What is it about AI that makes it useful for teachers and learners?

Professor Rose Luckin
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Founder
rose@educateventures.com
1st: Mechanization, water power, steam power
2nd: Mass production, assembly line, electricity
3rd: Computer and automation
4th: Cyber Physical Systems
Technology capable of actions and behaviours “requiring intelligence when done by humans” (2018)
A Perfect Storm

Data, plus very sophisticated AI, plus computing Power and Memory
What AI are you already using?
How can data be used to improve learning?

Data is the ‘new oil’, and is the power behind AI

BUT it is UNREFINED

DATA can also be the power behind Human Intelligence

BUT it is UNREFINED
What are the implications of AI for Educators?
AI and Education

1. Using AI in Education to tackle some of the big educational challenges

2. Educating People about AI so that they can use it safely and effectively

3. Changing Education so that we focus on human intelligence and prepare people for an AI world
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What are the implications of AI for Educators?

- **ACTION 1**: Using AI in Education to tackle some of the big educational challenges
- **ACTION 2**: Changing Education so that we focus on human intelligence and prepare people for an AI world
- **ACTION 3**: Educating People about AI so that they can use it safely and effectively
AI can adapt based on data about learners/teachers...
Is Education Ready for AI?
AI in Education Today: Adaptation
MATHiaU™

The 1-to-1 math coach college students can count on.
AI can recommend based on data about learners/teachers...
Learn more. Teach better.

Discover tutorials that help all teachers prepare for a digital future!

REGISTER HERE
AI can sense data learners/teachers’ behaviours...

... and then advise/recommend
AI in Education Today: Early years

Science-based A.I. platform that monitors child’s language and cognitive development and guides parents through a personalised and home-based curriculum

Working with:

Goldsmiths
University of London

THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

THE UNIVERSITY OF
SYDNEY
AI in Education Today: Early years

Evidence-based A.I. platform that monitors child’s language and cognitive development and guides parents through a personalised and home-based curriculum.

AI/NLP MONITOR:
We monitor the quantity and quality of early parent-child talk.

01 MONITOR
02 ANALYSE
03 IMPROVE

Shaping positive parenting habits

PERSONALISED:
Activity ideas
Book & Toy Bundles
Expert consultations

VISUAL PROGRESS
SHAREABLE REPORTS
GAMIFICATION
AI can sense and adapt based on multiple sources of data about learners/teachers...
SimSensei uses backchannel behavior to indicate listening.
Data is very important — it is what makes machine learning AI function.
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The 7 steps to AI Readiness: ETHICAI

There are seven key steps to getting your organization ready to leverage the transformational power of AI. These can be found in the ‘ETHICAI AI Readiness’ framework:

1) **Educate, enthuse, excite** – about building within your community an AI mindset
2) **Tailor and hone** - the particular challenges you want to focus on
3) **Identify** – identify (wisely), collate and
4) **Collect** – new data relevant to your focus
5) **Apply** - AI techniques to the relevant data you have brought together
6) **Learn** – understand what the data is telling you about your focus and return to STEP 5 until you are AI ready
7) **iterate**

And all these steps should be done ETHICALLY
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Important points to note

• This is simplified
  • It is vital to make all existing assumptions explicit, question them and check that they are correct

• This is about how AI could help us understand our challenges?
• ONLY THEN we can properly assess how AI could help us tackle the challenge
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And all these steps should be done ETHICAlly
1. Interdisciplinary Academic intelligence
2. Meta-knowing intelligence
3. Social intelligence
4. Meta-cognitive intelligence
5. Meta-subjective intelligence
6. Meta-contextual intelligence
7. Perceived self-efficacy
Machine Learning and Human Intelligence
The future of education for the 21st century

Rosemary Luckin
When teaching was delivered online for many students and then hybrid with some students in school and others at home — what happened to continuity and quality?

<table>
<thead>
<tr>
<th>Criteria – 10 steps</th>
<th></th>
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</thead>
<tbody>
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<td>✅</td>
</tr>
<tr>
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<td>probably</td>
</tr>
<tr>
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</tr>
<tr>
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<td>not very</td>
</tr>
<tr>
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What can data offer for ensuring the quality of teaching and learning?

What data do I need?

What data the research says I should collect?
Data that other people have already collected and analysed as well

- **Open knowledge maps**
  - [https://openknowledgemaps.org/](https://openknowledgemaps.org/)

- **Digital promise research map**
  - [http://researchmap.digitalpromise.org/](http://researchmap.digitalpromise.org/)
What can data offer for ensuring the quality of teaching and learning?

