ICT skills for the future: Instruments and data

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WTIS 2018
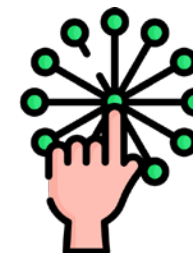December 2018
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Outline

- Introduction

- Global Framework for Reference on Digital Literacy Skills

    - Methodology

    - Proposed Competence areas and competences

- Mapping digital literacy assessment tools

    - Process and classifications

    - Methodological challenges

    - Existing instruments

    - Recommendations

Two indicators for same targets

SDG Target 4.4:

By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

Global Indicator - Indicator 4.4.1:

Proportion of youth/adults **with information and communications technology (ICT) skills**, by type of skill

▶ **Not a learning outcome indicator**: indirect
(but correlated with measures of skills)

Thematic Indicator - Indicator 4.4.2:

Percentage of youth and adults who have achieved at least a minimum level of proficiency in **digital literacy skills**

▶ **Learning outcome indicator**: direct

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The set of skills in the Global Indicator are self reported

Potential **self-reporting bias**
→ threatens the validity of the data through

- misunderstanding
- social desirability bias

But has as advantage

- cost efficient

Figure 5.1 Skills to be measured to assess ICT skills

- 🗀 Copying or moving a file or folder

- 🗐 Using copy and paste tools to duplicate or move information within a document

- ✉ Sending e-mails with attached files (e.g. document, picture, video)

- — Using basic arithmetic formulae in a spreadsheet

- 🖨 Connecting and installing new devices (e.g. modem, camera, printer)

- ⬇ Finding, downloading, installing and configuring software

- ▶ Creating electronic presentations with presentation software (including text, images, sound, video or charts)

- ⇄ Transferring files between a computer and other devices

- </> Writing a computer program using a specialised programming language

Source: UNESCO Institute for Statistics (UIS).

Global-thematic indicator relationship

FIGURE 12.3:

Not all types of indirectly assessed ICT skills accurately predict the population's directly assessed problem-solving proficiency in technology-rich environments

Correlation between two indirectly assessed ICT skills and two directly assessed proficiency levels of problem-solving skills in technology-rich environments, selected countries, 2011–2015
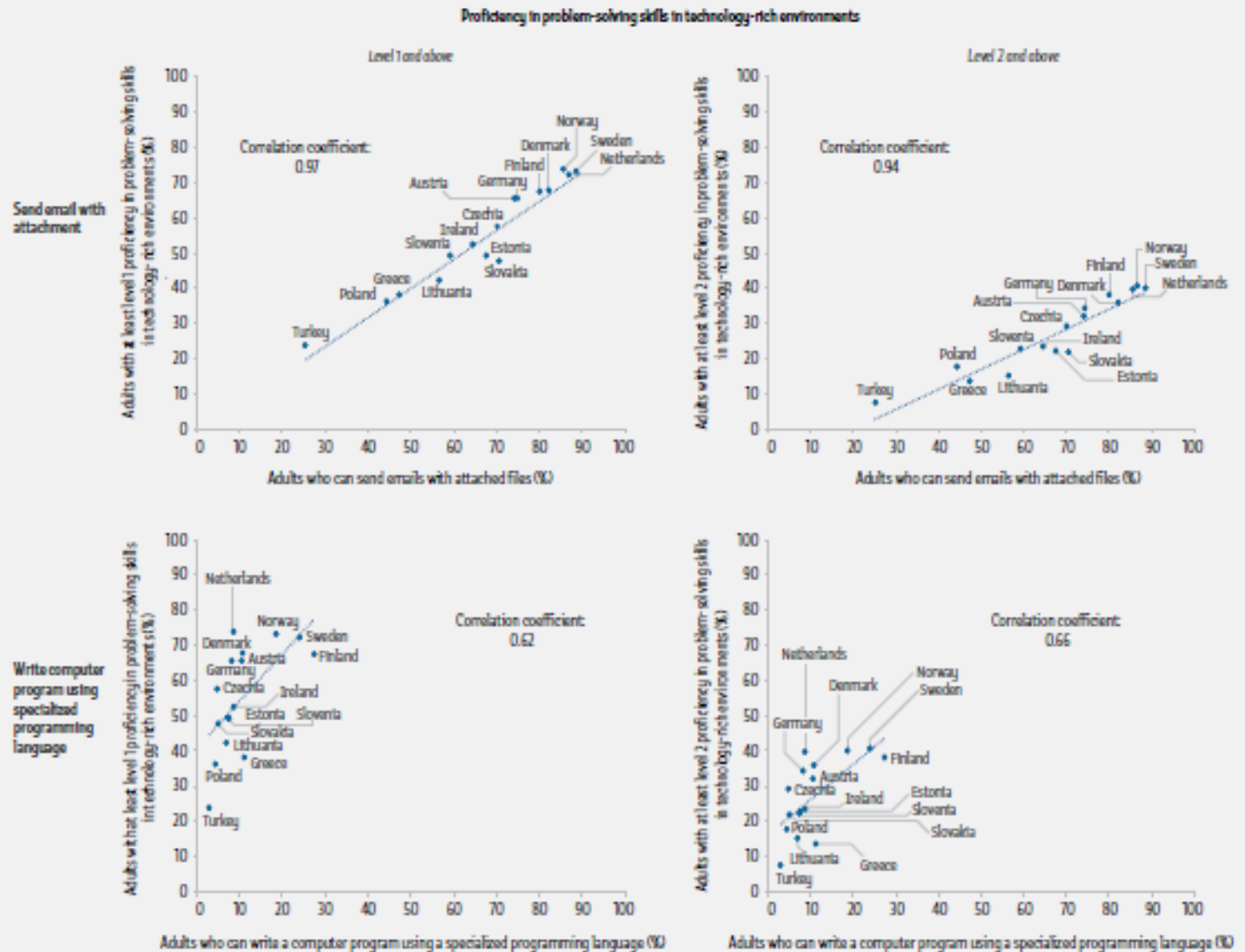
Source: GEM Report team analysis using data from Eurostat and OECD PIAAC.

