

Exploring futures for Artificial Intelligence in education

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AI: What are we talking about?

“Technologies used to allow computers to perform tasks that would otherwise require human intelligence, such as visual perception, speech recognition, and language translation”

– Scotland’s AI Strategy, 2021

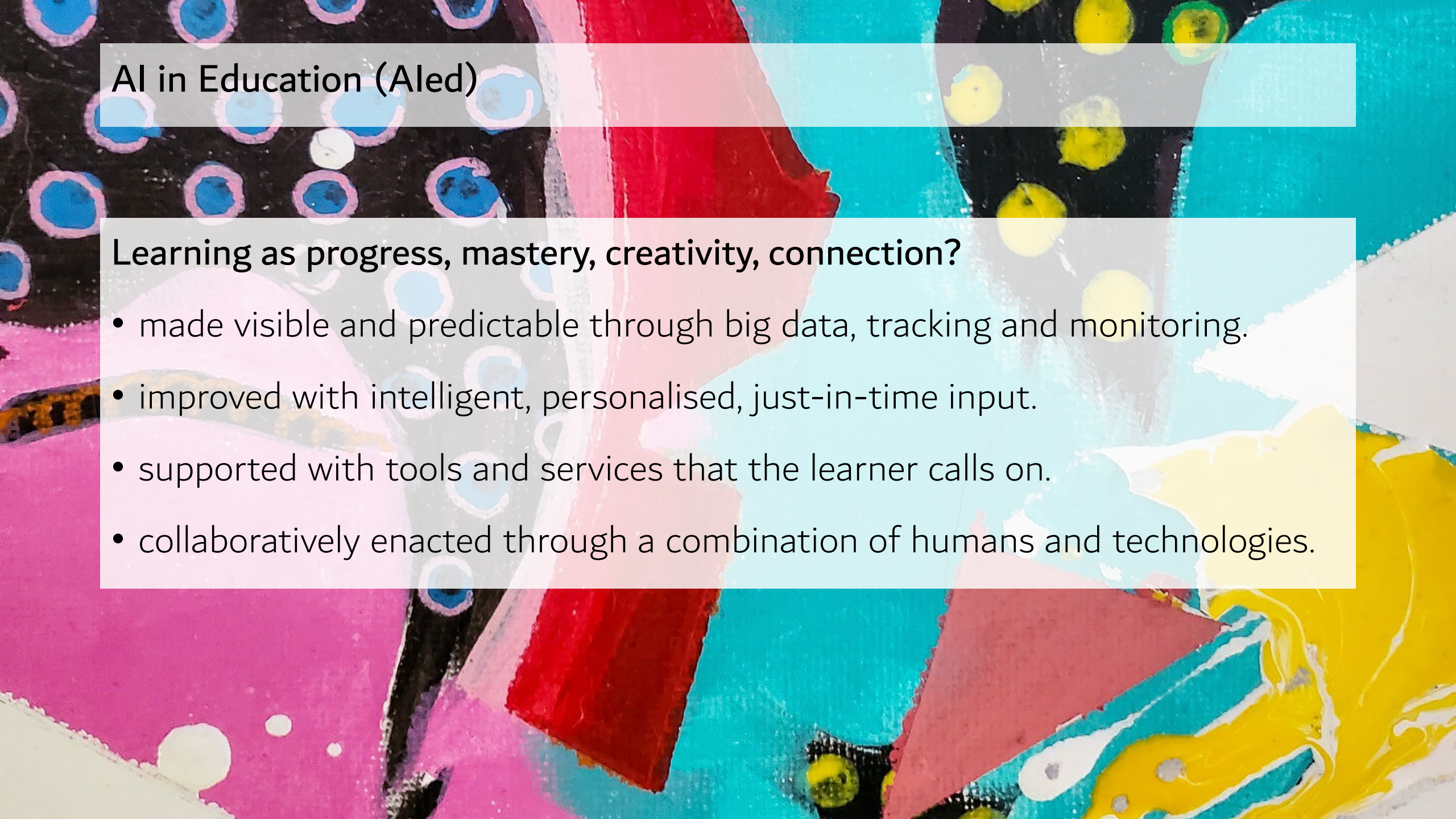
“machines that can learn from their own experience, adapt to their contexts and uses, improve their own functioning, craft their own rules, construct new algorithms, make predictions, and carry out automated tasks without requiring control or oversight by human operatives”

– Williamson and Eynon 2020

AI: What are we talking about?

