



BANCA D'ITALIA
EUROSISTEMA

Education in the digital world

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Centesimus Annus Pro Pontifice Foundation – Seventh Consultation Meeting
“Ethos, Education and Training:
Avenues toward equality and ethical behaviours in the digital era”

Catholic University of the Sacred Heart
Milan, 31st January 2020

Let me first thank the Centesimus Annus Pro Pontifice Foundation for organising this meeting and its President, my former colleague Anna Maria Tarantola, for her kind invitation. In this talk, I will first describe the main changes that are taking place in the global economy, focusing on their consequences for employment and work opportunities. I will then discuss the role of education in responding to these changes.

Over the past 30 years, the world has undergone a radical transformation driven by two main phenomena. The first is technological progress, with the innovations developed in the information and communications sector in the 1990s and, more recently, with the so-called digital revolution. The second is that this process has taken place in the context of a progressive globalisation, i.e. the liberalisation of international trade in goods, services and financial capital, which is being accompanied by strong growth in the cross-country movements of information, ideas and people.

These phenomena are having widespread profound effects, right down to our everyday lives:

- the introduction of the internet in the early nineties has permanently changed interpersonal communications and is now shaping how consumption and production take place. The rapid development of mobile telephony has favoured its diffusion: while in 1990 there were only two subscriptions per one thousand people around the globe, there is now more than one subscription per head. The share of the global population using the internet has then grown over the last 20 years, from a mere 7 per cent to over 50 per cent, with many countries, and not only the most advanced, well above 90 per cent;

- as a result, the digital economy is among the fastest growing sectors. In the European Union it produces about 7 per cent of total value added. The sharp rise in the shares of firms who make a significant part of their revenue by selling online, of those who purchase cloud-computing services and of employees with business access to the internet suggests that in the future this sector will continue to increase rapidly;
- the integration of markets and the international fragmentation of production have given rise to so-called global value chains: for many consumer goods, each single component is sourced from the countries where it is produced most efficiently. This has allowed costs to be cut, making the products accessible to a wider range of consumers.

These transformations promise great welfare opportunities, but they also pose major challenges at both the economic and the social level. An important source of concern is their impact on the labour market and on the skills required by the production system.

New technologies have already started to replace many manual and, especially, routine jobs, cutting costs while possibly creating temporary strains on employment. Data-processing and information-intensive tasks, in which human contribution once appeared to be indispensable, are also increasingly being automated. Recent examples include the introduction of customised on-line language courses based on machine learning techniques, the “internet bots” hired by a growing number of firms to handle the initial stages of customer services, the new possibilities opened up by the latest generation of virtual personal assistants.

The combination of globalisation and technological progress has also provided all companies, and not just multinationals, with a new potential pool of human capital from around the globe, such as low cost manufacturing workers from China, software and customer service professionals from India, or skilled workers from Eastern Europe. This may have contributed to generating additional tension in advanced economies, which have seen a significant portion of their key industries relocate to other geographic regions.

The burden of these changes is borne unevenly across countries and social groups. In advanced economies, it has generated fears of a revival of the phenomenon that 90 years ago John Maynard Keynes called “technological unemployment”. The experience of countries such as the United States, Japan and Germany, which are at the frontier of technological development and where unemployment rates are close to historical minimum levels, suggests that, as Keynes himself concluded in 1930, technological unemployment may well only be a temporary adjustment phase. Policy-makers, however, cannot ignore the costs of this transition, and every effort should be made to minimise the difficulties for those who are affected the most.

Longer-lasting implications may emerge for labour market participation (which is declining among prime-age males in many countries), the quality of occupations and wage inequality. Over the last few years, in fact, the structure of job opportunities has sharply polarised in many advanced countries, including Italy, with expanding demand in both high-wage and low-wage occupations, but diminishing opportunities

in middle-wage jobs. More specifically, employment has increased in many managerial, highly professional and technical roles on one hand, and, on the other hand, in occupations such as low-education food service jobs, home aides, security services. Job opportunities have instead fallen in “white-collar” administrative and sales occupations and in middle-skill “blue-collar” production, craft, and repairs. This decline is detrimental to the earnings and the participation rates of the middle-class, affecting, in particular, workers without a tertiary education.