Indicator 4.4.2:

Percentage of youth and adults who have achieved at least a minimum level of proficiency in **digital literacy skills**

What is a globally agreed definition of ICT and digital literacy skills?

- **Outcome indicator**

- *Global Competency Framework of Reference on digital literacy skills*

- Measurement strategy by Task Force chair

- Mapping of existing assessments on the Global Framework for Digital Literacy Skills

Using DigComp 2.1 as a base mapping for digital literacy frameworks

In-depth consultation with experts from all over the world

Online consultation with various stakeholders

Final Global Framework for Reference on Digital Literacy Skills
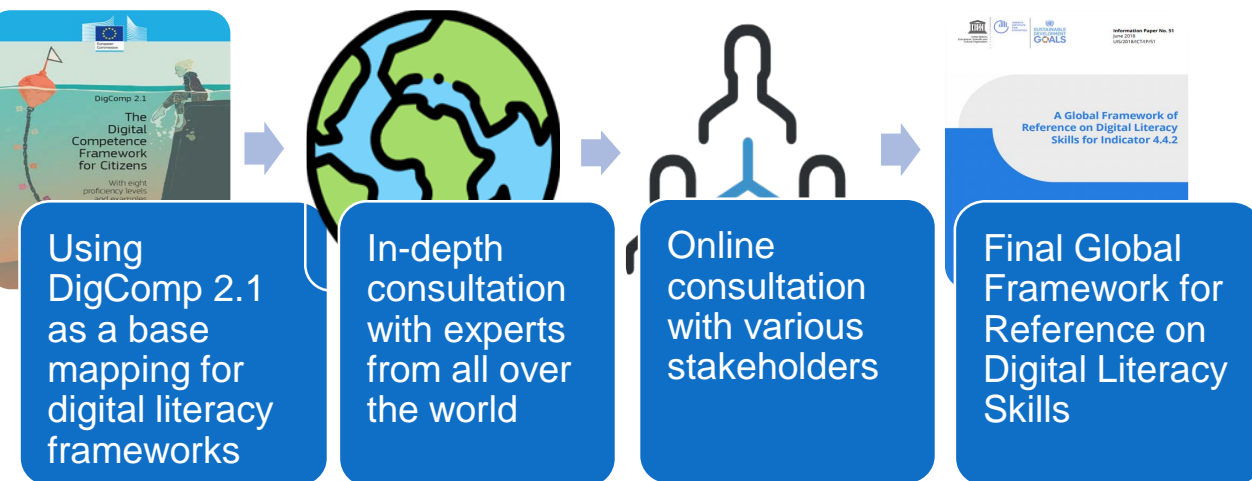
Example: Pathways mapping for agriculture

