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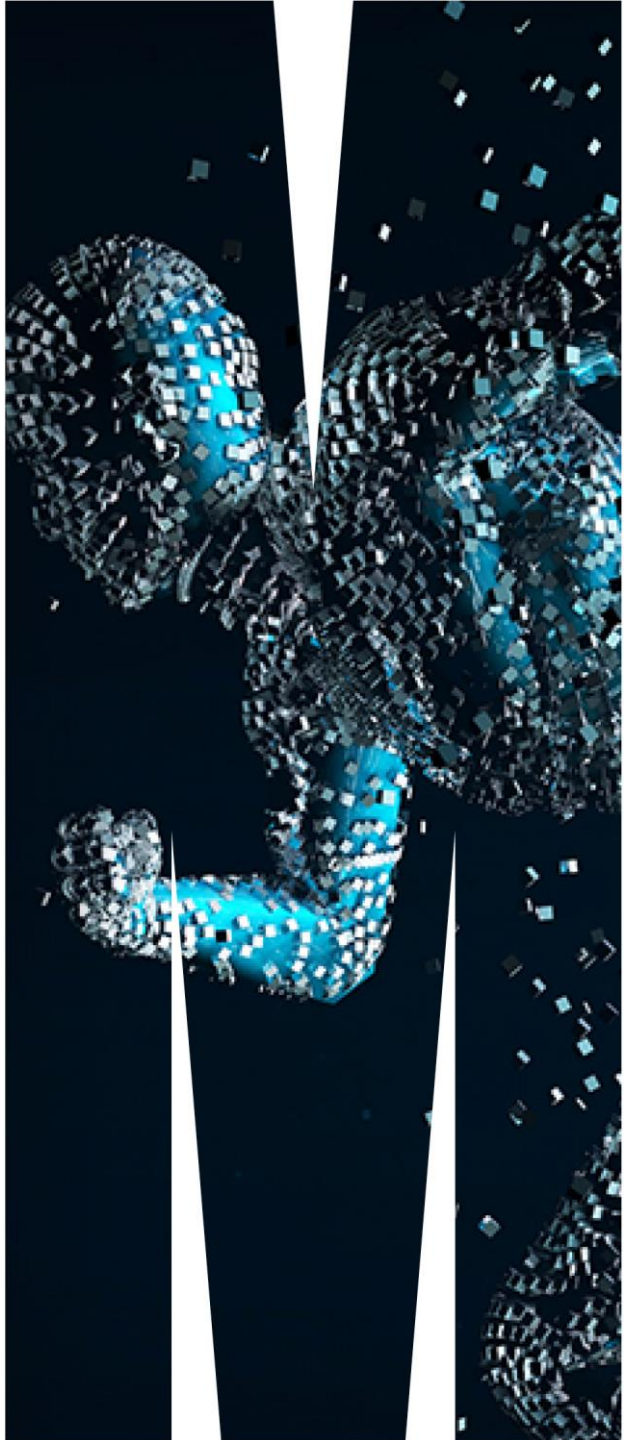
Identity Shape Shifting: How basic science teaching practices can foster identity transformation from medical student to medical professional.



IAMSE Winter/Summer Seminar Series

27/28th of January, 2022

I wish to acknowledge the Wurundjeri Woi Wurrung and Bunurong People of the Kulin Nations, on whose land I am gathered today. I pay my respects to their Elders, past and present.

Introductions & Perspectives

Michelle D. Lazarus, PhD

- Director, CHAE (anatomy)
- USA expat
- Ed researcher
- Lab Head

Shemona Rozario, MD

- Junior doctor
- PhD candidate (Ed research)
- Aspiring educator

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Where have we been, where are we now…

Where are we *going* and who *will we be*?

Past

Present

Future

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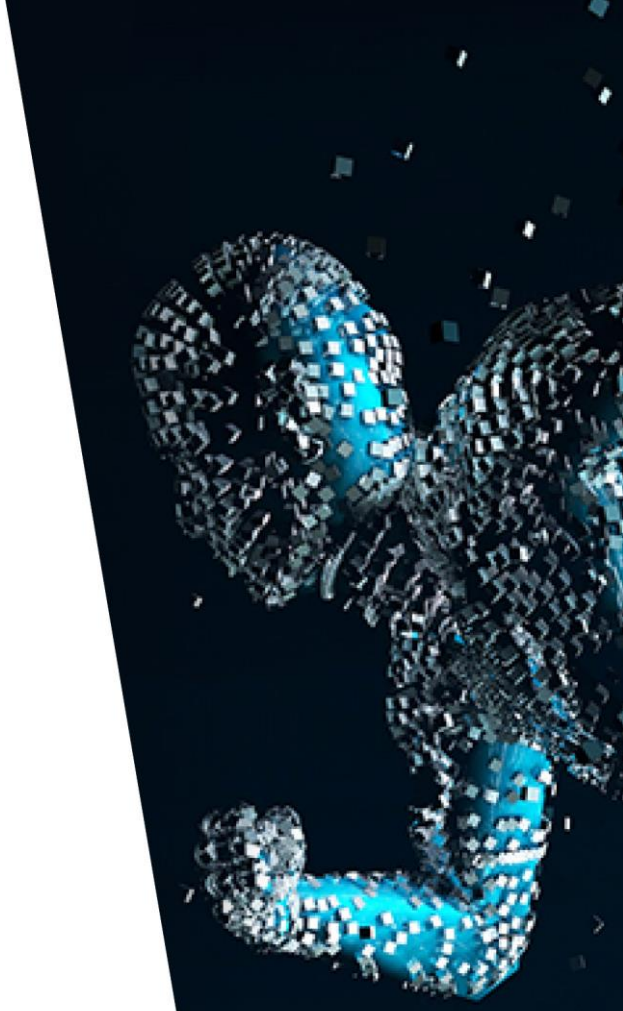
How do we define professional identity?

"How we perceive ourselves as professionals based on our attributes, beliefs, values, motives and experiences in relation to our profession, providing us with ethical frameworks and values."

– Rees & Monrouxe, 2018



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How do we define professional identity?

- Example of how Dr Clem (Emergency Physician) defines her professional identity

"[I] take care of really sick patients... I help make their lives better"

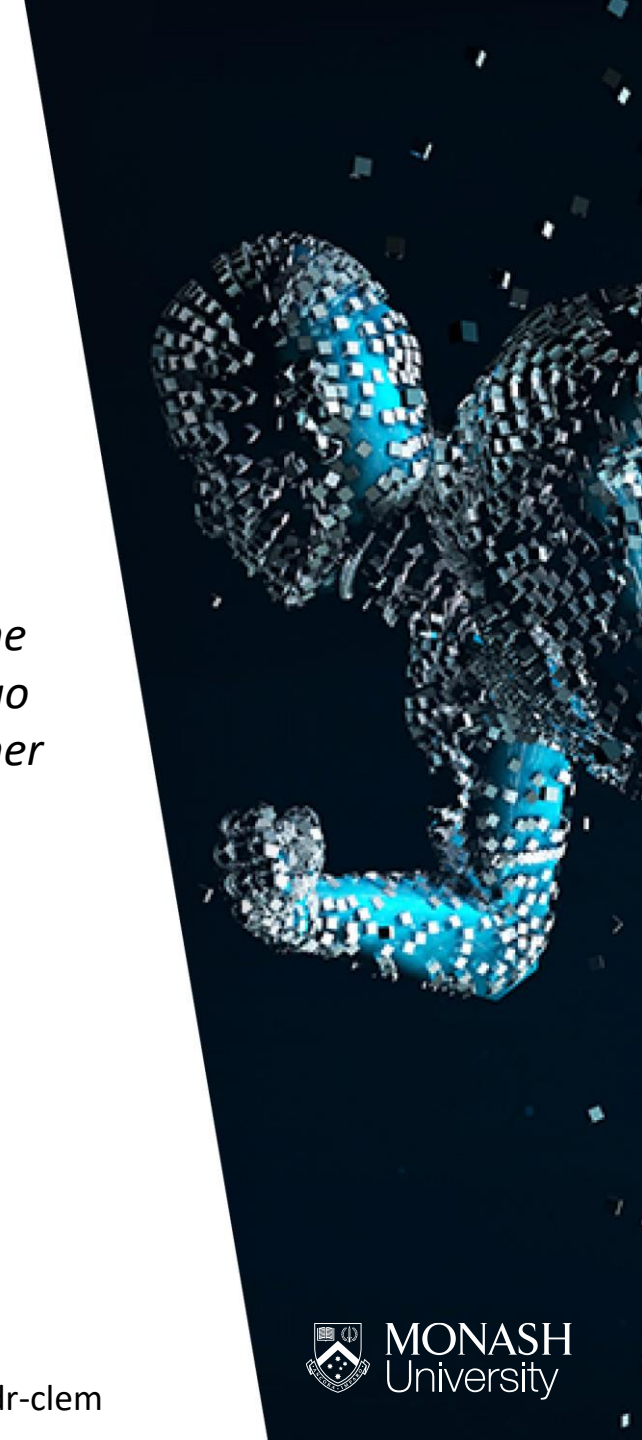
"[I] review any patients in the emergency department... I go back and check the labs, other tests, and x-rays to give the patient's information and a plan."

"I enjoy working with people from all walks of life"

"[I am] a team player"

"[I am] captain of the ship"

https://www.ama-assn.org/residents-students/specialty-profiles/what-it-s-specialize-emergency-medicine-shadowing-dr-clem



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How do we define professional identity?

- Example of how Dr Clem (Emergency Physician)

*"**[I] take care of really sick patients**... I help make their lives better"*

What we do influences how we view ourselves

= Professional Identity

Pratt et al., 2006

"[I am] captain of the ship"

"I enjoy working with people from all walks of life"

https://www.ama-assn.org/residents-students/specialty-profiles/what-it-s-specialize-emergency-medicine-shadowing-dr-clem

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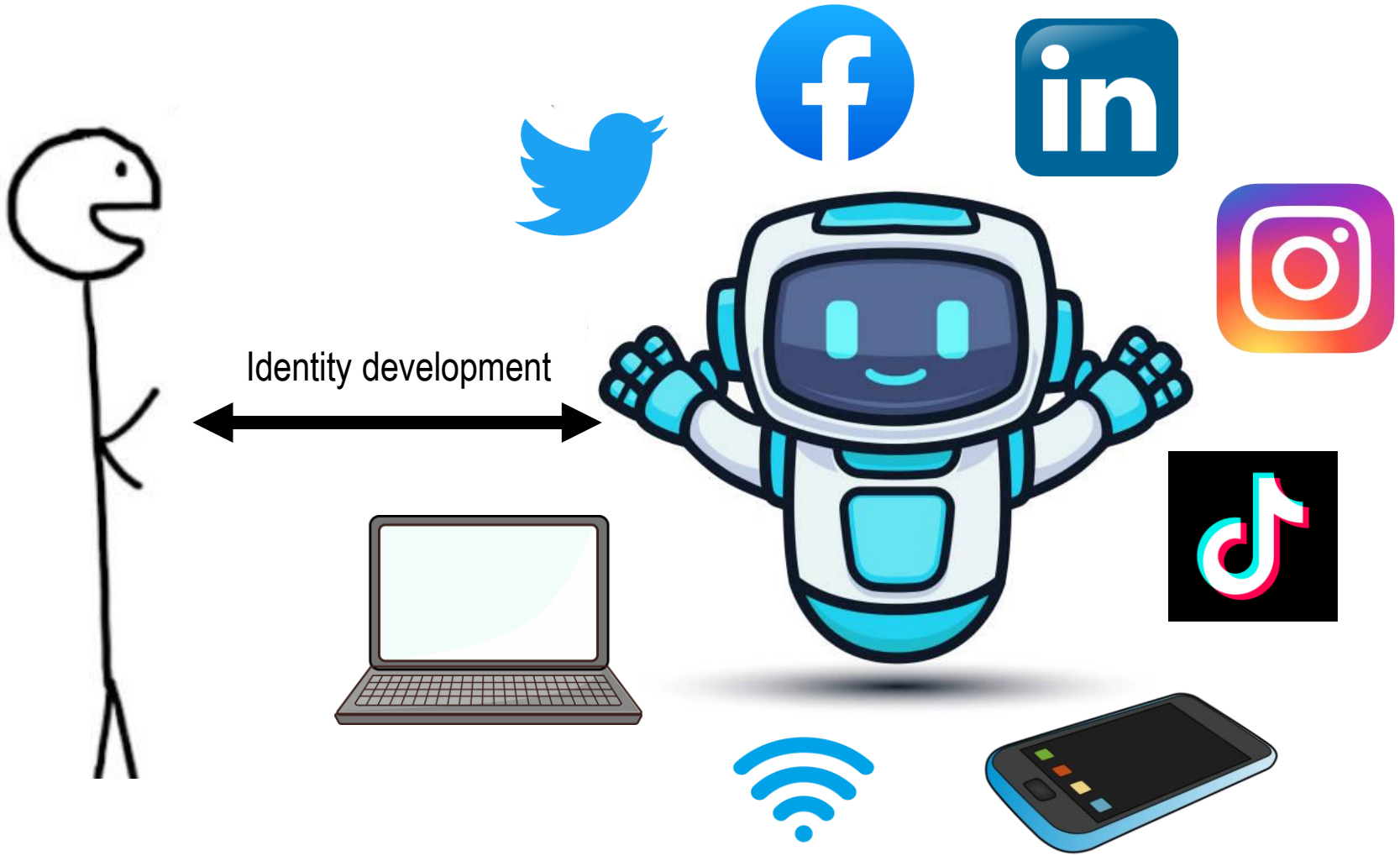
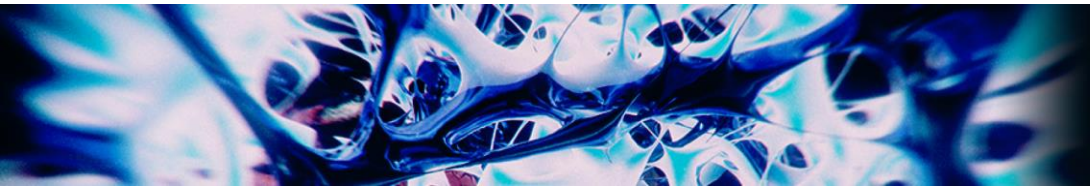
Evolution of Identity (Personal & Professional)

