Innovations in PIAAC
How Technology and Methodology Differentiates PIAAC
OVERVIEW

- WHY ASSESS DIGITAL PROBLEM SOLVING in TECHNOLOGY-RICH ENVIRONMENTS (PS-TRE)
- THE PIAAC PS-TRE FRAMEWORK
- WHAT PIAAC TELLS US ABOUT PROFICIENT PS-TRE
- WHO IS PROFICIENT AT PS-TRE?
- LINKING STRATEGY TO PERFORMANCE: ONGOING RESEARCH
- CONCLUSIONS
Why assess problem solving in TRE?

- more than 1.5Bn computers in use worldwide (est., ITU)
- 70% of OECD households connected to the Internet, up from 10% in Year 2000 (OECD, 2010).
- 6 bn mobile phone subscriptions in 2012, up from less than 1 bn in 2000 (World Bank).
- 2-digit growth in digital pad sales over the past few years.
A broad range of ICT uses

- Communicating
- Listing, counting
- Informal learning
- Job finding
- Civic life
- Shopping, traveling, entertainment
People use ICT to solve problems

- A situation involving some kind of obstacle or difficulty.
- Involves complex cognitive operations:
  - Problem finding, Problem shaping, and Problem solving per se.
- Involves “Metacognition”: monitoring and self-regulation.
  (Chi, Glaser, and Reeves, 1981; Funke, 2010; Mayer, 1992; Newell and Simon, 1972; Sweller, 1998)
What kind of problems are these?

- Existing problems that people solve differently with ICT (e.g., find out who can or can’t come at your child’s birthday party)
- New problems that can be solved thanks to ICT (e.g., arrange an itinerary from Poitiers to DC)
- Problems that are created by the use of ICT (e.g., « HTTP 404 »)
The definition used in PIAAC

Problem solving in technology-rich environments involves using digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks (OECD, 2010).
The PS-TRE framework distinguishes three dimensions: technology, task and cognitive.
Some facts about the PS-TRE domain of PIAAC

- PS-TRE involved PIAAC participants who were willing and able to use ICT. Across participating countries, 72.8% were included (Sweden: 88%; Poland: 50%)

- PS-TRE assessment included 14 items split into two blocks. 8 received binary scoring while 6 were polytonous

- Completion of a block took approx. 30 minutes.
## Three core proficiency levels

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<tr>
<th>Level</th>
<th>Technology features</th>
<th>Task features</th>
<th>Cognitive processes</th>
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<tbody>
<tr>
<td>1. Basic</td>
<td>- Generic applications&lt;br&gt;- Little or no navigation&lt;br&gt;- Information directly available, no tools.</td>
<td>- Few steps; single operators</td>
<td>- Reach a given goal using explicit criteria; low monitoring; simple match; Categorical reasoning.</td>
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<td>2. Intermediate</td>
<td>- Generic and novel applications; some navigation required; use of tools facilitates operations</td>
<td>- Multiple steps; multiple operators</td>
<td>- Goal may need to be defined; some monitoring; potential impasses; evaluation, integration, transformation of information; inferential reasoning.</td>
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<tr>
<td>3. Advanced</td>
<td>- Generic and novel applications; more navigation required; use of tools required to efficiently solve the problem</td>
<td>- Multiple steps; multiple operators</td>
<td>- Define goal and criteria; high monitoring; high inferential reasoning and integration; evaluate relevance and reliability; frequent impasses</td>
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Younger test-takers tend to perform better,

Age effect larger at low or intermediate levels of education.

Who is proficient at PS-TRE?
Linking strategy to performance

A focus on three representative items:

- “Easy” (#19a, 63% correct): locate specific entry in 200-item list and communicate data through email (bin.)
- “Medium” (#7, 46%): Find best option among a set of items featured in online shopping websites (bin.)
- “Difficult” (#2, 13%): Consider competing demands and make the best arrangements through ad-hoc Web application and email (poly.)
Total number of actions is positively related to performance for easy, medium and difficult items.

Action is key to success
People are more likely to succeed if they follow an optimal path throughout the environments, pages and commands involved in the task.
Summary, conclusions, perspectives

• PS-TRE framework led to theory-based, large-scale assessment of proficiency using naturalistic scenarios.

• Proficiency driven by a combination of task and technology features people can handle, and cognitive processes they can bring to bear.

• Ongoing research work seeks further prediction of performance using fine-grain strategy measures, e.g., function use.
Thank you

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