Skills and digitalisation
Implications for education and lifelong learning

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The kind of things that are easy to teach are now easy to automate, digitize or outsource.
The Race between Technology and Education

Inspired by “The race between technology and education”
Pr. Goldin & Katz (Harvard)
Comparing skills of computers and adults

Literacy Proficiency in OECD Countries (PIAAC)

- Level 1 and Below
- Level 2
- Level 3
- Level 4-5

Near-term computer capabilities
TWO EFFECTS OF DIGITALISATION

Non routine tasks

Routine tasks

Tasks without use of ICT

Tasks with use of ICT
TWO EFFECTS OF DIGITALISATION

- Non routine tasks, Low use of ICT
- Non routine tasks, High use of ICT
- Routine tasks, Low use of ICT
- Routine tasks, High use of ICT
Some premises

- Technology **substitutes** workers in the performance of some tasks (routine ones) but also **complements** workers.

- Skills are **multidimensional**; skills **evolve** with experience and with technology.
MEASURING THESE EFFECTS WITH THE **SURVEY OF ADULT SKILLS** (PIAAC)

FROM INFORMATION ON TASKS PERFORMED ON THE JOB

- **Non-routine intensity increases**
  - Higher degree of freedom at work
  - **Non-routine intensity indicator**
    - [Marcolin, Miroudot and Squicciarini, 2016]

- **ICT intensity increases**
  - More tasks performed with ICT
  - **ICT intensity, task-based skills indicator**
    - [Grundke et al., 2017; Skills Outlook 2017]
COUNTRIES EXPLAIN VERY LITTLE OF THE VARIANCE IN DIGITAL EXPOSURE

OCCUPATIONS ARE MORE IMPORTANT
OCCUPATIONS’ EXPOSURE TO DIGITALISATION DIFFERS SUBSTANTIALLY

MEDIAN DIGITAL EXPOSURE INDICATORS

SIGNIFICATION VARIATIONS WITHIN OCCUPATIONS

LIMITED IMPACT OR MILD SUBSTITUTION AND COMPLEMENTARY EFFECTS

STRONGLY AFFECTED BY ICT DEVELOPMENT

STRONGLY AFFECTED BY AUTOMATION

WHAT DOES DIGITALISATION CHANGE FOR WORKERS ON THE JOB?

TASKS PERFORMED

USE OF COGNITIVE SKILLS
EXPECTED EFFECT OF INCREASE FROM 25TH TO 75TH PCTILE OF DIGITAL EXPOSURE ON COGNITIVE SKILL INTENSITY

ICT USE and NON-ROUINE INTENSITY INCREASE TASK CONTENT VARIETY

EXPECTED EFFECT OF INCREASE FROM 25TH TO 75TH PCTILE OF DIGITAL EXPOSURE ON TASK INTENSITY

SKILLS DEVELOP WITH EXPERIENCE

DOES DIGITALISATION ENABLE SKILL DEVELOPMENT?
PROBLEM SOLVING SKILLS IMPROVE WITH PROLONGED DIGITAL EXPOSURE

Expected effect of increase from 25th to 75th percentile of digital exposure on probability of learning at least once a week.

ARE COUNTRIES PREPARED FOR THIS TECHNOLOGICAL CHANGE?
WHAT ROLE CAN EDUCATION PLAY?
SIGNIFICANT INCREASE IN TERTIARY EDUCATION

SHARE OF 25-34 BY EDUCATION LEVEL (%)

Upper secondary or post-secondary non-tertiary

Tertiary

Below upper secondary

... BUT A TERTIARY DEGREE DOES NOT GUARANTEE SKILLS

SHARE LACKING BASIC SKILLS BY EDUCATION LEVEL (%)

Below upper secondary

Upper secondary or post-secondary non-tertiary

Tertiary

Czech Republic
Finland
Netherlands
Japan
Norway
Australia
Sweden
Denmark
Estonia
New Zealand
Germany
Austria
England/N. Ireland (UK)
Flanders (Belgium)
Slovenia
Russian Federation
Canada
Lithuania
Korea
Poland
United States
Ireland
Israel
Greece
Slovak Republic
Singapore
Turkey
Chile

LESS EDUCATED WORKERS TEND BE TO MORE SPECIALISED

SPECIALISATION OF WORKERS BY EDUCATION LEVEL

Workers need to keep on learning at various stages of life to face the changes brought by digitalisation.
DIGITALISATION RAISES NEEDS FOR TRAINING

