Hype vs. Reality: A.I./Robotics and the impact on employability

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With Sincere Thanks to

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Global Institute
Our World

Volatile
Uncertain
Complex
Ambiguous
Societal Challenges

Greed
Financial Meltdown
Global Warming
Personal Privacy

Intolerance
Religious fundamentalism
Political Absolutism
Personal Challenges

Employability
Belonging
→ Happiness
Economic Challenges

Globalization
Innovation
1) Reform curricula
2) Link to labor market needs
Providers are twice as likely as employers and youth to rate youth as prepared.

Respondents who agree that graduates/new hires are adequately prepared, %

- Employers: 35
- Youth: 38
- Education providers: 74


1 Overall, the entry-level employees we hired in the past year have been adequately prepared by their prehire education and/or training.
2 Overall, I think I was adequately prepared for an entry-level position in my chosen career field.
3 Overall, graduates from my institution are adequately prepared for entry-level positions in their chosen field of study.
Curriculum reflects the late 1800’s
And not today’s world
Nor tomorrow’s
Technology and education are in a race

Source: Goldin & Katz, “The race between education and technology”
Is this time different?
What should students learn for the 21st century™?
For a better world
Coalition of key global players

International organizations
- ERB
- OECD
- UNESCO
- World Bank

Jurisdictions
- Finnish National Board of Education
- KEDI
- Government of Alberta Education
- Ontario
- China
- Korea
- Singapore
- Australia
- Victoria

Academia
- Harvard
- MIT
- Massachusetts Institute of Technology
- Olin College
- Penn
- Stanford University

Foundations & Non-Profits
- Fondation Henri Moser
- Bill & Melinda Gates Foundation
- Hewlett Foundation
- McGraw-Hill Research Foundation
- USCF
- AT&T Foundation

Corporations
- Google
- IBM
- Intel
- Microsoft
- Promethean
- Wolfram
...to redesign education standards... (Math as example here)
...on the basis of all dimensions,

Education with a capital “E”
Leveraging our entire selves

head hand heart
Reassess Knowledge for relevance
Learn Skills
Creativity
Critical Thinking
Communication
Collaboration
Build Character

Intrapersonal:
• Mindfulness
• Curiosity
• Courage
• Resilience

Interpersonal:
• Ethics
• Cooperation
• Leadership
Train metacognition

Learning how to Learn
“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn”

Alvin Toffler
…through the prism of Knowledge
…while incorporating Modern knowledge,
Harness interdisciplinarity
Integrated Fields (reflecting subject domains only)

- Engineering & Technology (M, EE, CS, etc)
  - Maths
  - Physics

- Environmental science
  - Chemistry
  - Biology/zoo/botany
  - Biotech/Synthetic Bio
  - Medicine
  - Geography/Geology
  - Maths

- Anthropology
  - Sociology
  - History
  - Political science
  - Linguistics
  - Mythology/Religions
  - Maths (Stats/Probs)

- Robotics

- Journalism

- Cinema

- Business

- Biosystems

- Social systems

- Wellness

- Skills/Character/Metacognition
  - Systems-centric
  - Ethical

- Language/writing/story
  - Media
  - Communication/Rhetoric
  - Philosophy/ethics/civics
  - Psychology/Sociology
  - Maths (Stats/Probs)

- Storytelling/Poetry
  - Acting/Improv
  - Media Technology
  - Design/Graphism/Arts (decors, photography, etc)

- Economics
  - Marketing
  - Sales/Persuasion
  - Entrepreneurship
  - Law
  - Non-profit too

- Health & Nutrition
  - Sports & exercise & artistic expression (danse)
  - Meditation/yoga
  - Psychology/Neuroscience
  - Spirituality & Morality

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**Knowledge - Traditional**

**Knowledge - Modern**

**Skills**

**Character**

**Metacognition**

**Futures & Economics**

**Learning Sciences**

**Final Consolidation & Reconciliation**
“Event Horizon”: What if formal education cannot catch up?
Protocol

Deep, candid, respectful debates
Keeping in mind our personal biases (psychological and occupational)
Succinct interventions
Off-the-record
Avoiding jargon and acronyms

Q&A from Observers at specific intervals
Worker Tasks in the U.S. Economy, 1960 – 2009:
All Education Groups

- Non-routine Analytical
- Non-routine Interpersonal
- Non-routine Manual
- Routine Cognitive
- Routine Manual
Alarmism?

Yet... alarmism can be good to make policymakers and the public take notice and stave off the problems...
Science or Pseudoscience?

Source: Oxford Martin School: The Future of Employment; September 2013

www.curriculumredesign.org
"All those in favour of accepting more robots?"
Employees of the Month

January: Ethel
February: Matt
March: Frank
April: Carol
May: Marton
July: Tom
August: Autotron
September: Autotron
October: Autotron
November: Autotron

Kanin
The Predictions Are Not Recent

“If every tool, when ordered, or even of its own accord, could do the work that befits it... then there would be no need either of apprentices for the master workers or of slaves for the lords.”

Aristotle, 322 BC
“Darwin among the Machines”

“That the time will come when the machines will hold the real supremacy over the world and its inhabitants is what no person of a truly philosophic mind can for a moment question.”

Samuel Butler, 1863
Recurring Theme

“I have created a machine in the image of a man, that never tires or makes a mistake. Now we have no further use for living workers.”

Fritz Lang’s Metropolis, 1926
Hype Cycle

Source: Gartner Group
We tend to overestimate the effect of technology in the short run... and underestimate the effect in the long run.

Source: Roy Amara, Former President, Institute for the Future
Should we bother?

Human-level AI predictions

Source: MIRI, “Predicting AI”
The difficulty in forecasting technology

It took an extra decade!

- Techie part mostly correct
- Second-order effects were missed:
  - Music
  - Cameras
- No forecast of third-order effects (shopping etc)
- No forecast of confluence of technologies (Internet, etc)
Projection Occupational Employment Trends:
Bank Tellers

1968

• “Important clerical occupations such as secretaries, stenographers, typists, cashiers, bank tellers, mail carriers, postal clerks, and telephone operators are not expected to be heavily affected by the use of computers…”

1980

• “Technological innovations will not affect many types of clerical workers whose jobs involve a high degree of personal contact.”

1992

• “… Employment of bank tellers is not expected to keep pace with overall employment growth in banks and other savings and credit institutions because of the increasing use of automatic teller machines…”

2000

• “… The increased use of ATM machines and Internet banking will reduce the number of tellers.”

Source: David Autor, MIT
Bank Tellers in the U.S. 2000 - 2011

Source: David Autor, MIT
Gas Station Attendants in the U.S. 2000 - 2011

Source: David Autor, MIT
Goals

Via the questions list and agenda, answer: *Is it possible to reasonably predict the impact of AI/Robotics on employment?*

- This conversation is an assessment of the possibility to reach a reasonably robust prediction, not the prediction itself.
- Boundary condition: 5-15 years → NO generalized AI
Thank you!

“What should students learn for the 21st century™?”

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