An unstoppable force meets an immovable object

Expertise and AI in professional education

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A few caveats and assumptions…

- Early stages of developing these arguments.
- Some of these claims are speculative and possibly too optimistic.
  - We will continue seeing an acceleration in AI development.
  - Leading to an increase in competence and the ability to complete real-world tasks.
  - Continued reduction in bias and hallucination (although these will probably never be eliminated), leading to an increase in trust.
- I am a techno-optimist.
- The typical classroom is not the ideal classroom.
- *Care* is expensive.

Overview

- Theme: Teaching and learning in low-resource settings.
- Claim: **Generative AI reduces the degree to which access to expertise is an obstacle to learning**.
- Argument:
  - Generative AI is an expert mentor in a wide range of knowledge domains;
  - Providing universal access to previously silo'd (and expensive) expertise;
  - Which threatens the status of the university;
  - Where new education paradigms will take advantage of expertise-on-demand;
  - So that health professions education will soon look very different.

Things you may have heard

- **Biased**. The collective consensus of humanity (at least, of those who create internet content).
  - People are biased.
- **Hallucination** (i.e. makes things up).
  - People confabulate all the time.
- No **data provenance**. We cannot trace anything back to a source.
  - Why do any of us have our beliefs and values?
- **Energy intensive**, net producer of CO_2.
  - But not more than industry, transport, etc.

Generative AI (e.g. ChatGPT, Claude, Bard)

- Generative AI is a **next-word-predictor**.
- Generative AI is **multimodal** (i.e. they can see, hear, and speak).
- Generative AI is increasing in **competence**.
  - Plugins, APIs, and the new GPTs mean that we can connect foundation models to 3rd party services e.g. physics engines, Wolfram|Alpha.
- Generative AI is **everywhere**.
  - OK, maybe not yet, but soon. Computer operating systems, productivity software, cars, phones. Intelligence-on-demand. For everyone. For free.
- Generative AI is **simple**. We are programming computers with natural language.

Experts...

- Have extensive knowledge and experience in a particular domain, which typically takes years to develop.
- Apply knowledge to solve problems, make decisions, and achieve goals.
  - They don't just know facts, they know how to use them.
- Intuitively understand and judge complex situations.
- Convey complex ideas simply, communicating skill development and knowledge effectively.

Generative AI is an expert

- Generative AI has:
  - Expertise within, and across, professional domains.
  - Extensive knowledge, and the ability to apply it in creative ways.
  - The ability to understand and navigate complexity.
  - Expert communication skills.
- Generative AI gives us access to expertise through natural language.
- Constantly getting better at producing accurate responses to increasingly complex questions (i.e. larger context windows).
- Don't ask it for answers. Ask it for ideas.
- Moving from *information* abundance, to *expertise* abundance.

Personal learning

- Connect complex concepts to personally meaningful experiences.
  - Something that the best teachers might regard as a core skill.
  - Example: "Explain ACL rehabilitation, using the metaphor of Formula One racing."
- Students don't need expertise in a knowledge domain to progress their learning in that domain.
- Generative AI makes learning personal in a way that professional programmes cannot do at scale.
  - Because it's too expensive.
  - Oxford / Cambridge tutorial system comes close (see previous point).

Here is an attempt to explain ACL rehabilitation using a Formula One racing metaphor:

The ACL or anterior cruciate ligament is like the suspension system on a Formula One race car. It helps provide stability and allows the driver to take tight turns at high speeds without crashing. When an ACL tears, it's like the suspension failing on the race car. Suddenly the car loses stability and crashes easily with any abrupt steering maneuvers.

Just like the race car needs repairs before getting back on the track, the knee needs ACL reconstruction surgery. This involves grafting a new ACL using a tissue graft to replace the torn ligament. This is like installing a new, sturdy suspension system on the race car.

