

Threshold Concepts and Troublesome Knowledge

A Transformative Approach to Learning

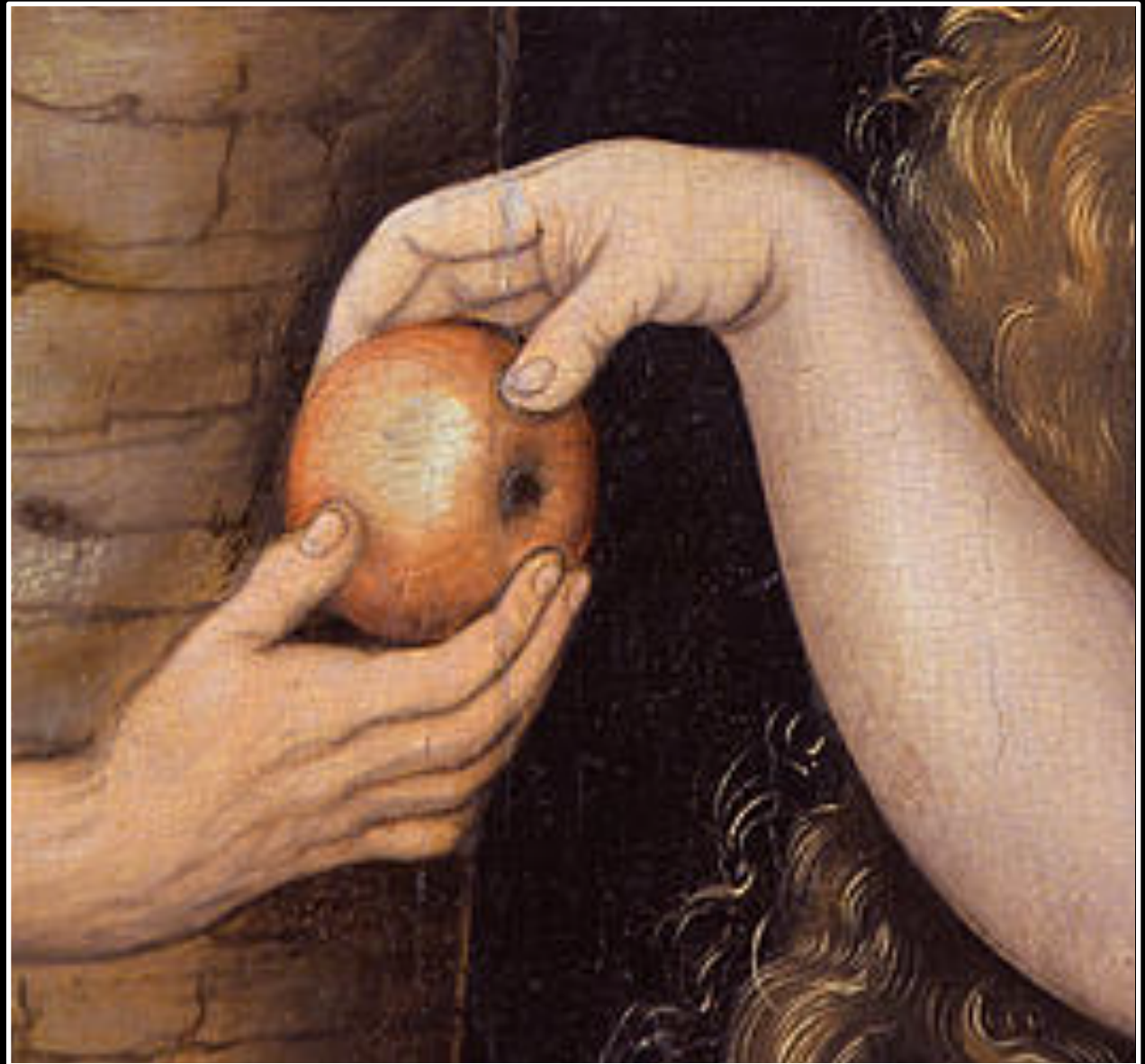
Ray Land

Durham University

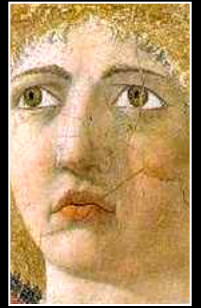


Threshold Concepts and Troublesome Knowledge

A
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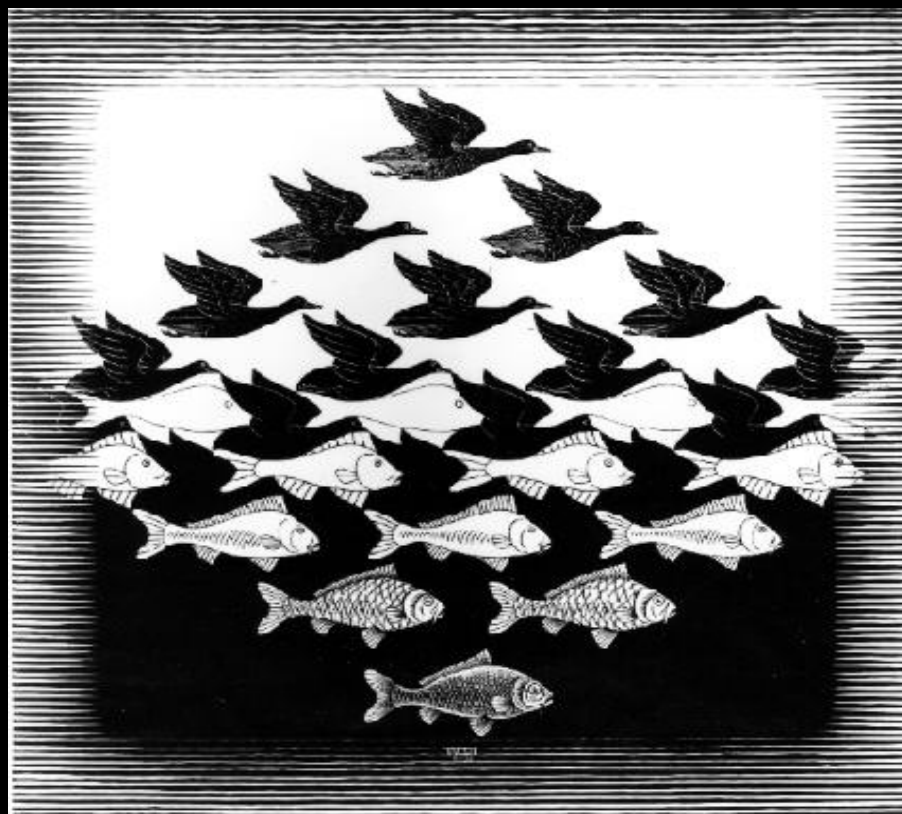
Pedagogies of uncertainty



In these settings, the presence of emotion, even a modicum of passion, is quite striking--as is its absence in other settings. I would say that without a certain amount of anxiety and risk, there's a limit to how much learning occurs.

One must have something at stake. No emotional investment, no intellectual or formational yield.

