European Parliament

Rethinking education in the digital age

The digital transformation is already changing the European economy and European society. New technical and 'soft' skills are gaining in importance both in the labour market and as a means for fully participating in society. As a result, traditional roles, content and methods of education are being challenged – education today needs to prepare students for changing tasks and roles both in the labour market and as European citizens. The study 'Rethinking education in the digital age' analyses the current state of play of education in the digital age across Europe, and anticipates trends and emerging issues. It summarises current strengths and weaknesses, lays out upcoming opportunities and threats, and derives policy options for European policy-makers.

Current state and future of education in the digital age

Education in the digital age includes but is not restricted to digital education, encompassing the transmission of technical, 'soft' and citizenship skills, and refers to both formal and non-formal education throughout the European citizens' entire lifetimes. In order to elucidate multiple perspectives, the study is structured among four stakeholder groups: policy-makers, students, educators and trainers, and employers and employees.

Transnational, national and sub-national **policy-makers** have produced a large body of policy work on digital education and education in the digital age. For approximately the last two decades, policy work has often focused on 'soft' factors such as teacher training and student competence-building, as well as content development. From around 2015, policy approaches have often included 'iterative' and 'organic' approaches, i.e. small-scale experiments that can, if successful, be upscaled and mainstreamed. In terms of providing digital infrastructure, digital equipment in schools is generally at a good level across the European Union. However, large disparities between regions and countries persist. Recent trends in digital education are the provision of platform and cloud solutions for schools, as well as the increasing integration of open educational resources and massive open online courses into everyday school teaching.

Students in Europe have generally high digital skills, although differences persist, specifically according to educational background and country. Gender differences in skills are negligible among today's student generation, but girls remain by far less likely to turn their digital competences into a career. In the future, soft and citizenship skills such as computational thinking and entrepreneurship skills should be more strongly transmitted by European schools, and career guidance will play an increasingly important role.

Educators and trainers in Europe today frequently use digital tools. However, digital applications are often not sufficiently adapted in pedagogically meaningful ways. Furthermore, the vast majority of teachers do not or only sporadically participate in professional development focused on digital education. Teachers, moreover, often lack training and a supportive framework (including school curricula) for focusing their teaching more strongly on the soft and citizenship skills urgently needed in the digital age. At the same time, new teaching technologies could offer opportunities for personalising learning contexts, thereby improving student motivation and retention. When introducing corresponding teaching technologies, however, issues such as algorithmic discrimination and data protection will need to be discussed and solutions for them implemented.

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Employers and employees increasingly operate in contexts of high work flexibility and a decreasing demand for mid-level qualifications. This influences education in the sense that today's students need to be prepared for more flexible forms of work, a possibly more flexible labour market and more mobile and dynamic work biographies. At the same time, the existing workforce will have to undergo extensive upskilling and reskilling, increasing the relevance of lifelong learning and informal and non-formal education.

Policy options

In the field of education, most competences lie with the Member States, and the implementation of change therefore considerably depends on national and sub-national players within the system, from governments and public administration down to schools and teachers. The most appropriate option for the European Parliament therefore is to promote policy that actively supports stakeholders and competent authorities in their efforts and that consolidates individual projects and initiatives. In this spirit, we present below **the most pertinent policy options** resulting from our study 'Rethinking education in the digital age'.

Option 1 – Incorporating education in the digital age into existing and future research frameworks to further promote evidence-based policy

Digital technologies, from hardware such as computers, tablets and smartphones, to teaching and learning software, are increasingly entering the education sector. The advantages are clearly discernible, but disadvantages and uncertainties are also repeatedly discussed. Scientific efforts need to be accelerated to resolve the insecurities surrounding the use of digital technologies in education and to identify the drivers and challenges for pedagogically valuable digital teaching and learning. Policy decisions should build on the resulting scientific evidence.

Several studies (PISA, ICILS, PIAAC) already incorporate the analysis of digital competences present in the population and among students. In addition to diagnosing the outcomes, new processes of teaching and learning should be examined more extensively. The suggested research should cover the following topics:

- Teaching methods for the digital age, including the question of which type of exposure to digital media is meaningful and pedagogically fruitful at which age and under what circumstances.

- Impact and useful applications of artificial intelligence in education, including personalised learning content, protection against algorithmic discrimination and data protection issues.

- Applied research to guarantee the scientific foundations of teaching software.

- Acceptance research on how teachers can be encouraged to adjust teaching methods to the requirements of the digital age.

The study in annex recommends expanding the current fairly sporadic funding for technologies for learning implemented in Horizon 2020, the EU funding programme for research and innovation. Similar to the efforts under the European Social Fund (ESF) to improve education and training in general, research should be intensified specifically on educational technologies. A particular focus should be placed on applied research, the transfer of results from academia to teacher training and schools, and the development and communication of good practice projects.

