Threshold Concepts and Educational Development

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Troublesome knowledge
Academics’ own definitions of quality would seem to remain predominantly discipline-centred

Potential benefits for educational development

- Discipline-based approach
- Action poetry
- Twin focus: Conceptual and ontological space
- Transactional Curriculum Enquiry (decoding)
- Analytical tool for curriculum (re)design
- Discursive tool for pedagogical enquiry
1. Brief reprise of the model
2. A closer look at liminality
3. Learning ‘space’
4. Conceptual space
5. Ontological space
6. Implications for development
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)
I am part of all that I have met;
Yet all experience is an arch
where ethro’
Gleams that untravell’d world,
whose margin fades
For ever and for ever when I
move.

Tennyson ‘Ulysses’
• Threshold concepts
• Liminality
• Troublesome knowledge
• Episteme (the underlying game)
Characteristics of a threshold concept

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

- ritual knowledge
- inert knowledge
- conceptually difficult knowledge
- the defended learner
- alien knowledge
- tacit knowledge
- loaded knowledge
- troublesome language
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
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).
East of Eden through the threshold
‘...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, epistememes 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)
Examples

- 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’
- History – ‘Asiatic Conceptions of Time’
- Comparative Religion– ‘Biblical texts as Literary Texts’
- Plant Science ‘Photoprotection’
- Health Science – ‘Care’
- Physics – ‘Gravity’
- Geology - ‘Geologic Time’
Decoding the Disciplines

1. What is a bottleneck to learning in this class?
2. How does an expert do these things?
3. How can these tasks be explicitly modelled?
4. How will students practise these skills and get feedback?
5. What will motivate the students?
6. How well are students mastering these learning tasks?
7. How can the resulting knowledge about learning be shared?

(Middendorf, J. and Pace, D. 2004)
A closer look at liminality
Liminality as flux

Liminality ..appears to be a ‘liquid’ space, simultaneously transforming and being transformed by the learner as he or she moves through it.

(Meyer & Land 2005 p.380)
Transformative

‘The condition of liminality may be transformative in function; there may be a change of state or function’

(Meyer & Land 2006 p.22)
oscillative

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.

(M. Orsini-Jones 2006)
discursive

Indissoluble interrelatedness of the learner’s identity with thinking and language (reading, writing, listening, talking).

... students acquire a point of view and terminology of a technical kind, which allow them to talk and think about patients and diseases in a way quite different from the layman. They look upon death and disabling disease, not with the horror and sense of tragedy the layman finds appropriate, but as problems in medical responsibility.

(Becker, Geer, Hughes and Strauss, 2005, p. 421)
potentially creative?

No, I think you’re misunderstanding me... we’re not talking here about our students coming out of this liminal space..this liminality, whatever ..We’re saying we want them to stay in it. We want them to stay precisely in that fluid state .. That complexity .. that emergence, because in that way their ideas won’t become crystallised, they won’t harden and get stylised. Their ideas will stay emergent ...provisional, exploratory ... Still with lots of unexplored possibilities .. Fresh. That’s what we want. Keeping that way of seeing . We want them .. and their ideas .. to stay held in that tension.

That’s the creative space.

(Lecturer, Art School)
Mimicry (coping)

a student in a ‘stuck place’, having glimpsed the outline of a threshold portal and perhaps only vaguely aware of what lies beyond it, but conscious of the failure to cross it, may engage in two forms of mimicry.

The first is compensatory mimicry, in an assuage of self that something is understood – witness the novice student who rehearses what is known (but irrelevant) in learning for examinations, rather than what is required to be known for them.

The second is conscious mimicry, when the student is aware that what is required is beyond grasp, other than through the mimicry of pretension.

(Meyer & Land p. 2006 p.24)
Emergent entities (properties or substances) ‘arise’ out of more fundamental entities and yet are ‘novel’ or ‘irreducible’ with respect to them (Lewes 1875).

Transformation, as an emergent, is a higher-level property, which cannot, in Lewes’ sense, be deduced from or explained by the properties of lower level entities.

George Henry Lewes 1875
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
Analysing spatial metaphors

- Zone of proximal development (Vygotsky)
- Threshold space v transformational space (Douglas)
- Smooth and striated space (Deleuze and Guattari)
- Third space (Bhabha)
- Potential space (Winnicott)
The proposed distinction is between the idea of space as a container, and the idea of space as connection. In a threshold space, things, effects, and events are contained or exteriorised; in a transformational space they are transmitted.