(Shulman 2005:4)

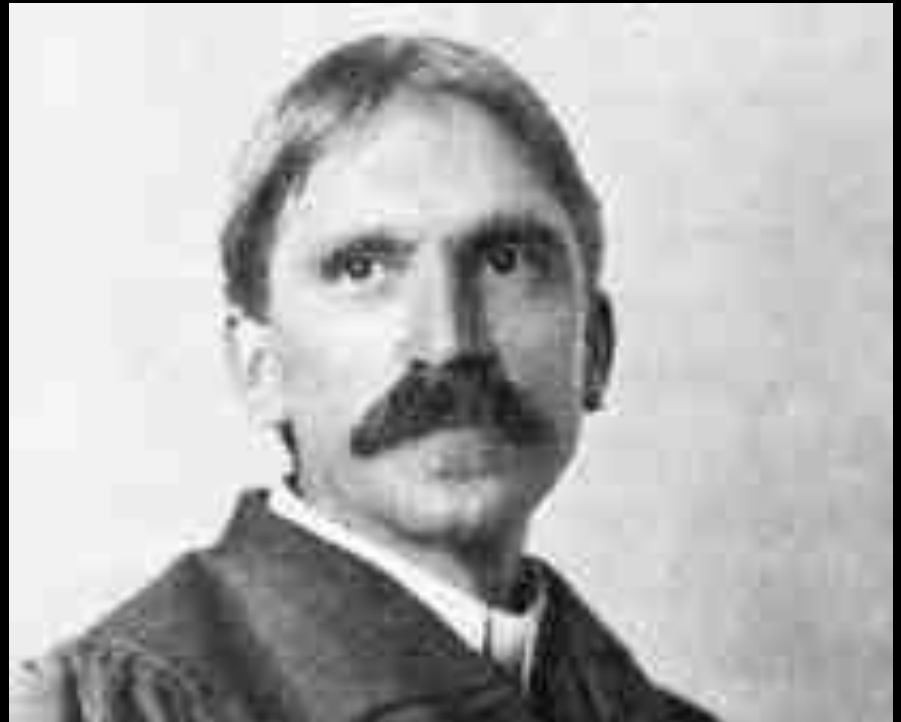


Troublesome knowledge



‘The path of least resistance and least trouble is a mental rut already made.

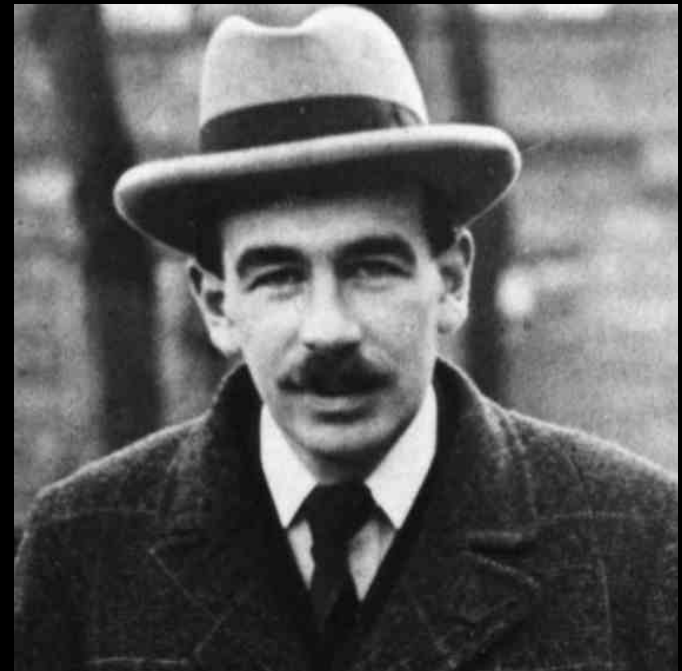
It requires troublesome work to undertake the alteration of old beliefs.’



John Dewey 1933

The difficulty lies, not in the new ideas, but in escaping from the old ones, which ramify ... into every corner of our minds.

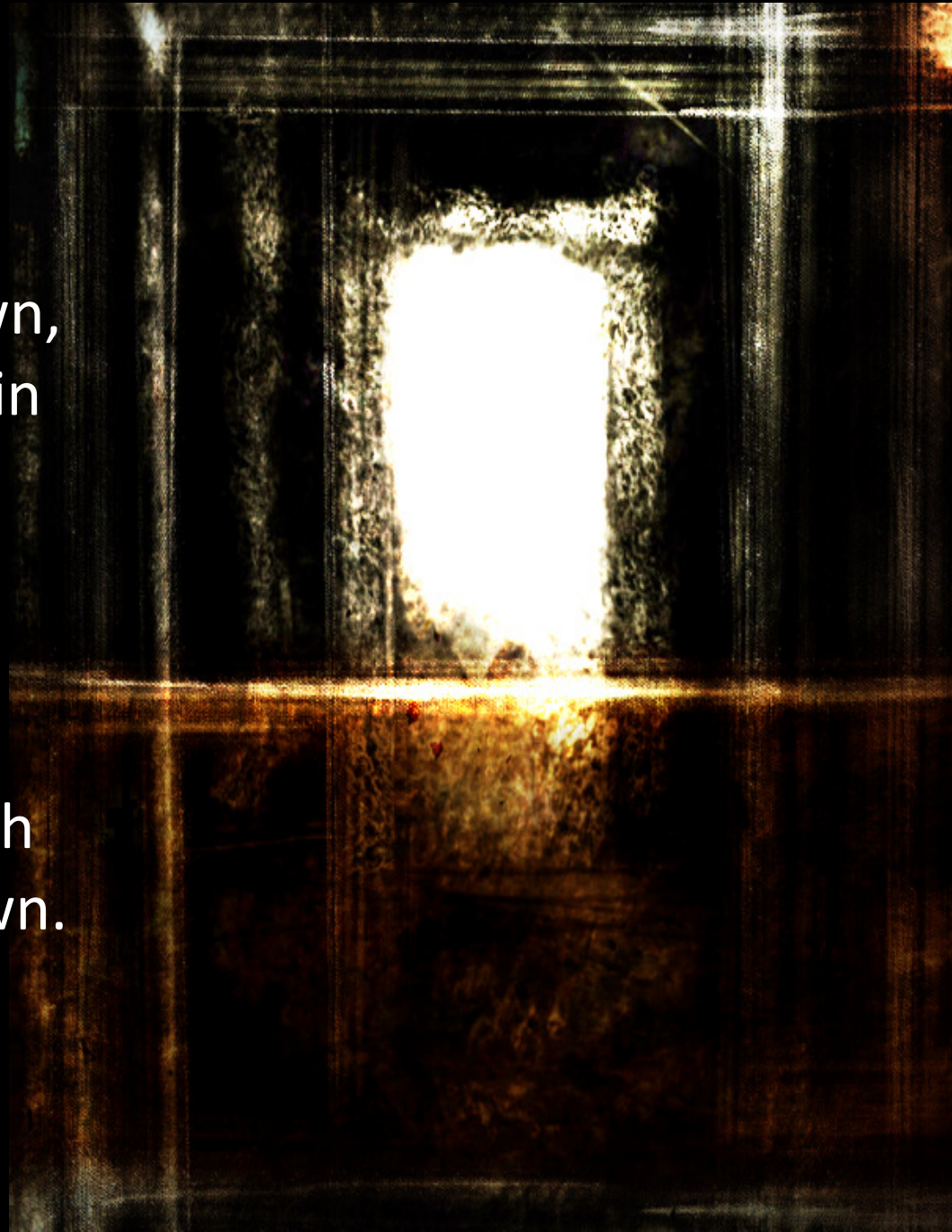
John Maynard Keynes (1936)



Real learning requires
stepping into the unknown,
which initiates a rupture in
knowing...

