An Introduction to Threshold Concepts and Troublesome Knowledge

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Threshold Concepts and Troublesome Knowledge

A transformational approach to learning
Discipline-based teaching focuses on the strong primary influence of the disciplinary context, its signature ways of thinking and practising, its generally accepted conceptual structures and boundaries and the tribal norms and values of its community of practice.

- Disciplines have developed their own conceptual worlds, with their own robust ‘ways of thinking and practising’ (WTP) (McCune & Hounsell 2005, p. 255)

- Immersion within these worlds and practices constitutes the process of academic formation.

- We are what we know (...and do).
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 tho’
Gleams that untravel’d world,
whose margin fades
For ever and for ever when I move.

Tennyson 'Ulysses'
• Threshold concepts
• Liminality
• Troublesome knowledge
• Episteme (the underlying game)
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).

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

Sir Andrew Wiles

Perhaps I can best describe my experience of doing mathematics in terms of a journey through a dark, unexplored mansion. You enter the first room of the mansion and it’s completely dark. You stumble around bumping into furniture, but gradually you learn where each piece of the furniture is. Finally, after six months or so, you find the light switch, you turn it on, and suddenly it’s all illuminated … Then you move into the next room and spend another six months in the dark.
• First student: I understood it in class, it was when we went away and I just seemed to have completely forgotten everything that we did on it, and I think that was when I struggled because when we were sat in here, we’d obviously got help if we had questions but.....when it came to applying it.....I understood the lectures and everything that we did on it but couldn’t actually apply it, I think that was the difficulty.

from G. Cousin, Journal of Learning Development Feb 2010

• 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.

from G. Cousin, Journal of Learning Development Feb 2010
Osmosis is counterintuitive, it goes the opposite way.

When does it click? When you study marine fish in second or third 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).

- Well, from not knowing what it is to knowing what it is, that is the big step one. So that can be knowing how to apply the concepts that we use.

- There are some things you learn, you suddenly think, wow, suddenly everything seems different...you now see the world quite differently.

from G. Cousin, Journal of Learning Development Feb 2010
Janus – divinity of the threshold

epistemological

ontological

Characteristics of a threshold concept

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

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

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)
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)

Troublesome or Threshold?

• What do Physicists consider to be fundamental to a grasp of their subject?

• What are the transformative points in the Physics curriculum?

• What do Physics students find difficult to grasp?

• What curriculum design interventions can support mastery of these difficulties?
• To what extent would you say Physics has a distinctive way of thinking and practising?

• What might be its characteristic modes of reasoning and explanation?

• Is there a tacit or unspoken ‘underlying game’?


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