

Advanced draft for the Forum



European Education and Training Expert Panel

Issue paper - Technological change and the future of work

Contents

1. Introduction	2
2. Key challenges and opportunities	3
2.1. Technology, changing needs in the labour market and skills development.....	3
2.2. Career engagement, co-careering and adult learning.....	4
2.3. The importance of VET for the future of work.....	5
3. Looking towards 2030: priority areas of action.....	6
3.1. Shifting education and training towards a new future	6
3.2. Encouraging adult learning by meeting individual learning needs	7
3.3. Re-examining education and training systems, including more flexibility and transparency and the promotion of VET	9
3.4. The role of non-traditional and non-formal education in skills development.....	9
4. Concluding remarks.....	11

1. Introduction

The strategic framework for European cooperation in education and training (ET 2020)¹ is based on common objectives and supports the improvement of the education and training systems of the European Union's Member States through common tools, mutual learning and the exchange of good practice via the open method of coordination. The value of this cooperation is widely recognised.

Since the adoption of ET 2020 in 2009, European societies and economies have been undergoing fast and extensive transformations that affect the way people live and work – and the way they learn. Consequently, there is a need to strengthen the relevance and impact of European cooperation by better understanding global trends and their implications for EU education and training policies.

As the current strategic framework comes to an end in 2020, the European Commission – Directorate-General for Education, Youth, Sport and Culture – is carrying out wide consultations as part of the preparations for its successor. The European Education and Training Expert Panel has been convened in order to make a strategic contribution by reflecting on the concept of 'embracing change', as well as discussing in what ways new trends are likely to influence education and training in the future, and how they could be addressed through European cooperation over the next decade.

The Panel – composed of 18 international experts² – was asked to focus on six thematic blocks, namely: demographic change; inclusion and citizenship; technological change and the future of work; digitalisation of society; environmental challenges; and investment, reform and governance. These were selected by the Commission from a pool of analyses of long-term strategic trends.

For each block, the Panel was invited to address the following scoping questions.

- Which are the major societal developments that will have an impact on how education and training are delivered in Europe in the medium to long term? How can European cooperation best respond to these challenges?
- What should be the strategic objectives of European cooperation in education and training for the next decade? Which should be the priority areas and themes?

The Panel carried out its work between October 2018 and January 2019.

This issue paper reflects the Panel's debates. It first illustrates the trends, challenges and opportunities for education and training that are associated with Technological change and the future of work over the coming decade. It suggests issues that could be addressed through European cooperation, and offers a number of concluding remarks.

The information and views set out in this issue paper are those of the Expert Panel members and do not necessarily reflect the official opinion of the European Commission.

¹ Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training ('ET 2020'), OJEC 2009/C 119/02 ([https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52009XG0528\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52009XG0528(01)&from=EN))

² The members of the Expert Panel were: Hermann J. Abs, Emmanuel Boudard, Etienne Denoël, Paul Downes, Malcolm Fisk, Silvija Karklina, Eva Klemenčič, Per Kornhall, Sandra Kučina Softić, Carla Morais, Rob Mudde, Serena Pastore, Andrius Plečkaitis, Anna Rabajczyk, Hanne Shapiro, Teresa Sordé-Martí, Gabriela Teodorescu and Raimo Vuorinen.

2. Key challenges and opportunities

In what is increasingly becoming a knowledge-intensive economy, individualised and tailor-made learning is needed for both young people and adults. This has an impact on the kinds of education and training that should be provided with a view to including a greater focus on creativity, entrepreneurship skills and other soft skills for the 21st century. It also impacts how education is delivered, for example using digital technologies, as well as educators. Technology is ushering in radical changes – such as automation or artificial intelligence (AI) in the world of work – and has the potential to transform education and training. Nonetheless, its potential remains largely untapped. A future-oriented approach is needed to prevent a mismatch between investment in education and training and the demand for new and evolving skills. The focus therefore needs to be placed on ensuring that individuals can steadily develop the right skills to remain employable and active citizens in the context of rapid technological and social change.

