Learning and Assessment in (and for) a digital world

Professor Margaret Bearman
Centre for Research in Assessment
and Digital Learning (CRADLE), Deakin
University
**Second International Virtual Meeting
on Teaching, Learning and Evaluation
in Higher Education 23 Nov 2021**

DEAKIN
UNIVERSITY

Agenda

Living in a digital world

Higher education at the crossroads

21st century skills?

"Robot-proofing"

Focus on assessment

Living in a digital world

Postdigital

"A state in which the disruption brought upon by information technology has already occurred"

Cramer, F. (2015). What is 'Post-digital'?. In Postdigital aesthetics (pp. 12-26). Palgrave Macmillan, London.

"At June 2020, **nearly all [people between the ages of 18 and 35] (99%) had a smartphone** as their main phone handset **and connected to the internet multiple times a day using a mobile phone (95%)**"

Australian Communications and Media Authority Report May 2021

Since the COVID-19 pandemic began, young people increased[11]:

watching video content
more than those aged 35+ (44% vs 36%)

participation in social media
more than those aged 35+ (25% vs 18%)

web browsing
more than those aged 35+ (41% vs 28%)

online shopping
more than those aged 35+ (40% vs 28%)

studying online from home
more than those aged 35+ (51% vs 38%)

Australian Communications and Media Authority Report May 2021

Ways of knowing have changed

"…with the onset of digital reason, perhaps **a new kind of truth value** is emerging…"

Barnett, R., & Bengtsen, S. (2017). Universities and Epistemology: From a Dissolution of Knowledge to the Emergence of a New Thinking. Education Sciences, 7(1), 38.

New forms of knowledge: an epistemic crisis?

"…where emotional response prevails over factual evidence and reasoned analysis. Accuracy and transparency give way to algorithmic analyses of what people prefer to hear…"

Dahlgren, P. (2018). Media, knowledge and trust: The deepening epistemic crisis of democracy. Javnost-The Public, 25(1-2), 20-27.

Higher education at the cross roads

Photo by Mike Enerio on Unsplash

DEAKIN
UNIVERSITY

"… right now, higher education is at a major crossroads. The impact of massive shifts in society due to the Fourth Industrial Revolution, with the double whammy of COVID-19 leads to an entire sector requiring deep, urgent, radical change"

Macken, C., Hare, J., & Souter, K. (2021). Higher Education in the Time of Disruption. In *Seven Radical Ideas for the Future of Higher Education* (pp. 1-13). Springer, Singapore. p. 2.

"...**education is the most powerful tool that can be leveraged against disruption**. Future employees must be able to interact with machines, and **tertiary education in particular must be capable of developing those skill sets**, both for the sake of the global economy, and to ensure its own survival amidst a variety of alternative education providers."

Macken, C., Hare, J., & Souter, K. (2021). Higher Education in the Time of Disruption. In *Seven Radical Ideas for the Future of Higher Education* (pp. 1-13). Springer, Singapore. p. 2

Comes to a bigger debate

"The argument and debate over higher education are often framed as a dichotomous question: **Is the purpose of higher education to promote individual success or to promote the common good?**"

Blessinger, P., Sengupta, E., & Makhanya, M. S. (2021). Unlocking the Potential of Higher Education by Serving the Common Good. In *The Promise of Higher Education* (pp. 337-343). Springer, Cham.

Higher education is not just producing labour

" …things that go beyond work readiness: so very much about community readiness and community engagement and understandings of **the context in which they teach** and not just the classroom technical skills. …" (Education academic)

21ˢᵗ century skills?

Photo by Nick Harsell on Unsplash

21st century skills

"Core" 21st century digital skill dimensions: technical; information management; communication; collaboration; creativity; critical thinking; problem solving.

"Contextual" 21st century digital skill dimensions: ethical awareness; cultural awareness; flexibility; self-direction; lifelong learning.

Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. Computers in human behavior, 72, 577-588.

Employer perspectives

"...**employers** observed that these graduates were **well prepared in terms of their professional presentation and verbal communication skills, as well as in their ability to use new technology.** Conversely, employers observed ... [**n**]**ew project management graduates** generally **lack confidence in asking for help, responding to confrontational situations, applying basic construction knowledge and professional writing ability**..."

Borg, J., & Scott-Young, C. M. (2020). Employers' perspectives on work readiness in construction: are project management graduates hitting the ground running?. International Journal of Managing Projects in Business, 13(6), 1363-1379.

So comm skills and digital skills good but still some "21st century deficits".

BUT higher education needs to prepare graduate for skills that are as yet unknown by employers...

# The challenge of the 4th industrial revolution

"Every day we see the emergence of new technologies. And every day we see **a widening gap between progress and society's ability** to cope with its consequences… the changes we see around us **threaten to overwhelm us** if we cannot collaborate to understand and direct them."