By definition, all TC
scholarship is concerned
(directly or indirectly) with
encountering the unknown.

Schwartzman 2010 p.38



pax intrantibus, salus exeuntibus (1609)



In public and marketing documentation our discourse of the student experience has become interwoven with narratives of graduate success, images of student happiness, a sense of student entitlement and the friendliness and helpfulness of (providing) staff.





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The future of quality assessment in higher education

Quality Assessment Review Steering Group
Discussion document
January 2015

Discussion document
January 2015

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WE DON'T WANT THE TEF

The government are planning to introduce league tables for teaching. When they introduced these for research they were a disaster.

STUDENTS WANT BETTER TEACHING but a REF for teaching won't make any improvements. As research funding becomes more and more scarce, the REF has led to intense competition between universities and the bullying of junior academics. We fear the TEF will do the same.

MONEY DOESN'T IMPROVE TEACHING
Introducing a financial incentive to teaching will only make this problem worse. The divide between teaching and research will grow, and the quality of teaching will drop. Money can't solve the problem—structural change is needed. Audits like the TEF give the impression of improvements while pushing the situation close to unsalvageable. Instead of the TEF we need research-engaged teaching; instead of audits, we need greater university autonomy.

THE SYSTEM IS BROKEN. The dysfunctional relationship between teaching and research in universities is well-documented by scholars such as Angela Brew and Mike Neary. The current model excludes students from membership of the academic community. Furthermore, the division between teaching and

WE DON'T WANT HIGHER FEES. The government have suggested that institutions will be rewarded for

LEAGUE TABLE



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The only real voyage of discovery consists not in seeing new landscapes, but in having new eyes, in seeing the universe with the eyes of another.

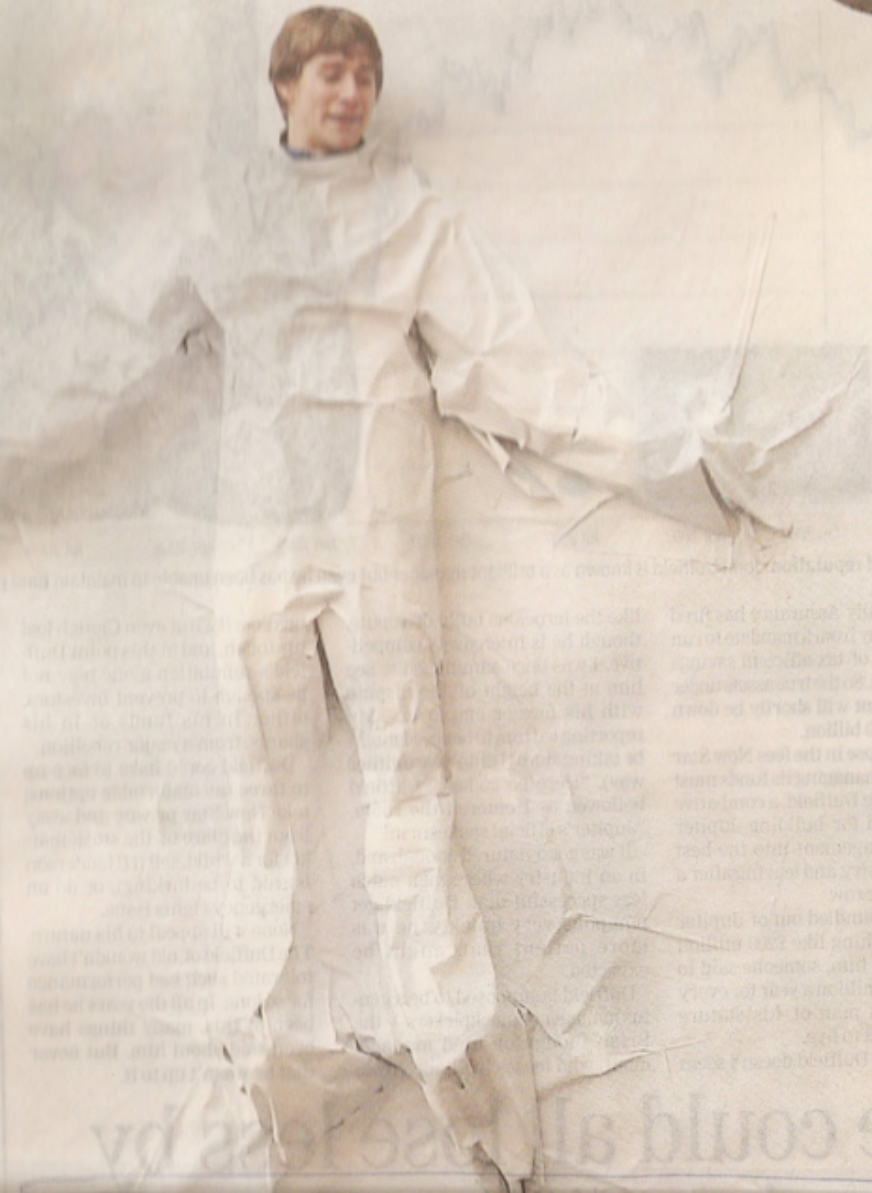


Marcel Proust, 1900

- **Threshold concepts**
- **Liminality**
- **Troublesome knowledge**
- **Episteme (the underlying game)**
- **Einstellung (design fixation)**

STUCK

Causes of conceptual (or other) difficulty?



The role of the teacher is to arrange victories
for the students



Quintilian 35-100 AD



Academics' own definitions of quality would seem to remain predominantly discipline-centred

(cf. Henkel, 2000:106).





Notion that within specific disciplines there exist significant 'threshold concepts', leading to new and previously inaccessible ways of thinking about something.

(Meyer and Land, 2003).



‘Concept?’



‘a unit of thought or element of knowledge
that allows us to organize experience’

Janet Gail Donald (2001)

‘Learning to Think: Disciplinary Perspectives’



James Joyce's 'epiphany'
— the 'revelation of the whatness of a thing' .

But threshold concepts are both more
constructed and re-constitutive than revelatory,
and not necessarily sudden.
(ευρηκα!)

Threshold Concepts



Akin to a portal, a liminal space, opening up a new and previously inaccessible way of thinking about something.