What data do I need?

What data the research says I should collect?

What relevant data do I have access to?

Synthesis
Where do we start?

Where might the data about an organization and the people who are part of it be found?

Or we could ask:

What are the **data sources**?
Example Data Sources

Log Data
from Interactions with technology, including and button clicks

Historical Data
From Tests, Interviews and Videos

Video data from which Eye-Movements can be detected
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Let’s add some new data

- **Log Data**
  - from Interactions with technology, including and button clicks

- **Historical Data**
  - From Tests, Interviews and Videos

- **Video data from which Eye-Movements can be detected**

- **Behavioral Data**
  - From a survey
Remember the ETHICS
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What are our ingredients – the data we have collated and collected?

Log Data
from Interactions with technology, including and button clicks

Historical Data
From Tests, Interviews and Videos

Video data from which Eye-Movements can be detected

Behavioral Data
From a survey
What are our ingredients – the data we have collated and collected?

- Log Data from Interactions with technology, including and button clicks
- Historical Data From Tests, Interviews and Videos
- Video data from which Eye-Movements can be detected
- Behavioral Data From a survey
AI for analysis and understanding
What are our ingredients – the data we have collated and collected?

Log Data
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Work Flow

collated, cleaned, organized transformed data set
Modeling Using Machine Learning techniques to profile interactions and make predictions

Behavioral Data e.g. Questionnaires
Historical Data From Tests, Interviews and Videos
Log Data from Interactions
Multimodal Data From Eye-Movements and Button clicks

Interaction Profiles
Natural Groupings enable Profiles

The groupings that cluster analysis can produce enable the identification of profiles.

In this example profiles of different sorts of educational interaction can be identified, for example it may show that one interaction profile has high values for small group sessions in science with high levels of activity by students when at home.
Profiling four types of interaction, using four features
1. The average amount of online activity by students as shown in the log data;
2. The geographic location of the student: home or school;
3. The style of the interaction: whole class or small group collaboration;
4. The use of technology: just the online platform or online platform and additional technology;

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Profiling four types of interaction, using four features
Could it be that the patterns that we clustered relate to other data that we have access to?
For example data from the survey about student confidence?

Profile 1
Profile 2
Profile 3
Profile 4

Average level of self-reported confidence about learning

Profile 1
Profile 2
Profile 3
Profile 4

Profiles 1, 2, 3, and 4 are represented in the graph.

Additional tech
School
Active Students
Home
Whole group
Online only
Profile 2
Profile 3
Profile 4
For example data from the survey about student focus and attention
But, remember this is just an example

These are the sorts of questions that AI can help you answer
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How might AI in education evolve?
What might happen if we connected more disciplines?

**Could we** catalyse a revolution in how we learn to transform education and training to meet the needs of a dynamic and challenging world.

**How?** By connecting our understanding of the neural and informational structures that support and influence learning in the brain to the way those structures shape and are shaped by learning in the world.

**By answering this question:** How can we connect learning as it occurs in the brain with how people learn with artificial and human others in the world?

**Tools:** software and wearable technology for real-time readout of brain state and behaviour to facilitate self-regulation and knowledge acquisition.

**Capacity building:** a community of scientists and educators who will realise the potential of our science ethically and equitably for the benefit of society.
Detect learning states from neural data

Address technical challenges observing neural data in reliable, valid, practical ways in real-world learning settings.

Specify types of neural data and their cleaning, processing, and modelling.

Apply learning science to the design of AI algorithms

Adapt to each learner’s needs, based on neural, cognitive and behavioural data using human or software,

Ensure that the way that AI interprets the neural, cognitive and behavioural data will be accessible by learners, educators, and parents.
Tara and Ethan seem stuck... Maria has been idle a while...

14 students combining unlike terms
9 students transforming one side only

Zzz...
Implications for Education

Educating people about AI so that they can use it safely and effectively

http://instituteforethicalaiineducation.org
Education is crucial – regulation will never be enough.
References and Resources


**AI Readiness**

Downloadable videos can be found here: [https://www.educateventures.com/webinars](https://www.educateventures.com/webinars)
Discussion Prompts

• What are the greatest challenges for educators when it comes to understanding what AI is capable of achieving?
• How best could the data that is held in schools be leveraged to support school development?
• Which of the challenges that educators and learners face do you believe to be the most important and suitable for the application of AI?
• How best can the education ecosystem be encourage to work together to understand the best role for AI to play?