Defining the skills citizens will need in the future world of work

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We know that digital and AI technologies are transforming the world of work and that today's workforce will need to learn new skills and learn to continually adapt as new occupations emerge. We also know that the COVID-19 crisis has accelerated this transformation. We are less clear, however, about the specific skills tomorrow's workers will require.

Research by the McKinsey Global Institute has looked at the kind of jobs that will be lost, as well as those that will be created, as automation, AI, and robotics take hold. And it has inferred the type of high-level skills that will become increasingly important as a result. [1] The need for manual and physical skills, as well as basic cognitive ones, will decline, but demand for technological, social and emotional, and higher cognitive skills will grow.

Governments are keen to help their citizens develop in these areas, but it is hard to devise curricula and the best learning strategies without being more precise about the skills needed. It is difficult to teach what is not well defined.

We, therefore, conducted research that we hope will help definitions take shape and could contribute to future-proof citizens' skills for the world of work. [2] The research identified a set of 56 foundational skills that will benefit all citizens and showed that higher proficiency in them is already associated

with a higher likelihood of employment, higher incomes, and job satisfaction.[3]

Defining foundational skills for citizens

Some work will, of course, be specialized. But in a labor market that is more automated, digital, and dynamic, all citizens will benefit from having a set of foundational skills that help them fulfill the following three criteria, no matter the sector in which they work or their occupation:

- add value beyond what can be done by automated systems and intelligent machines
- operate in a digital environment
- continually adapt to new ways of working and new occupations

We used academic research and McKinsey's experience in adult training to define what these foundational skills might be (Exhibit 1). We started from four broad skill categories—cognitive, digital, interpersonal, and self-leadership—then identified 13 separate skill groups belonging to those categories.[4] Communication and mental flexibility are two skill groups that belong to the cognitive category, for example, while teamwork effectiveness belongs to the interpersonal category.

Exhibit 1

Our research identified 56 foundational skills that will help citizens thrive in the future of work.

56 DELTAS[1] across 13 skill groups and four categories

Cognitive

Critical thinking
- Structured problem solving
- Logical reasoning
- Understanding biases
- Seeking relevant information

Planning and ways of working
- Work-plan development
- Time management and prioritization
- Agile thinking

Communication
- Storytelling and public speaking
- Asking the right questions
- Synthesizing messages
- Active listening

Mental flexibility
- Creativity and imagination
- Translating knowledge to different contexts
- Adopting a different perspective
- Adaptability
- Ability to learn

Interpersonal

Mobilizing systems
- Role modeling
- Win–win negotiations
- Crafting an inspiring vision
- Organizational awareness

Developing relationships
- Empathy
- Inspiring trust
- Humility
- Sociability

Teamwork effectiveness
- Fostering inclusiveness
- Motivating different personalities
- Resolving conflicts
- Collaboration
- Coaching
- Empowering

Self-leadership

Self-awareness and self-management
- Understanding own emotions and triggers
- Self-control and regulation
- Understanding own strengths
- Integrity
- Self-motivation and wellness
- Self-confidence

Entrepreneurship
- Courage and risk-taking
- Driving change and innovation
- Energy, passion, and optimism
- Breaking orthodoxies

Goals achievement
- Ownership and decisiveness
- Achievement orientation
- Grit and persistence
- Coping with uncertainty
- Self-development

Digital

Digital fluency and citizenship
- Digital literacy
- Digital learning
- Digital collaboration
- Digital ethics

Software use and development
- Programming literacy
- Data analysis and statistics
- Computational and algorithmic thinking

Understanding digital systems
- Data literacy
- Smart systems
- Cybersecurity literacy
- Tech translation and enablement

[1]Distinct elements of talent.

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Looking for still more precision, we identified 56 distinct elements of talent (DELTAs) that fall within these skills groups. We call them DELTAs, rather than skills, because they are a mix of skills and attitudes. “Adaptability” and “coping with uncertainty” are attitudes, for example. [5]

DELTA proficiency and outcomes

From here, we conducted two further pieces of research. First, we sought to gauge the level of proficiency in the 56 DELTAs among today’s workers compared with the level we believe will be required to future-proof citizens’ ability to work. Second, we sought to gauge whether proficiency in these DELTAs was already associated with certain work-related outcomes.