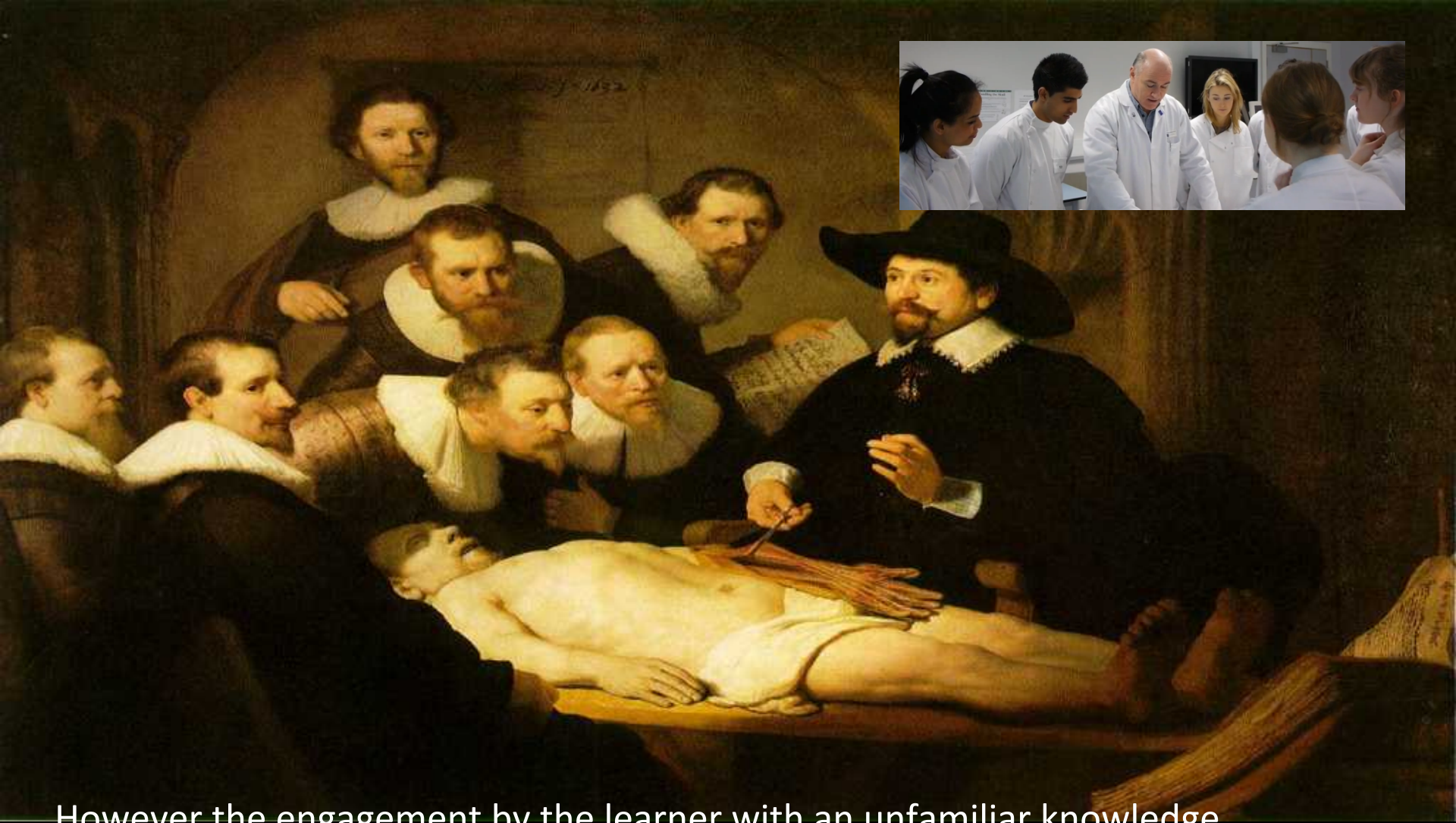
Represents a transformed way of understanding, or interpreting, or viewing something without which the learner finds it difficult to progress, within the curriculum as formulated.

Threshold Concepts



As a consequence of comprehending a threshold concept there may thus be a transformed internal view of subject matter, subject landscape, or even world view.

Such a transformed view or landscape may represent how people 'think' in a particular discipline, or how they perceive, apprehend, or experience particular phenomena within that discipline, or more generally.



However the engagement by the learner with an unfamiliar knowledge terrain and the ensuing reconceptualisation may involve a reconstitution of, or shift within, the learner's subjectivity, and perhaps identity.

Ontological implications. Learning as 'a change in subjectivity'. (Pelletier 2007).



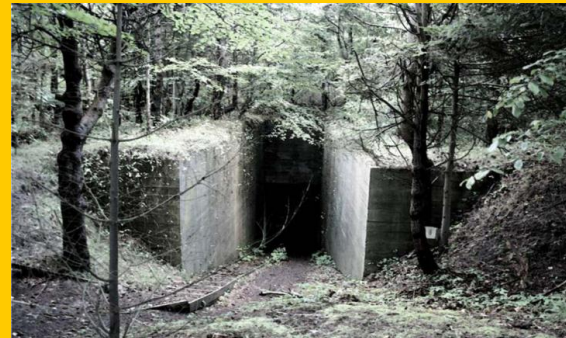
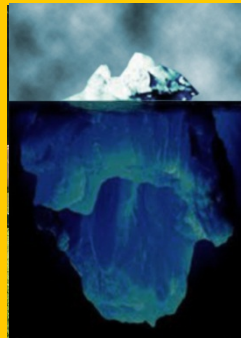
Liminality

- a transformative state that engages existing certainties and renders them problematic, and fluid
- a suspended state in which understanding can approximate to a kind of mimicry or lack of authenticity
- liminality as unsettling – sense of loss

- Q. Did you feel the same as student 1?
- Second student: Yeah. I felt lost.
- Q. In lecture times as well?
- Second student: You know, I understood the concept for about let's say 10 seconds, yes yes, I got that and then suddenly, no no, I didn't get that, you know, suddenly, like this.

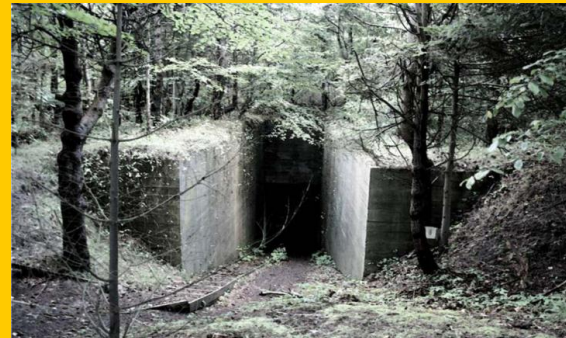
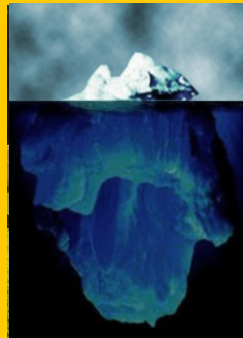
Student voice:

In the beginning we were thrown into something completely new and unknown that has been difficult to deal with. The feeling of not being clever enough, and not having control of what you are doing, have resulted in a lot of frustration and stress, and this has influenced the process to the extent that I have become exhausted and depressed, and I wanted to quit”



Student voice:

“Eventually it became clear that the project was about examining the edge/ridge, the exciting state of mind where meaningful and many faceted places may emerge.The architecture here on the edge/ridge is rich on senses, a delicate point of balance. It *is* senses”.