Trading using mobile phone	Using smartphone to cut out middlemen	A data-driven irrigation system using Internet-of-things

Proposed Competence Areas and Competences

Process

a. Based on the EU - DigiComp

b. Review of 43 digital literacy frameworks; focus on:

- 7 national frameworks with clear competencies

- 3 popular enterprise frameworks

c. Consultations

Key recommendations

- Add competences 0 and 6

0. Hardware and software operations

1. Information and data literacy

2. Communication and collaboration

3. Digital content creation

4. Safety

5. Problem solving

6. Career-related competences

Proposed Competence Areas and Competences

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0.1 Physical operations of digital technologies

0.2 Identifying data, information and digital content to operate digital technologies

1.1 Browsing, searching and filtering data, information and digital content

1.2 Evaluating data, information and digital content

1.3 Managing data, information and digital content

An outline of the study….

- Mapping digital literacy assessment to the Global Framework for Reference

- Evaluate assessments that cover a large part of the framework

- Recommend next steps on assessment tools suitable for indicator 4.4.2

Process

a. Review of prior mapping exercises

b. Analysis

Different classifications of assessments

- By purpose: research, credentials, statistics

- By focus: technical skills (e.g. ICDL), information literacy (e.g. ICILS), digital competence (e.g. PIAAC)

- Delivery: self-report, self-assess on scale, test; if so by item: multiple choice, interactive, authentic

Methodological challenges in the assessment of digital literacy
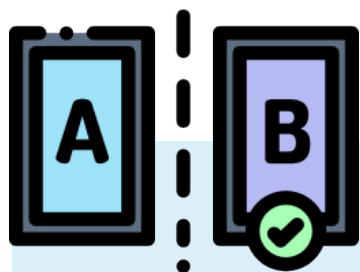
Psychometrics:

- Multidimensional Item Response Theory

- Monotonicity; instrument does not make knowledgeable persons take the test.

- Local independence; performance in one item does not affect performance in another.

Validity:

- Degree to which results can be interpreted and used.

- Internal validity: methodological correctness/coherence of a research instrument.

- External validity: re-usability through relevance to a wider audience.

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Existing instruments for assessing digital literacy

- **Performance assessment**, where individuals are monitored by human observer or software while being engaged in solving authentic, real-life problems by using common software tools (e.g. browser, word processor, spreadsheet)

- **Knowledge-based assessment**, where individuals are responding to carefully designed test items that measure both declarative and procedural knowledge

- **Self-assessment**, where individuals are asked to evaluate their knowledge and skills with questionnaires that might range from structured scales to free-form reflection.

Best matches to the Global Framework:

✓ DigComp in Estonia; test grades 9/12

✓ PIX in France; advanced platform and item design

✓ Digital Competence Wheel in Denmark; most competence areas, attractive visual feedback

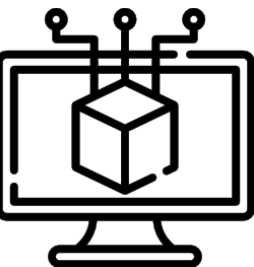✓ MDS in Netherlands/UK; reliable, valid, and effective

Recommendations
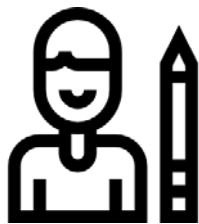
- **Self-report**; response on 3-5 point scale; short test duration; automatic assessment for all items

- **Piloting**; with 1000+ respondents; 3 languages; different countries

- **Knowledge-based**; test extension for selected competency areas to enhance validity

- **Software architecture**; similar to Pix

- **Extensions**; for e-portfolios, microcredentials

Thank you!

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