“AI is whatever hasn't been done yet. Software and algorithms developed by AI researchers are now integrated into many applications, without really being called AI” (Woolf 2015)

“AI [mostly] enters education through mundane back-end AI-as-a-service plug-ins, rather than in the more spectacular guise of automated pedagogic agents or tutoring systems” (Williamson & Eynon 2020)

The background is a vibrant, abstract collage. It features large, irregular shapes in shades of red, cyan, yellow, and pink, which appear to be torn pieces of paper or fabric layered together. Interspersed among these are numerous small, circular splatters and dots in various colors, including blue, yellow, and white, set against a dark background. The overall effect is one of dynamic, creative energy.

AI in Education (Aled)

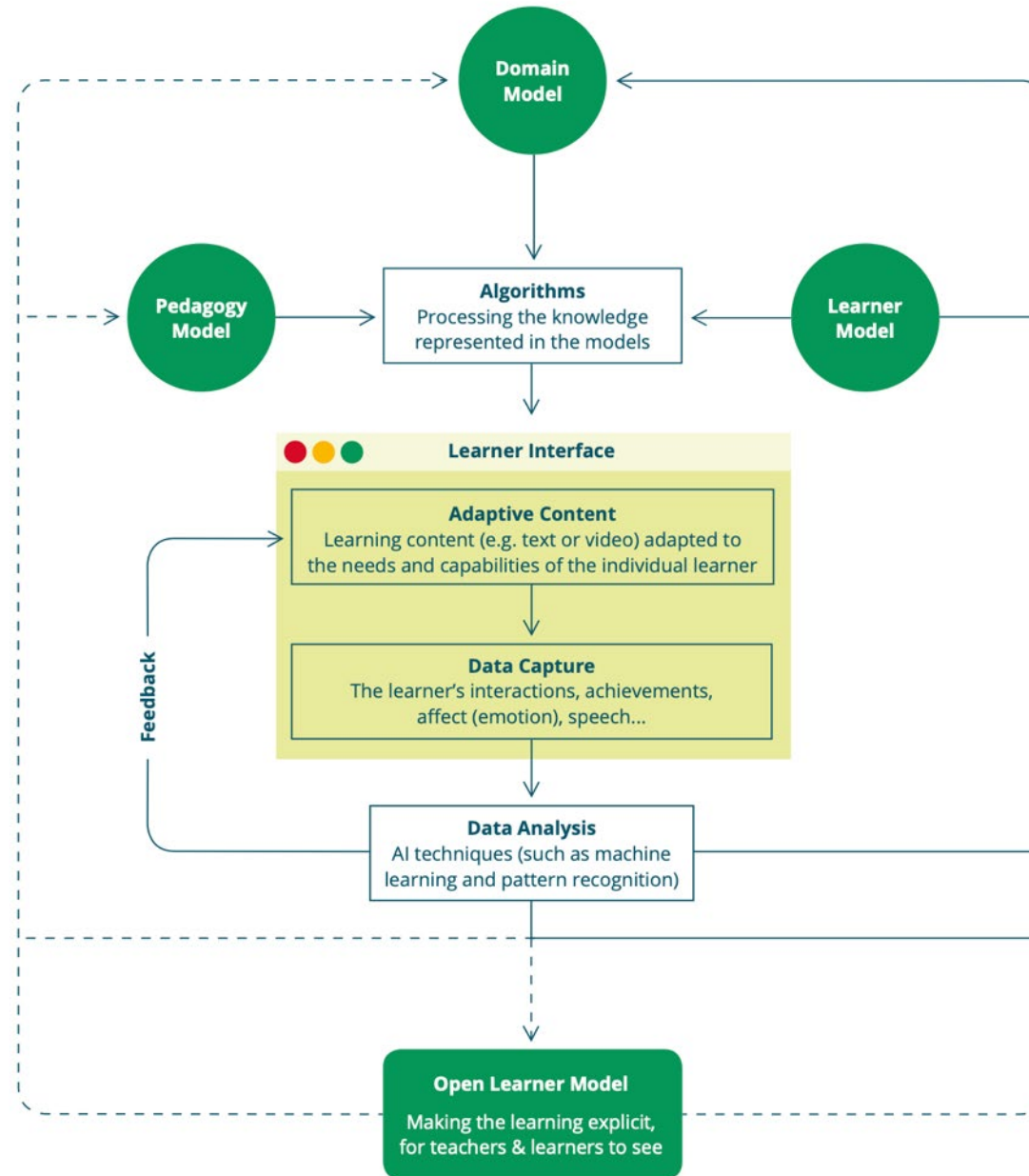
Learning as progress, mastery, creativity, connection?

- made visible and predictable through big data, tracking and monitoring.
- improved with intelligent, personalised, just-in-time input.
- supported with tools and services that the learner calls on.
- collaboratively enacted through a combination of humans and technologies.