Progressive function of the liminal state

- Countenancing and integration of something new
- Recognition of shortcoming of existing view
- Letting go of the older prevailing view
- Letting go of an earlier mode of their subjectivity
- Envisaging (and accepting) an alternative version of self through the threshold space (as a practitioner) - 're authoring' of self. 'undoing the script' (Ross 2011)
- Acquiring and using new forms of written and spoken discourse and internalising these

Marine biology

Osmosis is counter-intuitive, it goes the opposite way. When does it click? When you study marine fish in 2nd or 3rd year, you see what would happen; it's in a relevant situation. In first year you do mechanisms in blocks and there's no relevance

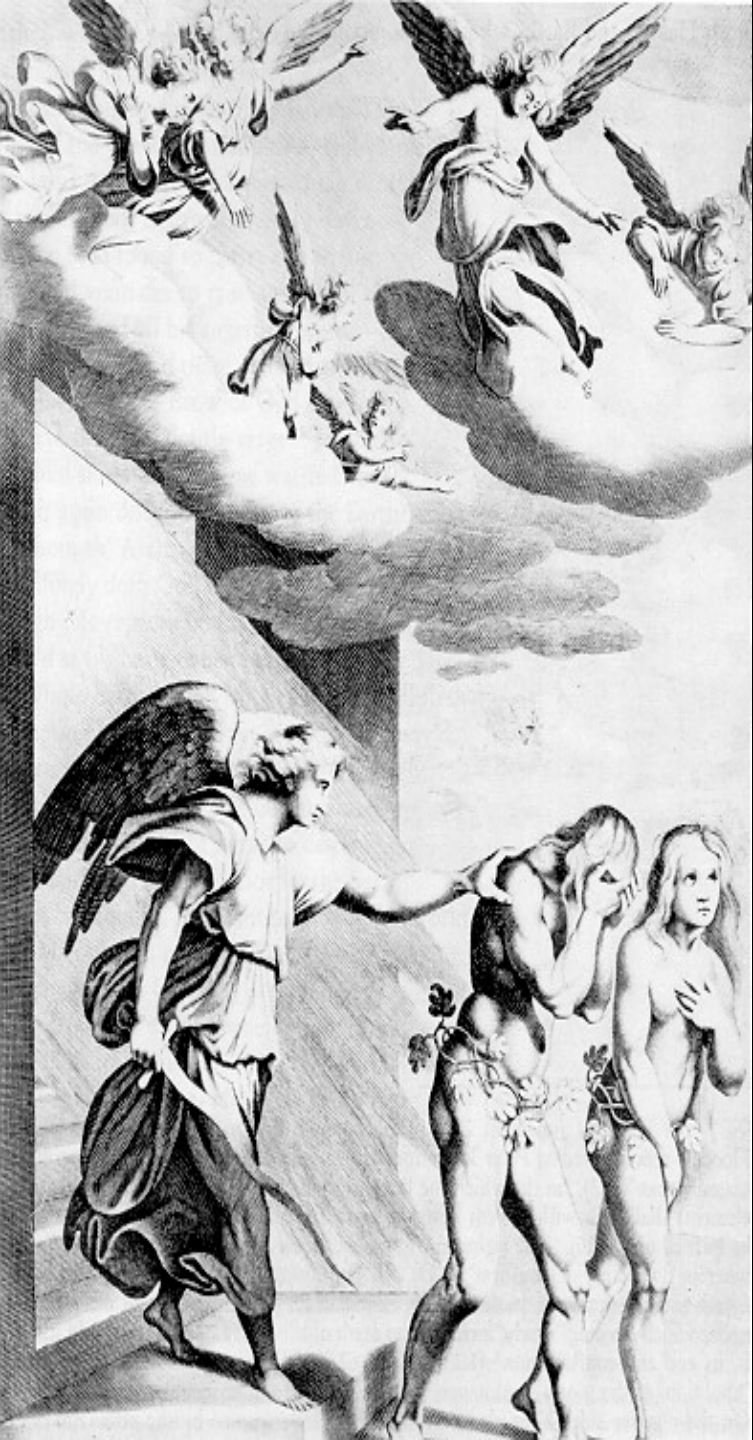
Taylor 2008, p. 191

Janus – divinity of the threshold

epistemological



ontological



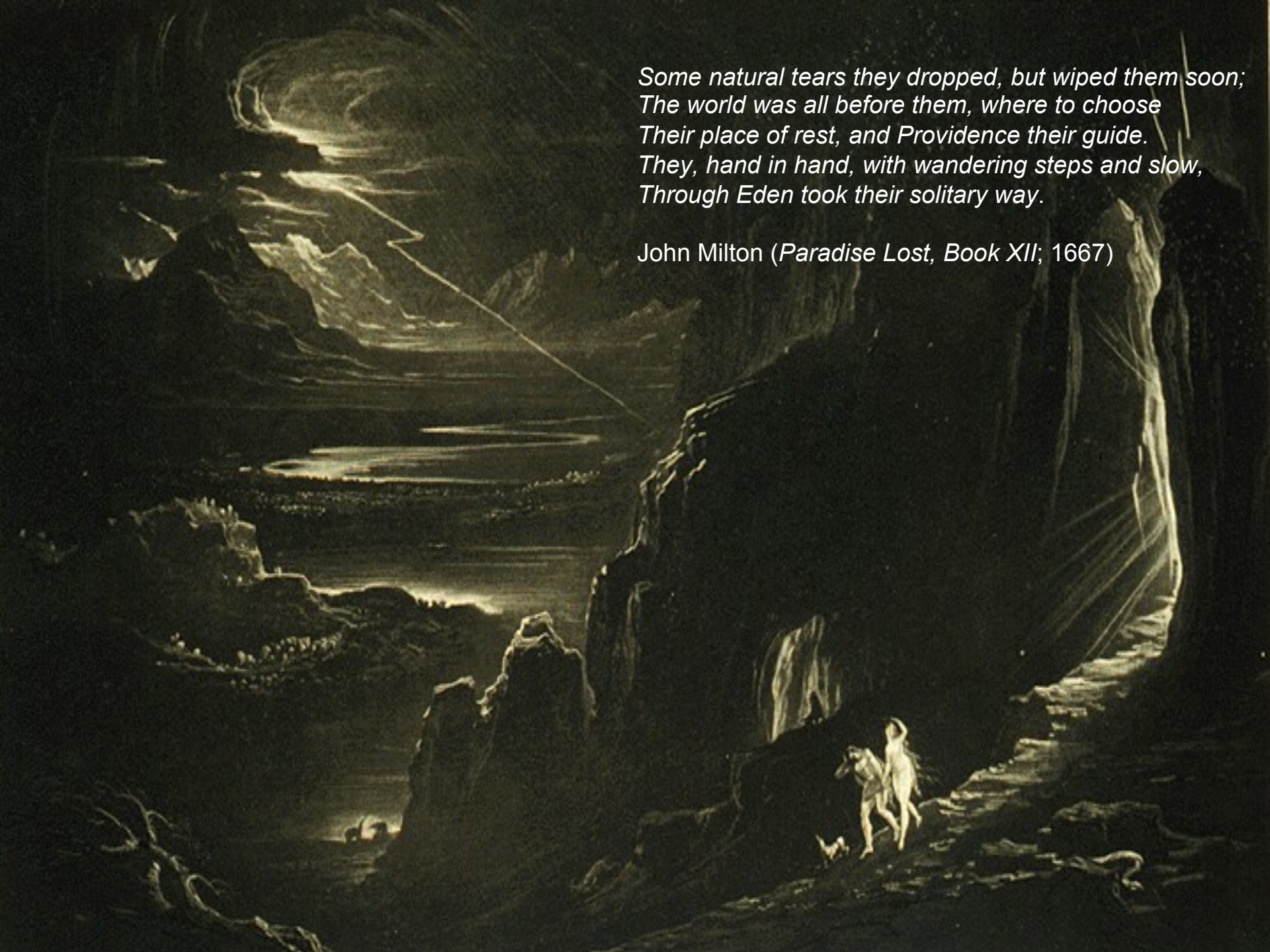
Characteristics of a threshold concept

- integrative
- transformative
- irreversible
- bounded
- re-constitutive
- discursive
- troublesome