2.1. Technology, changing needs in the labour market and skills development

Technology is rapidly and continuously changing all aspects of today's society and will continue to do so in the near future. Both digitalisation and further technological advancement in, for example, automation, AI, robotics, virtual reality (VR), artificial reality (AR) and big data, will have a significant impact on our lives and will require the development of new skills, irrespective of our age. The discussions of the Expert Panel highlighted the overall opportunities presented by technology and the specific opportunities that technology such as digitalisation, robotics and AI can have for education and training. However, reaping the benefits of technology is conditional on a shift in learning as well fundamental adjustments to education and training systems in the EU.

One key aspect of this challenge centres on the need for education and training systems to identify, anticipate and teach skills that are suitable for future needs, rather than to catch up with technological change after it has happened. In this regard, the Expert Panel discussed the importance of knowledge and skills. Whereas some experts pointed to the need for a balance between the two, others stressed the need to eliminate this duality and focus on conceptual understanding. Nonetheless, all experts were convinced that there are at least some elements of knowledge that are fundamental to certain disciplines, that are not expected to change and that must be taught.

The influence of new technologies goes beyond information and communications technology (ICT) and will extend to all aspects of work, changing tasks and responsibilities or leading to the disappearance or creation of jobs. The acquisition of digital skills will remain important; it is anticipated that, in the coming 10 years, even those professions not directly related to ICT will require digital skills in order to increase efficiency. People will also need the skills and (basic) knowledge that enable them to work with new technologies such as AI, big data, machine learning and VR and AR systems. On top of this, continuous technological developments are accompanied by new issues surrounding ethics and morality. Responsible usage of technology must be addressed in education and training – something that accounts for all government regulations in general. All of this results in the need for modern and high-quality education and training that will enable future employees to acquire the skills needed in the 21st century, such as creativity, entrepreneurship skills and more general career management skills, all of which should be paired with an understanding of the responsible use of technology. In addition, some experts felt that basic skills need to be taught over a lifetime, as the content of such basic skills will evolve with technological and organisational change, making lifelong learning inevitable.

Another part of the challenge is the teaching of such skills in itself. Skills can be acquired in various ways, including learning-by-doing or conceptual building. On top of this, there is a general teacher shortage and many current teachers lack the knowledge and/or means to gain the necessary skills. This issue is made even more complex by the need to integrate skills teaching across disciplines and with the highly individualised needs of learners, for example with adults, who often combine learning with work and family life.

Another potential challenge could be significant skills shortages as a result of a decreasing working population combined with the growing demand for skills related to new technology and an insufficiency of teachers who are suitably qualified to teach these skills. With an increase in the retirement age and a growth in the relative proportion of people aged over 65, it is likely that some individuals will remain in the workforce for longer. This issue needs to be addressed by the education and training systems and governments across the Member States of the EU, who need to plan and budget for how to reduce these skills shortages while at the same time balancing it with the need for existing job profiles. Nevertheless, based on skills forecasts by the European Centre for the Development of Vocational Training (Cedefop), the greatest demand for new employment is being generated by the need to replace retiring workers in existing jobs. Mentoring systems could help to address changes in the workforce and contribute to keeping older people in the labour force for longer whilst improving ICT skills above the basic level should be a priority in any upskilling programme or module for adults.

In a constantly shifting world, individuals with comparatively low skills are particularly vulnerable. Consequently, there is a particular need to upskill these individuals and to devise ways to engage those at risk of discontinuing learning early in life – especially just after reaching the end of mandatory schooling – and those who have already done so. Here, there needs to be a focus on basic skills, on ‘learning to learn’ and cross-cultural issues. If people can reach a certain skill level, learning to learn – for example by self-directed learning – will become easier.

2.2. Career engagement, co-careering and adult learning

Technology can have a significant impact on the very concept of a ‘career’; careers are becoming increasingly multidirectional, for example, as individuals change jobs more frequently and learn new skills in response to technological developments. Education and training systems therefore need to be aware of the need to provide learners with new career management skills³ and forms of career engagement and co-careering⁴. Further support for adult learners could include, for example, peer-to-peer guidance, help with the use of social media for professional purposes, labour market platforms and community learning. Community learning is particularly valuable as it has been proven to have a positive effect on those with comparatively low levels of education and basic workplace skills (see also Section 2.1).