(Douglas 2011 p. 45-46)
Containment v connection

Containment is secondary to connection. To pass *outside* in threshold space is to cross a line demarcating an interior, whether by choice, accident or involuntary ejection. In transformational space however, there is no strict exterior, only degrees of connection. ... Charing Cross on Beck’s [1931 London Underground] map differs from Edgeware not because it is a more capacious station, with better amenities and more platforms, but because it has greater *connectivity*.

(Douglas 2011 p. 45-46)
Third space

• Hybridity to me is the ‘third space’ which enables other positions to emerge

• This third space displaces the histories which constitute it, and sets up new structures of authority.

Homi Bhabha (1994)
Homi Bhabha’s dynamic *third space* is, an interstitial realm like the threshold, which accommodates ambivalence, conflict, confusion, movement, change and notably, *potentiality.*

(Bhabha 1994 p. 218)
Potential space (Winnicott 1967)

For Winnicot, potential space is an intermediate or third area – neither the individual’s inner world, nor actual, nor external reality. In potential space, creativity develops in the ‘discovery, creation, and development of a self’ (Palombo, Bendicsen & Koch 2009 p.154).

Inside and outside are kept suspended: the inner and outer touch each other in a dance-like movement ... Characteristic of potential space is a negative capability [Keats] to endure in a psychically open process yet remain coherent in changing circumstances (Bonz & Struve, 2006 p.152)
Conceptual space
(drawn on the work of Peter Vivian)

de Saussure 1916
Cognitive domain

Variation in understanding prior to dealing with the new concept

Meaningless

Partial understanding

Wrong

Unique experiences of acquiring the new concept

Physical domain

Common collection of signifiers (words & symbols for the pre-requisite concepts)

Common pedagogic process (teaching new concept)
The learner has a cognitive stock of existing concepts and their labels i.e. signs. When introducing a new concept, it is common practice to create a new signifier thus adding a new sign to the learners stock. It takes time to learn this sign and when the learner emerges from the tunnel, their ability and willingness to use the signifier will depend on their understanding of the signified and their feelings about the learning process.
Note that the tunnel is drawn in the conceptual domain, which is internal to the individual learners and tutors. Communication between these individuals is in the physical domain where the oral and graphic signifiers play their part.
Any concept has to be described or represented using already familiar signs, and if any of these are poorly understood then the description or representation will be misunderstood. Perhaps the threshold concept is so troublesome not because the concept is so difficult but because it challenges the learners understanding of its component concepts and this is why it acts as a check point for the learner’s progress.
Learners need to engage with and manipulate conceptual materials i.e. the physical means of describing, discussing and exploring concepts. These are the signifiers in the physical domain.

The teacher creates a framework of engagement by setting tasks designed to motivate the learner to engage with conceptual matters (i.e. the signifieds) by transforming the signifiers from one context to another. The teacher can then infer understanding on the part of the learner by comparing the learner’s transformation with their own.
The transformative and integrative effects of threshold concepts cause the meanings of the existing signs in the learner’s collection to change – a new collection of signs, a new ‘dialect’.

Generally speaking, different ‘dialects’ can be recognised because there are changes in the signifiers but sometimes the signifiers stay the same and so the altered understandings are not self-evident. The change in dialect goes unnoticed.
Changing the signified changes our perception of the signifier and can cause us to identify new signifiers for the concept in different domains i.e. the integrative effect. This effect is accumulative and gradually affects our perception of the whole world around us and hence how we fit in that world. The threshold concept may be in the nature of a conceptual straw that breaks the camels back – a piece in a jigsaw of concepts that causes them to coalesce and produce a step change in perception.
New signs have to be acquired *sequentially* but concepts are not designed to be understood in a sequential manner and the world operates as an integrated *whole*. A certain amount of holistic understanding is always required. This inevitably means that there is a period of uncertainty in which the reason for introducing the concept and perhaps the concept itself are not understood. It is a challenge for the course designer to minimise these periods and threshold concepts are required to integrate these concepts at regular intervals otherwise the course remains conceptually fragmented.
The physical learning of signs is sequential in that the processes of learning are sequential by nature i.e. reading, listening, writing, and thinking etc. This does not preclude repetition (recursiveness) or digression (excursiveness).

