Lorsque vous entendez les mots « Intelligence Artificielle », quelle est la première chose qui vous vient à l'esprit ?
Artificial Intelligence (AI)

- AI is already here and can do some amazing things.
- AI affects our daily lives in many different ways.
- But we usually don't recognise it as AI.
  Instead, we call it computer games, or WhatsApp, or passport control, or self-driving cars, or proactive policing, or...
  ...and robotics is only one application of AI.
Artificial Intelligence and education

AI and education: 3 buckets (categories)

- Student-facing AI
- Teacher-facing AI
- System-facing AI

Learning with AI
- Learning about AI
- Preparing for AI

- How AI works
- AI techniques
- Ethics of AI
Learning with AI: **system-facing**

- AI technologies that automate aspects of school or university administration, including:
  - admissions,
  - timetabling,
  - learning management,
  - attendance recording,
  - predicting which students are at risk of failure...

Learning with AI: **student-facing**

There are many different types.
Intelligent Tutoring Systems (ITS)
- Alef
- ALEKS
- BluePop
- AmritaCREATE
- Aroad
- Assignments
- Byju's
- Century
- Civitas
- Cogbooks
- Cognii
- DomoLab
- EriLearn
- Inq-ITS
- iReady
- Knewton
- Liulishuo (Laix)
- Mathia
- Qubela
- Realized
- Smart Learning Partner
- Quantum
- eRoad
- Smart Sparrow
- Snappet
- Safos
- Squirrel AI
- Toppr
- Thinkster Math
- Toppr

Dialogue-based Tutoring Systems
- AutoTutor
- CIRCSIM
- SCHOLAR
- Watson Tutor

Exploratory Learning Environments
- Betty's Brain
- Crystal Island
- ECHOES
- Fractions Lab

Automatic Writing Evaluation
- e-Rater
- Intelligent Essay Assessor
- OpenEssayist
- PEG
- Revision Assistant
- Write to Learn
Learning with AI: student-facing

Automatic Essay Writing
- AI Writer
- Articolo
- Conversion.ai
- Essay Toolbox
- Essaybot
- Marlowe
- MyEssayBot
- Sassbook
- WordAI
- ...

Welcome
Welcome to Essaybot's Smart Editor, which will help you finish an essay in minutes. We will guide you through the automated writing process.

Learning with AI: student-facing

Learning Network Orchestrators
- Smart Learning Partner
- Third Space Learning

Language Learning
- TAL AI Language Teaching System
- Babbel
- Duolingo
- Ersikli (Alelo)
- Lingvist
- LAIX
- IEnglish
- ...and many others

ITS +
- ALP
- Alt School
- Lumilo
- Cognitive and Immersive Systems Lab

Lumilo
Wayne Holmes

Learning with AI: **student-facing**

Chatbots

- ADA
- Genie
- EduBot
- LaMDA
- (Woebot – for mental health)
  ... and many others

Learning with AI: **student-facing**

Smart curation of learning materials

X5GON Discovery

Search and find materials from all over the world

Search for CER Material

Learning with AI: **teacher-facing**

Learning with AI – **teacher facing**

Student-facing AI + dashboard ≠ Teacher-facing AI
Learning with AI: teacher-facing

Support for Teachers
With innovative teacher tools to learn and resources for implementation, this site offers a rich selection of lesson plans, activities, videos, and more, all from a trusted collection of educational support materials.

Teacher Advisor

Learning about AI

AI Techniques
- Classical AI (symbolic AI)
- Machine learning
- Artificial neural networks
- Deep learning
- ...

AI Technologies
- Natural language processing and generation
- Image recognition and processing
- Autonomous agents
- Affect detection
- Data mining for recommendation
- Artificial creativity
- ...

Artificial Intelligence and education

Student-facing AI
Teacher-facing AI
System-facing AI
Learning about AI
How AI works
How to create AI
Application of AI
Preparing for AI
Living with AI
Human values
Ethics

Learning about AI

AI Technologies
- Classical AI (symbolic AI)
- Machine learning
- Artificial neural networks
- Deep learning
- ...

Learning about AI
Preparing for AI

The AI Now Institute at New York University is an interdisciplinary research center dedicated to understanding the social implications of artificial intelligence.

Limits of Artificial Intelligence

Computers now better than humans at recognising and sorting images.
Wayne Holmes

Limits of AI

• A human chooses and cleans the data.
• A human labels the data.
• A human designs the network.
• A human trains the network.
• A human curates the outputs and makes the value judgements.

Limits of AI

Panda
57.7% confidence

Gibbon
99.3% confidence

Limits of AI

Tay
[USA]
Racist and sexist comments

BabyQ
[China]
Online defamation

Rinna
[Japan]
Professed a love for Adolf Hitler

Luda
[Korea]
Offensive comments about disability and homosexuality

Limits of AI

Lighter skin males
100%

Darker skin males
98.7%

Lighter skin females
92.9%

Darker skin females
68.6%
Wayne Holmes

Limits of AI

“Machine learning methods offer great promise for fast and accurate detection and prognostication of coronavirus disease 2019 (COVID-19). Our review [of 2,212 studies] finds that none of the models identified are of potential clinical use.”