- Our identities are formed from, and develop through, social interactions
  - E.g. everyday interactions with people in our environment



Cruess et al., 2015



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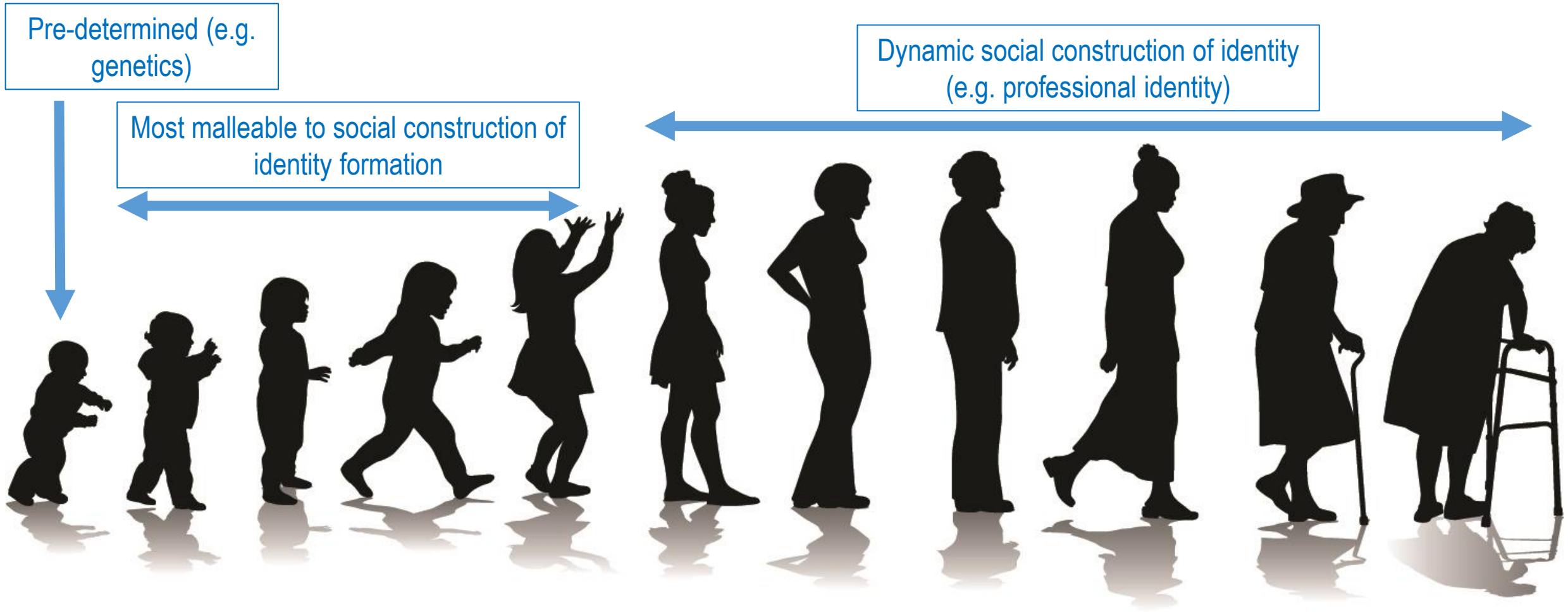
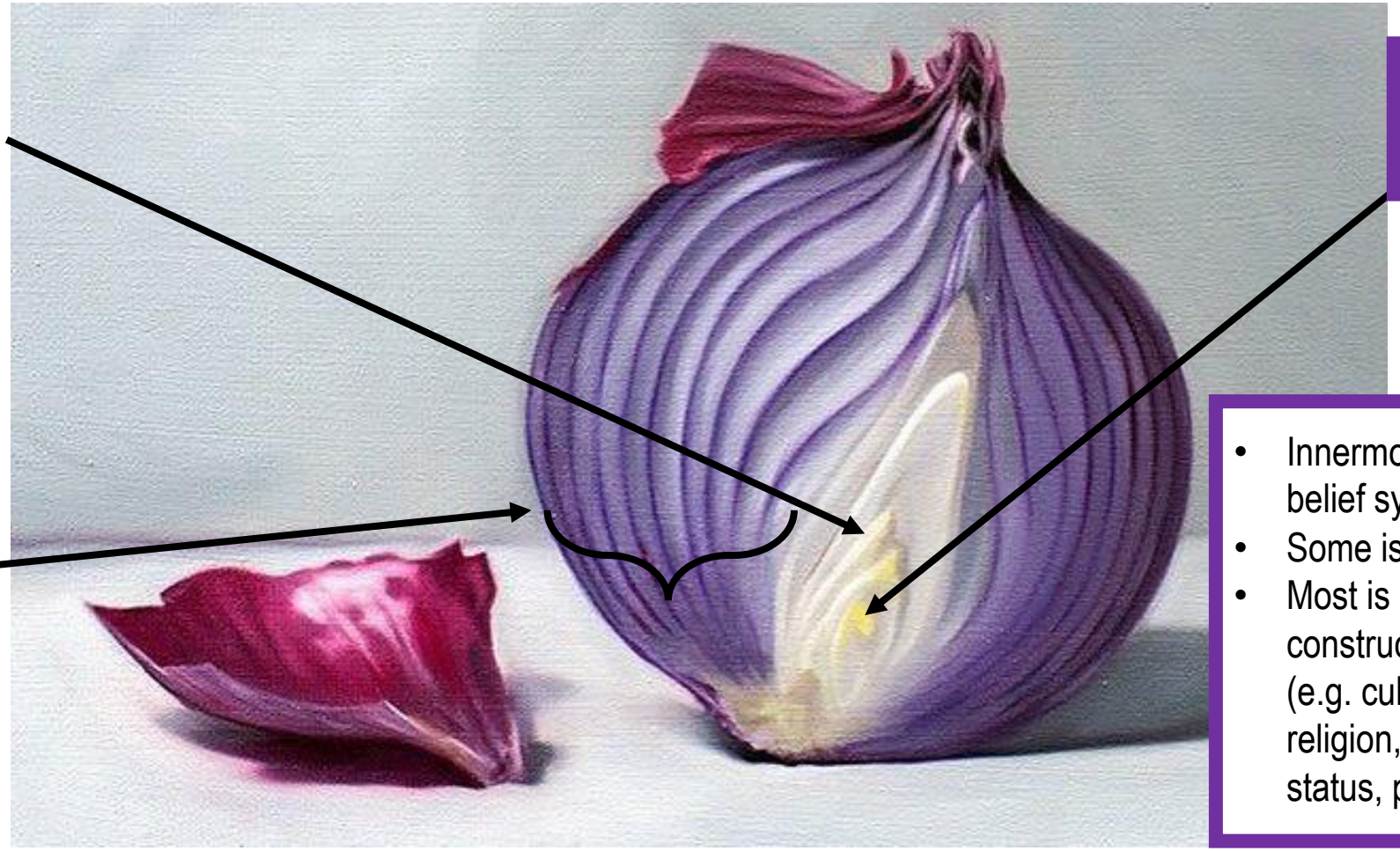
Evolution of Identity (Personal & Professional)



Monrouxe, 2010

How to integrate Personal and Professional Identity

Inner layers (early constructed identity that we identify as our internal identity as we grow older)



Onion core (internal identity)

Outer layers (constructed identity)

- Innermost values and belief systems
- Some is pre-determined (genetics)
- Most is socially constructed through interactions (e.g. culture, religion, socioeconomic status, personal relationships)

Monrouxe & Poole, 2013

How to integrate Personal and Professional Identity

Monrouxe & Poole, 2013

How to integrate Personal and Professional Identity

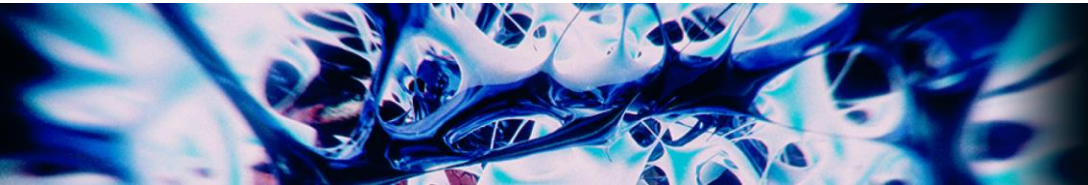
Outer layers mould to onion core

Professional identity ⟷ Personal identity

negotiation

Clash = identity dissonance

Monrouxe & Poole, 2013



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What happens when the ingredients are wrong?

When Professional and Personal Identity don't mix?

Rejection ←  → Negotiation

Identity-integrity violations

(Pratt *et al.*, 2006)

What happens when the ingredients are wrong?

Longitudinal study (6 years)

Semi-structured interviews

- 0, 6-8 and 12 months into training
- At the end of residency

Academy of Management Journal
2006, Vol. 49, No. 2, 235–262.

CONSTRUCTING PROFESSIONAL IDENTITY: THE ROLE OF WORK AND IDENTITY LEARNING CYCLES IN THE CUSTOMIZATION OF IDENTITY AMONG MEDICAL RESIDENTS

MICHAEL G. PRATT
University of Illinois at Urbana-Champaign

KEVIN W. ROCKMANN
George Mason University

JEFFREY B. KAUFMANN
Iowa State University

Through a six-year qualitative study of medical residents, we build theory about professional identity construction. We found that identity construction was triggered by work-identity integrity violations: an experienced mismatch between what physicians did and who they were. These violations were resolved through identity customization processes (enriching, patching, or splinting), which were part of interrelated identity and work learning cycles. Implications of our findings (e.g., for member identification) for both theory and practice are discussed.