Proficiency

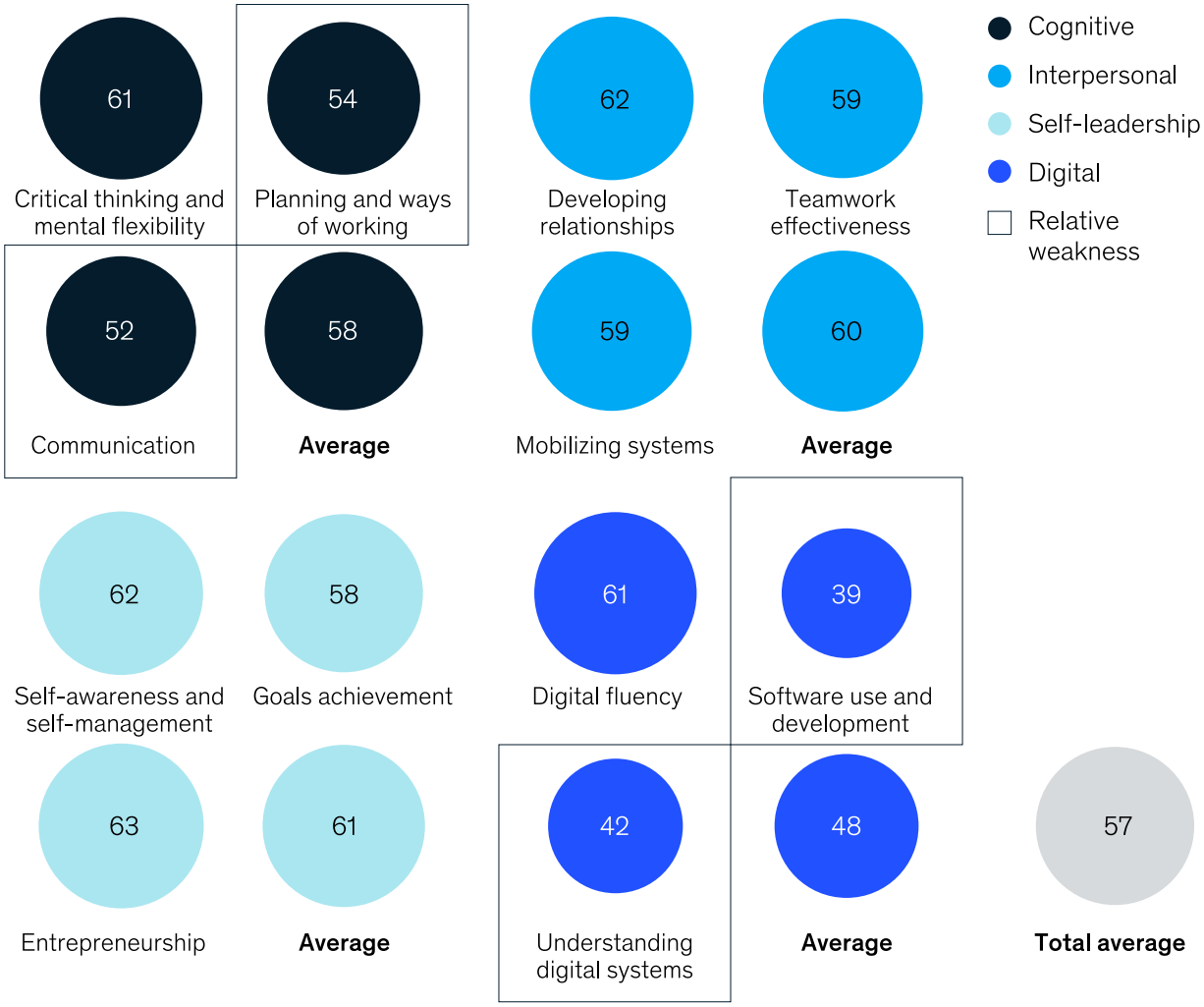
To ascertain proficiency levels, we defined a desirable level of proficiency in each of the 56 DELTAs, then devised a psychometric questionnaire to assess respondents’ proficiency against this bar. Eighteen thousand people from 15 countries completed the online questionnaire and were given a score on a scale of 0 to 100 for each DELTA (see the sidebar “Example: Evaluating proficiency levels for DELTAs”).