In practice with minimum pass marks of 40% it is likely that many learners will move from one pedagogic block to another with shortfalls in their understanding. Such blocks are created by the definition of courses, years, modules and even assignments.
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Common collection of signifiers
(words & symbols for the pre-requisite concepts)

Common pedagogic process
(teaching new concept)
A group of learners being introduced to a new concept will be assumed by the teacher to possess a common understanding of the component concepts. Actually, what they share is a common collection of signifiers in the physical domain i.e. the words and symbols used to label the component concepts.

As a group they will be subject to a common physical pedagogic process which again is a manipulation of linguistic signs. All this occurs in the physical domain. So is it probably impossible to know the extent of that common understanding – another *incorrugible*? The act of learning remains a personal cognitive and affective process.
The last diagram identifies four arbitrary states of understanding – complete, partial, incorrect and meaningless.
With just 3 component concepts and 4 states there are 48 possible permutations. When one considers that partial understanding is measured on a continuous scale between none and complete and that the number of component concepts and their components can be much greater than 3, the potential variation is enormous.

It is also possible that the teacher does not have complete understanding of the new concept and its components.
Previous pedagogy

Inappropriate understanding established/reinforced

Current pedagogy

Current understanding needs to be replaced by new understanding
Discourse

The understanding of the language being used is critical. The teacher’s use of language, signs and syntax, may fail to communicate meaning because of the learner’s inability to handle that usage.

This is one possible reason why learners are able to grasp concepts from their peers that were meaningless when supplied by their teachers. Another reason could be the recursive and excursive natures of the peer support process.
A concept may underpin a number of signs but it does not necessarily follow that the concept is included in the learner’s sign collection. The concept may have been introduced to the learner beforehand who had failed to grasp its relevance to the subsequent collection or its existence may be presumed by the teacher.

Without a signifier, there is no reminder in the physical domain that the concept exists. If that concept is not understood appropriately, then this lack of understanding will have a deleterious impact on the signification of the sign collection.
4. Ontological shift
Threshold capital?

- There may be signifiers which the learner recognizes but are meaningless to them. These empty signifiers are particularly interesting as they are then susceptible to unfortunate connotations e.g. fear and anxiety.

- What dispositions and affective states may be more beneficial in assisting students successfully to negotiate liminal states?

- Do they constitute another incorrigible or are they susceptible to measurement?
Psychological capital (PsyCap)

‘PsyCap’ is defined as ‘an individual's positive psychological state of development’ that is characterized by:

1. Self-efficacy – having confidence to take on and put in the necessary effort to succeed at challenging tasks;
2. Optimism – making a positive attribution about succeeding now and in the future;
3. Hope – persevering toward goals and, when necessary, redirecting paths to goals in order to succeed; and
4. Resilience – when beset by problems and adversity, sustaining and bouncing back and even beyond to attain success

(Luthans, Youssef, & Avolio, 2007, p. 3).
Considerations for Course (Re)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’.
2 importance of engagement

Existing literature regarding teachers who want students to develop genuine understanding of a difficult concept points to the need for engagement. 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).
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).
Dynamics of Assessment
• problem of signification of a particular understanding when the concept is outwith the domain of prior experience

• need to monitor progress by revealing thought processes that generally remain private and troublesome to the learner (Cohen, 1987).

• in traditional assessment, a student can produce the ‘right’ answer while retaining fundamental misconceptions (Marek, 1986).

• potential value of concept mapping to explore such variation (Kinchin and Hay 2006)
EXPERTISE requires purposeful oscillation between

KNOWLEDGE STRUCTURES

organised as

CHAINS

can be combined to create

indicative of

COMPETENCE

can contextualize

embedded in

NETS

can be viewed as competing

allows selection of most appropriate

indicative of

UNDERSTANDING
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.
Overcoming Barriers to Student Understanding
Threshold concepts and troublesome knowledge
Edited by Jan H. F. Meyer and Ray Land

Threshold Concepts within the Disciplines
Ray Land, Jan H. F. Meyer and Jan Smith (Eds.)

Threshold Concepts and Transformational Learning
Jan H. F. Meyer, Ray Land and Caroline Ratcliffe (Eds.)