Medical residents (*n*=29)

Primary care

Surgery

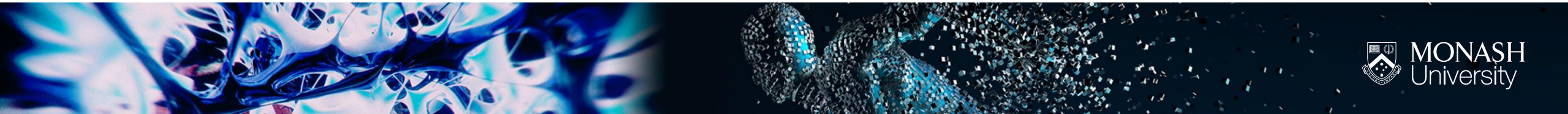
Radiology

Pratt et al., 2006

- New **radiology residents** reported minimal time spent reporting patient images
- Most of their time was spent attending lectures, tutorials, and studying

- **Surgical residents** reported the time they needed to spend on completing paperwork did not match their expectations of being a surgeon

- **Primary care residents** reported that the work they were required to do matched their expectations of the roles and responsibilities of a primary care physician



Major violations

Adoption of prior medical student identity

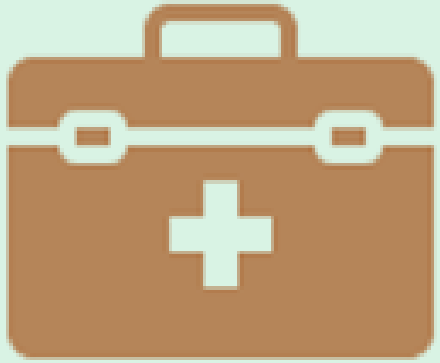
- New **radiology residents** reported minimal time spent reporting patient images
- Most of their time was spent attending lectures, tutorials, and studying

Adoption of parallel identity (e.g. general doctor)

- **Surgical residents** reported the time they needed to spend on completing paperwork did not match their expectations of being a surgeon

Minor violations

Reinforcement of current identity



- **Primary care residents** reported that the work they were required to do matched their expectations of the roles and responsibilities of a primary care physician

Major violations

IDENTITY SPLINTING

Adoption of prior medical student identity

- New **radiology residents** reported minimal time spent reporting patient images
- Most of their time was spent attending lectures, tutorials, and studying

IDENTITY PATCHING

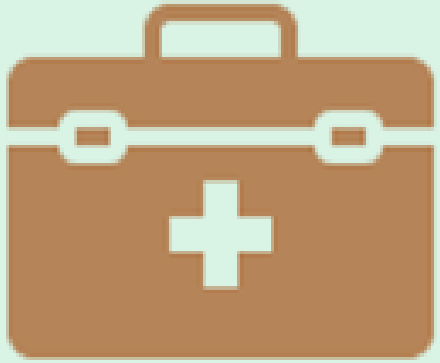
Adoption of parallel identity (e.g. general doctor)

- **Surgical residents** reported the time they needed to spend on completing paperwork did not match their expectations of being a surgeon

Minor violations

IDENTITY ENRICHING

Reinforcement of current identity

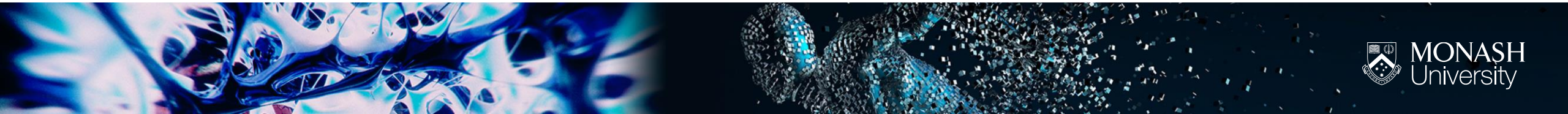


- **Primary care residents** reported that the work they were required to do matched their expectations of the roles and responsibilities of a primary care physician

What were the take-home messages from the Pratt *et al* (2006) study?

1. The work of radiology, surgery and primary care residents differs
2. Residents' professional identities were entwined with their work
3. Identity-integrity violations facilitated the development of residents' professional identities

Pratt et al., 2006



What is the ideal cooking environment for professional identity formation?

- The right environment
- The right people

Cruess et al., 2019; Brown et al., 2021; Goldie, 2012

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The role of basic science educators is to generate a five-star review of our future healthcare professionals.

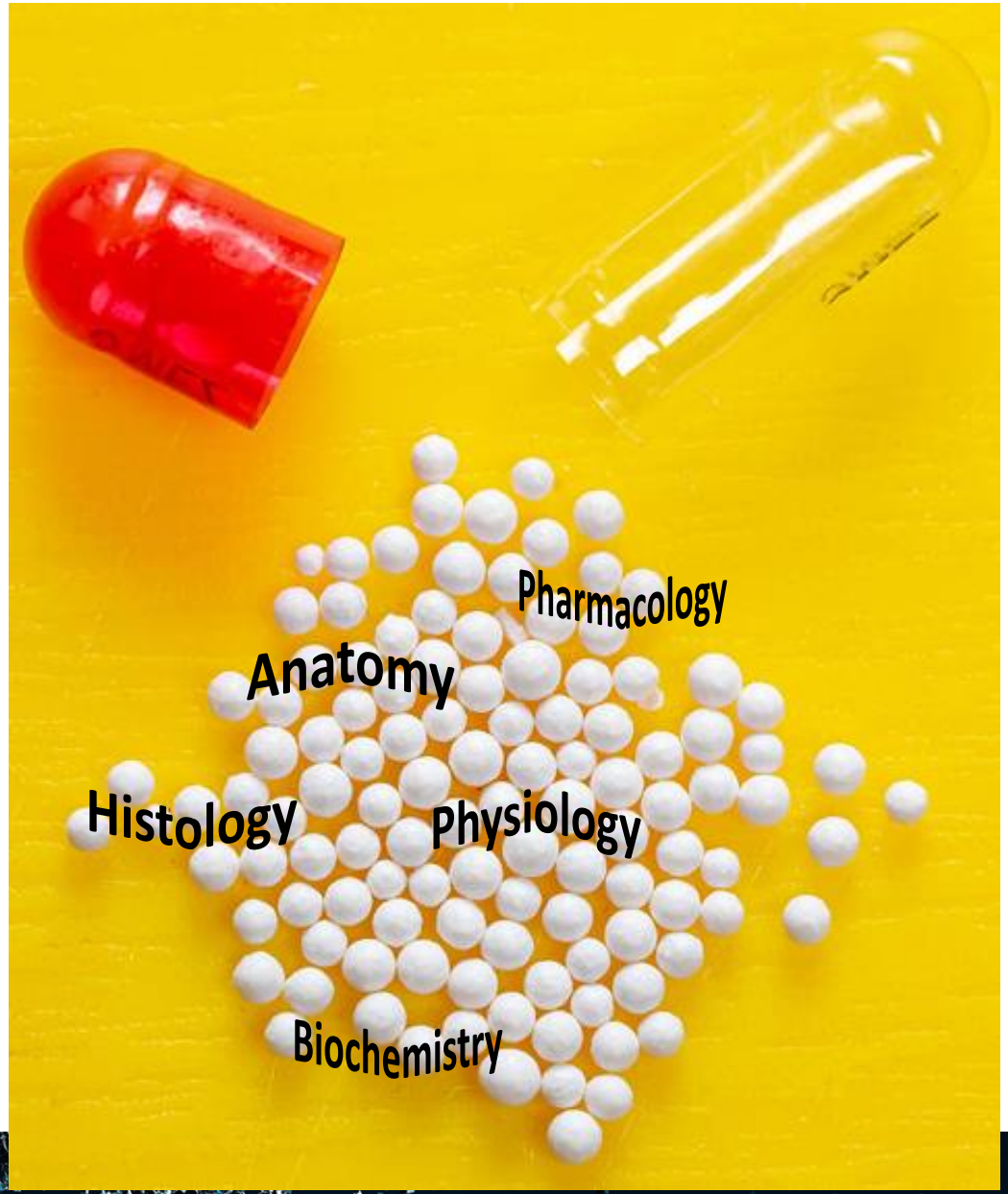
Dr. Nicole N. Woods
Cognitive Psychologist

https://staff.ki.se/kiprime-podcast-episode-6-nicole-n-woods

What does the basic science ingredient play in the recipe?

I have been getting intense pain (points to upper right side of abdomen) after eating. It lasts for 4 hours, and nothing seems to help.

A spoonful of sugar....



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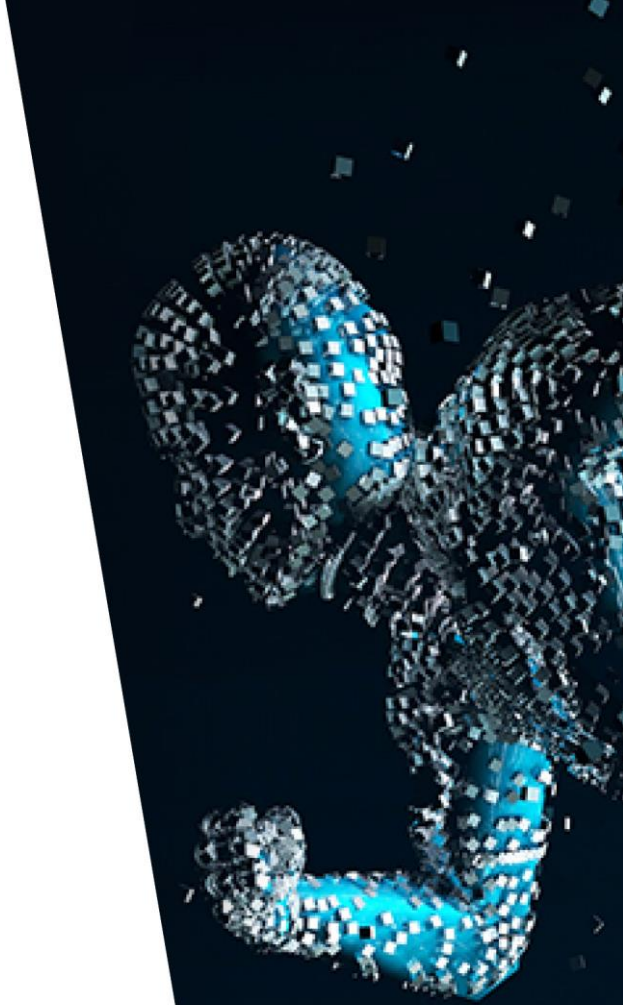
The Basic Science Educator is “Chef”

How do you get to the diagnosis with “abdominal pain” starting point?



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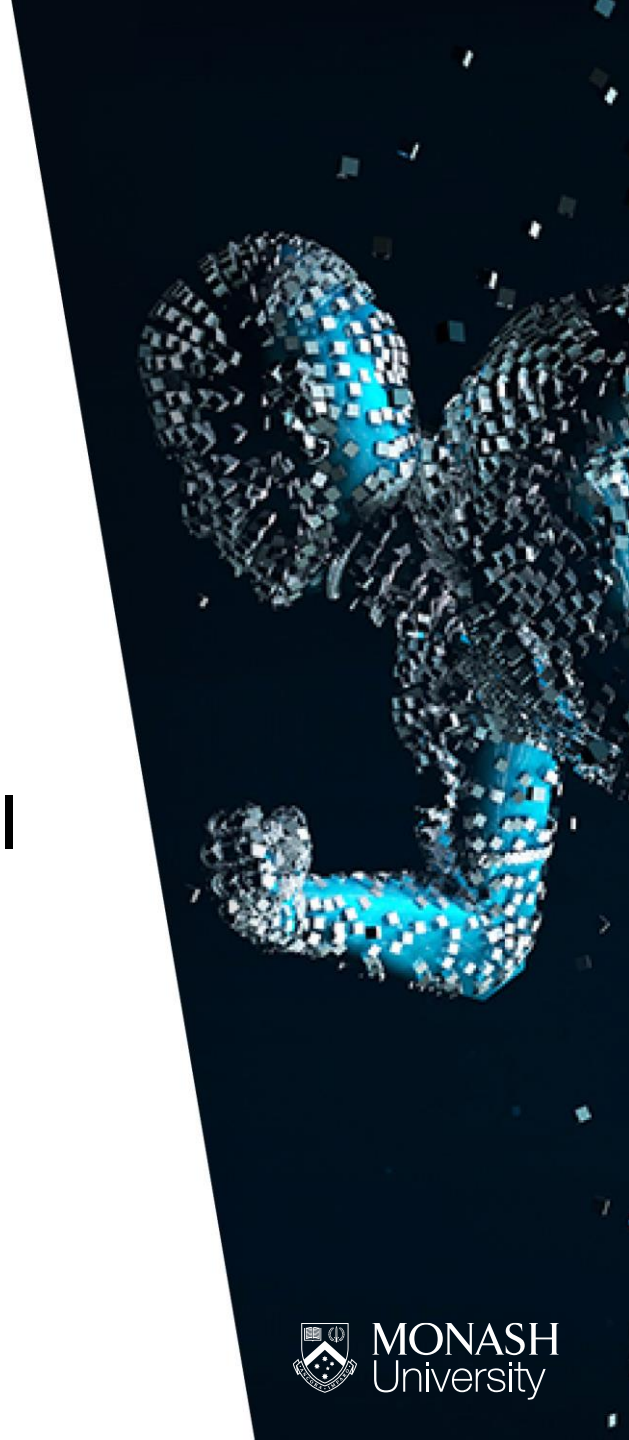
What is the role of foundational sciences in PID in modern medical education?

Contemporary and future medical professional identity includes technology

What is the identity of a doctor in the future?

Ken Masters (2019): "To be a competent doctor, an AI system does not have to be the best doctor in the world. AI [only] **has to be better than the worst graduating student in your class** … if AI is better than your average student, it is [already] **better then 50% of all doctors**".

Post-pandemic, many of us are engaging technology in our teaching environment (i.e. restaurant).



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Anatomy Education as an Exemplar

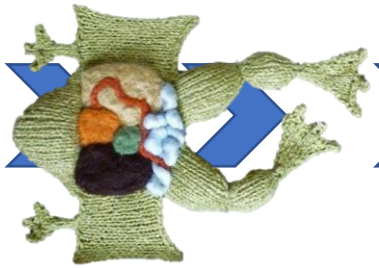
Is Anatomy the "Canary in the Coal Mine?"

