How will AI transform education?

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What is AI?

The quest to build machines that can reason, learn, and act intelligently.

MIT Technology Review
Framing the Issue
Our problems are problems of scale
Online as a response to scale

- Modality not a solution
- ~50 degrees at scale
2 Sigma Problem

1-1 Tutoring

- Individualized instruction (pace)
- Immediate feedback
- Corrective action
Status of Higher Education

- 7 in high school grad start college
  - Only ½ graduate on time

- Only 7.3% single parents get a degree in 6 years
  - 46% drop out

- Students delaying college after high school:
  Only 13.7% with a degree
  - If working full time: 10.7%
  - No financial assistance from parents: 7.7%

- 38 million working age adults: some college, no degree
Shifting Demographics & Work/Life

By 2035, more Americans of retirement age than people below 18

Western children, 50% chance of living to be 105
Automation
Artificial Intelligence

40% of Americans are in occupational categories that could shrink by 2030.

14.7 million workers under age 34 could be displaced by automation.

4x higher risk of displacement for workers with high school diplomas or less.
Churn of Knowledge

In 2015, $160 Billion in the U.S and $356 Billion globally spent in corporate education and training

HBR, 2018

39% of large company executives barely able or unable to find the talent they need

Deloitte survey
1
Transforming Learning
Personalized Learning

- **Student-content interactions**
  - Curriculum pathways
  - Pace of learning
  - Location of learning
- **Student-student interactions**
  - Asynchronous and just in time
- **Student-faculty interactions**
  - Asynchronous, whenever, wherever
  - Informed by student performance (learning analytics)
- **Student-institution interactions**
  - Alerts, nudges, advising to guide learning
4 D’s of Robotization

- Dear
- Dangerous
- Dirty
- Dull
The Dull

- How long does the paper need to be? Can it be double-spaced?
- Is there an upper page limit to the paper?
- How do I submit the paper?
- Are we required to attend the online office hours?
- Can I get my degree plan approved?
When the Teaching Assistant Is a Robot

Faculty members experiment with artificial intelligence in the classroom

Ashok Goel, a computer-science professor at Georgia Tech, is surrounded by his teaching assistants, including "Jill Watson" (on the screen), a question-answering software program.
Gmail can now autocomplete entire emails with a new feature called Smart Compose — here’s how to turn it on

But the ‘Smart Compose’ feature seems to get better the more time you spend with it and is still in its early stages, so Google could tweak it in future.
Georgia State University supports every student with personalized text messaging.
2
Transforming Curriculum & Learning Spaces
Impact on Jobs

Impact on Curriculum

- Truck drivers
- Customer service personnel
- Accountants
- Lawyers
- Doctors
- Teachers
- Where courses need to improve
- Natural language processing (scrubbing course forums)
- Safe learning - extreme learning
- Creative thinking for solving non-routine problems
- Not what you know, but what you can do with what you know
- Soft skills - curiosity, critical thinking
“Never again is someone going to pay you to answer a question that they can look up on Wikipedia. School is really for solving interesting problems.”

Seth Godin, Best-selling author, EDUCAUSE 2011
45% undergraduates show no statistically significant gains in critical thinking, complex reasoning, written communications.

2300 undergraduates in 24 institutions over 4 years.
“Though the university community is a major force of innovation in our society, it is curiously resistant—even hostile—to innovations attempted within the university.”

Teacher preparation

- Create content
- Deliver content
- Facilitate and guide (advise) learning
- Assess learning

- Instill curiosity
- Inspire critical thinking
- Encourage flexibility
- Reinforce collaboration
Cultivating Ethics, Inclusion, & Social Justice
THIS IS YOUR MACHINE LEARNING SYSTEM?

YUP! YOU POUR THE DATA INTO THIS BIG PILE OF LINEAR ALGEBRA, THEN COLLECT THE ANSWERS ON THE OTHER SIDE.

WHAT IF THE ANSWERS ARE WRONG?

JUST STIR THE PILE UNTIL THEY START LOOKING RIGHT.
● 7% of users produce 50% of the posts on Facebook

● 4% of users produce 50% of the reviews on Amazon

● 0.04% of Wikipedia’s registered editors (about 2000 people) produced the first version of half the entries of English Wikipedia
Jill Watson Doesn’t Care if You’re Pregnant: Grounding AI Ethics in Empirical Studies

Jill Watson is our name for a virtual teaching assistant for a Georgia Tech course on artificial intelligence. Jill answers routine, frequently asked questions on the class discussion forum. In this paper, we outline some of the ethical issues that arose in the development and deployment of the virtual teaching assistant. We posit that experiments such as Jill Watson are critical for deeply understanding AI ethics.
Diversification of Education & Workforce

- Distributed learning & work as an important tool of diversification
- AI depends on diversity of data

19% Higher revenue due to innovation when management is diverse
1. Transforming Learning
2. Transforming Curriculum & Learning Spaces
3. Cultivating Ethics, Inclusion, & Social Justice
Our response?

http://popin.it/kmv34a
How will AI transform education?

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Resources

https://elearningindustry.com/ai-is-changing-the-education-industry-5-ways
https://www.sciencedirect.com/science/article/pii/S1877050918315382
https://towardsdatascience.com/survey-d4f168791e57