G20 INSIGHTS

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POLICY AREA:
Digitalization

Adult Training in the Digital Age

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Abstract

Digital technologies will both create new jobs and replace existing ones.To cope with increasing labor market dynamics in the digital age, workers will have to become more mobile across jobs, occupations, and industries. The relative importance of their job-specific skills will decrease while that of their general skills applicable to various occupations will increase. The G20 should establish national adult training programs that focus on improving workers' general skills, specifically their theoretical, non-cognitive, and digital skills. These general skills will enable workers to work with technology instead of competing with it, thereby increasing their job mobility and employability.

Challenge

Technological change will further accelerate in the digital age. This will require even more workers to respond even more flexibly to an ever-changing labor demand. Estimates suggest that almost half of all jobs in developed countries are highly susceptible to being replaced by new, digital technologies within the next one or two decades (Frey and Osborne 2017). Jobs in less developed countries may face even greater challenges. The digital technologies will create many new jobs, too. But most of these new jobs will emerge in different occupations or industries. Moreover, they will require different skills than the current jobs (Brynjolfsson and McAfee 2011, Autor 2015). To retain workers' employability and strengthen their resilience to technological change in the digital age, even more workers than in the computerization age need to continuously update and adjust their skills to complement technological progress. Doing so will improve their mobility across jobs, occupations, and industries.

The political concepts of adult learning developed for the computerization age need to be re-focused to meet the challenges of the digital age. Policy responded to the continuously changing skill requirements of the computerization age by emphasizing lifelong learning (e.g., OECD 2003, 2005, 2010, UNESCO 2009, ILO 2010). Lifelong learning was also recognized as an important goal in

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United Nation's Sustainable Development Goals (SDG 4) and has been assigned high priority by the G20 since its 2009 Pittsburgh Summit. The political concepts of lifelong learning correctly recognize the need of public support of lifelong learning from cradle to grave. However, many of the current concepts fail in targeting those workers who need training the most, and teach practical skills needed on the current job instead of general (theoretical, non-cognitive and digital) skills required for job mobility.

Most adult training is employer-sponsored (OECD 2016: 368). It focuses mainly on training firm-, occupation- or industry-specific skills that enhance workers' productivity *within* their current jobs but puts too little emphasis on general skills that enhance workers' mobility *across* jobs, occupations or industries. Moreover, it primarily targets workers who are already fairly highly skilled (OECD 2016: 368, UNESCO 2016: 238) but puts too little emphasis on workers whose skill deficits make them susceptible to automation. This would be less of a problem, if workers themselves engaged in training of their general skills. But many of those workers who needed general training the most have—for a variety of reasons—only a low willingness to pay for training measures. This is why more public support is needed to provide general training for employed workers.

Eventually, the goal is to enable workers to complement technology instead of competing with it. Digitalization provides manifold opportunities to increase labor productivity, also of low- and medium skilled workers. To tap into this potential, workers need to be trained to productively work *with* technology. Theoretical, non-cognitive and digital skills *are* complements to technology. Training these general skills will therefore help workers to flexibly adjust to technological change. It will increase their mobility across jobs, occupations, and industries, thus increasing their employability. This will not only reduce technological unemployment resulting from digitalization. It will also reduce polarization and social tensions in the digital age.

Proposal

Establish adult training programs for employed workers with a focus on skills that complement technology.

The G20 should launch and spearhead a new initiative to establish national adult training programs that focus on strengthening workers' resilience to technological change. This initiative should encourage and support countries in establishing institutionalized national lifelong training programs for employed workers. The programs should focus on workers with limited general skills who are less mobile across jobs and occupations, and whose jobs are susceptible to being replaced by the new technologies. These programs should aim at upgrading workers' proficiencies of theoretical, non-cognitive or digital skills in order to

o keep them employable in the digital age,
o strengthen their resilience to technological change,
o enable them to utilize new technologies in order to increase their own productivity,

- o enhance their mobility across jobs, occupations and industries, particularly their upward mobility, and

- o spare them from the need to take lower-paying services jobs that cannot (yet) be automated.

The adult training program should define criteria for eligibility according to workers' susceptibility to automation. Eligible workers shall be granted the right to participate in certified off-the-job courses that focus on improving the workers' proficiencies in general skills, notably in theoretical, non-cognitive and digital skills. By focusing on general skills, the program will complement rather than replace employer-initiated training of practical (job-, occupation- or industry-specific) skills. The program should also raise the workers' awareness of the challenges from the new technologies for job security, incentivize them to participate in the program, and support them in choosing the courses that fit their needs best.

Training objectives

The adult training programs should focus on enhancing workers' proficiencies in theoretical, non-cognitive and digital skills. The programs should focus on teaching these general skills skills because these skills are required to productively use and apply new technologies. Thus, proficiency in these skills will further gain in importance in the digital age. Being difficult to codify in computer software, theoretical, non-cognitive and digital skills enable workers to complement—rather than compete with—the new technologies to come (Autor et al. 2003, Deming 2015).