The results showed respondents’ proficiency was lowest in two skill groups in the digital category—software use and development and understanding digital systems. Proficiency in the skill groups for communication and planning and ways of working—both in the cognitive category—was also lower than average (Exhibit 2).

Exhibit 2

Respondents' proficiency was lowest in two skill groups in the digital category—'software use and development' and 'understanding digital systems.'

DELTA[1] by category and skill group, all countries, average score[2]



Note: The margin of error is 1% with a 95% confidence interval. Averages are computed as the mean of country averages and not of all respondents' averages.
[1]Distinct element of talent.
[2]Index score calculation: survey answers for each DELTA were associated with a proficiency level of 1–3, which in turn corresponded with a score of 0–100. The index for each aggregation is calculated as the average of the answers for each DELTA within the skill group.

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Overall, survey participants with a university degree had higher average proficiency scores across 56 distinct elements of talent, suggesting

that those with higher levels of education are better prepared for changes in the workplace.

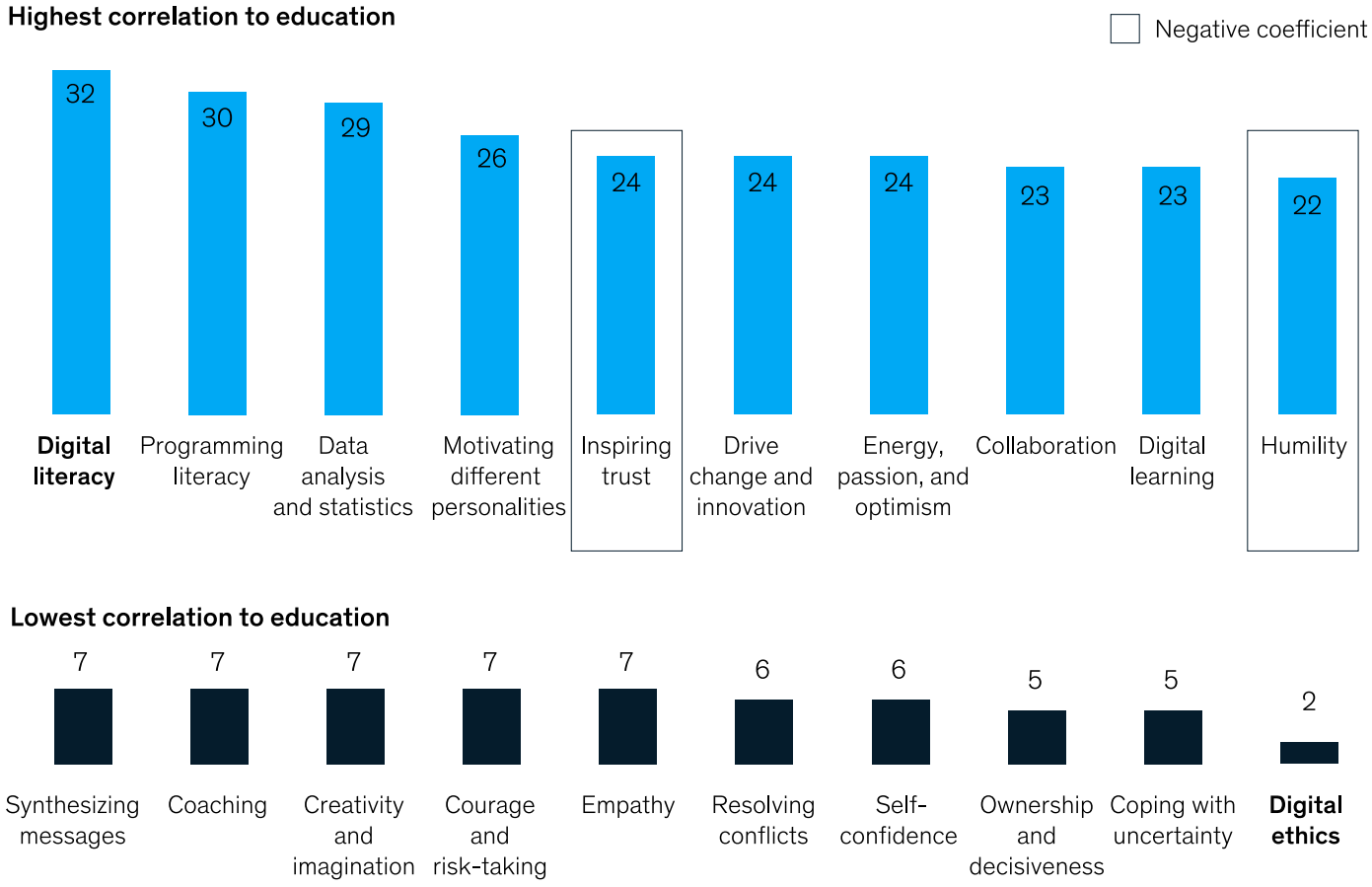
We also examined whether proficiency was linked to education. Overall, survey participants with a university degree had higher average DELTA proficiency scores than those without, suggesting—perhaps not surprisingly—that participants with higher levels of education are better prepared for changes in the workplace. However, a higher level of education is not associated with higher proficiency in all DELTAs. The association holds true for many DELTAs in the cognitive and digital categories. But for many within the self-leadership and interpersonal categories, such as "self-confidence," "coping with uncertainty," "courage and risk-taking," "empathy," "coaching," and "resolving conflicts," there is no such association. [6] For some DELTAs, more education was associated with lower proficiency, "humility" being an example.