AI in Education (Aled) – the ‘teacher function’

1. human teachers focus on personal, expert, complex tasks and interactions with students, while more routine, administrative and other tasks are automated.
2. human teachers focus on delivering content, while automated, intelligent systems ensure students receive this content in suitable ways, and test their attainment.
3. intelligent tutoring systems, automated essay grading, automated creation of personalized pathways combine as the teacher function with little human input.
4. human and non-human nodes in a network generate knowledge across time, space and between contexts.

AIEd system showing a simplified picture of a typical model-based adaptive tutor.



it's big business... but how much is hot air?

it has been estimated that the global market for AI products in education is set to expand from \$1.1 billion in 2019 to \$25.7 billion by 2030. At the same time, developers and vendors of AI systems are already claiming impressive learning gains, as adaptive learning software begins to be taken up across school systems. – Facer & Selwyn 2021

Proponents claim [AI] is able to accurately infer emotional states, while an academic review in the journal Psychological Science in the Public Interest has argued strongly that it simply cannot do this... for AI to be used in schools, it must be subject to rigorous testing to prove it can actually do as claimed – Scarff 2023

AI and Education (beyond Aled)

A range of tools and processes were not particularly created for educational purposes, but are finding purchase amongst teachers and learners.

- Generative AI for images, text, code and more
- Virtual assistants and voice applications
- Chatbots
- Recommendation systems

Some tools may be influenced by our educational and ethical principles... others perhaps not.

Are we on the cusp of big shifts in how people write, create, and consolidate knowledge?

What does this mean for education?

Unexpected impacts

New and emerging technologies complicate the picture of who or what might be automated through augmented and artificial intelligence

- a vision of the now-desirable human teacher as “absolutely present and who is coaching, not lecturing, flexible, willing to speed up, and ready to work whenever and wherever” (Ideland 2021)
- Cram101 may be able to synthesise textbooks into study guides, thus saving students time which they could use to study more... However, being able to discern what’s important from what isn’t when studying is a key skill in itself which may be lost. (Scarff 2023)

AI controversies

- automation in workplaces and public services;
- algorithmic forms of bias and discrimination;
- automated reproduction of inequalities and disadvantage;
- regimes of data-centred surveillance and algorithmic profiling;
- disregard of data protections and privacy;
- political and commercial micro targeting;
- control by technology corporations.