To ensure that future education in the digital age can build on scientific evidence and the latest scientific standards, results from publicly funded research should be made publicly available to all stakeholders concerned, fostering knowledge transfer from research to both practitioners and policy-makers. A means to support this knowledge transfer could be a knowledge-sharing platform for education in the digital age, as presented in the following option.

Option 2 – Supporting the creation of a knowledge-sharing platform for education in the digital age

Numerous stakeholders and a multitude of initiatives across Europe have so far dealt with the challenges of, and developed solutions for, education in the digital age. However, the vast knowledge gathered by the respective national and sub-national stakeholders is not to date accessible in one place.

A way to make existing expertise, experiences and success stories accessible to all relevant stakeholders would be the establishment of a platform for transnational, long-term coordination and dialogue on education in the digital age. Creating such a knowledge-sharing platform could greatly improve the dissemination and adaption of successful models across Europe.

The European Commission's Smart Specialisation Platform could serve as a model. This comprehensive platform incorporates several functions in one central location and was conceived within the European Commission's cohesion policy (operative from 2011). The platform follows a bottom-up approach, where countries and other stakeholders contribute their visions, demands and projects, and approach and solve them jointly. The platform assists EU countries in implementing their Research and Innovation Strategies for Smart Specialisation (RIS3), i.e. in identifying and exploiting their respective strengths and diminishing their weaknesses to accomplish long-term innovation and growth.

Following the example of the Smart Specialisation Platform, the proposed knowledge-sharing platform for education in the digital age could:

- provide information, methodologies, data, expertise, good practice examples and advice and guidance;

- align the resources and strategies of different stakeholders;

- promote a collaborative environment with mutual learning, transnational cooperation and innovation partnerships;

- incorporate helpful tools, such as wikis, scoreboards, maps, catalogues, visualisations, and communities.

Option 3 – Simplifying and harmonising the recognition and validation of lifelong learning

Digital technologies foster new opportunities for lifelong learning that go well beyond the traditional education system. While several systems and frameworks for approving achievements from lifelong learning are already established at the European level, existing systems and frameworks could go further in terms of transparency, visibility and reputation. In consequence, lifelong learning still tends to be underappreciated, underestimated and insufficiently validated despite its tremendous significance in times of major economic change initiated by the digital transformation.

The study recommends promoting the coordination of existing structures into a single system comprising a simplified and harmonised certification process aligned with all major stakeholders in the education sector, including new digital learning providers and public administration in the Member States. The harmonisation of secondary education resulting from the Bologna Process could serve as an example.

By harmonising and simplifying its recognition, both the value and quality of non-formal education could be increased, the reskilling and upskilling urgently necessary in the digital age could be accelerated and workers' skills and the labour market's necessities could be better and faster matched.

Option 4 – Offering a harmonised, yet versatile cloud solution for the provision of high-quality (open) educational resources

An important objective of education in the digital era is to incorporate already developed and available technologies for learning and teaching into everyday school life. Despite regular use in private leisure time, many teachers shy away from using digital learning resources in the classroom. To solve this issue, educators need to have easier access to supporting and complementary learning materials and methods. Likewise, suitably selected content, in the form of wikis, learning videos, learning games, tasks and tests are beneficial for students to learn independently, to fill knowledge gaps and to pursue individual interests.

The concept of open education is already being explored by some regions, universities and networks across the EU. However, these initiatives cooperate with a variety IT providers and partners (e.g. textbook publishers), resulting in an opacity of standards and a lack of interoperability.

One way to support educators and students in integrating digital technologies into the learning process would be to reduce opacity by supporting harmonised, yet versatile standards and interoperability. An initiative for open science organised by the European Commission, the European Open Science Cloud (EOSC), is expected to become operational in 2020 and could serve as a model. The EU could contribute by providing the necessary cloud infrastructure in compliance with European data protection, copyright laws and values, guaranteeing standards, interoperability, user-friendly operation and independence from commercial profit-oriented producers.

In conclusion, rethinking education in the digital age should become a central matter for today's policy-makers for two main reasons. First, only education can form a skilled workforce that is prepared for future jobs and a changing labour market. Rethinking education in the digital age therefore constitutes a prerequisite for Europe's future global competitiveness. Second, only education can provide the preconditions for social inclusion and equal participation for European citizens in a digitalised democracy. Rethinking education in the digital age therefore matters for safeguarding European values such as equality, democracy and the rule of law. The study in annex offers ways forward for EU policy-makers to contribute to these important goals.

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