Exhibit 3 lists the DELTAs where proficiency has the highest and lowest correlation with the level of education. (Some have a negative coefficient.)

Exhibit 3

Proficiency in certain DELTAs is not necessarily linked to education.

Accuracy of statistical models predicting DELTA[1] proficiency from level of education,[2]
percentage points above pure chance of 33% (3 proficiency levels, value of 0 = pure chance)



[1]Distinct element of talent.
[2]Three statistical models used: linear discriminate analysis, multinomial logistic regression, and ordinal logistical regression. For each DELTA, the figures displayed are from the statistical model that showed the highest predictive accuracy.

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Outcomes

We went on to test whether proficiency in the DELTAs was already helping people in the world of work; the results showed that survey respondents with higher DELTA proficiencies were, on average, more likely to be those that were employed, with higher incomes, and higher job satisfaction. Different DELTAs were more strongly associated with these three work-related

outcomes, however.

Holding all variables constant—including demographic variables and proficiency in all other elements—we found employment was most strongly associated with proficiency in several DELTAs within the self-leadership category, namely "adaptability," "coping with uncertainty," "synthesizing messages," and "achievement orientation" (Exhibit 4, part 1). [7]

High incomes were most strongly associated with proficiency in the four skill groups where overall proficiency levels were lowest among respondents—namely understanding digital systems, software use and development, planning and ways of working, and communication (the first two fall within the digital category and the latter two within the cognitive category). [8]

Digital proficiency seems to be particularly associated with higher incomes: a respondent with higher digital proficiency across all digital DELTAs was 41 percent more likely to earn a top-quintile income than respondents with lower digital proficiency. [9] The equivalent comparison was 30 percent for cognitive DELTAs, 24 percent for self-leadership DELTAs, and 14 percent for interpersonal DELTAs.