East of Eden

through the threshold



A dramatic, dark landscape painting. In the foreground, a steep, dark cliff face dominates the right side, with a narrow, rocky path leading down. Two small, pale figures are walking along this path. The background reveals a vast, dark valley with a winding river or path that leads towards a distant, brightly lit horizon. The sky is dark and swirling with clouds, and a single, bright light source illuminates the scene from the right, casting long shadows and highlighting the textures of the rocks and the figures. The overall mood is somber and mysterious.

*Some natural tears they dropped, but wiped them soon;
The world was all before them, where to choose
Their place of rest, and Providence their guide.
They, hand in hand, with wandering steps and slow,
Through Eden took their solitary way.*

John Milton (*Paradise Lost*, Book XII; 1667)





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Candidate concepts



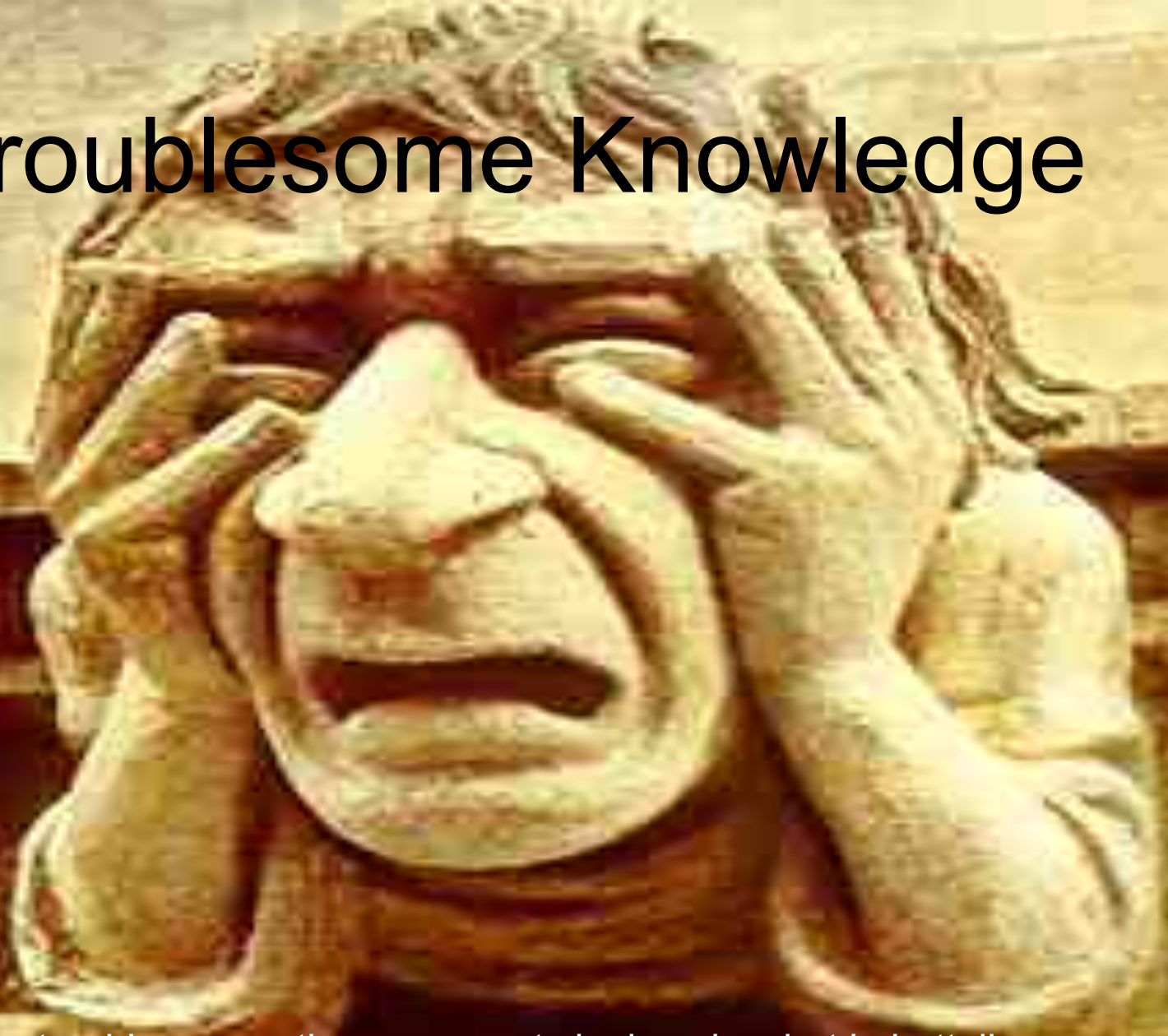
- Pure Maths – ‘complex number, a *limit*’, the Fourier transform’
- Literary Studies – ‘signification, deconstruction, ethical reading’
- Economics – ‘opportunity cost, price, elasticity’
- Design – ‘Confidence to challenge’
- Computer Science – ‘programming’, ‘Y and Recursion’
- Exercise Physiology – ‘metabolism’
- Law - ‘precedence’
- Accounting - ‘depreciation’
- Biology, Psychology - ‘evolution’
- Politics – ‘the state’
- Engineering – ‘reactive power’, ‘spin’
- Nursing ‘Evidence-based Practice’
- Mental Health Nursing ‘Recovery’
- Comparative Religion– ‘Biblical texts as Literary Texts’
- Plant Science ‘Photoprotection’
- Health Science – ‘Care’
- Physics – ‘Gravity’
- Geology - ‘Geologic Time’

Transactional curriculum inquiry

(Cousin 2009, pp. 201-212)

- What do academics consider to be fundamental to a grasp of their subject?
- What do students find difficult to grasp?
- What curriculum design interventions can support mastery of these difficulties?

Troublesome Knowledge



When troubles come they come not single spies, but in battalions

(Hamlet Act 4 Sc 5 ll 83-84)

looking for trouble

- Knowledge is troublesome for a variety of reasons (Perkins 2006). It might be alien, inert, tacit, conceptually difficult, counter-intuitive, characterised by an inaccessible 'underlying game', or characterised by supercomplexity.
- such troublesomeness and disquietude is purposeful, as it is the provoker of change that cannot be assimilated, and hence is the instigator of new learning and new ontological possibility.



