Education for Future Jobs

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Linking job impact of AI to education

- Shift focus away from jobs to skills

  o What transition is required?
  o Is it feasible?

- Evaluate AI using standardized tests

  o Uses explicit tasks, not vague topics
  o Allows direct comparison with people

  o Contrast to Oxford, McKinsey analyses

Example: OECD's Survey of Adult Skills (PIAAC)

- PIAAC measures 3 widely-used work skills

  o Literacy, numeracy, problem solving with computers

  o 75% OECD workers use these skills every day

  o Huge investment in education to develop them

Example PIAAC Literacy Questions

- International calls   *Level 3*
  - o   Text: website describing how to make international calls
  - o   Question: When would you need to dial 098?
  - o   Instruction: Highlight information to answer the question

- Library search   *Level 4*
  - o   Text: results of library search with titles and brief descriptions of books about genetically modified foods
  - o   Question: What book suggests that the claims for and against genetically modified foods are both unreliable?

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PIAAC Literacy: OECD Adults

Proficiency Level	OECD Adults
2 and below	53%
3	35%
4-5	11%

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PIAAC Literacy: OECD Adults vs. AI

Proficiency Level	OECD Adults	AI
2 and below	53%	Yes
3	35%	Close
4-5	11%	No

Source: Elliott, 2017, *Computers and the Future of Skill Demand*, OECD

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Simple model of skill adjustment

- Cognitive skills – developed in education
- Physical skills – developed outside of education

Cognitive Skills	Physical Skills		
	Low	Medium	High
Low			
Medium			
High			

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Simple model of skill adjustment

Distribution of Current US Employment
by Cognitive and Physical Skills (using O*NET)

Cognitive Skills	Physical Skills		
	Low	Medium	High
Low	0%	0%	0%
Medium	7%	74%	1%
High	1%	17%	0%

Source: Elliott, 2014, Anticipating a Luddite Revival, *Issues in Science and Technology, XXX(3):27-36.*

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Simple model of skill adjustment

Use computers as cognitive assistants

Cognitive Skills	Physical Skills		
	Low	Medium	High
Low	7%	74%	1%
Medium			
High	1%	17%	0%

Simple model of skill adjustment

But the physical skills may develop at the same time

Cognitive Skills	Physical Skills		
	Low	Medium	High
Low	7%	74%	1%
Medium			
High	1%	17%	0%

Simple model of skill adjustment

Also use computers as physical assistants

Cognitive Skills	Physical Skills		
	Low	Medium	High
Low	81%	⬅	1%
Medium			
High	18%	⬅	0%

Simple model of skill adjustment

Potential large-scale automation

Cognitive Skills	Physical Skills		
	Low	Medium	High
Low	81%		1%
Medium			
High	18%		0%

Simple model of skill adjustment

But we don't expect massive unemployment

Cognitive Skills	Physical Skills		
	Low	Medium	High
Low	⬭		1%
Medium			
High	18%		0%

Simple model of skill adjustment

Instead: long-term expansion of remaining jobs

Cognitive Skills	Physical Skills		
	Low	Medium	High
Low			**5%**
Medium			
High	**95%**		**0%**

Simple model of skill adjustment

- Scenario 1: cognitive automation but not physical

  o Need less education

- Scenario 2: both cognitive and physical automation

  o Need much more education

- Conclusion: more education not necessarily the right response

  o It depends on what happens with skills developed outside of education

Improving Skills: PIAAC Literacy Level 4-5

- We can do better than the OECD average of 11%

  o Adults with higher education: 21%

  o Adults in Japan with higher education: 37%

- But improvements are hard

  o <u>Decreased</u> 2 percentage points since 1990s

- No examples at scale with <u>most</u> adults at Level 4-5

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We need more information

- What we don't know

  o Do we need more or less education?

  o Can we move many more people to higher skills?

- Proposed OECD-National Academies program

  o Assess capabilities of AI and robotics in all work skills

  o Compare to human skills and education potential

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