] https://ec.europa.eu/commission/presscorner/detail/en/IP_18_4242

learn and thrive in the 21st century. Transforming education and training systems is a key part of the vision for a Europe fit for the digital age.

However, such transformation will not happen from one day to the next. It requires strategic and concerted action, as well as the pooling of resources, investment and political will to move ahead at EU and national level. Making the digital leap in education and training will be vital for people to achieve their potential without leaving anyone behind. It will also be vital for proving the effectiveness, relevance and legitimacy of education and training systems in preparing for – and shaping – the future.

The Commission invites the European Parliament and the Council to endorse this Digital Education Action Plan as the basis for cooperation and joint action to address the challenges and opportunities for education and training in the digital age.