Troublesome knowledge

- ritual knowledge
- inert knowledge
- conceptually difficult knowledge
- the defended learner
- alien knowledge
- tacit knowledge
- loaded knowledge
- troublesome language

Episteme: ‘the underlying game’

‘...a system of ideas or way of understanding that allows us to establish knowledge. ..the importance of students understanding the structure of the disciplines they are studying. ‘Ways of knowing’ is another phrase in the same spirit. As used here, epistemes are manners of justifying, explaining, solving problems, conducting enquiries, and designing and validating various kinds of products or outcomes.’ (Perkins 2006 p.42)

‘knowledge practices’ (Strathearn 2008)

Intellectual uncertainty

‘Intellectual uncertainty is not necessarily or simply a negative experience, a dead-end sense of not knowing, or of indeterminacy. It is just as well an experience of something open, generative, exhilarating, (the trembling of what remains undecidable). I wish to suggest that ‘intellectual uncertainty’ is ..a crucial dimension of any teaching worthy of the name.’

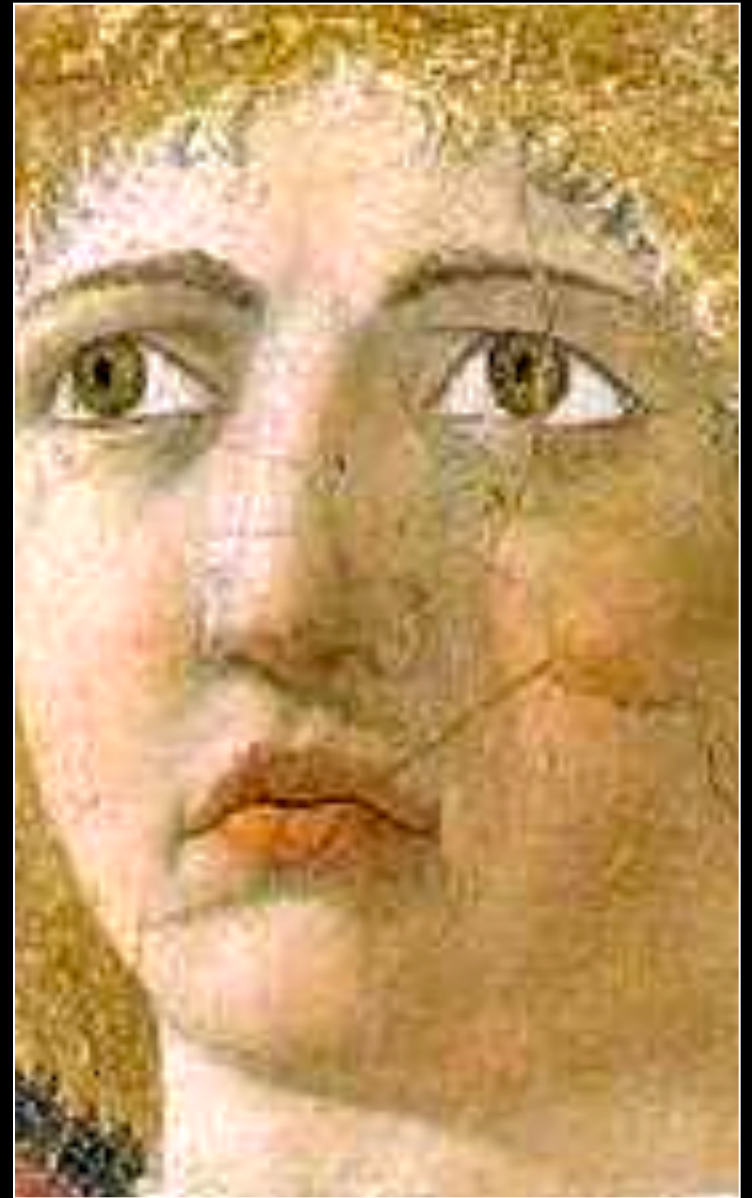
(Royle 2003 : 52)



Venturing into strange places

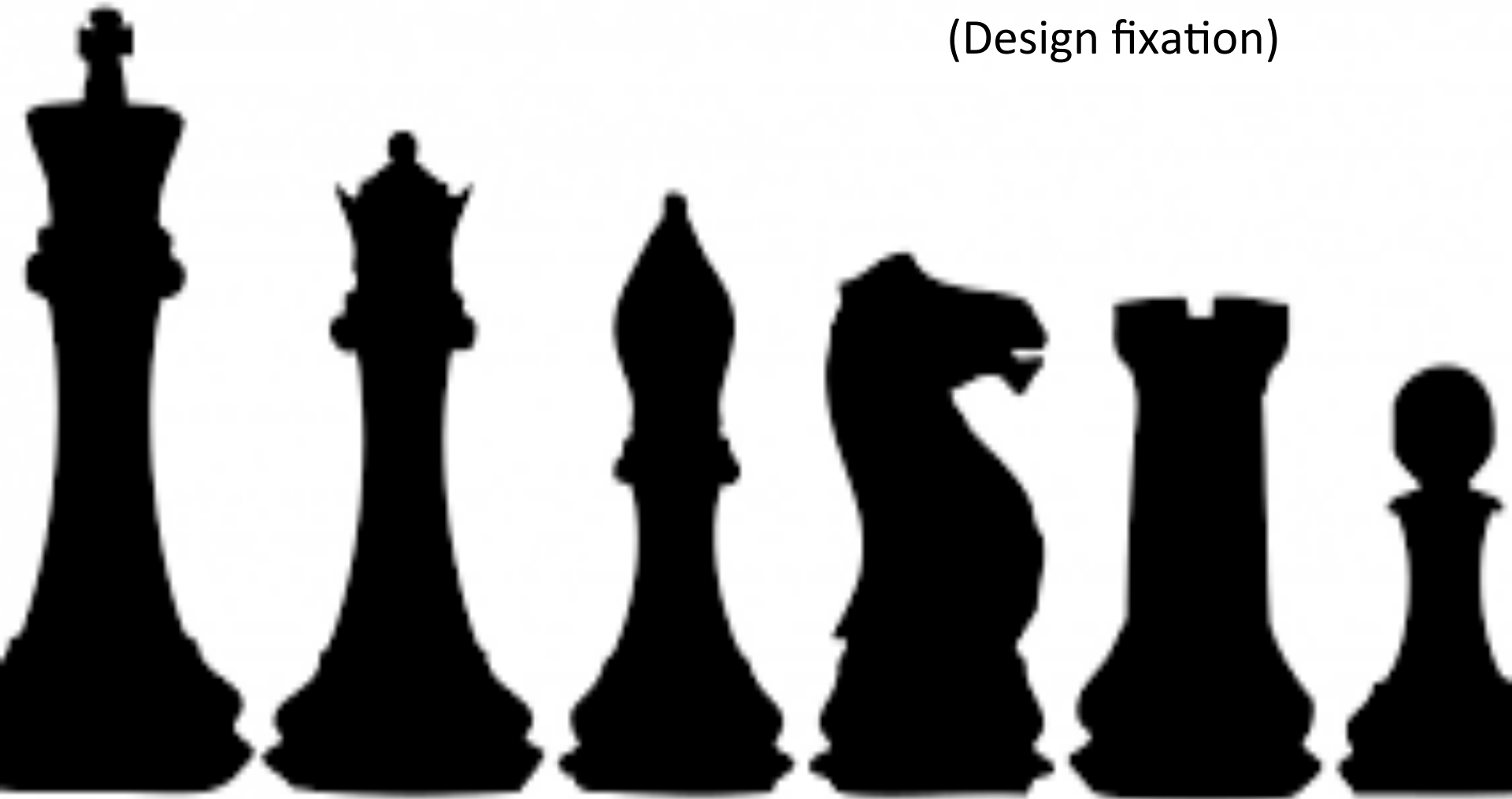
The student is perforce required to venture into new places, strange places, anxiety-provoking places . This is part of the point of higher education. If there was no anxiety, it is difficult to believe that we could be in the presence of a higher education.