1600-1550: Egyptians Identify Organs

BCE

400: Hippocrates a med school and focuses on MSK anatomy

384-322: Aristotle distinguishes vascular system components with animal dissections



280: Human dissection begins and Greeks lead the way in anatomy

Anatomy has withstood the test of time & changes in Technology

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Anatomy Education as an Exemplar

Anatomy has withstood the test of time

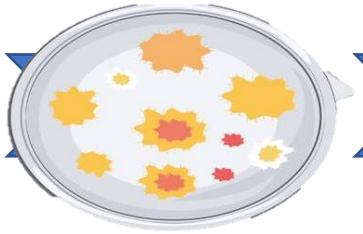
Dissection Limited during Medieval Times, thus surgery becomes critical for anatomy knowledge

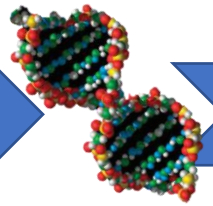
1543: "Modern Anatomy" is realized through accurate dissection images with Andreas Vesalius

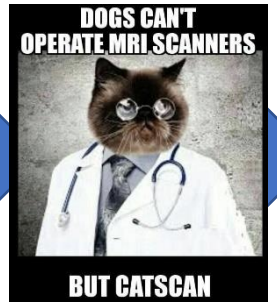
1839: Cell Theory proposed

1953 DNA discovered

CE





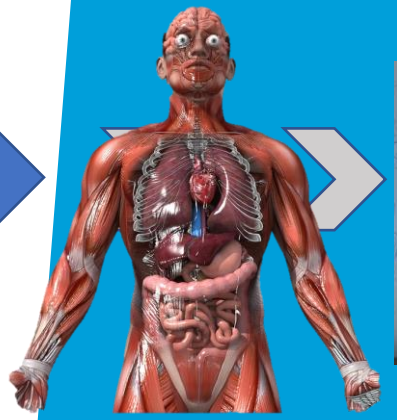


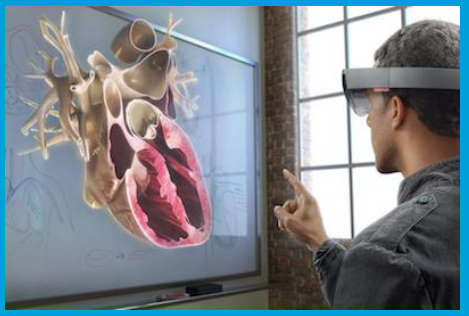
1489 da Vinci creates anatomical drawings

1895 X-ray demonstrated

1972: CAT scans discovered

1986: 3D human





2000s: VR/AR and 3D prints

Anatomy is maintained in MedEd despite technological & scientific advances

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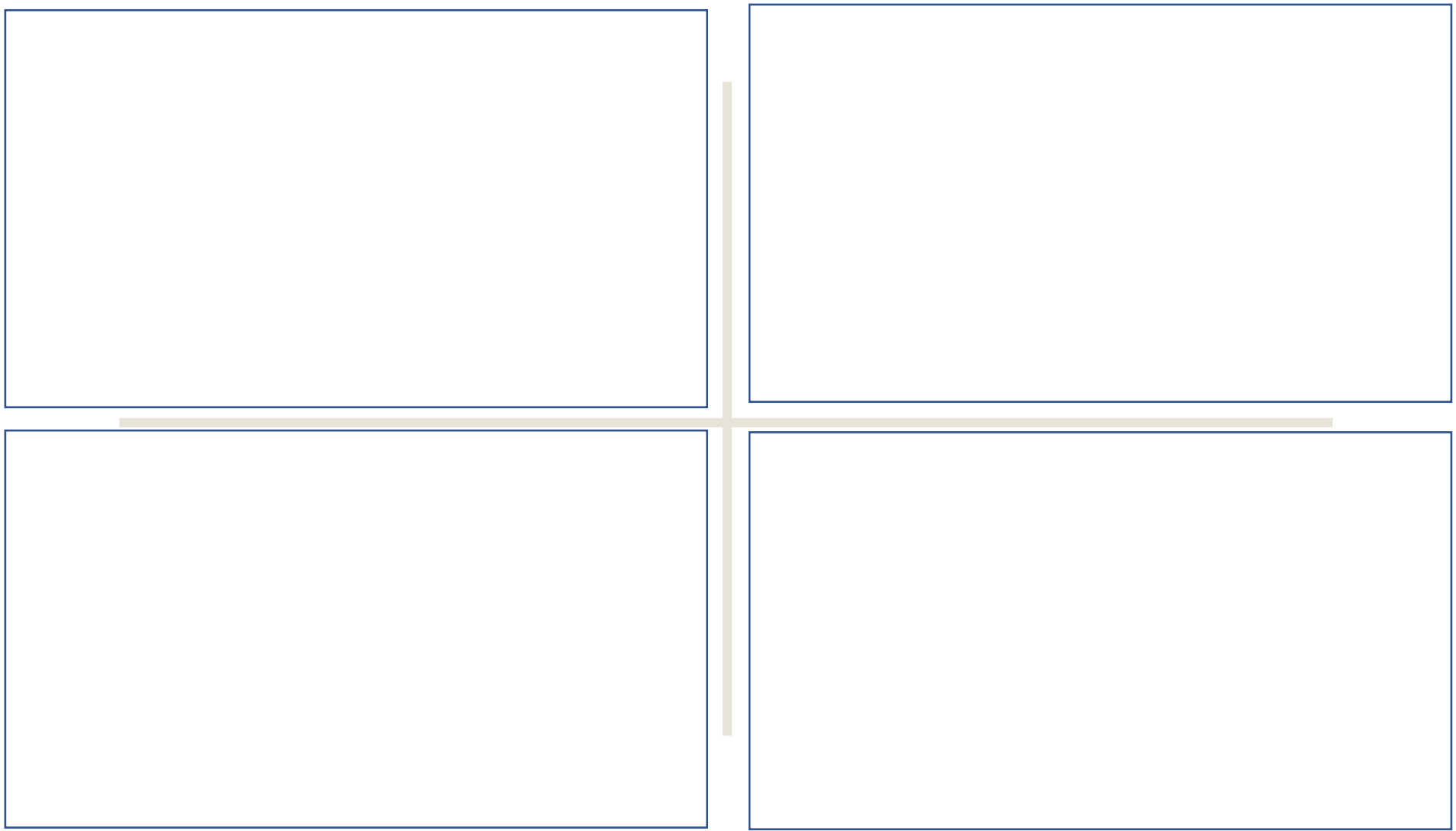
Across 27 studies, acquired from 50 years of research, NO effect on Short Term Learning…So Why Teach Basic Science?

Students' short term knowledge gains were equivalent regardless of being exposed to either dissection or another laboratory instructional strategy.

Wilson et al., 2018



AI is already integrated into teaching

Chatbot artificial intelligence

Chatbot self-learning

Artificial intelligence regulations

AI & Technology being used for:

- Learning Support
- Student Engagement & Learning Monitoring

Challenges to PID:

- Inappropriate technology can suggest that knowledge is finite and 'certain'
- Perception that humans are neat categories
- View that healthcare has singular logic and pathways for diagnosis

The future is already here...

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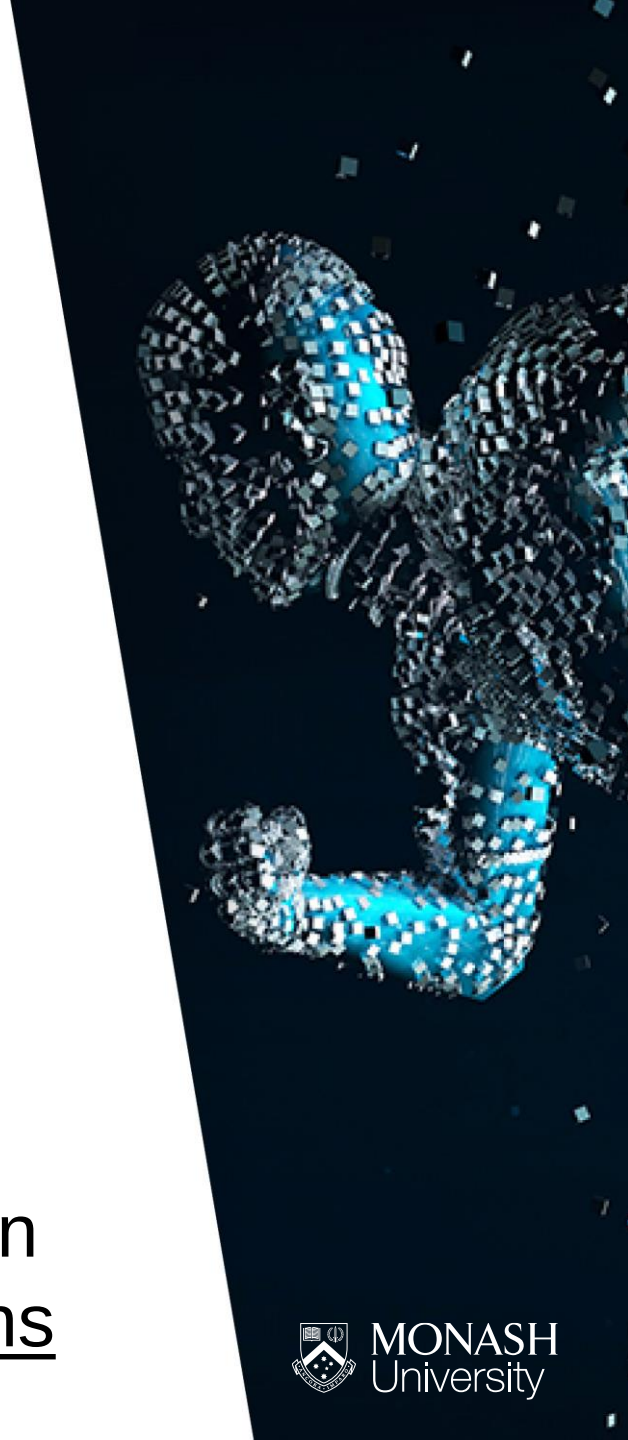
Psychosocial Skills are Limited in Existing AI

Despite the cost efficiency and potential reliability in practice, there are **limitations** including **transparency** & **trust** of the decision-making process, ability to make **ethical decisions** and maintain **patient privacy**, ability to detect novelty/**tolerate ambiguity**, integration of AI into **clinical workflow** effectively and **financial equality** for integration.

Stewart et al., 2018; He et al., 2019



What is clear is that we need a medical education system which focuses on AI literacy and limitations

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A recipe for PID with AI and humans in the mix

Thermomix won't work on its own…

- Involve ourselves in AI development
- Focus on the human side of education (identifying struggling students, building a sense of community)
- Delivery ratio is greater towards human

AI/Thermomix can help speed up the process

- Allows students who are less secure to engage with technology
- Technology developed to reinforce key principles of uncertainty, social justice etc.

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How can teaching practices influence PID in modern medical curriculum?

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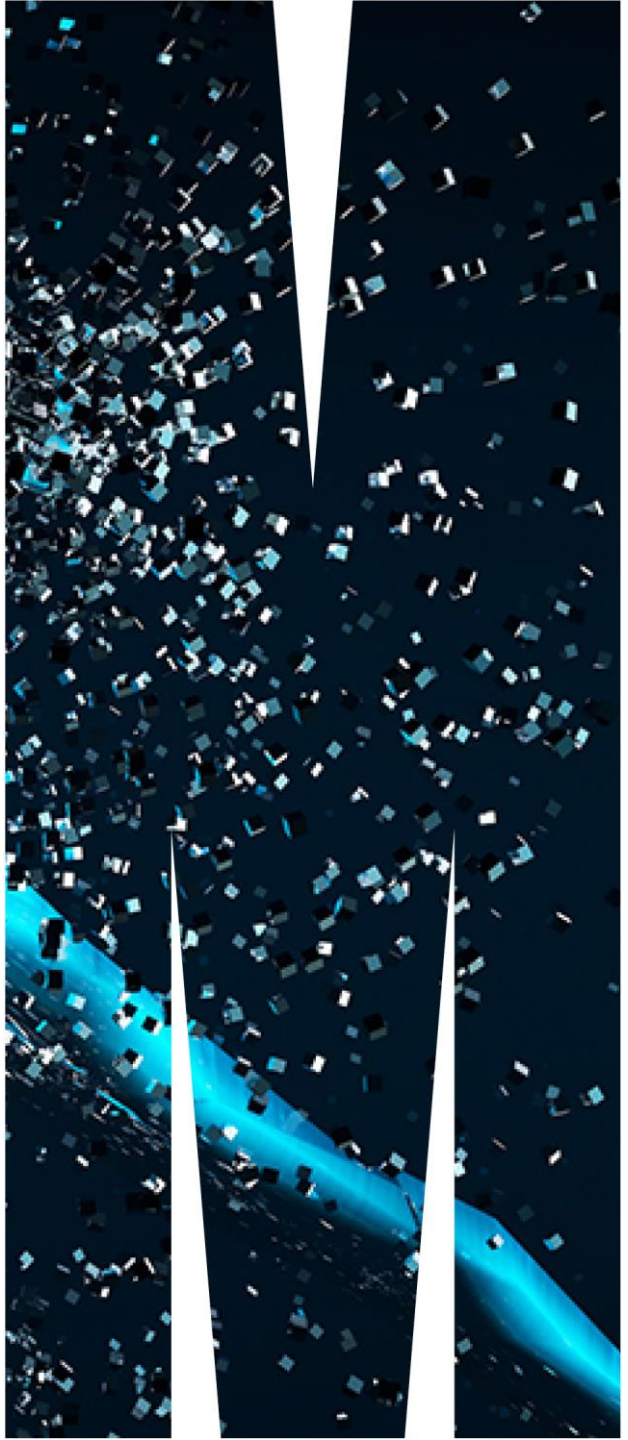
How Can We Engage Foundational Medical Science with UT/PID?