After the new ACL is in place, rehabilitation is critical, just as race cars need testing and tuning. Early ACL rehab focuses on reducing swelling and regaining range of motion, like getting that race car back to operating specs after sitting in the garage. Middle stage rehab builds strength in the muscles surrounding the knee to support it, similar to the fine tuning of the race car engine and related systems. Late stage ACL rehab works on power, balance and agility, getting that high performance vehicle ready to handle turns at speed.

The final phase of rehab after ACL reconstruction is all about control as the driver tests out the car at higher and higher speeds around the track. The goal is to rebuild trust and confidence in the knee so the patient can securely return to sports or other activities, very much like the race car driver pushing his car to the limit as he prepares to race. With dedication and hard work, both the race car and the knee joint recover to full capacity.

Copy Retry

"Use generative AI to replace me"

Use these prompts:

- What does it mean to say…?
- How do I connect…?
- Can you explain this…?
- When do I know…?
- Can you give me feedback on…?
- When is the best time…?
- Can you give me another example…?
- Can you help me practice…?
- How can I improve…?

Don’t use these prompts:

- Write my essay for me.
- Tell me what to do.
- Give me the answer.

Privileged role of universities

- Professional degree programmes are the gatekeepers and validators of expertise, with a monopoly on access.
- But, if generative AI enables universal, cheap, and reliable access to expertise, what value does the professional programme add?
  - Social and professional networks, diverse worldviews, personal experience.
  - But, these features are available outside the university.
  - We underestimate the value of *cheap and universal* access.
- Universities – and professional degree programmes – may soon lose their monopoly on access to, and accreditation of, professional expertise.

New education paradigms

- New education paradigms will emphasise:
  - **AI-first**: Redesigned from the ground up with generative AI in mind.
  - **Personal learning**: Contextualised learning resources, created on demand.
  - **Project-based**: Create something useful.
  - **Authentic assessment**: No artificial boundary between learning and assessment.
  - **Skills**: An emphasis on real-world problems.
- Threaten the role of universities as the gold standard for regulated learning.
- New education paradigms don't need to be better than the best programmes; they only need to be **cheaper than the average**.

Integrated student-AI ecosystems

- Institutions (and some countries) initially tried to ban generative AI.
- Current focus on maintaining a separation between the student and AI.
- Reluctant acceptance of the technology with strong constraints.
  - "Systems domesticate technology" (see *MOOCs*).
- But, students and AI will form an integrated knowledge ecosystem, capable of developing expertise.
  - See *distributed cognition*.
- Assessment reform is OK. **Education reform is better**.
  - Socio-technical systems.
  - Complex adaptive systems.

We've heard this all before (haven't we?)

- **Rate of change** in AI makes adaptation difficult, even when stakeholders are motivated to change.
- Generative AI is **widely available** through web-services, increasing access to anyone with an internet connection.
- AI can be **integrated into existing services** and platforms, rapidly expanding capabilities.
- AI can provide **personalised expertise** through customisable interfaces, increasing the likelihood of adoption.
- **Automation** and virtualisation can significantly reduce the cost of learning at scale.

Raise our expectations

- You have access to the most advanced software ever created, and you...used it to write an essay?
  - Also, how many physiotherapists write essays?
- Or did you:
  - Recognise a local need and start a business?
  - Build an app for marginalised service-users?
  - Launch a website for your community project?
  - Create a marketing campaign for a new service?
  - Build a product that patients want?
- Generative AI enables all the above.

Expertise-on-demand

- What capabilities are enabled when everyone has access to a:
  - Disciplinary expert?
  - Teacher?
  - Mentor?
  - Critical friend?
  - Writing coach?
  - Literature reviewer?
  - Research assistant?
- What are the implications for professional education on a global scale, when generative AI is embedded into everything?

Summary

- Universities have historically had a monopoly on expertise.
- Generative AI will enable universal and cheap access to increasingly reliable professional knowledge and technical expertise.
- This abundance of expertise will disrupt the privileged role of professional degree programmes in regulated learning.
- New education paradigms will emerge, with AI in central roles, which universities will find difficult to replicate.
- AI is an unstoppable force. **When will the university realise that it is no longer an immovable object?**

Thank you

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