Williamson & Eynon 2020

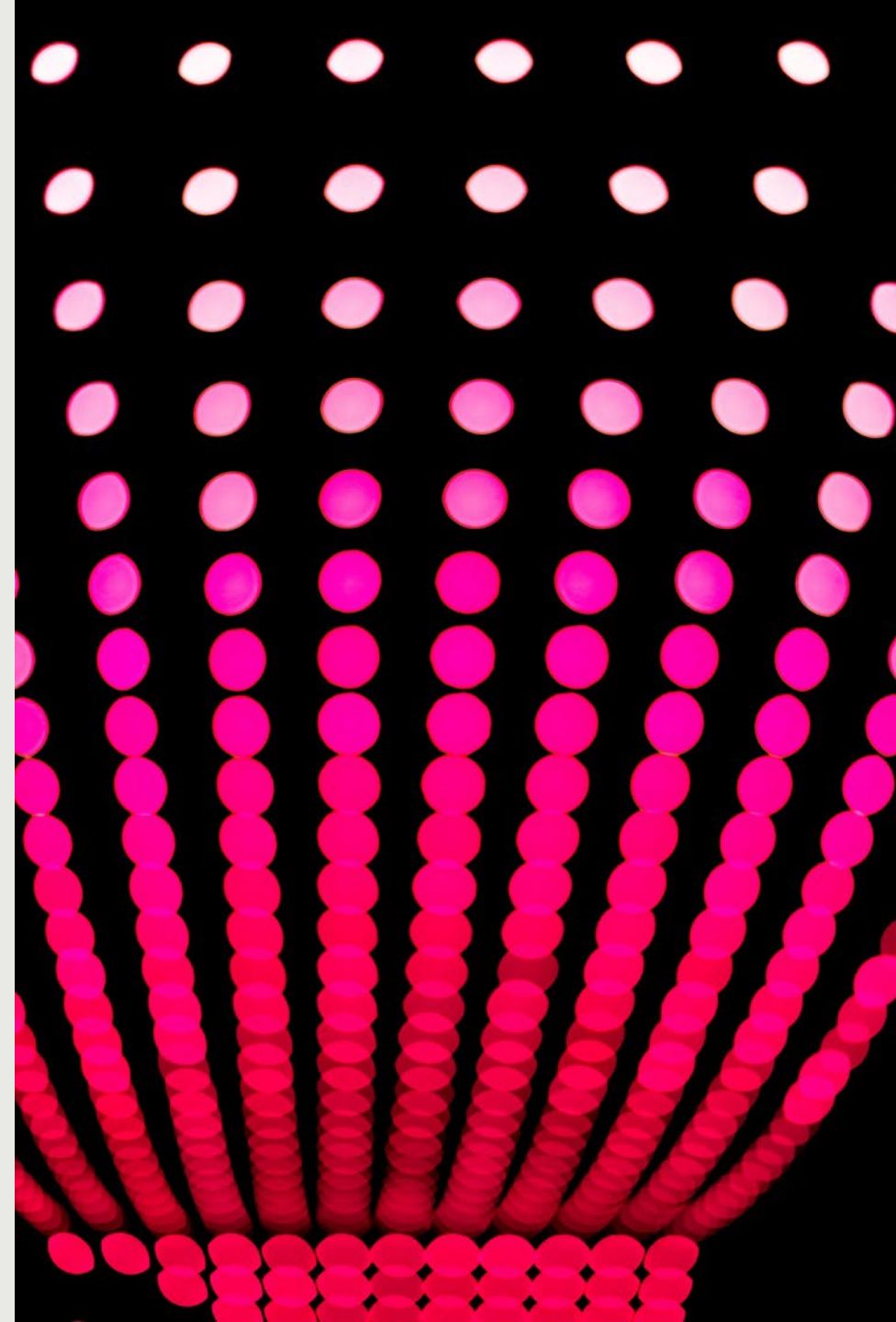
AI and our values

“We are a society that treats all our people with kindness, dignity and compassion, respects the rule of law and acts in an open and transparent way” - Scotland’s National Performance Framework

How do we “advance [educational] values and facilitate better educational experiences, rather than adding to teachers’ workloads or undermining their work”? (Gallagher and Brienes 2021)

- 1** AI should benefit people and the planet by driving inclusive growth, sustainable development and well-being.
- 2** AI systems should be designed in a way that respects the rule of law, human rights, democratic values and diversity, and they should include appropriate safeguards – for example, enabling human intervention where necessary – to ensure a fair and just society.
- 3** There should be transparency and responsible disclosure around AI systems to ensure that people understand AI-based outcomes and can challenge them.
- 4** AI systems must function in a robust, secure and safe way throughout their life cycles and potential risks should be continually assessed and managed.
- 5** Organisations and individuals developing, deploying or operating AI systems should be held accountable for their proper functioning in line with the above principles.

OECD Principles on Artificial Intelligence, 2019



How ChatGPT could be incorporated and used to augment teaching and learning

Role ⁶	Description	Example of implementation
Possibility engine	AI generates alternative ways of expressing an idea	Students write queries in ChatGPT and use the Regenerate response function to examine alternative responses.
Socratic opponent	AI acts as an opponent to develop and argument	Students enter prompts into ChatGPT following the structure of a conversation or debate. Teachers can ask students to use ChatGPT to prepare for discussions.
Collaboration coach	AI helps groups to research and solve problems together	Working in groups, students use ChatGPT to find out information to complete tasks and assignments.
Guide on the side	AI acts as a guide to navigate physical and conceptual spaces	Teachers use ChatGPT to generate content for classes/courses (e.g., discussion questions) and advice on how to support students in learning specific concepts.
Personal tutor	AI tutors each student and gives immediate feedback on progress	ChatGPT provides personalized feedback to students based on information provided by students or teachers (e.g., test scores).
Co-designer	AI assists throughout the design process	Teachers ask ChatGPT for ideas about designing or updating a curriculum (e.g., rubrics for assessment) and/or focus on specific goals (e.g., how to make the curriculum more accessible).
Exploratorium	AI provides tools to play with, explore and interpret data	Teachers provide basic information to students who write different queries in ChatGPT to find out more. ChatGPT can be used to support language learning.
Study buddy	AI helps the student reflect on learning material	Students explain their current level of understanding to ChatGPT and ask for ways to help them study the material. ChatGPT could also be used to help students prepare for other tasks (e.g., job interviews).
Motivator	AI offers games and challenges to extend learning	Teachers or students ask ChatGPT for ideas about how to extend students' learning after providing a summary of the current level of knowledge (e.g., quizzes, exercises).
Dynamic assessor	AI provides educators with a profile of each student's current knowledge	Students interact with ChatGPT in a tutorial-type dialogue and then ask ChatGPT to produce a summary of their current state of knowledge to share with their teacher/for assessment.