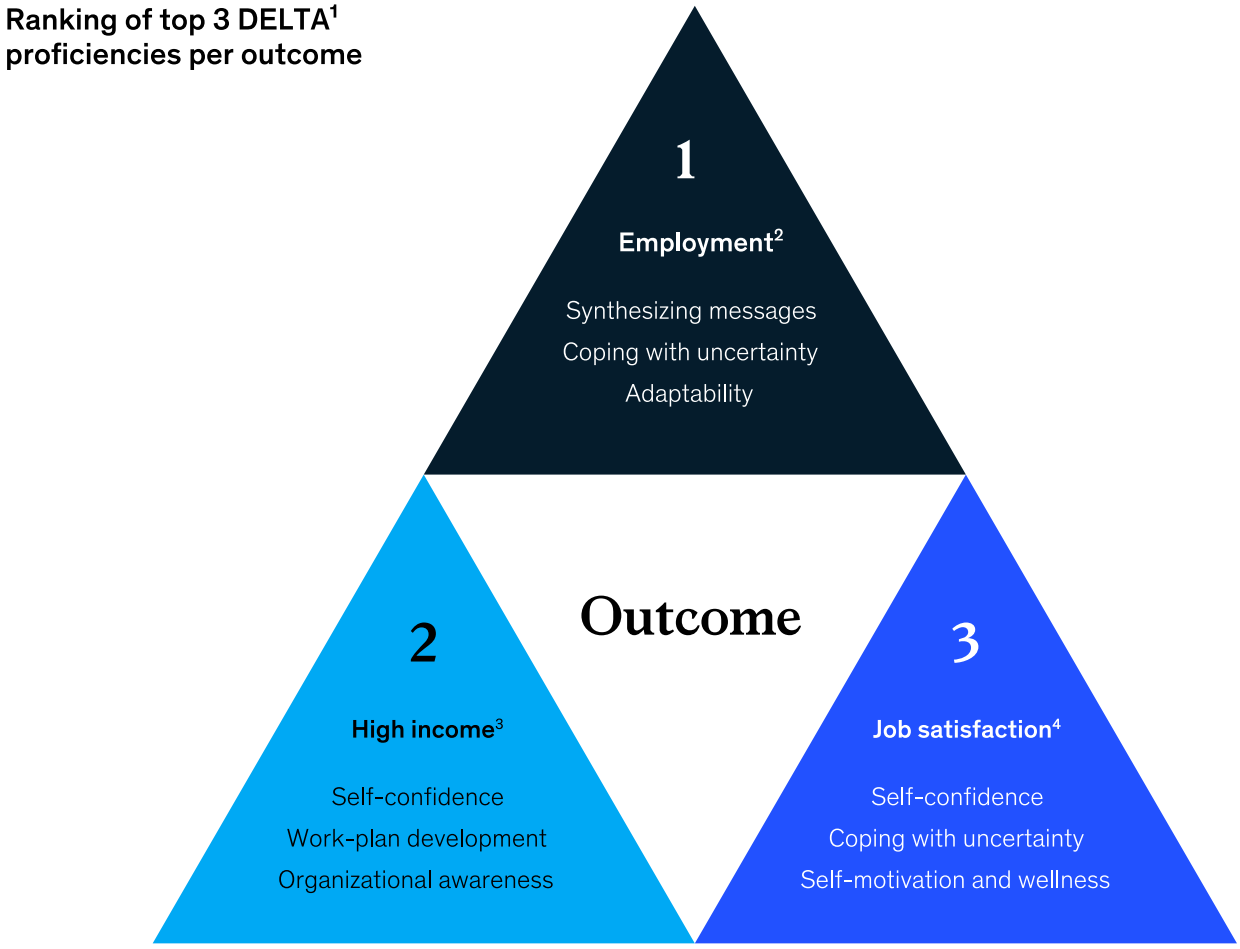
That said, the four DELTAs most strongly associated with high incomes were "work-plan development" and "asking the right questions," both in the cognitive category; "self-confidence," a self-leadership DELTA; and "organizational awareness," an interpersonal DELTA (Exhibit 4, part 2). [10]

Job satisfaction is also associated with certain DELTAs, especially those in the self-leadership category. Holding all variables, including income, constant, "self-motivation and wellness," "coping with uncertainty," and "self-confidence," had the highest impact on respondents' job satisfaction (Exhibit 4, part 3). [11]

Notably, proficiency in two self-leadership DELTAs—"self-confidence" and "coping with uncertainty"—ranked among the top three most predictive DELTAs for two out of the three outcomes (Exhibit 5).

Exhibit 5

We ranked the top three DELTAs in which proficiency predicts better outcomes for employment, high income, and job satisfaction.



Note: Data from non-OECD countries presented higher variance and were excluded from this analysis.
[1]Distinct element of talent.
[2]Probability of a survey participant being employed among citizens with income below the median.
[3]Probability of a survey participant being in the top quintile for income.
[4]Probability of a survey participant reporting being "fulfilled and satisfied" or "satisfied" with his/her job.