(Barnett 2007: 147)



Einstellung Effect

(Design fixation)



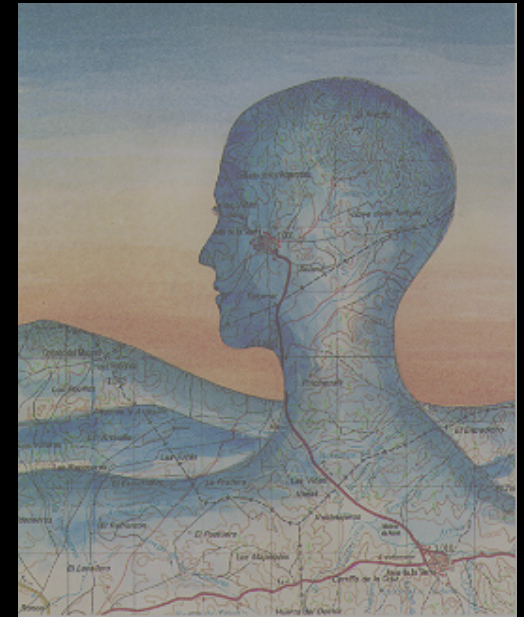
Luchins, A. S. (1942). Mechanization in problem solving - the effect of Einstellung. *Psychological Monographs*, 54, No. 6, 95.

‘Functional fixedness’

... our previous experience starts a self-fulfilling circle which begins with information consistent with the already activated schema being more likely to be picked up. Consequently the belief that the schema is the right one to deal with the situation is confirmed and alternatives are less likely to be considered (Keren, 1984).

People think they are considering the evidence in an open-minded way, not realising that their attention is being selectively directed to only certain aspects of the problem.

Those things that they notice do indeed fit in with the activated schema and so confirm the view that the way they are dealing with the situation is the correct one. Things that do not fit in are either not noticed, or if they are, ... not integrated because they do not fit the activated schema.



Paradigm blindness

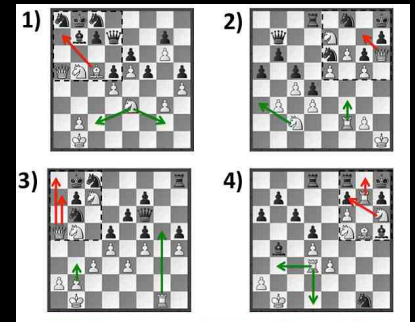
Experts rarely make mistakes but when they do, it is usually because they think the situation is a familiar one and apply their usual, but now inappropriate, methods to find a solution

(Singley & Anderson, 1989; Reason, 1990).

Eg doctors, scientists, managers, chess players, truck drivers, pilots, politicians, royalty, generals,

...architects, designers, teachers.

We show, by measuring players' eye movements, that the mechanism by which the first idea prevents a better idea coming to mind can be demonstrated. Crucially, we find that players believed that they were actively searching for better solutions when in fact they continued to look at aspects of the problem related to the first idea they considered.



This is why the Einstellung effect is pernicious – people do not realize that it is influencing their thoughts.

Considerations for Course (ReDesign)

- Jewels in the Curriculum
- Importance of Engagement
- Listening for Understanding
- Reconstitution of Self
- Recursiveness
- Tolerating Uncertainty
- The Dynamics of Assessment
- The Underlying Game

<http://www.ee.ucl.ac.uk/~mflanaga/thresholds.html>



Mick Flanagan, UCL

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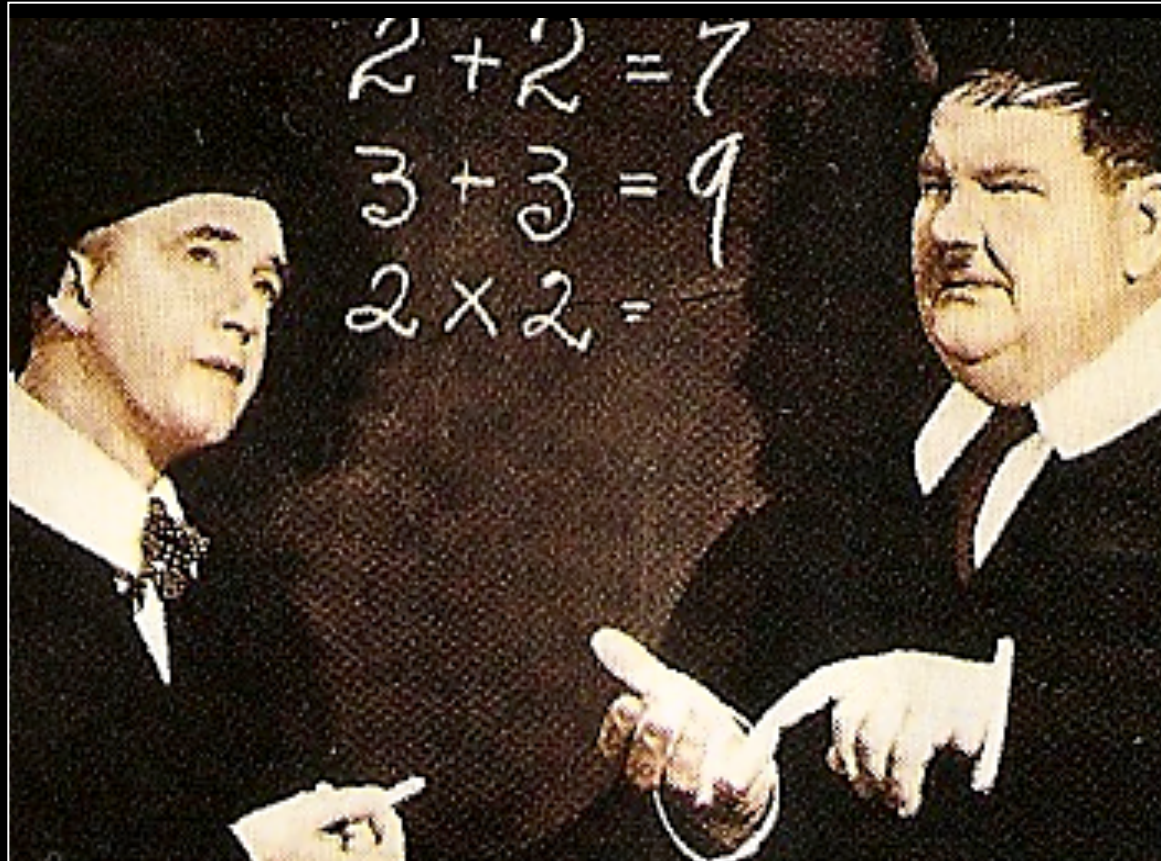
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Editors: Catherine O'Mahony, Avril Buchanan,
Mary O'Rourke and Bettie Higgs



ray.land@durham.ac.uk