threshold concepts & troublesome knowledge

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• Threshold concepts
• Troublesome knowledge
• Liminality
• Episteme (the underlying game)
The prevailing discourse of ‘outcomes’, ‘alignment’ and ‘achievement’ has, from critical perspectives, been deemed to serve managerialist imperatives without necessarily engaging discipline-based academics in significant reconceptualisation or review of their practice.

(cf. Newton, 2000).
Academics’ own definitions of quality would seem to remain predominantly discipline-centred

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

There are ontological implications.
Janus – divinity of the threshold

epistemological

ontological
East of Eden through the threshold
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)
Examples

- Pure Maths – ‘complex number, a *limit*, the Fourier transform’
- Literary Studies – ‘signification, deconstruction, ethical reading’
- Economics – ‘opportunity cost, price, elasticity’
- Design – ‘Spatial Understanding’
- Computer Science – ‘programming’, ‘Y and Recursion’
- Exercise Physiology – ‘metabolism’
- Law - ‘precedence’
- Accounting - ‘depreciation’
- Biology, Psychology - ‘evolution’
- Politics – ‘the state’
- Engineering – ‘reactive power’, ‘spin’
- History – ‘Asiatic Conceptions of Time’
- Comparative Religion – ‘Biblical texts as Literary Texts’
- Plant Science ‘Photoprotection’
- Health Science – ‘Care’
Opportunity cost in any particular choice is, of course, influenced by prior choices that have been made, but with respect to this choice itself, opportunity cost is *choice-influencing* rather than *choice-influenced*. Thus, if ‘accepted’ by the individual student as a valid way of interpreting the world, it fundamentally changes their way of thinking about their own choices, as well as serving as a tool to interpret the choices made by others.

(Shanahan, 2002)
They view statistics as a branch of mathematics because it uses mathematical formulas, so they look at statistics through a mathematical lens. What they are missing is the statistical lens through which to view the world, allowing this world to make sense. The concept of sampling distribution is this statistical lens. My own experience discovering this lens was a revelation, akin to the experience I had when I put on my first pair of eyeglasses – suddenly everything was sharp and clear. (Kennedy, 1998 p.142)
Provisional stabilities
(Saunders 2003)

Such examples are always situated within specific paradigms and cultural contexts. Hence they are always provisional and negotiable.

There is not one definitive and total conceptual understanding available, to which the tutor aims to bring the learner in due course. This would imply an objectivist position.
Characteristics of a threshold concept

• integrative
• transformative
• irreversible
• bounded
• re-constitutive
• discursive
• troublesome
Within the field of Cultural Studies a threshold concept that has to be understood early is the breakdown of the barrier between high and popular culture. This is fundamental to the Cultural Studies approach. This is a significant departure from practice in English Literature where that concept not only doesn’t really exist but if it did (i.e. if you crossed that threshold) it would undermine the discipline of Eng.Lit. itself. (Bayne, 2002).
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
• troublesome language
A mix of misimpressions from everyday experience (objects slow down automatically), reasonable but mistaken expectations (heavier objects fall faster), and the strangeness and complexity of scientists’ views of the matter (Newton's laws; such concepts as velocity as a vector, momentum, and so on) stand in the way. The result is often a mix of misunderstandings and ritual knowledge: Students learn the ritual responses to definitional questions and quantitative problems, but their intuitive beliefs and interpretations resurface in quantitative modelling and in outside-of-classroom contexts. (Perkins, 1999)
that which ‘comes from a perspective that conflicts with our own. Sometimes the learner does not even recognize the knowledge as foreign.’ (Perkins, 1999)

A threshold concept that is counter-intuitive for many Physics students is the idea, formalised in Newton’s second law of motion, that a force acting on a body produces acceleration rather than simply velocity or ‘motion’.
Tacit Knowledge

that which remains mainly personal and implicit (Polanyi, 1958) at a level of ‘practical consciousness’ (Giddens, 1984) though its emergent but unexamined understandings are often shared within a specific community of practice (Wenger, 1998).
Specific discourses have developed within disciplines to represent (and simultaneously privilege) particular understandings and ways of seeing and thinking. Such discourses distinguish individual communities of practice and are necessarily less familiar to new entrants to such discursive communities or those peripheral to them (cf Wenger, 2002).
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
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 2007)
Double trouble: ‘games of enquiry’

Concepts can prove difficult both in their categorical function and in the activity systems or ‘games of enquiry’ they support. Not only content concepts but the underlying epistemes of the disciplines make trouble for learners, with confusion about content concepts often reflecting confusion about the underlying epistemes.

(Perkins 2006 p.45)
Task 1

• Is it possible to identify areas of your own teaching which might require the learning of threshold concepts?

• What parts of your curriculum tend to prove ‘troublesome’ to students? What might account for the troublesomeness of this knowledge?
Ten Considerations for Course Design
Threshold concepts can be used to define potentially powerful transformative points in the student’s learning experience. In this sense they may be viewed as the ‘jewels in the curriculum’.
importance of engagement

Existing literature regarding teachers who want students to develop genuine understanding of a difficult concept points to the need for engagement eg. They must ask students to explain it, represent it in new ways, apply it in new situations, connect it to their lives and NOT simply recall the concept in the form in which it was presented (Colby, et.al, 2003: p263).
3 listening for understanding

However, teaching for understanding needs to be preceded by listening for understanding.

We can’t second guess where students are coming from or what their uncertainties are. It is difficult for teachers to gaze backwards across thresholds.
Grasping a concept is never just a cognitive shift; it also involves a repositioning of self in relation to the subject. This means from the viewpoint of curriculum design that some attention has to be paid to the discomforts of troublesome knowledge.
The need for the learner to grasp threshold concepts in recursive movements means that they cannot be tackled in a simplistic 'learning outcomes' model where sentences like 'by the end of the course the learner will be able to....' undermine the complexities of the transformation a learner undergoes (post-liminal variation). Consideration of threshold concepts to some extent ‘rattles the cage’ of a linear, outcomes-based approach to curriculum design.
Learners tend to discover that what is not clear initially often becomes clear over time. So there is a metacognitive issue for the student (self-regulation within the liminal state) and a need for the teacher to provide a ‘holding environment’ (Winnicott 1960).
pre-liminal, liminal, post-liminal variation

Why do some students productively negotiate the liminal space and others find difficulty in doing so? Does such variation explain how the threshold will be, or can be, or can only be approached (or turned away from) as it ‘comes into view’? And how does it ‘come into view’?

Value of concept mapping to explore such variation (Kinchin and Hay 2006)
contestability of generic ‘good pedagogy’

There is emerging indicative evidence that the ‘good pedagogy’ of relating concepts to everyday phenomena, or simplifying them, can break down, eg depreciation, opportunity cost.
The need to recognise the ‘games of enquiry we play’ (Perkins 2006). Disciplines are more than bundles of concepts. They have their own characteristic epistemes. Need for students to recognise the ‘underlying episteme’ or game and develop epistemic fluency.
Possibility of using thresholds framework to design more discipline-specific programmes of professional development.
Task 2

• If we were to think of threshold concepts as an organising framework for the curriculum, what might be the implications for (any of) the following:

• Teachers
• Students
• Institutions
• The curriculum and pedagogy?
References

• Meyer JHF and Land R 2003 Threshold Concepts and Troublesome Knowledge – Linkages to Ways of Thinking and Practising’ in Improving Student Learning – Ten Years On. C.Rust (Ed), OCSLD, Oxford