Roberts et al. 2021, Nature Machine Intelligence

The ethics of Artificial Intelligence and education

The ethics of AI and education

Data
What data is collected
(is the data private, consent given?)
What proxies are being used/misused?
How is the data analysed
(there’s no such thing as raw data)
What are the implications?

Holmes et al. (2021) Ethics of AI in Education: Towards a Community-Wide Framework. International Journal of AI in Education

The ethics of AI and education

Algorithms
How do we prevent algorithmic biases?
How do we guard against mistakes?
How do we protect against unintended consequences?
How do we stay in control?

Holmes et al. (2021) Ethics of AI in Education: Towards a Community-Wide Framework. International Journal of AI in Education
The ethics of AI and education

- Self-fulfilling teacher expectations?
- Unsustainable techno-solutions?
- Gender and ethnic biases?
- De-professionalising teachers?
- Accuracy and validity of assessments?
- Student agency?

Holmes et al. (2021) Ethics of AI in Education: Towards a Community-Wide Framework. International Journal of AI in Education

Replacing or augmenting teachers?

"Unfortunately we didn’t have a good experience using the program, which requires hours of classroom time sitting in front of computers... The assignments are boring, and students feel as if they are not learning anything... It’s severely damaged our education, and that’s why we walked out in protest.”

Washington Post newspaper, November 2018
Replacing or augmenting teachers?

"I don’t dare be distracted after the cameras were installed in the classrooms. It’s like a pair of mystery eyes are constantly watching me."
Exam monitoring

Proctoring software:
- Uses the computer’s camera, microphone and web browser to record test-takers
- Often requires a room scan to ensure the student is alone
- Validates identity using biometric measures like facial recognition or keystroke analysis
- Doesn’t allow test-takers to leave the view of the camera or to look away from the screen too many times for too long.
- Uses AI to automate the monitoring.

University monitoring

The systems represent a new low in intrusive technology, breaching students’ privacy on a massive scale. The tracking systems will infantilize students, further training them to see surveillance as a normal part of living, whether they like it or not.”

(Stokel-Walker, 2020)

Automated essay grading

Fooling by gibberish and highly susceptible to human bias, automated essay-scoring systems are being increasingly adopted.
Wayne Holmes

Automated essay grading

“Computers cannot measure the essentials of effective written communication: accuracy, reasoning, adequacy of evidence, good sense, ethical stance, convincing argument, meaningful organization, clarity, and veracity, among others.


Automated continuous assessment

Replacing examinations:

• “Stop and test” assessments do not rigorously evaluate a student’s understanding of a topic.
• “Artificial intelligence-based assessment provides constant feedback to the teacher, students and parents about how the student learns, the support they need and the progress they are making towards their learning goals.” (Luckin, 2017)

The ethics of AI and education

• Do no harm.
• Doing things ethically vs. doing things that are ethical.
• Transparency.
• Avoiding bias.
• Unintended consequences.
• Autonomy.
• Student agency.
• Surveillance
• Addressing diversity.
• Opening up the black box.
• Misuse of personal information.
• Earning and maintaining trust.
• Equity of access.
• Implications of predictions.
• Back-door privatisation.
• Sharing information.
• Student agency
• Marginalization of vulnerable populations.

The ethics of AI and education


<table>
<thead>
<tr>
<th></th>
<th>+ve</th>
<th>-ve</th>
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<tbody>
<tr>
<td>Automatic writing evaluation</td>
<td>Automatic formative assessment</td>
<td>Inaccurate summative assessment</td>
</tr>
<tr>
<td>Intelligent Tutoring Systems</td>
<td>Personalised learning</td>
<td>Limited student agency</td>
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<td></td>
<td>(in limited domains)</td>
<td>Lack of human interaction.</td>
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<td>Campus monitoring</td>
<td>Monitoring student well-being</td>
<td>Continuous surveillance</td>
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<tr>
<td>Emotion detection</td>
<td>Move students from -ve to +ve emotions to enhance learning</td>
<td>Compromised privacy (the final frontier?)</td>
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<tr>
<td>Continuous assessment</td>
<td>No more exams</td>
<td>Continuous surveillance</td>
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In summary…

- AI is clever but not as clever as many people claim.
- AI is likely to have a major impact in education.
- AI has the potential to transform education – for good, but also for bad.
- Educators, learning scientists and policymakers must engage with computer scientists and AI developers, to ensure that AI and education meets real needs and addresses the common good.

Further reading…

Intelligence Unleashed: An Argument for AI in Education
Technology-enhanced Personalised Learning: Untangling the Evidence
Artificial Intelligence in Education: Promises and Implications for Teaching and Learning
AI and Education: Guidance for Policymakers

Thank you for listening.

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