SHARE OF WORKERS REPORTING NEEDING FURTHER TRAINING FOR THEIR JOB BY EDUCATION LEVEL (%)

- Highly digital environment
- Poorly digital environment

LOW-SKILLED ARE LESS LIKELY TO PARTICIPATE IN TRAINING

SHARE OF WORKERS WHO PARTICIPATED IN ON-THE-JOB TRAINING IN THE PREVIOUS YEAR BY EDUCATION LEVEL (%)

Poverty is not destiny – Learning outcomes at age 15 by international deciles of the PISA index of economic, social and cultural status (ESCS)
Age 15 performance on the PISA collaborative problem-solving scale

PISA 2015 defines collaborative problem-solving competency as the capacity of an individual to effectively engage in a process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution and pooling their knowledge, skills and efforts to reach that solution.
The digital transformation expands and diversifies education, training and learning opportunities.

The certification of skills becomes increasingly important: employers need clear signals on workers’ skills.
Mean literacy proficiency and distribution of literacy scores, by educational attainment.

Qualifications don’t always equal skills.

Level 1 and below

Level 2

United States

Score
Literacy proficiency by level of educational attainment (25-34 year olds):

- Less than upper secondary
- Upper secondary
- Tertiary
EDUCATION IS ONLY A PROXY FOR SKILLS

DISPERSION IN UNOBSERVABLE COMPONENT IN LITERACY SKILLS

Diploma and observable characteristics poorly reflect individuals' literacy skills

Source: Skills Outlook 2017, Table 3.2 (OECD, 2017)
Creating new value connotes processes of creating, making, bringing into being and formulating; and outcomes that are innovative, fresh and original, contributing something of intrinsic positive worth. The constructs that underpin the competence are imagination, inquisitiveness, persistence, collaboration and self-discipline.

In a structurally imbalanced world, the imperative of reconciling diverse perspectives and interests, in local settings with sometimes global implications, will require young people to become adept in handling tensions, dilemmas and trade-offs. Underlying constructs are empathy, adaptability, trust.

Dealing with novelty, change, diversity and ambiguity assumes that individuals can ‘think for themselves’. This suggests a sense of responsibility, and moral and intellectual maturity, with which a person can reflect upon and evaluate their actions in the light of their experiences and personal and societal goals; what they have been taught and told; and what is right or wrong.
High quality initial education and lifelong learning

- Investing in high quality early childhood education and initial schooling, particularly for children from disadvantaged backgrounds
- Financial support targeted at disadvantage
- Opportunities and incentives to continued development of proficiency, both outside work and at the workplace.
Lessons from strong performers

Make learning everybody’s business

- Governments, employers, workers and parents need effective and equitable arrangements as to who does and pays for what, when and how.

- Recognise that individuals with poor skills are unlikely to engage in education on their own and tend to receive less employer-sponsored training.
Lessons from strong performers

Effective links between learning and work

• Emphasis on work-based learning allows people to develop hard skills on modern equipment and soft skills through real-world experience.
• Employer engagement in education and training with assistance to SMEs.
• Strengthen relevance of learning, both for workplace and workers broader employability.
Lessons from strong performers

Allow workers to adapt learning to their lives

- Flexibility in content and delivery (part-time, flexible hours, convenient location)
- Distance learning and open education resources.
Lessons from strong performers

Identify those who can benefit from learning most

- Disadvantaged adults need to be offered and encouraged to improve their learning
- Foreign-language migrants
- Older adults
- Show how adults can benefit from improved skills, both economically and socially
Lessons from strong performers

Improve transparency

• Easy-to-find information about adult education activities
• Combination of easily searchable, up-to-date online information and personal guidance and counselling services
• Less educated workers tend to be less aware of the opportunities
• Recognise and certify skills proficiency.
Lessons from strong performers

Guidance

• Timely data about demand for and supply of skills
• Competent personnel who have the latest labour-market information at their fingertips to steer learners
• Qualifications that are coherent and easy to interpret
Lessons from strong performers

Flexible labour-markets

- Labour-market arrangements that facilitate effective skill use and address skill mismatches
- Encourage mobility to optimise skill match.
Lessons from strong performers

Help employers make better use of workers skills

• Flexible work arrangements that accommodate workers with care obligations and disabilities
• Encourage older workers to remain in the labour market
• Encourage employers to hire those who temporarily withdrew from the labour market.
Lessons from strong performers

Help economies move up the value chain

• Governments can influence both employer competitiveness strategies and product-market strategies, which determine in what markets the company competes
• Strengthen 21st century skills
• Foster entrepreneurship.
Thank you

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