3 months old baby referred to you with left radial club hand and hypoplastic thumb.

If you planned....	And you found....	Your management becomes:
i. Centralization	i. Type I radius hypoplasia with mild (10 °) radial deviation	-2 : Strongly contraindicated -1 : Should be reconsidered 0 : Neither more nor less indicated +1 : Indicated +2 : Strongly Indicated

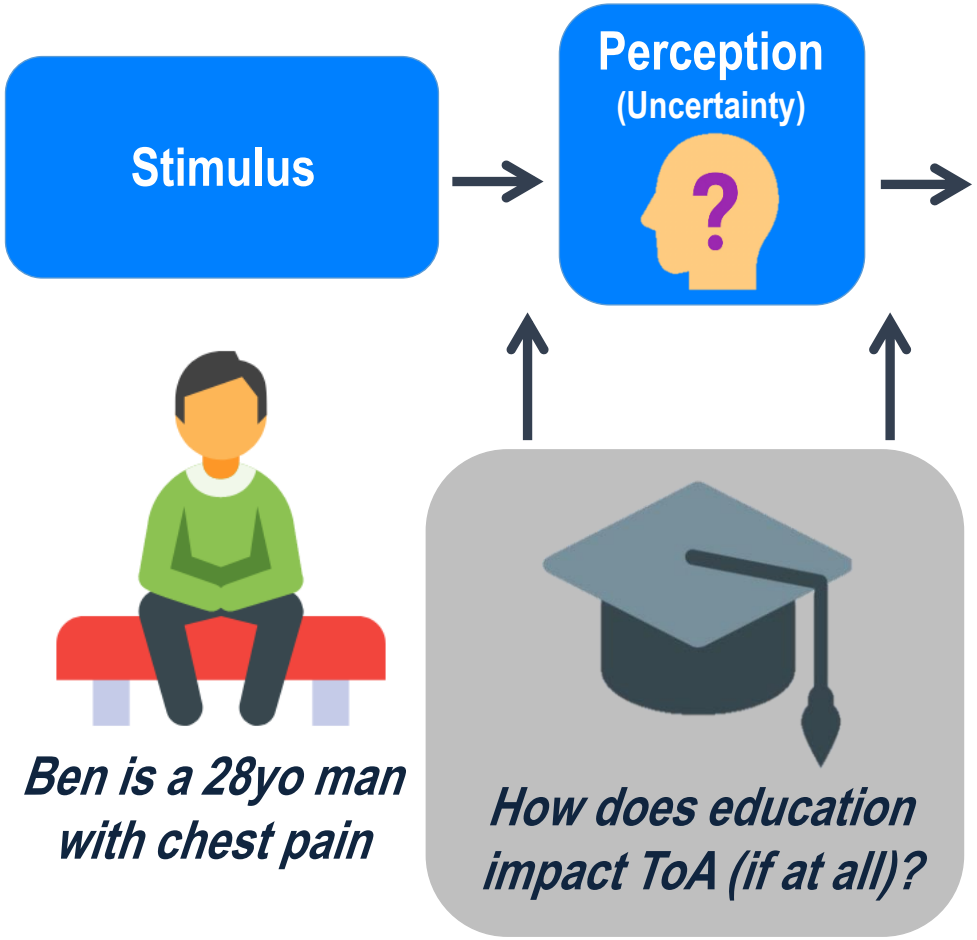
If you planned....	And you found....	Your management becomes:
ii. Pollicization	ii. The hypoplastic thumb has a CMCJ on x-ray	-2 : Strongly contraindicated -1 : Should be reconsidered 0 : Neither more nor less indicated +1 : Indicated +2 : Strongly Indicated

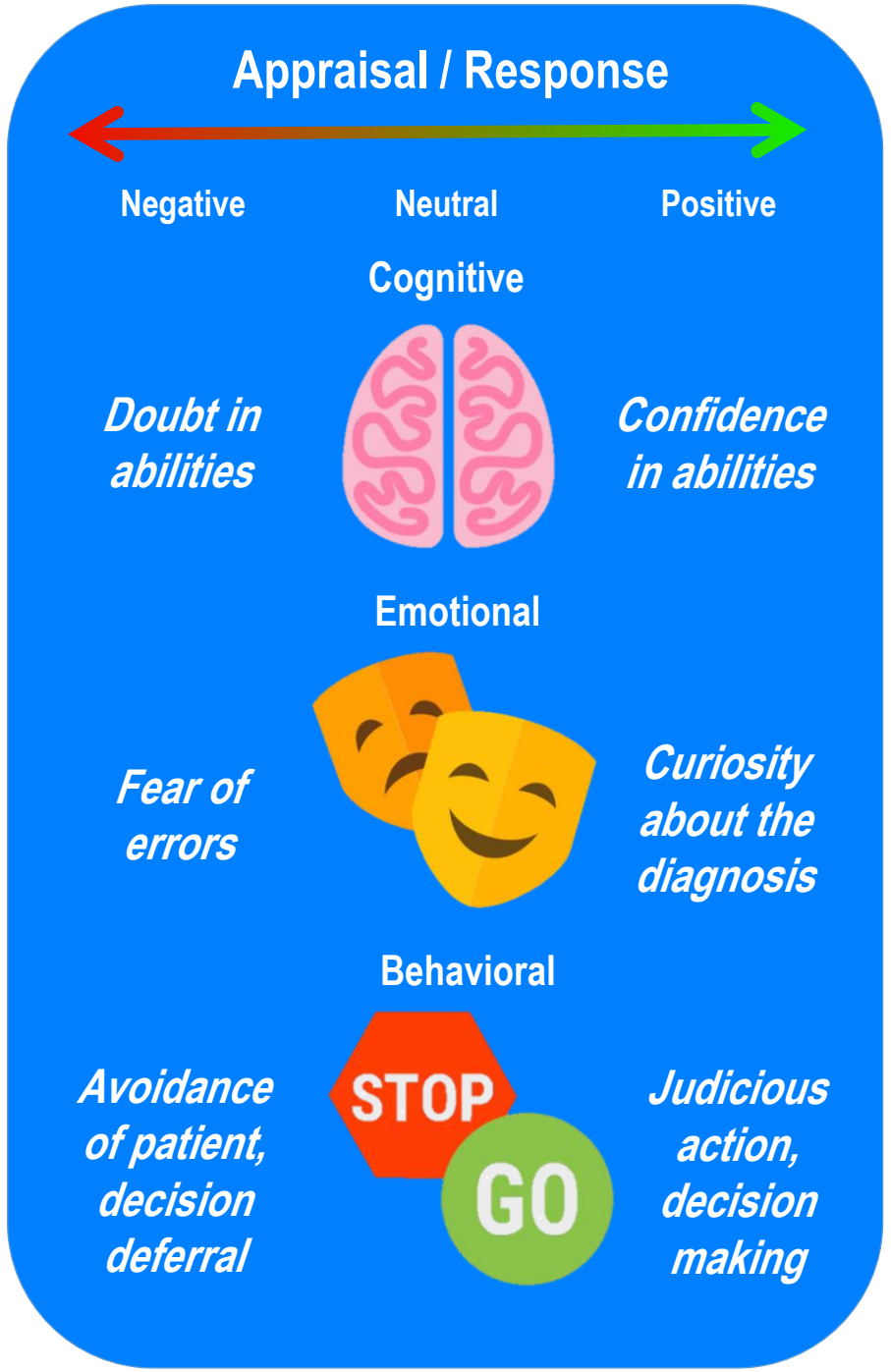
If you planned....	And you found....	Your management becomes:
iii. Surgery	iii. Severe thrombocytopenia on pre-operative workup	-2 : Strongly contraindicated -1 : Should be reconsidered 0 : Neither more nor less indicated +1 : Indicated +2 : Strongly Indicated



ToA is Managing Novelty Effectively

ToA appears to be impacted by anatomy education





Model adapted from Hillen et al., 2017

Uncertainty Tolerance, broadly, Benefits the Individual & the Workplace

Burnout
vs.
Job satisfaction

Difficulty problem solving
vs.
Creative solutions

Disengagement
vs.
Judicious action

Increased costs/supervision
vs.
Independence

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What are the role of educators in fostering (or hindering) learners UT?

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How do you feel here?

Write in the chat…

How do you feel here?

Write in the chat…

Educators & teaching practices need be the light in the dark.