Schwab https://www.weforum.org/agenda/2016/10/four-leadership-principles-for-the-fourth-industrial-revolution/

A particular concern for those of us who work with knowledge, either through teaching or research is "artificial intelligence" (AI).

AI is already undertaking a considerable amount of cognitive work on our behalf…

Robot proofing
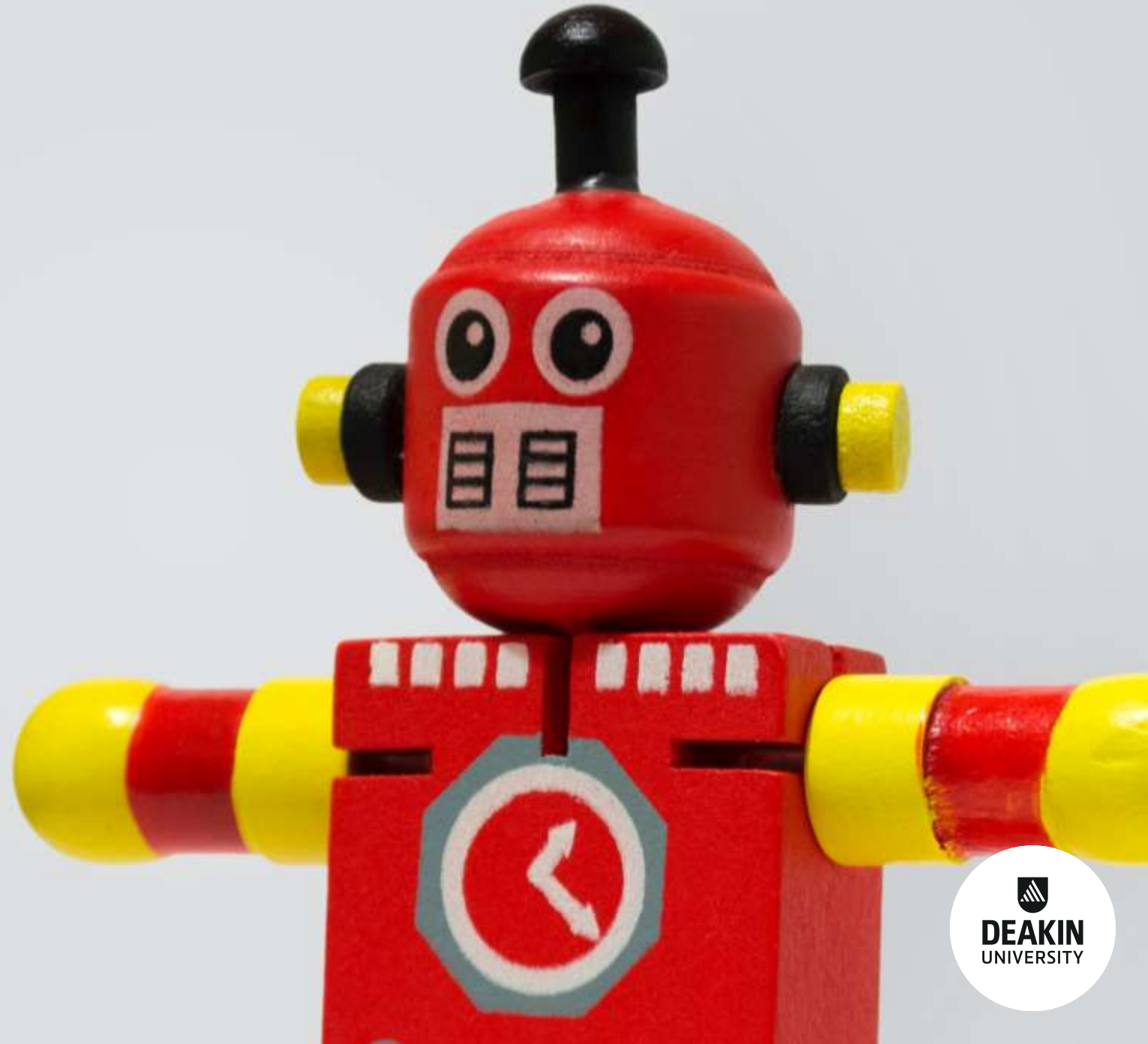
"Robot-proofing" higher education

"...an education for the digital age needs to focus not just on technology and understanding what technology can do but also what it cannot do – at least for now and perhaps never. In other, words a **robot-proof education nurtures our unique capacities as human beings** ..."

Aoun, J. E. (2017). Robot-proof: higher education in the age of artificial intelligence. MIT press. pg 48

DEAKIN UNIVERSITY

Defining AI

Technology offering the "best possible action in a situation".

Russell, S., & Norvig, P. (2016). *Artificial intelligence: a modern approach.* p. 30.