UNESCO AI policy recommendations:

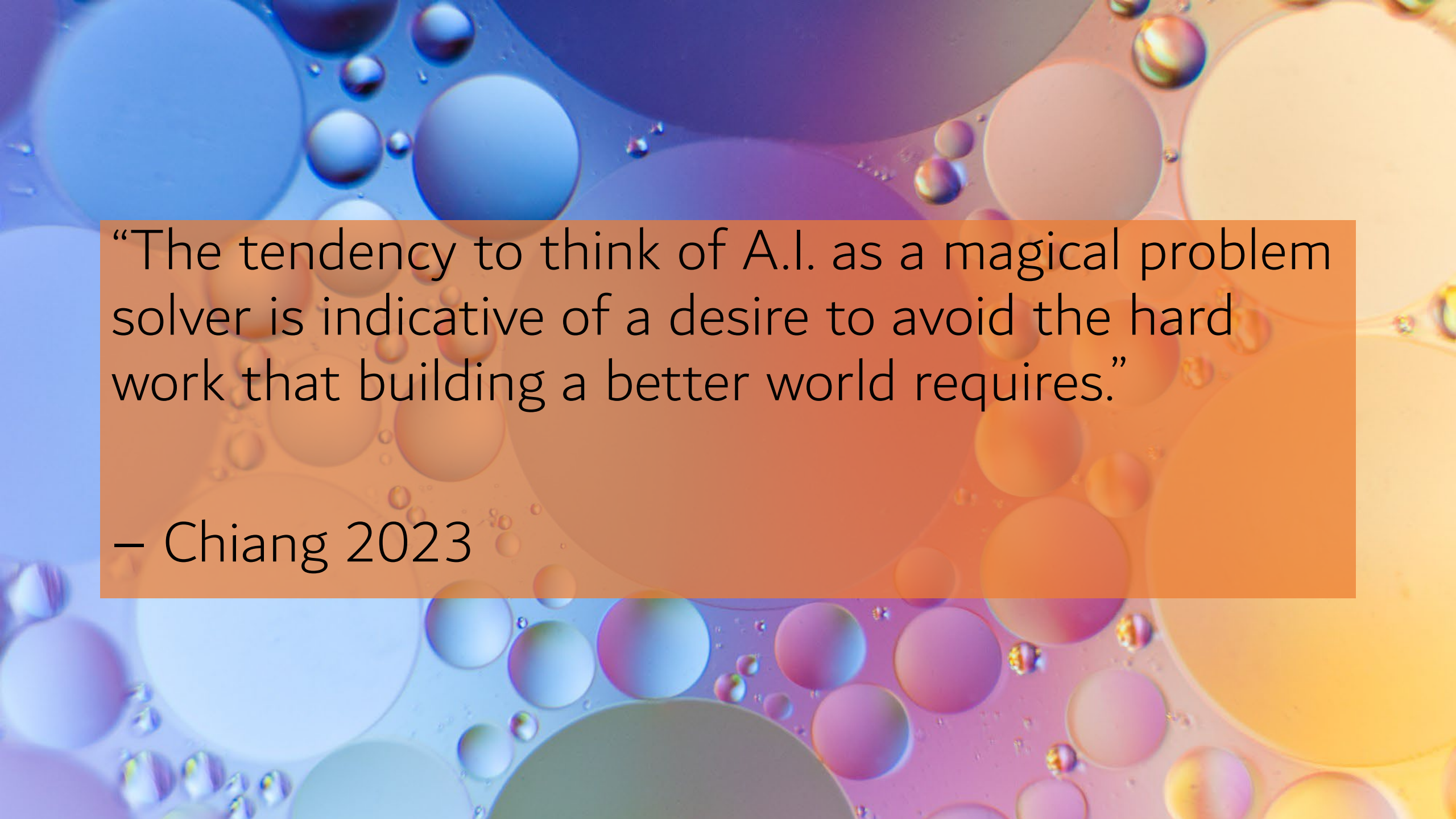
1. A system-wide vision and strategic priorities
2. Overarching principle for AI and education policies
3. Interdisciplinary planning and inter-sectoral governance
4. Policies and regulations for equitable, inclusive, and ethical use of AI
5. Master plans for using AI in education management, teaching, learning, and assessment
6. Pilot testing, monitoring and evaluation, and building an evidence base
7. Fostering local AI innovations for education.