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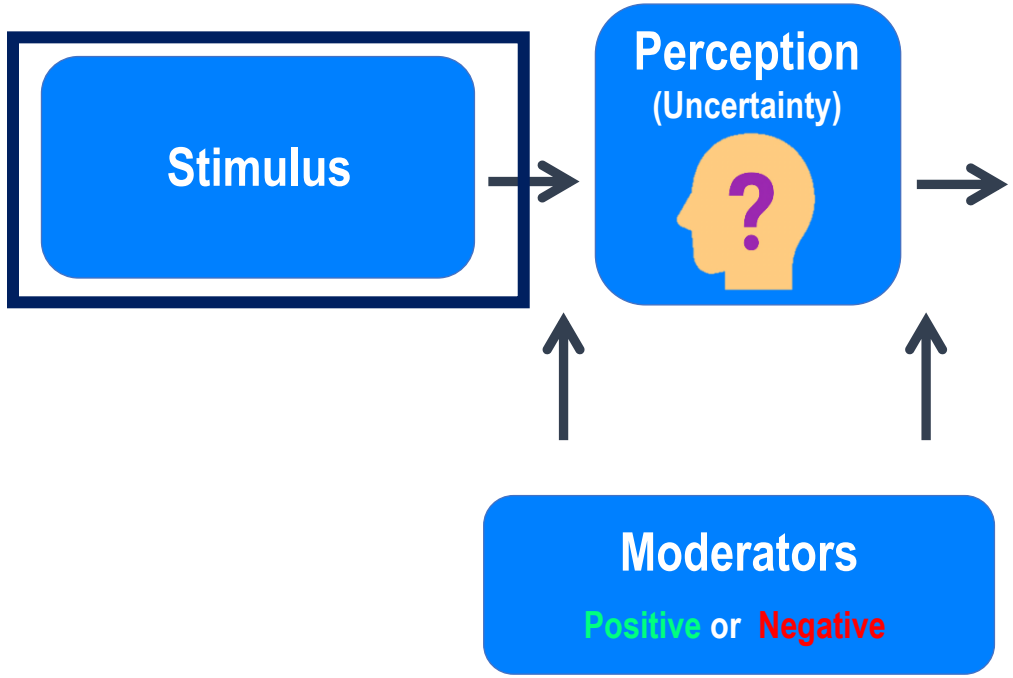
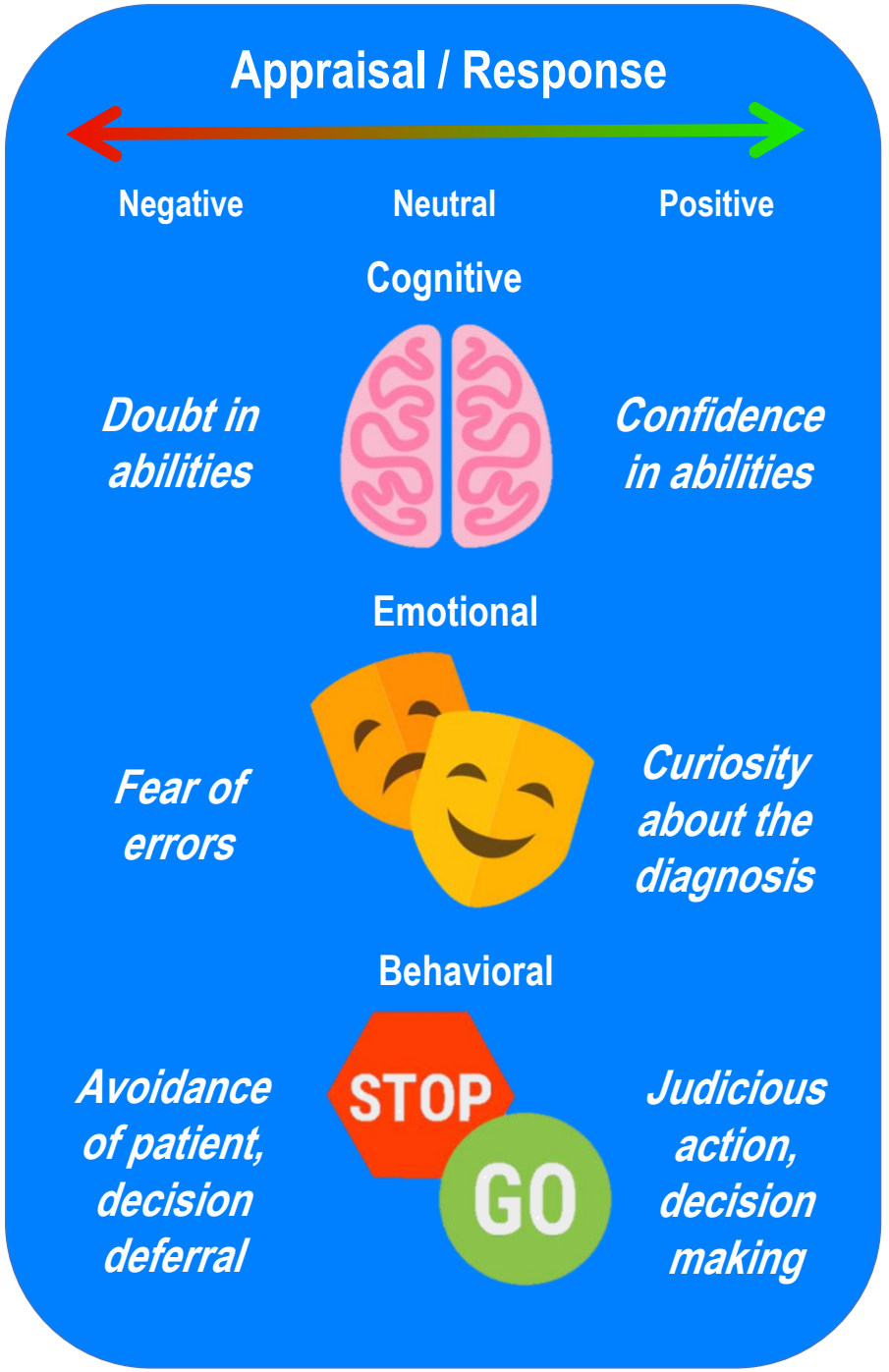
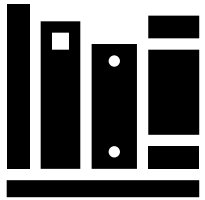
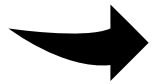




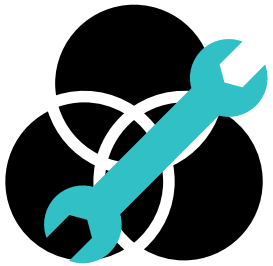
Model adapted from Hillen et al., 2017

We Can Stimulate Uncertainty Tolerance in The Classroom

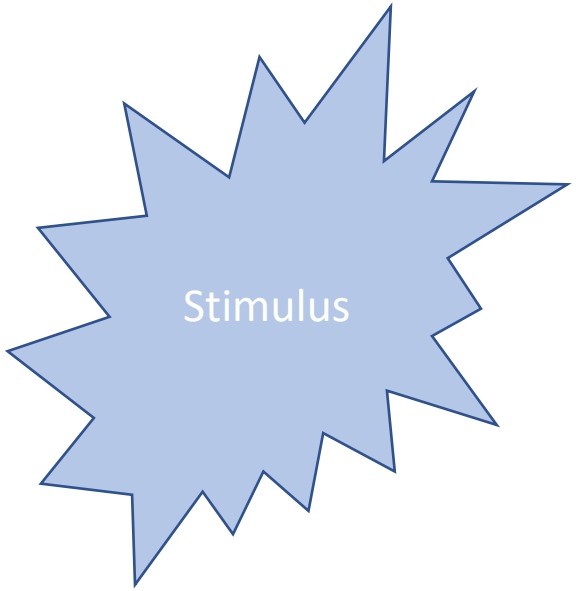


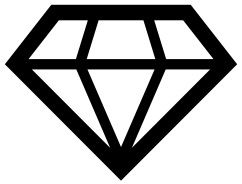


Transferring learning



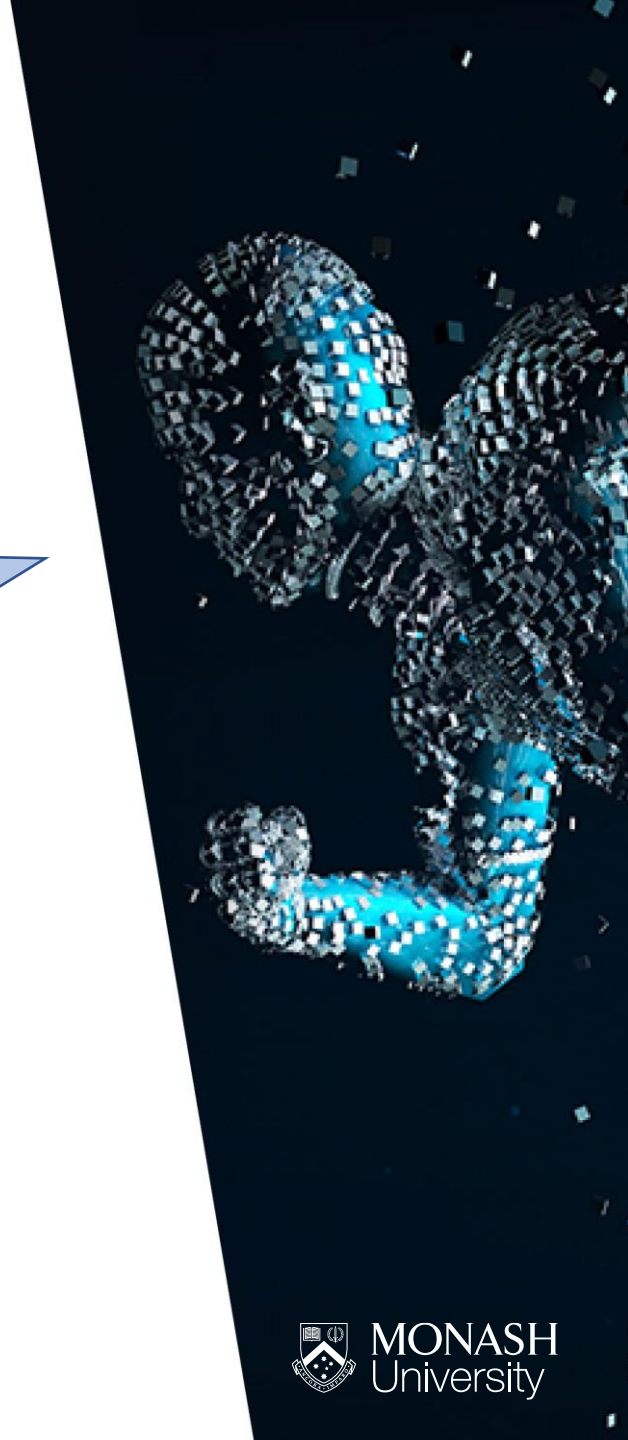
Grey Cases





Multifaceted Perspectives

Questioning Preconceptions



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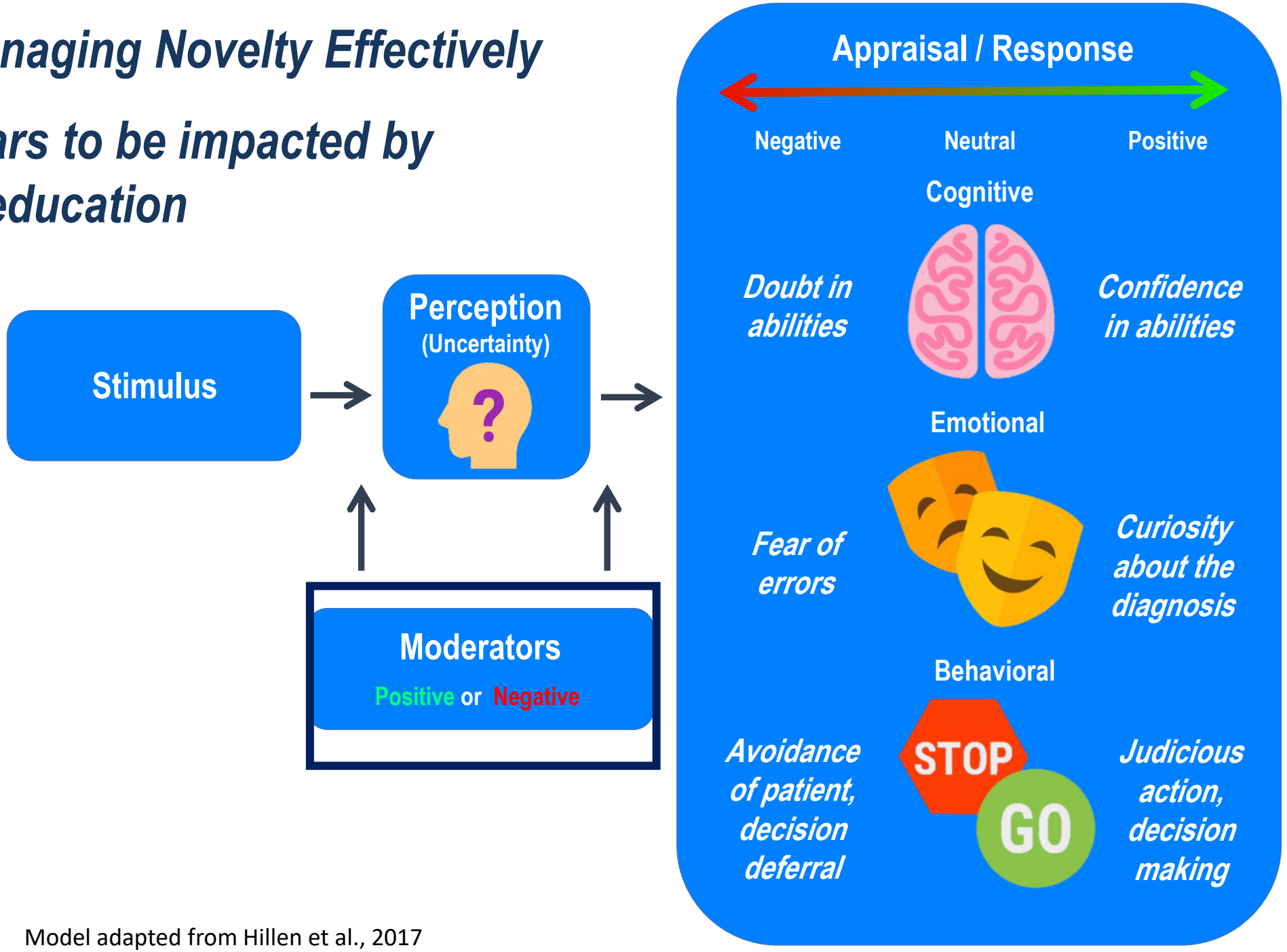
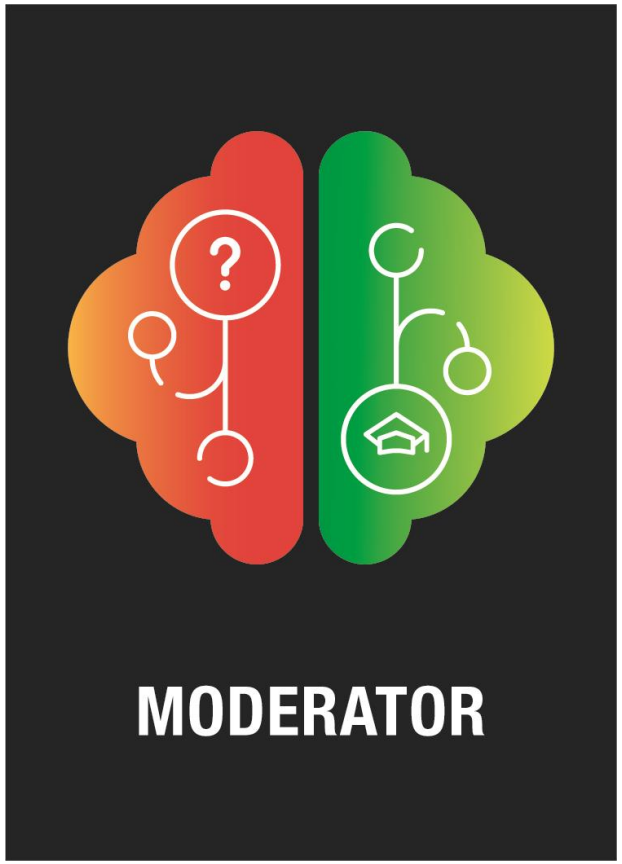
ToA appears to be impacted by anatomy education



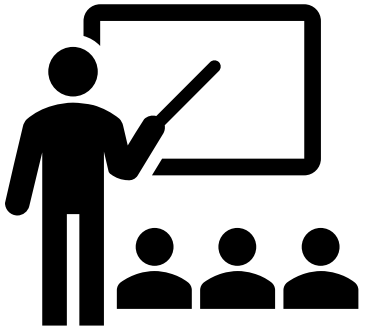
Model adapted from Hillen et al., 2017

Moderators come from students & educators

If we know our students….