³ Career management skills (CMS) include: personal management (e.g. self-knowledge of one’s capacities and interests, social skills etc. and applying this knowledge to career planning and other life situations); learning management (e.g. understanding the relationship between oneself and learning opportunities, the requirements of learning pathways and their links to the labour market, and applying this understanding to career planning and other life situations); and career management (sourcing, evaluating and analysing information about occupations, sectors and labour market opportunities, relating this information to one’s self-knowledge and learning acquisitions, and applying it to career planning and other life situations).

⁴ Co-careering occurs when expertise is shared and meaningful co-construction on career issues takes place with and among community members (Kettunen, 2017, p. 41).

Education and training systems also need to play a greater role in terms of motivating and incentivising all individuals to keep updating their skills throughout their lives. Individuals and communities differ in their capacities to find information on learning and work opportunities, and to interpret that information, to make meaningful decisions and to implement those decisions over their lifetimes. Career education can act as a link between the school, community and working life, promote social justice, equity, equality and inclusion and preventing marginalisation in education and employment. It also encourages individuals of all ages to reflect on future options and is therefore a cost-effective measure in terms of preventing dropout and further social exclusion. The development of knowledge and skills through career education also helps to ensure the availability of a skilled labour force and to maintain a balance between the demand and supply of skills and competencies in the future. Career education at schools as well as guidance and counselling services are the main policy instruments that can help individuals to develop the career management skills mentioned above. Education and training systems therefore need to support the development of a framework that outlines the competencies a citizen needs to effectively manage their learning and work choices from a long-term perspective and that differentiates career management skills expectations and outcomes according to the developmental stage of the individual. The teaching and acquisition of career management skills can take place in formal education and training settings, either as specialised education programmes or as cross-curricular competencies.

2.3. The importance of VET for the future of work

Vocational education and training (VET) is crucial to teaching workers the necessary skills and will therefore have a significant impact on the future of work. VET is particularly well aligned to meeting the challenges of technological change and has a key role to play in terms of regulating skills matches, tackling skills mismatches and avoiding skills shortages. Sweden, for example, has a shortage of workers with certain skills and VET has played a vital role in providing people with the opportunity to acquire those skills. Meanwhile in Finland, the 2018 reform of vocational upper secondary education has placed a strong emphasis on involving labour market actors in VET. The reform promotes a demand-driven approach with competency-based modules, and validates non-formal and informal learning with the aim of achieving flexible study paths and longer work careers. However, for VET to be able to successfully avoid mismatches, good skills intelligence is needed. However, due to its continually changing nature, good skills intelligence is one the biggest challenges facing VET.

Overall, there is a great need for vocational training, but this can only be ensured at national level when there is a choice of alternatives to compulsory secondary education in Europe. There should also be an opportunity to switch between vocational and academic paths, if desired. Those who will need special labour market integration should also be included.

The digital revolution will change the job market dramatically. At the same time, trends such as moving to different kinds of energy sources and the development of a circular economy, for example in the built environment and the automotive sectors, also call for workers with a more practical skill set. A shortage of this type of worker is already being felt in many countries due to an 'upward pressure' on learners' level of education. VET will therefore play a crucial role in ensuring that the workforce has the digital and practical skills that are needed to make these economic transitions possible and sustainable.

3. Looking towards 2030: priority areas of action

The following key themes for future European cooperation over the coming decade emerged.

Shifting education and training towards a new future:

- In order to provide individuals with the right skills and competencies, the EU should support a shift in learning that will transform education and training, and foster cooperation between public and private education and training providers on the one hand and business on the other.
- The need to accommodate all learner groups may lead to a re-examination of the structure of education and training systems.

Encouraging adult learning by meeting individualised learning needs:

- Adult learning should be encouraged through flexibility and an individualised approach to learning.
- Learning should be modular so that it can be undertaken at any time and in any place, quickly and tailored to the needs of the individual.
- Self-directed and autonomous learning skills should be taught from an early age.

Re-examining education and training systems, including more flexibility and transparency and the promotion of VET:

- Education and training systems should become more flexible and transparent by promoting different pathways in education and training and positively addressing the status of VET.
- The ongoing work at EU and national level should ensure greater transparency in the case of standards, qualifications and frameworks across all educational pathways, including vocational, requalification, formal and non-formal, professional and academic.
- A vertically and horizontally coherent governance policy for adult education should be developed.