2023 UNESCO Quick start guide: ChatGPT and Artificial Intelligence in higher education

<https://unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196>

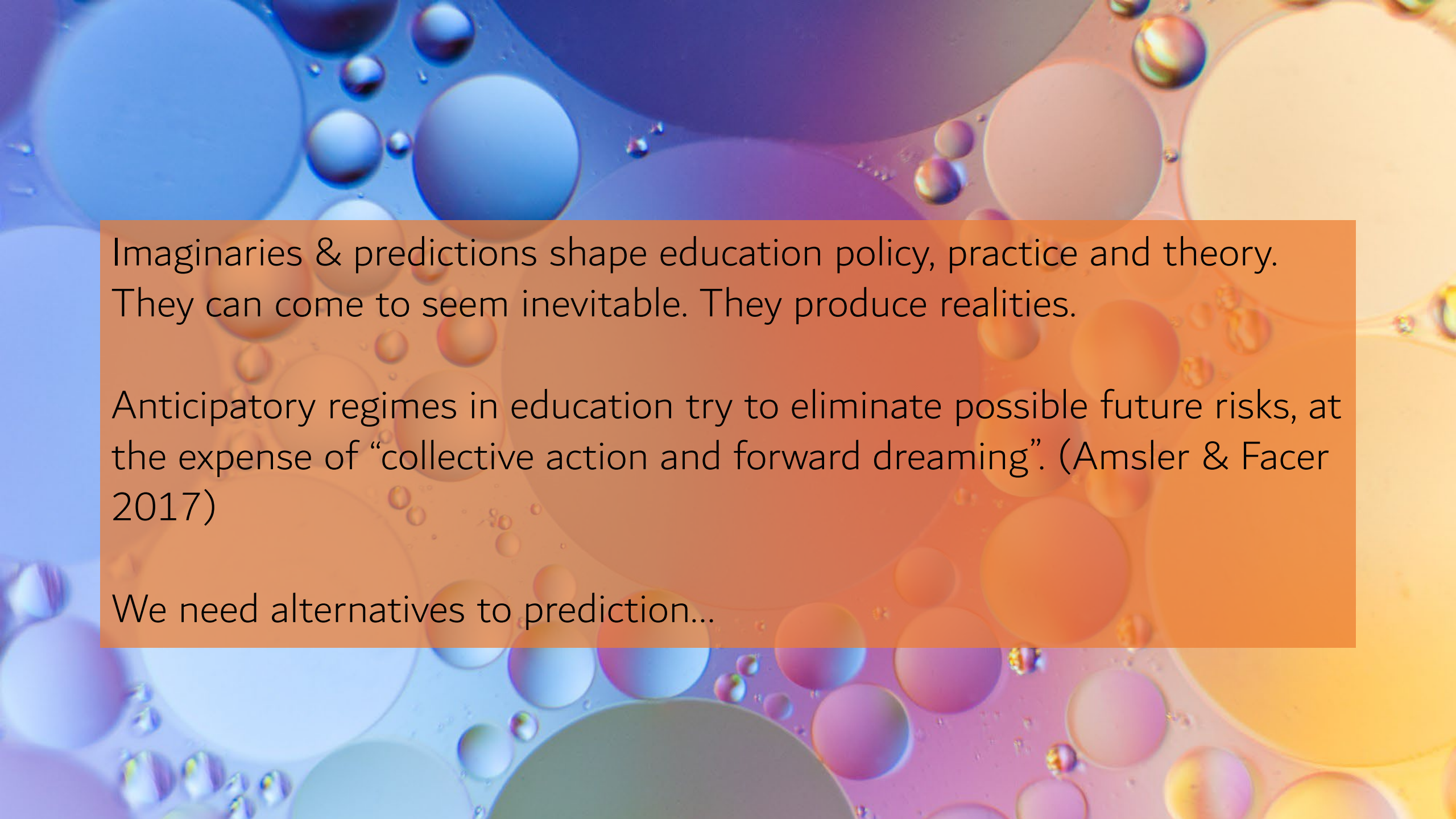


Why speculate?



“The tendency to think of A.I. as a magical problem solver is indicative of a desire to avoid the hard work that building a better world requires.”


– Chiang 2023



Imaginariness & predictions shape education policy, practice and theory. They can come to seem inevitable. They produce realities.

