

THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGIES ON EDUCATION AND TRAINING

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Abstract

ICT will change what, how, where and when people learn. Due to the widespread of technology and its power to facilitate highly dynamic, adaptable and engaging virtual learning environments, personalized lifelong learning opportunities will become feasible. ICT will support lifelong learning opportunities that smoothly integrate into people's lives and allow them to adapt their training objectives, schedule and pace to individual needs and preferences.

Keywords: *information and communication technologies (ICT), e-learning, education.*

Nothing changed so much the face of our society, the interactions between individuals and groups as the technology and especially Information and Communication Technologies. Learning and training is one of the primary beneficiaries of the tremendous evolution.

According to the European Internet Foundation, the key to adequately preparing learners for life in a digital world is to "redesign education itself around participative, digitally enabled collaboration within and beyond the individual educational institution".¹³ They predict that by 2025 this will have become the dominant worldwide educational paradigm.

In a similar manner, a study commissioned by the MacArthur Foundation envisages that, in the future, learning in E&T institutions will be based on the principles of:

- self-learning,
- networked learning,
- connectivity and
- interactivity.

Pedagogy will use inductive and de-centered methods for knowledge generation and open source education will prevail. Collins and Halverson envisage that, "with the advent and increasing impact of technologies, a new era of education, the lifelong learning era, will begin, which will differ substantially from the current

"schooling era" and will to a certain extent reflect a return to the pre-industrial "apprenticeship era". In the lifelong learning era, learning will take place across a number of different "venues" and will involve mixed/age groups in different constellations. On the whole, flexibility and diversity will increase."³ The authors argument that our society should reconceptualize the processes by which educators support student learning and motivation, in light of current research on these core components of education and the widespread availability of sophisticated interactive media. Rethinking what is important to learn, what careers students are prepared to assume, and how pre-college students transition from learning to work is also central, given the global shifts from industrial to knowledge workplaces and the evolution of lifestyles infused with technological resources. Another key aspect is that accomplishing the changes above requires new forms of educational leadership and organizational structures, including novel ways of coordinating learning in and out of school, as well as altering the role of government in education.

"The DELPHI study, conducted by the Learnovation project identifies technological progress and social networking on line, as the two most important factors for changing the way in which people learn, followed by cuts in public funding for education, globalization and multiculturalism. Thus the vision developed by the Learnovation project for 2025 is characterized by technology-enabled lifelong learning opportunities: "Being a lifelong learner becomes a condition of life. Technologies due to their massive and common use in everyday life, acquire an emancipating power on people's

opportunity and ability to learn, favoring a spontaneous tendency towards metacognition and ownership of their learning process.”⁴

A common thread associated with studies on the future of E&T is the emergence of lifelong learning as the new central learning paradigm. Lifelong learning is seen as an important ingredient for Europe’s response to demographic change, globalization and increased labor market dynamics.

Several emerging technologies, in particular open source technologies, cloud computing and mobile technology will enable a seamless education continuum that is centered on the student, not on the institutions. Thus, “education institutions will cease to be exclusive agents of coordination, service provision, quality assurance, performance assessment, or support. They will need to re-create themselves as resilient systems with flexible, open and adaptive infrastructures, which engage all citizens and re-connect with society; school will become dynamic, community-wide systems and networks that have the capacity to renew themselves in the context of change. As a consequence, the responsibility for the provision of individual education will increasingly move from the state to the individual and family groups. While state involvement in early years’ educational provision will remain central, the influence of the private sector on curriculum and policy will continue to grow.”³

The digital economy of the present and future requires a flexible and skilled workforce, with the capacity to adapt to the continual change of technology. This flexibility will need to be developed and nurtured. Generic and transversal skills – sometimes labeled soft skills – such as:

- problem solving,
- communication in different media,
- team working and ICT skills,
- management and leadership, multicultural openness, adaptability,
- innovation and creativity and
- learning-to-learn

are increasingly valued in modern economies and labor markets.

In particular at the post-secondary and professional learning level, people will need to

develop skills that facilitate going back and forth between learning and work.

We must take into consideration the impact of Information and Communication Technologies (ICT) on future learning strategies and trajectories. This impact cannot be foreseen but we can suppose it will be tremendous, ICT will become a major tool for landscaping future learning. Let us consider the evolution of ICT and the way it shaped our general life. “Moore’s law describes a long-term trend in the history of computing hardware: the number of transistors that can be placed inexpensively on an integrated circuit doubles approximately every two years. We have more computing power in a geometrical progression, at the same price. But the impact on life is exponential. When we see four year children who have better capacities on IT than a grandparent, or even a parent who have to acquire new skills to compete and adapt to challenges of communication we can have a glimpse of what can be next.”⁸

ICT become one of the major driving forces for socio-economic change. On the technological side, trends towards high-quality, converging, mobile and accessible technologies, together with more sophisticated, user-friendly, adaptable and safe applications and services will integrate technology more and more into everyday life. Eventually, more advanced technologies, such as ambient technologies, immersive 3D environments and powerful AI, may become a reality. As a consequence, technology will be more smoothly integrated into our daily lives and become a basic commodity, and a must.

“The emergence of all this new technologies and solutions, more integrated, adapted, will require new skills. As a consequence of changed communication and interaction patterns, interpersonal skills, such as communication, collaboration, negotiation and networking, will become more important. At the same time, the abundance and the flow of information will require individuals to improve their meta-cognitive skills, reflection, critical thinking, problem-solving, managing and organizing.”⁷

However ICT not only affects what people need to learn, but also how will they learn. Due to the ubiquity of technology and its power to

facilitate highly dynamic, adaptable and engaging virtual learning environments, personalized lifelong learning opportunities will become feasible. According to experts, in the future, a vast variety of learning modules, courses and packages will become viable to offer training opportunities for all learning and training needs, in all life stages and for all qualification levels. "One of the key issues in E-learning is lack of adaptation to the individual learning pace and progress."⁵ This problem will eventually be overcome by adapting different formats and combinations, including programs which will match to individual needs of learning styles, specific learning objectives, needs and preferences. Another aspect, the partial absence of peer support and collaboration, will be resolved by online groups which will leverage individual progress.

All the factors involved agree that basic digital skills and open access need to be fostered. "Policy makers need to ensure that all citizens will be able to benefit from the opportunities offered and that more vulnerable groups are equipped with the necessary skills to participate in learning activities that are more and more technology-based. Guidance is needed for educators, learners and parents alike on how to best use technology."²

The implications for the school curriculum and instructional practice could be profound:

- a new definition of human intelligence,
- more sophisticated methods of assessment,
- decentralization of teaching into workplace settings, a greater emphasis on collaborative learning,
- a curricular shift from presenting data to evaluating and synthesizing ideas,
- a focus on solving real-world problems using concepts and skills from multiple subject areas.

The most important barriers to this evolution will not be technical or economic but conceptual and organizational and unless controlled the

outcome of this changes may be undesirable. We must begin shaping the use of these emerging tools now if we are to have a bright educational future.

Learning is the issue; e is simply a mechanism.

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