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How DELTAs could help shape education and adult training

Our findings help define the particular skills citizens are likely to require in the future world of work and suggest how proficiency in them can influence work-related outcomes, namely employment, income, and job satisfaction. This, in turn, suggests three actions governments may wish to take.

Reform education systems

Our research suggests governments could consider reviewing and updating curricula to focus more strongly on the DELTAs. Given the weak correlation between proficiency in self-leadership and interpersonal DELTAs and higher levels of education, a strong curricula focus on these soft skills may be appropriate.

Governments could also consider leading further research. Many governments and academics have started to define the taxonomies of the skills citizens will require, but few have done so at the level described here. Moreover, few, if any, have undertaken the considerable amount of research required to identify how best to develop and assess such skills. For instance, for each DELTA within the curriculum, research would be required to define progression and proficiency levels achievable at different ages and to design and test developmental strategies and assessment models. The solutions for different DELTAs are likely to differ widely. For example, the solutions to develop and assess “self-awareness and self-management” would differ from those required for “work-plan development or “data analysis.”

In addition, governments could consider setting up institutions for research and innovation in education to fund the research, facilitate researchers’ access to schools to test innovative solutions, and establish which methods work for which DELTAs. They could also make the emerging data and insights available to researchers and educators in the private sector.

Reform adult-training systems

The majority of respondents we surveyed—like the majority of people in society at large—were no longer in national education systems. Raising proficiency in the DELTAs would therefore require continuous adult training. The fact that proficiency in digital DELTAs—shown to improve the chances of achieving higher incomes—was lower among older survey respondents who had left the national educational system illustrates this point.

The curricula of adult-training courses may also have to change. For example, our research has shown that self-leadership DELTAs may be particularly important for employment outcomes, yet these are not commonly covered by adult-training programs. For example, in an online scan of adult-training programs, we found that courses or modules to develop DELTAs within the skill groups of goal achievement or self-awareness and self-management were 20 times less common than those to develop communication DELTAs. That could be an urgent gap to fill to adequately respond to the wave of unemployment caused by the COVID-19 pandemic.

Specific actions that might encourage relevant adult learning include the following:

- *Establish an AI aggregator of training programs to attract adult learners and encourage lifelong learning.* AI algorithms could guide users on whether they need to upskill or reskill for a new profession and shortlist relevant training programs. To develop accurate algorithms, governments would need to collect and organize data on market demand for jobs and skills, as well as data on training programs. Programs listed should include those that teach DELTAs correlated to work-related outcomes. Self-leadership DELTAs could be particularly

important given their link to employment.

- *Introduce a skill-based certification system.* Occupation-based qualifications risk becoming outdated rapidly as occupations requiring new skills emerge. Hence, skills-based accreditation may better suit employers' needs. Providers could develop programs that cover the practical skills and DELTAs required to perform a certain occupation, but add new components or remove old ones as those occupations evolved. Several AI start-ups have developed algorithms capable of identifying and updating the skill sets required for different occupations. Governments could adapt these to enable a dynamic, skill-based certification system.
- *Fund schemes that encourage a higher focus on DELTAs.* Some governments award lifelong learning grants to their citizens, who can enroll in training programs within a national aggregator. To help equip citizens for the future world of work, governments could funnel funds toward programs that include the DELTAs associated with employment. For example, trainees could be offered spending vouchers for particular programs only, while funding to program providers could be conditional upon employment outcomes or the provision of training modules that include certain DELTAs.

Ensure affordability of lifelong education

Most children around the world have access to primary and secondary schooling, but not all of it is of high quality, and early education for the very young—the best age at which to develop certain mindsets and attitudes—is unaffordable for most people in most countries. In addition, very few countries have worked out a system to provide affordable access to quality adult training.

Hence, just as the Industrial Revolution in the 19th century drove an

expansion of access to education, today's technological revolution should drive further expansion to ensure universal, high-quality, affordable access to education from early childhood to retirement and to ensure that curricula include the DELTAs that will future-proof citizens' skills in the world of work.