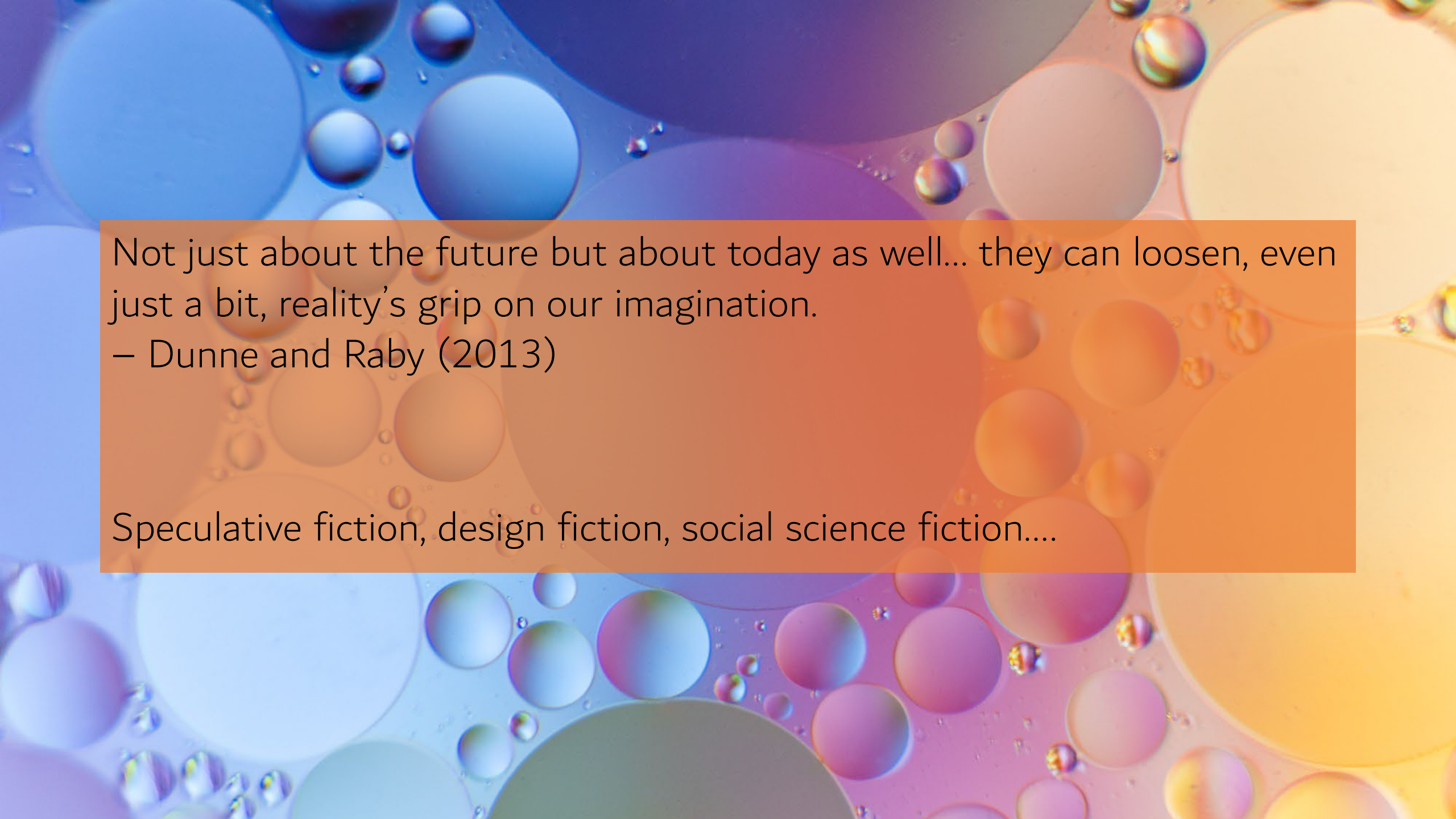
Anticipatory regimes in education try to eliminate possible future risks, at the expense of “collective action and forward dreaming”. (Amsler & Facer 2017)

We need alternatives to prediction...



A speculative approach works with the future as a space of uncertainty, and uses that uncertainty creatively in the present. It engages with emergence and complexity in educational futures, values playful, imaginative, glitchy and strange encounters and is responsible to the future.

– Ross, 2023



Not just about the future but about today as well... they can loosen, even just a bit, reality's grip on our imagination.