We can better select moderators



There are a wide variety of evidence-based teaching practices we can use to foster (or hinder) learner UT

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So how do we play the game of developing learner UT through curriculum design?

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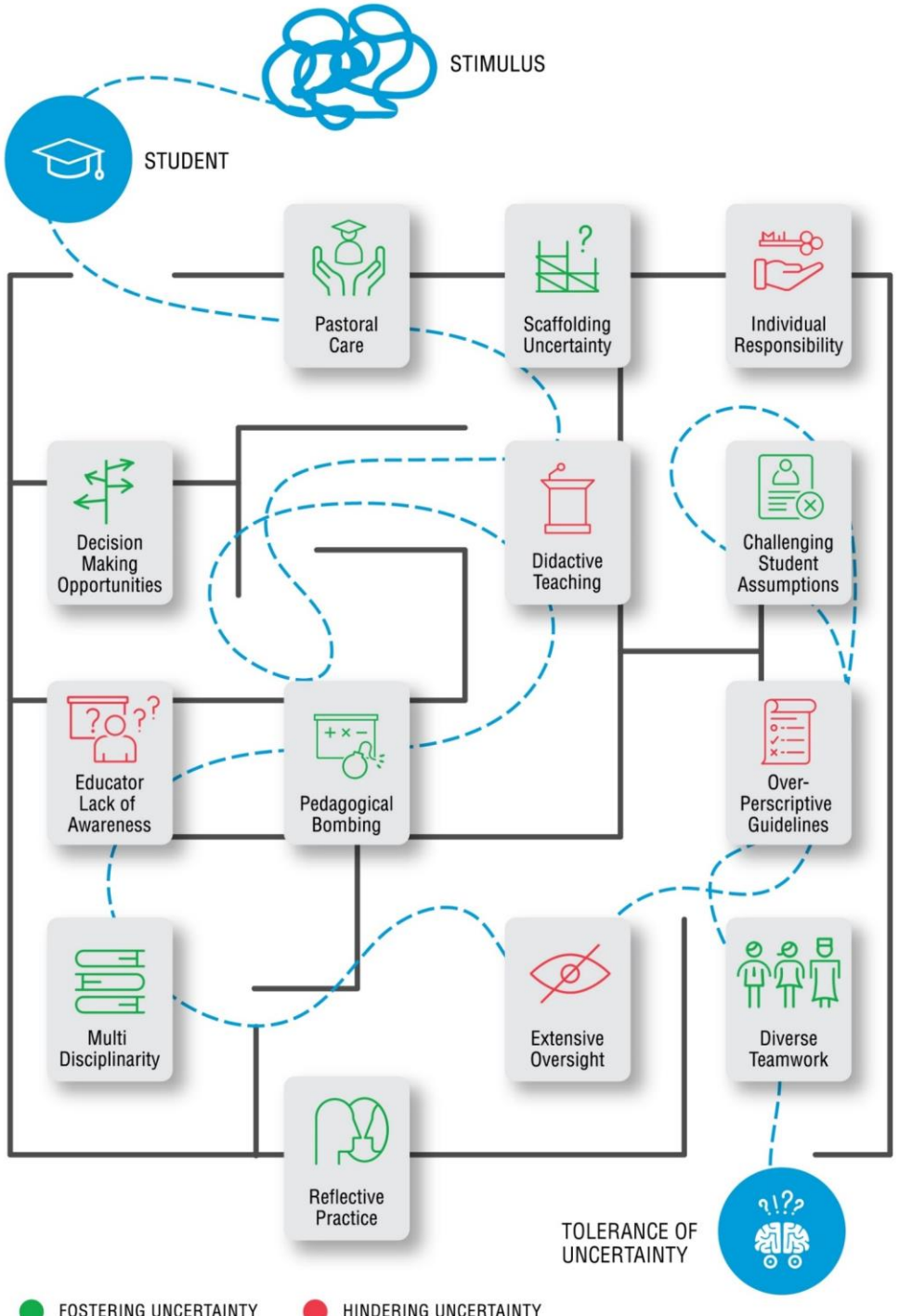

The key is to "play" your hand well by knowing who is on your team!

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This card game is evidence-based.

Moderator

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Sometimes we HAVE to "hinder" learner UT

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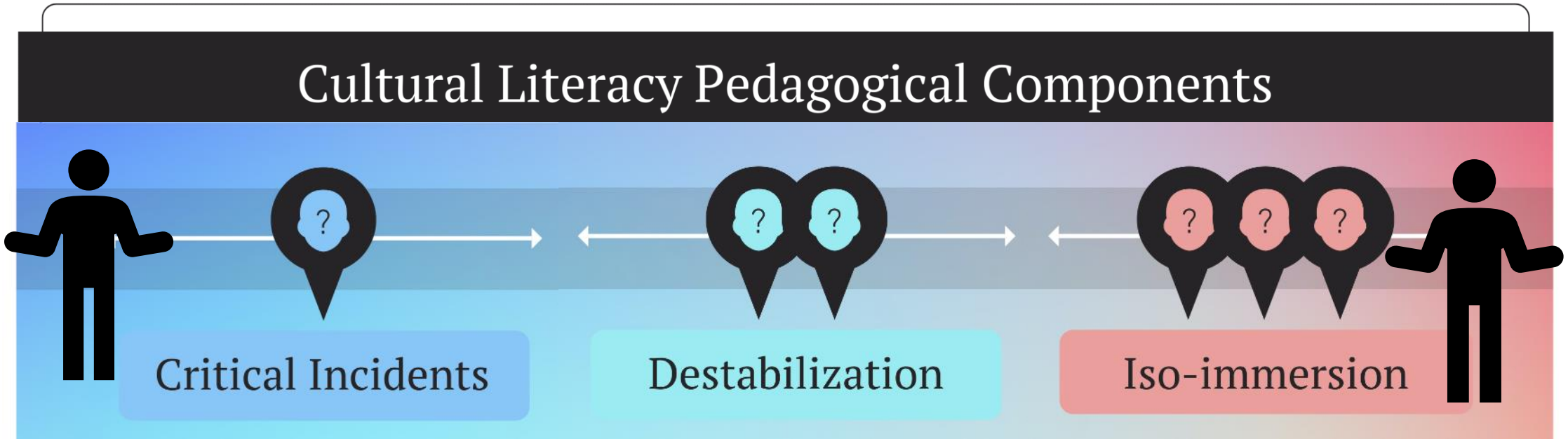
Turn to Cultural Literacy Pedagogy to Foster UT imbued PID

Uncertainty stimuli



Case Studies

Role Play/Simulation

WIL/Placements

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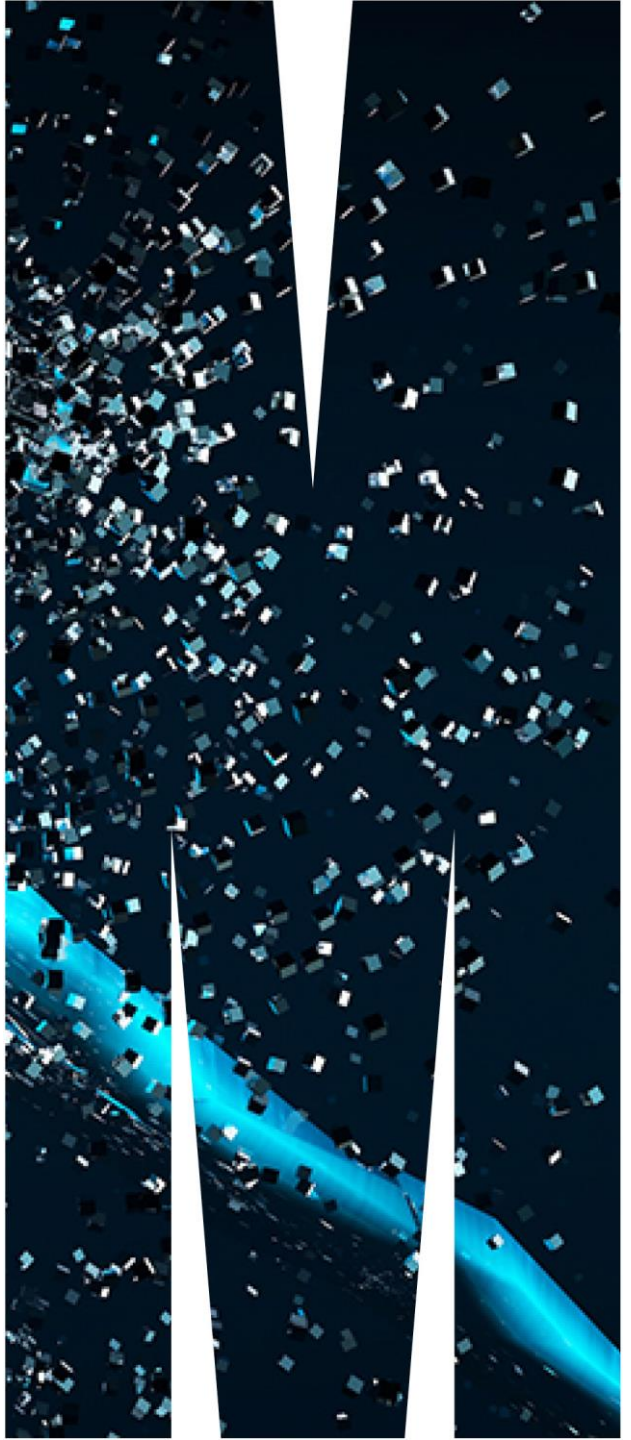
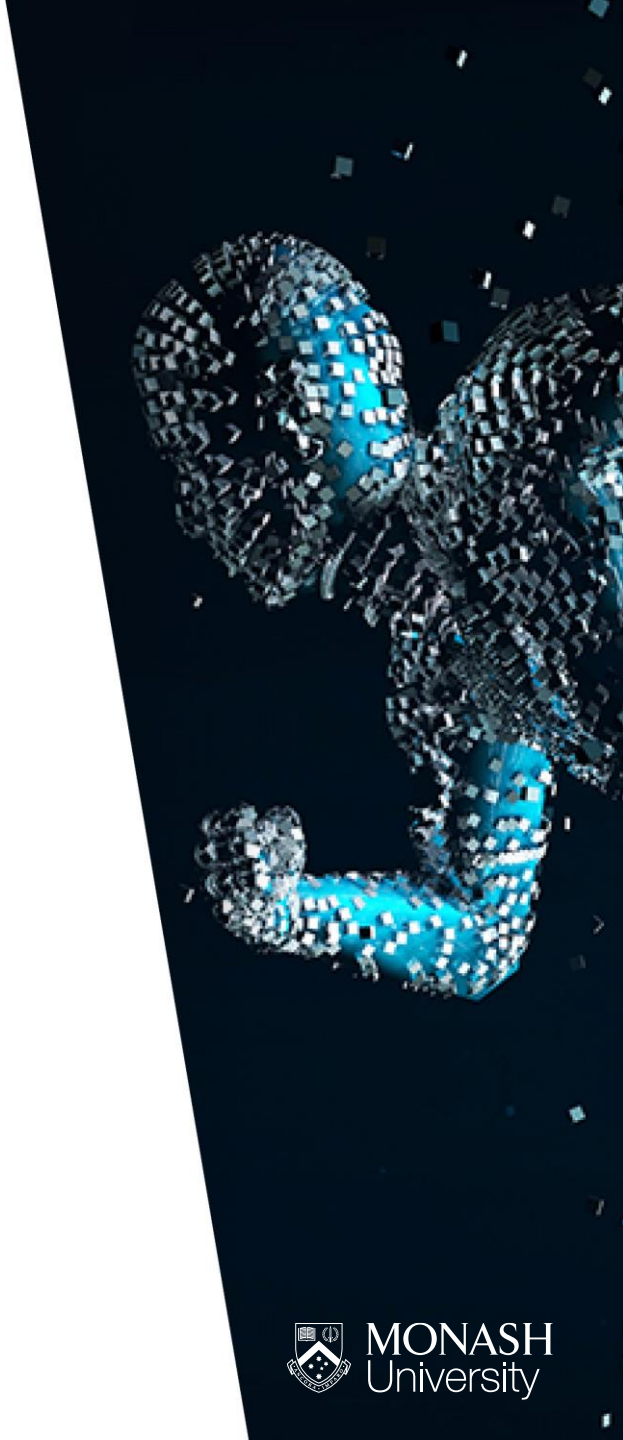
So why do we need science specialists at all?