New technologies are also having a multifaceted impact on labour intensity (as measured by the average number of hours worked per worker). Bear in mind that, in advanced countries, an important secular trend had been the decline in the average hours worked per worker, which moved in tandem with increases in productivity and wages. In recent decades, however, these trends seem to have changed. Labour intensity, in particular, has shown a “bifurcation”. On one hand, a substantial portion of the global labour force now works very long hours (more than 48 hours per week). On the other hand, there has been a growth of (often involuntary) short-hour and part-time contracts, with the most famous example probably being the so-called “mini jobs” in Germany.

Although more research is needed to fully understand the causes of both phenomena, technology seems to have contributed to amplifying them. For those who work more, for example, business smartphones and other digital devices may have blurred the boundaries between work and private life, further increasing the number of hours worked. On the other hand, the so-called “gig economy jobs” (micro tasks, crowdworking, manual services) have fuelled “time-related underemployment”, a form of labour underutilisation affecting those who would be willing to increase their working hours but are unable to do so.

Which policies should be designed and implemented to contain the economic and social costs due to higher automation and digitalisation? My view is that the most important response should be to prioritise investment in education: investment that must be inclusive because, as recently argued by Pope Francis, “every change calls for an educational process that involves everyone”.

In Italy, for example, the challenge of raising human capital is especially important. Data show that, compared to other advanced countries, Italians spend less time in education, they learn less and, once they are in the workplace, participate in less professional training. As the labour market participation is also low, this brings the share of young people who are referred to as “NEET” (Not in Education, Employment, or Training) to well above the European average.

But public investment in education does not mean simply providing more financial resources to schools and universities. Quality spending is needed to improve these infrastructures, because we need schools that are not only endowed with up-to-date ICT tools, but are also sufficiently attractive and comfortable: students should be able to enjoy and fully benefit from their time in attending them. In addition, a far-reaching reflection is needed on both what is taught in schools and on how it is taught.

With regard to the content of education, many observers place a greater emphasis on “creative” subjects. It is now widely recognised that a modern school curriculum should integrate science, technology, engineering and mathematics (known with the traditional acronym STEM) with the arts (STEAM) as well as reading and writing (STREAM). In fact, when most routine and data-driven tasks are automated, human contribution will be concentrated in those creative tasks aimed at developing new goods and services or at customising or differentiating existing ones. These tasks require us to understand and anticipate consumer needs and behaviours, to improve the design of new products and to analyse their integration into every-day life.

Importance should also be given to financial education, including its digital facets. New technologies in the financial industry are introducing novel products, services and providers. But the growing digitalisation of financial decisions is not always accompanied by an increase in financial literacy levels, even among the younger population. For instance, for Italy, our survey – conducted within the Group of Twenty (G20) using a methodology developed by the OECD – shows a very low level of financial literacy with respect to the G20 average, especially among the least educated respondents, the elderly and women; only about 30 per cent of all the respondents showed sufficient financial knowledge, versus a still low 48 per cent, on average, for the G20. Enhancing financial education, as well as familiarity with digital tools, is needed to raise awareness in the use of digital financial services and help protect customers from digital crimes, such as phishing scams, account hacking and data theft.

It is also worth remembering that new technologies are leading to a growing digital footprint of consumers and entrepreneurs. Not only financial service providers but also online retailers, social network platforms, and other internet service providers gather vast amounts of personal information. These data are often used as input for algorithms that profile customers and can draw behavioural predictions. Profiling permits the personalisation of services, but it can also lead to unfair discrimination; in the United States, for example, some cases have emerged of discrimination based on ethnicity and gender.

In the broader context of data protection legislation, the European Union has built safeguards against algorithmic bias, which include the right to refuse to be “subject to a decision based solely on automated processing, including profiling”. In the financial sector, this norm applies to decisions on credit and insurance. Financial education would further help to make people aware of the implications of their digital activity, of the use made of their data, and of their rights.