The role of non-traditional and non-formal education in skills development:

- Non-traditional and non-formal learning is becoming more important in today's changing world and can offer flexible options in skills development.
- Validation and quality assurance are key aspects of non-traditional and non-formal learning but this can be complex.

3.1. Shifting education and training towards a new future

The development of the appropriate level of skills and competencies is vital in helping the EU to meet the challenges posed by technological change, and the consequently changing demand for skills, in both the labour market and in society as a whole. However, it remains difficult to identify and anticipate which skills and knowledge are needed in the (near) future and therefore to prevent potential mismatches or the undersupply of skills, even if this is done in close cooperation with business. These efforts therefore need to be strengthened by a shift in education and training which should be supported by a new cooperation framework. This should include the development of guidelines on the use of new technologies in programme design, the delivery of teaching, the monitoring of learning and the assessment and certification of learning outcomes. Meeting this challenge will require the involvement of a range of actors, as well as the development of initiatives specifically designed to include and support all individuals in their acquisition and maintenance of relevant and useful skills. Moreover, the new

framework should also aim to foster cooperation among public and private education and training providers, together with business.

This framework should support a holistic approach to education and training. It should also be based on monitoring (with appropriate use of key performance indicators and benchmarks) while keeping in mind that each education and training system has a different starting point. The focus of developments should be on adult education; in basic education up until the age of 18 children should devote themselves to learning and not solely focus on skills development, as a child's development goes beyond the acquisition of skills. Nevertheless, some primary and secondary school teachers will need to be upskilled in order to bring new technology to life in their classes and inspire children to step into the digital world. 'Making and doing' with new technology should be part of the school education curriculum. Equally, efforts to introduce tracking systems should continue and should also support individuals who have left school so that they can be involved in adult education and start work with the support of mentors or teachers.

The requirement to accommodate all learner groups may lead to a re-examination of the structure of education and training systems, including their funding structure and who contributes to the costs of education, as well as the roles that public and private education and training providers play in designing and teaching the material (given that providers of technical infrastructures also tend to be the best placed to provide the training). A possible restructuring of education and training systems is closely linked to the need for greater transparency, which is discussed in more detail in section 3.3.

3.2. Encouraging adult learning by meeting individual learning needs

EU education and training systems need to make adjustments in order to empower individuals to take control of their learning and training needs over their lifetime and to engage in self-directed learning. This is particularly important in the case of adult learners, given the expectation for individuals to update their skills throughout their lifetime.

Rapid technological changes continuously affect the skills and knowledge needed not only for today's labour market, but also for society in general. The breadth and amount of information currently available has made it necessary to filter information, as human memory has limitations. It is important, therefore, to consider how to carry out such filtering. Further, some skills and knowledge learned at school will need to develop and adapt to new environments, workplaces and circumstances. Learning should therefore be modular so that it can be undertaken at any time and in any place, quickly and tailored to the needs of individual. This will ultimately lead to self-regulated learning, in which individuals control their learning environment and monitor, direct and regulate activities towards the goals of information acquisition, the expansion of expertise and self-improvement.

Self-directed or autonomous learning by adults is a precondition for effective learning. In order to be successful as an autonomous learner, individuals need to possess the right learning skills, both to be able to learn independently and to cooperate with others. Self-directed learning also requires a solid knowledge base, acquired during younger years. Primary and secondary education should therefore strive to provide children with the ability to become self-directed learners. Autonomous learning can also be supported by teachers. Indeed, the role of teachers in the development of the support system for autonomous adult learning – comprising resources, learning to learn skills development and ICT tools and resources – needs to be enhanced.

One of the main challenges to adult learning, however, is a lack of motivation due to time constraints or lack of means. Perhaps by changing the perception of learning from a constraint to 'formal leisure',

undertaken for enjoyment outside of work, could encourage more adults to learn. More practical ways to encourage and support adult learning could be the promotion of greater flexibility in educational pathways, innovative co-financing mechanisms, non-financial incentives or providing career (co-careering) and educational guidance. Individuals could also be encouraged to keep an individual log or portfolio of training undertaken. All of this should be part of a wider genuine, progressive and integrated lifelong learning strategy.