– Dunne and Raby (2013)

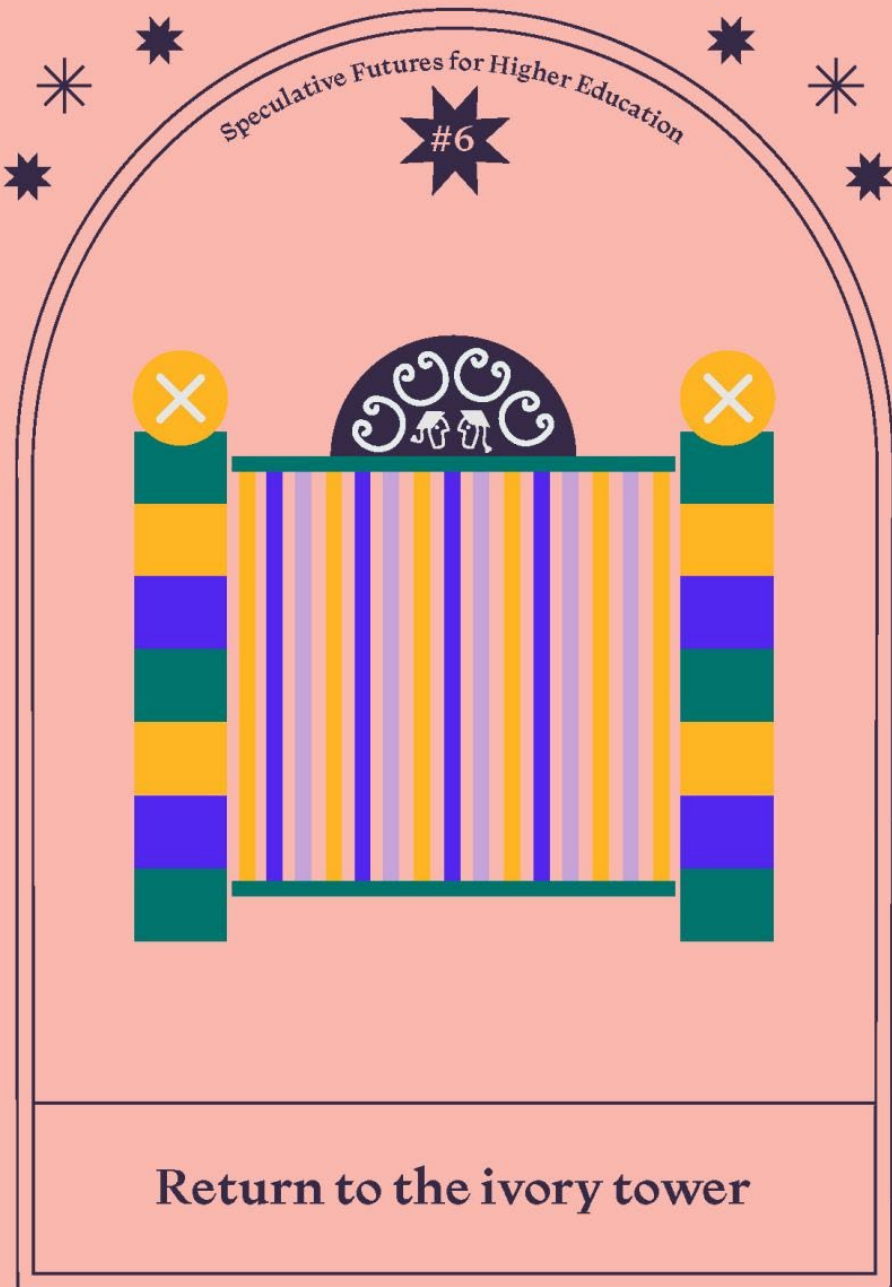
Speculative fiction, design fiction, social science fiction...



Machine learning and AI are university infrastructure. AIs do all the heavy lifting of academic work from literature reviews to student assessment.

Surveillance is pervasive – no-one cares because the gains are significant. Data is sifted, sorted and pushed to students, academics and administrators with infinite granularity.

AI-enabled analysis of historic, behavioural and neuro data provides instant, just-in-time categorisation of students' capacities.



Widening participation policies have failed as automation decimates semi-skilled work.

In-depth academic study is now only for a small number likely to move into 'elite' roles.

Universities have returned to severely capped intakes and one-to-one tuition.

The gated physical campus is once again the locus of university life.



Automation has taken all the jobs. Paid work has ceased to be the defining activity of adult humans.

Everyone now has time for lifelong higher education. The humanities, creative and arts-based disciplines reign supreme.

However humans are struggling to understand what they are for.

Let's speculate...

What kinds of human-AI collaborations would we consider exciting and positive for education in Scotland?

Our scenario

How should we think about assessing and measuring learning if AI assistants and creators become ubiquitous?

Your task

In groups of 4 or 5: each group gets one perspective to take in considering this scenario (teacher, student, parent and so on)

For about 15 minutes, have a discussion in your group about what this future might be like, and might feel like.

Then, consider the following questions (and make some notes to share back to the full group):

1. What AI technologies and practices do you think are significant for this person?
2. What are the exciting and positive aspects of this future from this perspective?
3. What are the concerns and risks?
4. What questions does your group have?

Thank you!!

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