"Smart" things that AIs already do for us

Tax returns

Facial recognition

Pathology image recognition

… and a whole host of things we take for granted: spell check, google, voice recognition

Design for this slide

DEAKIN
UNIVERSITY

What type of knowledge work does artificial intelligence do well?

- Identify patterns in text, image and space

- More accurately (for the most part) than humans

- Exponentially faster than humans

- And at scale

Some types of knowledge work that are uniquely human …

Knowing how you know – personal epistemology

Knowing what makes 'good work' – evaluative judgement

Luckin, R. (2018). *Machine Learning and Human Intelligence: The future of education for the 21st century.* UCL IOE Press.

Bearman, M., & Luckin, R. (2020). Preparing university assessment for a world with AI: tasks for human intelligence. In *Re-imagining University Assessment in a Digital World* (pp. 49-63). Springer.

In other words, humans produce and legitimise knowledge

and they know how knowledge is produced and legitimised.

People can (but machines can't)

Hold a multiplicity of perspectives

Determine what constitutes knowledge

Develop knowledge tools, such as standards.

Make judgements about how standards play out in particular local contexts.

So for me, **the future of higher education in a digital world should include teaching these uniquely human forms of knowledge work…**

And I'd like to start with **assessment.**

Focus on assessment

University assessment is a "moral activity " through which institutions and educators reveal their values both by *what* is assessed and *how.*

Knight (1995) *Assessment for Learning in Higher Education* Pg 13

Change assessment and you change everything

Evaluative judgement

Evaluative judgement: "capability to identify quality of work of both self and others".

Graduates need to be able to construct their own sense about quality within a unique practice environments.

Assessment can promote evaluative judgement through cycles of self, peer and educator assessment.

Tai, J., Ajjawi, R., Boud, D., Dawson, P., & Panadero, E. (2018). Developing evaluative judgement: enabling students to make decisions about the quality of work. Higher Education, 76(3), 467-481; Bearman, M., Brown, J., Kirby, C., & Ajjawi, R. (2021). Feedback that helps trainees learn to practice without supervision. *Academic Medicine*, *96*(2), 205-209.

Evaluative judgement - undergraduate

"I visited this site in Brighton and observed that the concrete slab has been pulled up for some reason. Basically, it is considered ineffective operation on construction site because this activity must affect the cost and time of original planning. It also affected the bricklayers while they were building the poles at the back of the house and the circulation was interrupted by the concreter fixing the floor in the middle of the way"'.

Gladovic, C., Tai, J. H. M., & Dawson, P. (2021). Qualitative approaches to researching evaluative judgement in pedagogical activities: a case study. Assessment & Evaluation in Higher Education, 1-14.

Evaluative judgement - postgraduate

'Textbook knowledge by itself was not a marker of quality in the frequently uncertain world of general practice: *"[You] realise that a lot of these rules and things that we are taught are very black and white, and that's not true in the context of the person's life and circumstances...."'*

Bearman et al. (2021 in press) Learning to recognise what good practice looks like: how general practice trainees develop evaluative judgement *Advances in Health Sciences Education*

Assessment tasks that promote evaluative judgement prompt students to grasp:

"What qualities make this a good piece of work?"

"If I were to set the criteria for success what would they look like?"

"How do I know if I've done a good job?"

We can explicitly ask students to articulate:

What type of knowledge is held within this task?

How would I/we articulate quality in this task?

What part of this task is better done in collaboration with others, by machine, with conjunction with machines?

Bearman, M., & Luckin, R. (2020). Preparing university assessment for a world with AI: tasks for human intelligence. In Re-imagining University Assessment in a Digital World (pp. 49-63). Springer,.

"Robot-proofing"

These types of assessments need to be central.

Mostly we put knowledge recall work as the centre plank of assessment

Reflective diary 10%, recall-based exam 50%

BUT we need our assessments to promote complex applications and articulations around knowledge.

For this, we need to teach explicit kinds of knowledge work

Not just 'what I know' but 'how I know' and 'how do I know that this is quality work'

Bearman, M., & Ajjawi, R. (2021). Can a rubric do more than be transparent? Invitation as a new metaphor for assessment criteria. Studies in Higher Education, 46(2), 359-368.

Bearman, M., Brown, J., Kirby, C., & Ajjawi, R. (2021). Feedback that helps trainees learn to practice without supervision. Academic Medicine, 96(2), 205-209.

"Sophisticated" knowledge work is a key capability for a digital world

Photo by DEAR on Unsplash

DEAKIN
UNIVERSITY

In conclusion

- We live in a digital world

- Higher education has to take the road not yet travelled

- 21st century skills might be part of the answer

- But their current formulation doesn't necessarily help with AI

- New forms of knowledge work start with assessment.