At European level, continued funding could be targeted at stimulating cooperation on adult learning. A European network of adult learning material, open to all EU citizens, could also be developed and promoted. This network could also use a uniform 'badging' system, which would make it possible for learners to show their progress in such a way that it would be recognisable throughout Europe. Overall, resources developed by the EU – such as the European Lifelong Guidance Policy Network (ELGPN)⁵ – could serve as a basis for employers and individuals in their journey towards adult learning, and could be further developed to address new challenges.

Lifelong guidance provision for adults has strong added value for workers, employers and policymakers. It helps employees to maintain their employability as well as to gain better qualifications through relevant training courses and through the validation of their learning experience. It also assists the progression and development of employees, both at work and on a personal level. Lifelong guidance means that employers have better skilled and competent staff. In the workplace overall, it supports individual and enterprise decision-making on training and upskilling pathways in order to adapt to changes in technology and the business environment. Lifelong guidance also helps individuals to move and to manage the transitions from one job to another.

It is generally accepted that tailored learning can be achieved by widening access to information, advice and guidance as a continuum within educational structures. The Estonian EU Presidency Conclusions on Lifelong Guidance 2017⁶ noted that the reality of establishing and maintaining lifelong guidance provision with universal access for citizens is very challenging for national administrations. This is due to the diversity of settings for such provision across education, training, employment and the community sectors. Widening access to such services for all citizens also requires policy coherence, partnerships, careers and the professionalization and integration of services. Thus, lifelong guidance needs to be repositioned across the policy fields at national and EU levels, in particular taking into account the future of work and in preparing citizens for scenarios of employment, underemployment or no employment in a segmented labour market.

In the light of lifelong learning, thought should be given to developing a coherent pathway for progression from an elementary level of professional skills to a higher-education level in specified fields. In such a pathway, validation would take place after the completion of every achievement level, while skills and knowledge would be gained in the workplace and at non-formal courses at both public and private entities. A comparative table could be developed, showing how long it takes an adult to accomplish or achieve the skill-levels and to be considered for validation in EU Member States. Another idea could be to expand the EU's Upskilling Pathways, which is a methodological guide on how to involve adults in learning⁷. In its current form, Upskilling Pathways aim to help adults obtain a minimum level of literacy, numeracy and digital skills, but also to gain a broader set of skills to progress towards a diploma in upper secondary education or an equivalent. By the inclusion of the concept of lifelong

⁵ <http://www.elgpn.eu/>

⁶ http://www.cedefop.europa.eu/files/7th_european_conference_on_lifelong_policies_communique_tallinn_27-28_sept_2017_final_endorsed.pdf

⁷ <https://ec.europa.eu/social/main.jsp?catId=1224>

learning, Upskilling Pathways could serve as a ladder (or a 'tree' or 'road system') that encourages all learners to build and expand their knowledge.

3.3. Re-examining education and training systems, including more flexibility and transparency and the promotion of VET

The requirement to accommodate all learner groups will also have an effect on transparency in terms of educational structures, especially in the light of the variety of education and training systems across the EU.

The new EU cooperation framework for education and training should support greater transparency, both in the governance and funding of education and training. Greater transparency should also be promoted across educational pathways in order to encourage qualified individuals to pursue their education by moving across or between such pathways. More specifically, the ongoing work at the EU and national levels should continue to ensure greater transparency in the case of standards, qualifications and frameworks across all educational pathways, including vocational, professional and academic, requalification, formal and non-formal. Linked to this greater flexibility between educational pathways should be the promotion of the status of VET among students, families and society should be promoted. As part of this, VET should be supported in its adjustment to technological changes.

Another challenge that must be urgently met is policy coherence in adult education. A governance model should be developed in which vertical coherence reflects the different levels of authority involved in adult education, starting from national adult education policy guidelines (where funding resources and quality standards are provided) and ending with the adult education providers in the most diverse forms of educational delivery (formal and non-formal or work-based). Coherence is also needed on the horizontal level. At this level, the coordination between different ministries is extremely important, as well as between different adult education providers, particularly where a range of VET schools, higher education and adult education non-formal providers are present. Providers' activities need to be coordinated in order to ensure that adult education is effective and that all adults are included on their path towards higher skills and improved knowledge. This is, however, difficult when there are so many stakeholders involved and is only possible when the routes and funding pathways are known, in other words, when there is transparency in the governance, funding and pathways of adult learning and education and training in general.