An appropriate education would also contribute to limiting the “digital divide”, that is the lack of opportunities available to people without access to the internet. As the diffusion of digital devices is becoming more global and their complexity grows, access to opportunities will depend not simply on having the information and communication tools, but also on having the skills needed to use them.

Expanding the content of education alone is, however, not sufficient. As Tullio De Mauro, the great Italian professor of linguistics and former Minister of Education,

pointed out some years ago, in many countries school life has been governed by three principles: “first, silent listening in class to the lesson of the teacher who explains, between the chair and the blackboard, what is already written in the book; second, studying the book at home, with exercises; third, back to class with questions to verify the studying of the book”.

This traditional method where knowledge is passively imparted from teachers to students is no longer enough. History, arts, literature, languages, mathematics, science, economics will have to be taught in a dynamic context with sufficient room to stimulate creativity, intellectual curiosity, discussion and negotiation with other students, the ability to cooperate, enhance respect for others and foster ethical behaviour. Digitalisation should not become a prison: it is necessary to learn about it, but we also have to be able to debate its merits and be prepared for the tools that will be used in the future. As Malala Yousafzai, the Pakistani activist for the right to education and the youngest ever Nobel Prize laureate, reminded us in 2013: “one child, one teacher, one book, one pen can change the world”. In the quest for a better world today, we could also add new “digital devices”, when used properly, to this list.

Improving the content of education and the teaching methodologies is needed to prepare our students not only for what we think is going to matter in the workplace tomorrow, but also for what we do not yet know. We know that today’s workers are required to develop and continuously refine a large arsenal of both cognitive and non-cognitive skills. They need to be able to search for specific information in the ever-growing ocean that is the internet, recognise the quality of this information, process it critically. To adapt to the modern model of business organisation, it is widely recognised that there is a great need to develop “soft skills” such as problem-solving attitudes, teamwork, effective communication and negotiation.

However, adequate investment in education is also needed to face the uncertainty that surrounds the jobs and the skills that will matter in the future. The current pace of technological change requires workers to “learn to learn” and to continuously update their skills. Understanding the importance of investing in culture and knowledge, not only throughout our school careers, but also spanning our entire working life and beyond, is therefore the crucial challenge for the global economy.

This challenge is even more important in Europe, due to its demographic trends. By 2045 the population aged between 20 and 64 will have fallen by about 30 million in the European Union (and by 6 million in Italy alone). The difficulties for GDP growth and, in turn, public debt, long-term care and pensions will be formidable. Economic development in Europe will continue at a pace similar to that of the past only if progress is made in reviving productivity growth. To this end, it is necessary to put reforms in place which improve the business environment and favour innovation.

But a key contribution must come from human capital. As pointed out by Edmund Phelps, the Nobel laureate in economics in 2006, in his analysis of the causes of the slowdown in productivity observed in advanced economies in recent decades, reviving the dynamism of our economies requires rediscovering behavioural attitudes that supported

economic growth in the past, such as the desire to create new things, the propensity to explore, the drive to seek better jobs, face new challenges and be successful. Education is the key to reactivating these attitudes.

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Let me now conclude. As an economist and as a central banker, in this brief discussion I have focused on the role of education and human capital to enhance economic development and to respond to the changes that are taking place in the financial system and in the global economy. But it would clearly be an understatement to think that investing in education matters only for its positive impact on economic growth or on personal finances. As Pope Francis put it in September 2018, "without the right to education there is no real freedom, which allows every person to be the protagonist of their own destiny".

A better education is the key to a better world. It can contribute in a profound way to supporting our sense of civic duty, including increasing respect for others, strengthening compliance with the rule of law, improving trust and cooperation, enhancing solidarity. It is therefore essential to foster values that have an intrinsic worth, regardless of their effects on the economy, and that are key for the social cohesion and the well-being of citizens – values that, today, are most needed.