Theoretical skills are cognitive (intellectual) skills that determine the ability to learn, evaluate and take initiative.[1] Theoretical skills go beyond the applied occupational skills that are required for performing every day's job routines in specific jobs or occupations. They enable workers to better understand and critically reflect why they do what they do, to creatively solve non-routine problems, and to acquire new knowledge or problem-solving routines that come with the new technologies. Higher proficiencies in these skills will not only enable workers to adapt more flexibly to new technologies, work requirements, and work environments in their current jobs. They will also enhance workers' mobility across jobs, occupations or industries (e.g., Poletaev and Robinson 2008, Geel and Backes-Gellner 2011).

Non-cognitive skills are the characteristic patterns of values, behaviors and attitudes that determine a person's stance on learning and taking initiative. Non-cognitive skills, also termed "soft" skills, include (see, e.g., Lerman 2013a: 7, Van de Werfhorst 2014: 129-130, OECD 2015):

- o Basic "employability" skills such as punctuality, reliability, responsibility, integrity, honesty and work discipline are important for all jobs, especially for those with low requirements of cognitive or, for that matter, theoretical skills. Employers arguably value these skills as highly as, or even higher than, basic cognitive skills like reading or writing (Lerman 2013b).

- o Values, behaviors and attitudes that constitute a precondition for learning, problem solving and creativity such as curiosity, open-mindedness, determination, self-confidence and self-motivation.

These non-cognitive skills facilitate the accumulation of theoretical skills by enhancing the willingness to learn (Almlund et al. 2011, Kautz et al. 2014). This is why deficits in non-cognitive skills such as a lack of curiosity, determination or self-confidence frequently go hand in hand with lower cognitive skills and lower creativity (Cunha et al. 2010, Whitmore Schanzenbach et al. 2016, Sternberg 2006).

o Social (interpersonal) skills such as the ability to communicate or to work in teams are important in several respects. On the one hand, the ability to direct, coordinate and motivate co-workers is a valuable managerial skill that complements theoretical skills. On the other hand, caring for others' well-being is a valuable skill in various services, including health and domestic services. In any case, social skills will be difficult to be replaced by technology in the foreseeable future.

Digital skills are cognitive skills that are specific to using digital technologies and working in digitized environments. Digital skills include (i) ICT skills, i.e. the ability to utilize ICT and the Internet to access, process, and exchange information, (ii) software and programming skills, i.e. the ability to autonomously use computer programs and to adjust them to users' requirements, and (iii) digital literacy, i.e. the basic understanding of how digital technologies work, which opportunities they offer and which risks they come with (e.g., cybersecurity).

Target group

The adult training programs should specifically target workers who are highly susceptible to automation. Empirical evidence suggests that workers self-select into those occupations and jobs whose skill requirements match their own skill endowments comparatively well. As a consequence, workers with low proficiencies in general skills tend to self-select into jobs that can be automatized comparatively easily. After losing their jobs to digital technologies, these workers will face particularly high risks of suffering permanent economic and social deprivation. They will not only have to write off their job-specific skills. They will also be ill-prepared to take new jobs that complement the new technologies. Recent experience from the U.S. (Autor and Dorn 2013) indicates that many of these workers will have little chance but to take lower-paying jobs in service industries. The proposed adult training programs shall gradually reshape these workers' skill endowments toward higher proficiencies in theoretical, non-cognitive and digital skills. While these higher proficiencies may help them little in keeping their current jobs, they may qualify them for new jobs that are less easily automated. At least, training general skills should spare workers from the need to move down the income ladder. At best, it may enhance their upward mobility toward jobs that complement the new technologies.

Motivating eligible workers to voluntarily participate in adult training will be one of the programs' most crucial and most difficult tasks. One of the most disappointing insights from evaluations of voluntary training measures is that the workers who needed the training the most show the least willingness to participate (OECD 2016, Schwerdt et al. 2012, Caliendo et al. 2016). Many eligible workers may at first show little willingness to participate in training for a variety of reasons. These

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reasons include insufficient information, aversion against classrooms, or a lack of motivation. The reasons may actually be rooted in deficits of precisely those non-cognitive skills that the program is meant to eliminate.[2] Since forced participation in training is not an option because participants cannot be forced to learn, the programs must devote utmost effort to motivating the targeted workers to participate voluntarily. Motivation-enhancing measures may range from information and awareness-raising[3] to extensive coaching, attractive designs of training courses and financial incentives. Exploring successful ways of motivating eligible workers to participate in the program will likely take several years of trial and error, and will have to be supported by careful scientific evaluations and extensive exchange of experiences. The G20 should encourage and substantiate these evaluations and exchanges.