3.4. The role of non-traditional and non-formal education in skills development

An important way to address skills development is to encourage individuals to develop their skills outside of formal education. Formal education could in this way be enhanced in a number of ways, including the development of apprenticeship schemes that also includes adults. For example, this could cover adults with comparatively low levels of skill or who have not completed their education, or those who need to enhance their skills due to changing demand. Upskilling measures should start with the identification of current skills and competencies, so that people can identify the areas in which they need to enhance their skills.

Non-traditional and non-formal learning can offer flexible options in skills development. Additional skills, knowledge and experience acquired through informal learning can contribute to improving personal development and positive self-image. This can also help to raise the level of competencies required both in the workplace and in life more broadly. Informal learning takes place outside the institutional

context and, unlike formal learning, it is not organised or structured in terms of objectives, times or learning support. Individuals are increasingly embarking on such programmes because they are more accessible and affordable, maybe even being free. They are also more focused on the individual's needs, enabling people to acquire skills that are specifically in demand. Such programmes are also often flexible in relation to time and place, and can be conducted online, which makes it easier to reach a large number of participants.

Formal recognition of competencies acquired through non-formal learning includes the validation of learning outcomes and the certification of the results of the assessments by issuing certificates or digital badges. Informal education has a very wide group of potential students, from schoolchildren and young people, to employees, older workers, low-skilled workers and unemployed people and those with a migrant background. These programmes and modules, which are often relatively short, enable rapid acquisition of specific knowledge and skills and are available globally via the internet. However, the role of validation in the case of non-formal or workplace learning cannot be overestimated. Nevertheless, regular validation of an adult's achievement in skills acquisition when working or learning non-formally can act as a stimulus for adults. Non-formal education is often a means of enabling adults to get back onto learning pathways as the diverse methods involved make it more attractive and easier for adults to accomplish. Programmes can be made attractive and valuable by being split into smaller segments that satisfy the immediate needs of an adult learner.

Given the multitude of potential sources of programmes and courses, another issue concerning non-formal education is quality assurance. One way of ensuring good quality could be to develop a network of non-formal adult education providers in order to ensure transparency and reliability. The local municipality in which courses are offered could gather and publish relevant information. There is also an overarching need for governance models to establish transparency and a safe space for all adult learners. Equally, opening up education and developing open educational resources (OERs) could enable growth in quality and hence the reputation, distinctiveness and competitiveness of individuals and institutions that develop the contents of these resources. In addition, OERs enable existing educational programmes and processes to be improved, as well as the creation of new educational programmes and systems.

4. Concluding remarks

It is clear that a number of significant changes are acting as pressure points and are having an impact on the future world of work. These include the ageing population and the emergence of new technologies that drive new business models. This has, and will continue to have, a huge impact on the demand for skills.

These changes require policy action from the EU, which should centre on supporting adult learning and VET in order to encourage a culture of upskilling throughout the course of an individual's life. Further, encouraging lifelong education and training systems to become more flexible in order to be better able to adjust to technological change is key, as is the identification of the skills and knowledge needed for the future.

Other key areas to consider in the coming decade relate to how to foster greater creativity and entrepreneurial spirit among learning providers and learners themselves, and how to ensure that education and training providers, businesses, unions and other actors all work together to address the challenges posed by a continuously changing labour market. These actors are all part of an ecosystem in terms of the development of education, and they therefore need to be included as part of the process in order to raise engagement levels, particularly among employers, as part of an exchange of best practice.

There is a shift not only in education and training, but also in the labour market. It might be possible to enable education and training systems to anticipate the effects of these changes if there is collaboration with those working in the fields where the change is taking place. It should also be remembered that it is important for children to be educated in a largely traditional manner, while being prepared for a life of continuous learning. At present, lifelong learning is difficult for many; it is a skill that must be learned at a young age if it is to be successfully used in later stages of life.