Effective teaching requires pedagogical content knowledge (PCK)

Teaching psychosocial skills without the sciences leads to ‘empty capsules’ and ultimately ineffectual integration between the skills and the knowledge – both required for PID

Deconstructed Medical Knowledge….Is this what we want?



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Take Aways?

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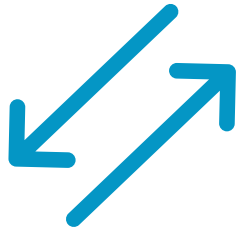
Why Build Science Curriculum with PID in mind?

More prepared for the realities of their future careers

- There seems to often be a mis-match between how we teach basic science, how students think basic science is used in careers, and the reality of basic science knowledge in clinical practices

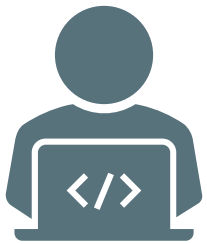
Eases Transitions

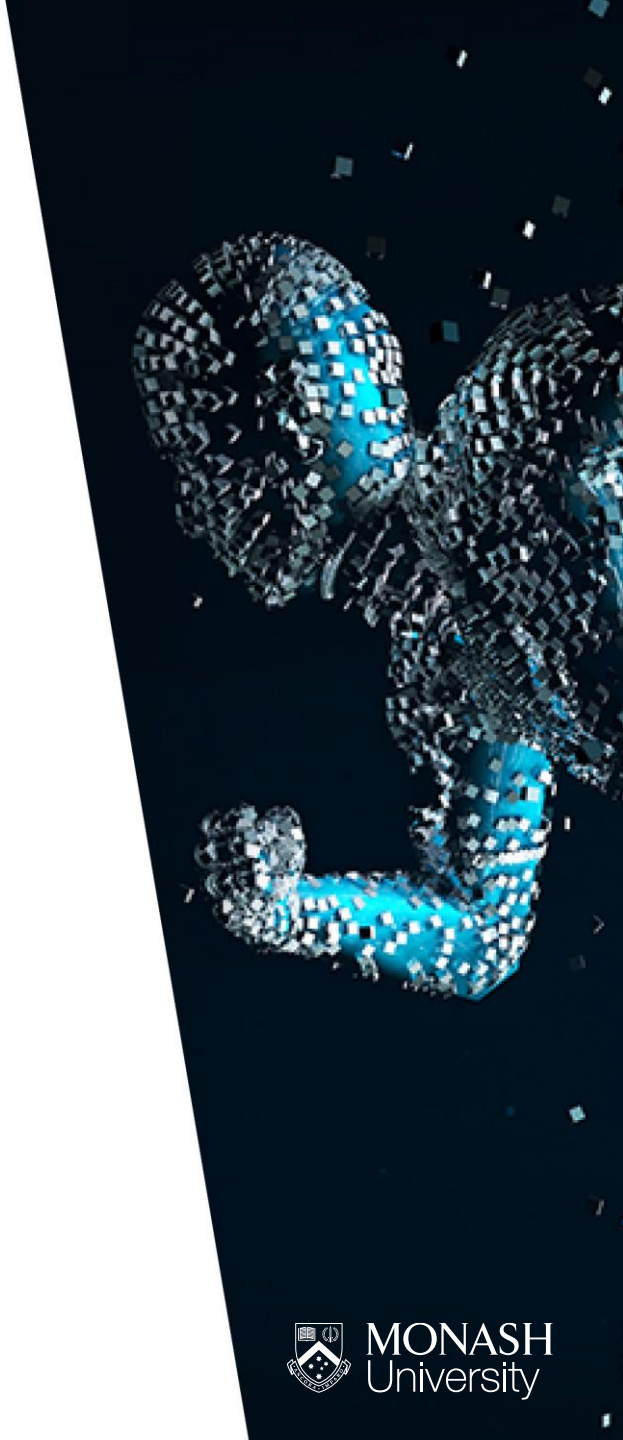
- Creating a classroom fostering UT, helps students manage future transitions to work/study/practice.



Future Protecting

- In many areas, AI is unable to replicate humans' ability to tolerate uncertainty and detect novelty, thus this skill is future protecting
- Routine tasks will be done by AI, and UT will be more and more prevalent in future





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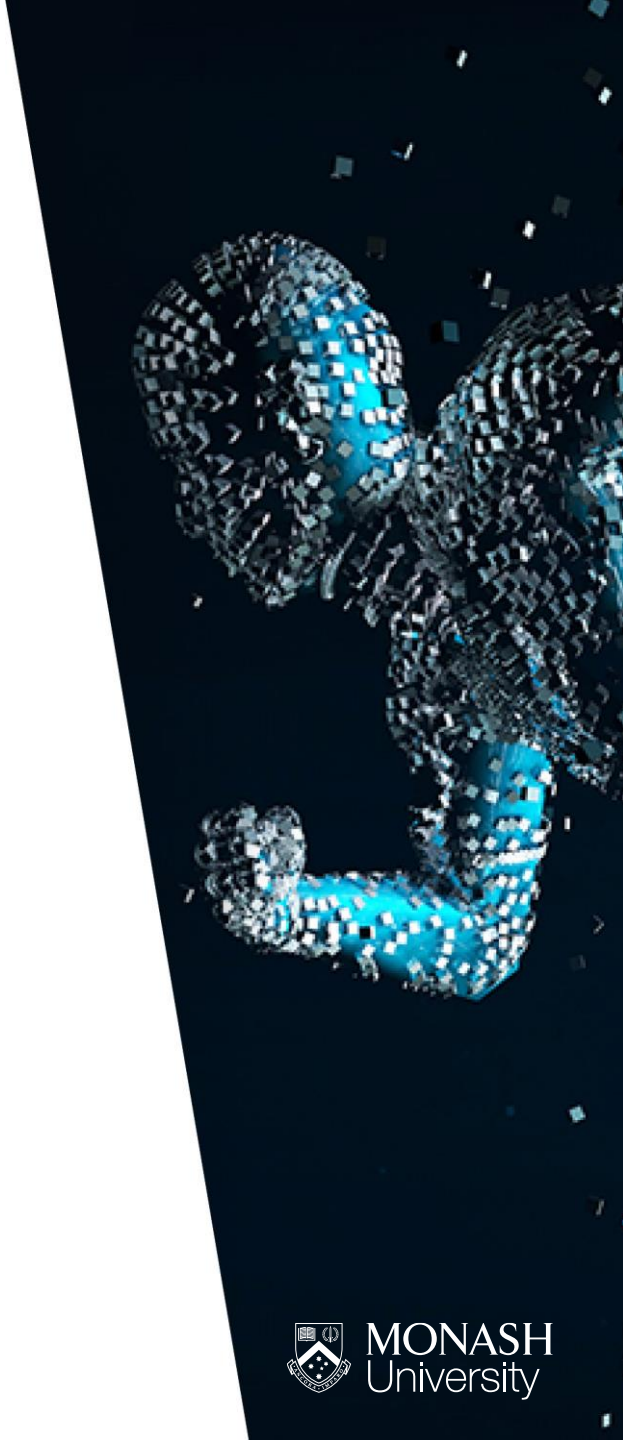
What questions do you have?



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Thank you!

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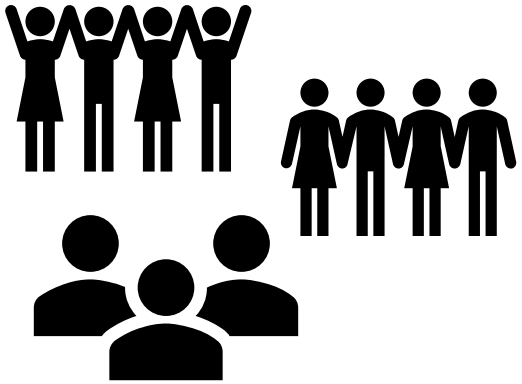
Research Participants



Funding Support

Education Services Australia

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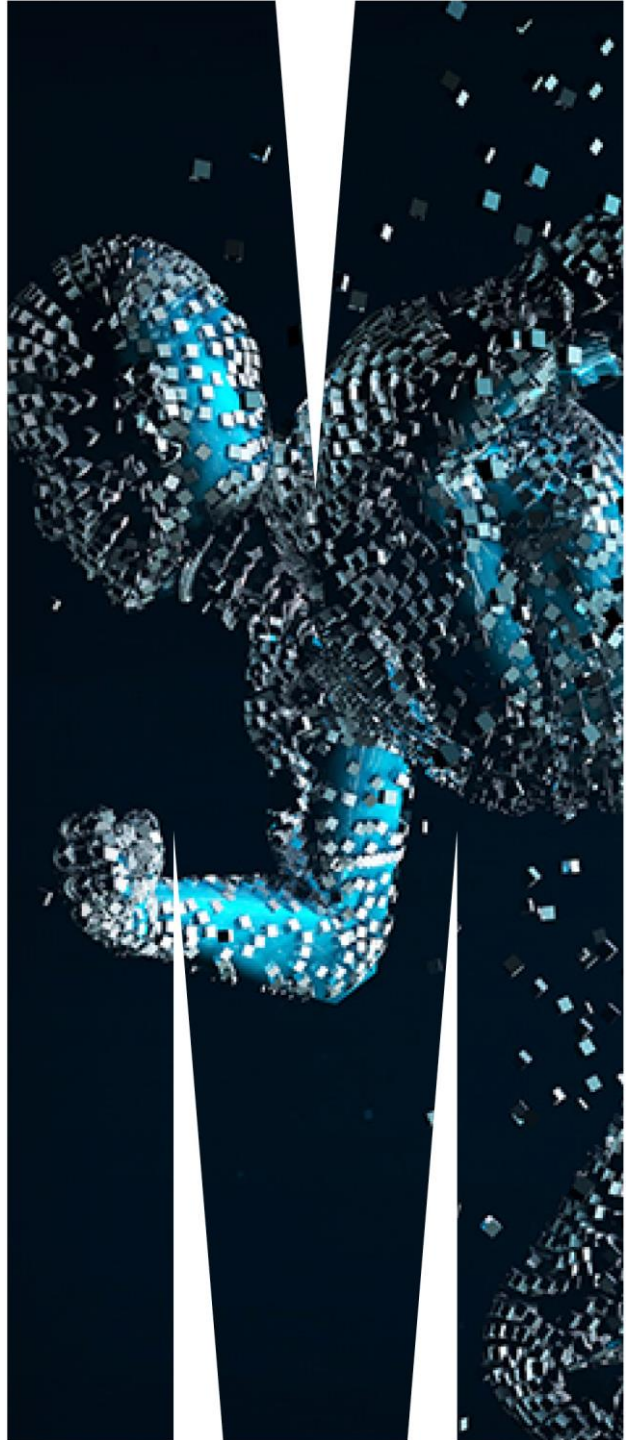

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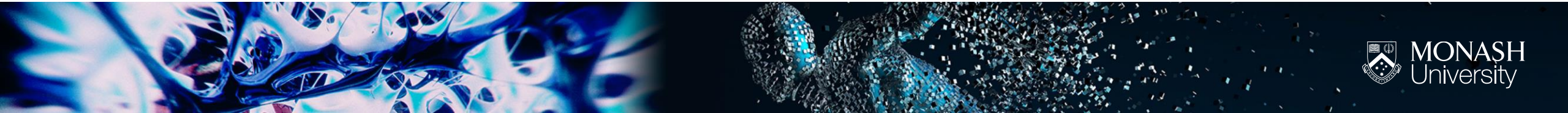

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