Funding

Public funding of the adult training programs is justified by lowering social costs of polarization. The program costs should generally be covered by all relevant stakeholders in proportion to their benefits from the program. The costs include the costs of the courses themselves, workers' wage losses during the training, and administrative costs. The beneficiaries include the trained workers, employers, and society as a whole. The trained workers themselves benefit from improved long-run income prospects. Employers as a whole benefit from a larger pool of better educated workers from which they may draw their workforces. And society benefits from less social tensions as well as from higher income tax revenues and lower costs of social assistance if polarization can be alleviated. The computerization of jobs during recent decades has contributed to aggravating the polarization of employment and wages in several G20 countries (Autor and Dorn 2013). Arguably, it has also fostered political populism supported by those who feel left behind by the technological changes (Taylor 2017). The costs of social polarization and political instability are difficult to quantify in dollars and cents, and will likely differ across countries. However, the prospects of greater social and political stability alone may justify a significant public contribution to funding the program.

Governments should cover the lion's share of the programs in the first years. The initial phase of the program in each country will be characterized high uncertainty about program success and extensive learning about effective incentive systems for eligible workers, appropriate curricula, preferred course designs, and effective administration. This learning will require a good deal of trial and error. It may even be designed as a series of controlled, scientifically evaluated experiments that expose randomly chosen workers to different incentive systems, curricula and course designs. This initial phase should be financed mainly by governments, possibly supported by low-interest loans by the World Bank or local development banks. As the program becomes more popular and converges to a stable institutional design and workable operational structures, the governments may gradually divert financial burdens to other stakeholders.

Administration and control

Governments should set up the program's legal framework and appoint a single, national agency to administer the entire program. This agency should be embedded in the national education system. The governments should grant the program agency far-reaching autonomy that enables it to explore feasible ways to implement and design the program. In particular, the agency should be responsible for

o Determining and occasionally adjusting the range of eligible workers, possibly based on reliable studies of the susceptibility of occupations or, for that matter, tasks, to being automated in the respective foreseeable future,

o Issuing periodical training vouchers or training accounts that entitle the eligible workers to participate in one or two weeks of off-the-job training per year,

o Serving as a one-stop shop for all concerns of the eligible workers,

o Trying out and selecting appropriate measures to incentivize and to coach eligible workers,

o Accrediting and supervising the—private or public—training institutions,

o Exploring effective ways of offering courses online,

o Deciding on the magnitudes of tuition fees and compensations for wage losses,

o Continuously evaluating incentive schemes for workers and the effectiveness of the courses,

o Keeping the program budget and deciding on how it is spent, and

o Deciding on to what extent non-eligible workers, including unemployed, may participate in training courses.

The detailed task profile of this agency, which may be an existing national agency or a newly created agency, will have to be subjected to the specificities of the country's institutional, economic, and social framework. Governments should ensure that it fits smoothly into this framework and complements existing agencies rather than competing with them. They should ensure in particular that program success will not be compromised by conflicts of interest on the side of the agency.[4]

Governments should appoint a supervisory body for the program that advises and monitors the program agency. This supervisory body should represent all relevant stakeholders, including the government (notably the Ministries of Education and Labor), the national unemployment agency, employers' associations, trade unions and researchers (notably from education, psychological and economic sciences). The supervisory body should, on the one hand, serve as an advisory council to the program agency. It should continuously communicate the needs of all relevant stakeholders to the agency. On the other hand, it should critically supervise the agency's policy. It should, for example, regularly commission external evaluations by independent scholars of the agency's policies regarding the eligibility of workers, the incentive systems, the courses' contents and cost-effectiveness. The results of these evaluations should be fed directly into the program agency to facilitate timely improvements of the system. They should also be published to keep the public informed about the development of the adult training program, thus raising people's awareness of changing skill demand in the digital age.

The G20 should support regular exchange of information on successes—and failings—of the national training programs. To facilitate learning across national borders, and to establish an additional layer of checks and balances, the G20 should request comparative periodical reports on all national adult training programs. These reports should be prepared by international organizations specialized in the field, for instance the UNESCO, the OECD or the ILO. The comparative reports should include elements of evaluation. They may, for example, identify best practices in the various activities of the national agencies or limitations to the international transferability of specific activities. Such evaluations will not only help improve the effectiveness and reduce the costs of national programs in the G20 countries. They will also help third countries in establishing their own adult training programs to better meet the challenges from digitalization.

1. Apart from literacy and numeracy, theoretical skills include learning skills, i.e., the ability to acquire and remember knowledge, thinking skills, i.e., the ability to combine and re-combine available information and knowledge, and metacognitive skills, i.e., the ability to purposefully combine the various skills and critically reflect their usefulness in a specific context.

2. Studies have shown, for example, that workers with a more external locus of control, i.e., who believe that their life is determined more by chance or fate than by their own action, participate less in training because they systematically underestimate the benefits of this training (Caliendo et al. 2016).

3. Eligible workers should, for example, be informed about the reasons why they were chosen and the aims of the training program. A recent study by Barr and Turner (2017) suggests that a well-designed campaign of awareness-raising may increase the willingness to participate more than financial incentives.

4. The agency should, for example, not be dominated by employers who might try diverting program funds for training of job-, occupation- or industry-specific skills, i.e., use the program as a substitute for their own training investments. Neither should it be dominated by unemployment agencies that might try diverting program funds to training of unemployed workers.

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