Section 1: Introduction to threshold concepts

An introduction to threshold concepts

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Introduction

The idea of threshold concepts emerged from a UK national research project into the possible characteristics of strong teaching and learning environments in the disciplines for undergraduate education (Enhancing Teaching-Learning Environments in Undergraduate Courses - http://www.tlrp.org). In pursuing this research in the field of economics, it became clear to Erik Meyer and Ray Land (2003, 2005, 2006), that certain concepts were held by economists to be central to the mastery of their subject. These concepts, Meyer and Land argued, could be described as 'threshold' ones because they have certain features in common. The purpose of this brief piece is to outline these features and to point to the distinctive value of a threshold concept approach for curriculum design.

Overcoming the 'stuffed' curriculum

If we want to develop an understanding of the pedagogy of the subject we teach, we have to start somewhere and making sense of what seems central and often difficult to grasp by most learners, is a good place to begin our inquiry. A tendency among academic teachers is to stuff their curriculum with content, burdening themselves with the task of transmitting vast amounts of knowledge bulk and their students of absorbing and reproducing this bulk. In contrast, a focus on threshold concepts enables teachers to make refined decisions about what is fundamental to a grasp of the subject they are teaching. It is a 'less is more' approach to curriculum design.

Recognising threshold concepts

So how do we recognise threshold concepts? Meyer and Land present five key characteristics of a threshold concept:

1. Grasping a threshold concept is transformative because it involves an ontological as well as a conceptual shift. We are what we know. New understandings are assimilated into our biography, becoming part of who we are, how we see and how we feel. To illustrate, Meyer and Land (2006, p.3) give the example of a cook who comes to realise that understanding the concept in physics of heat transfer as a function of temperature gradient is key to the chef's art. 'Imagine', they write 'that you have just poured two identical cups of tea; you want to cool down one as quickly as possible, you add milk to the first cup immediately, wait a few minutes and then add milk to the second'. Intuitively, you might think the first cup will be the cooler but it is the second because 'in the initial stages of cooling it is hotter than the first cup with the milk in it and it therefore loses more heat because of the steeper temperature gradient'. Once this principle is understood, trainee chefs will shift their attention from ingredients to the pots and pans selected for particular dishes. This kind of 'turn' in understanding a subject marks an important initiation into any subject culture.

2. A threshold concept is often irreversible; once understood the learner is unlikely to forget it (this does not exclude subsequent modification or rejection of the concept for a more refined or rival understanding). One of the difficulties teachers have is that of retracing the journey back to their own days of 'innocence', when understandings of threshold concepts escaped them in the early stages of their own learning.

3. Another characteristic of a threshold concept is that it is integrative in that it exposes the hidden interrelatedness of phenomenon. Mastery of a threshold concept often allows the learner to make connections that were hitherto hidden from view.

4. A threshold concept is likely to be bounded in that 'any conceptual space will have terminal frontiers, bordering with thresholds into new conceptual areas' (Meyer and Land, 2006, p. 6). One important caution is to be aware that a threshold concept can be a form of disciplinary property and as such, its presentation in a curriculum may carry an inherent tendency to invite congealed understandings. This implies a curriculum design perspective that aims for a research-minded approach to mastery in which there is always space for questioning the concept itself. An essentialist reading of threshold concepts is best resisted by sustaining a sense of their provisional explanatory capacity.

5. A threshold concept is likely to involve forms of 'troublesome knowledge'; David Perkins defines this as 'that which appears counter-intuitive, alien (emanating from another culture or discourse), or seemingly incoherent' (in Meyer and Land, 2003, p.7). From this view, mastery of a threshold concept can be inhibited by the prevalence of a 'common sense' or intuitive understanding of it. Getting students to reverse their intuitive understandings is also troublesome because the reversal can involve an uncomfortable, emotional repositioning.

In my own work (Cousin, 2006) I have explored some of the emotional issues that make learning troublesome since it is important to temper the implicit suggestion in the idea of a threshold concept that the difficulty of its mastery inheres in the concept itself. While this is very often the case, we need to be aware that this difficulty cannot be abstracted from the learner or the social context. In this relation, the idea of liminal states provides a useful metaphor to aid our understanding of the conceptual transformations students undergo, and the difficulties or anxieties that attend these transformations.

Liminal states

Meyer and Land (2006, p.22) suggest that learning involves the occupation of a liminal space during the process of mastery of a threshold concept. This space is likened to that which adolescents inhabit: - not yet adults; not quite children. It is an unstable space in which the learner may oscillate between old and emergent understandings just as adolescents often move between adult-like and child-like responses to their transitional status. But once a learner enters this liminal space, she is engaged with the project of mastery unlike the learner who remains in a state of pre-liminality in which understandings are at best vague.

The idea that learners enter into a liminal state in their attempts to grasp certain concepts in their subjects presents a powerful way of remembering that learning is both affective and

cognitive and that it involves identity shifts which can entail troublesome, unsafe journeys. Often students construct their own conditions of safety through the practice of mimicry. In our research, we came across teachers who lamented this tendency among students to substitute mimicry for mastery, like the following media studies teachers (Cousin, 2006, p.139):

> *Quasi plagerism…copying it out of books and shoving it in…that's the student's default position*

These comments are likely to sound familiar to many teachers. But what kind of 'refuge' is mimicry? Does it protect from deeper learning or can it be a path towards it? The worry for teachers is that students will substitute learning for a permanent strategy of mimicry. For instance, Meyer and Shanahan (2003, 2006) demonstrate how some economics students arrest their understanding of 'opportunity cost' (a proposed threshold concept) at a naïve level and can even get through a degree programme by staying at this level. In this case, learning is the product of ritualised performances rather than integrated understandings. How can teachers design a curriculum which invites students to enter liminal spaces?

Curriculum design

I do not have the space to cover all of the design principles associated with threshold concept mastery and will limit my discussion to four of them (see Land, Cousin, Meyer and Davies, 2006 for a much fuller discussion).

1. Jewels in the curriculum

Threshold concepts can be used to define potentially powerful transformative points in the student's learning experience. They are the 'jewels in the curriculum' because they identify key areas that need mastery. "A focus on these jewels" write Land *et al.* (2006, p. 198),

> "allows for richer and more complex insights into aspects of the subjects students are studying; it plays a diagnostic role in alerting tutors to areas of the curriculum where students are likely to encounter troublesome knowledge and experience conceptual difficulty".

The first design principle, then, is to explore (ideally with students) what appear to be the threshold concepts in need of mastery.

2. Listening for understanding

Because it is difficult for teachers to gaze backwards across thresholds, they need to hear what the students' misunderstandings and uncertainties are in order to sympathetically engage with them. Why do some students productively negotiate the liminal space of understanding and others do not? Rather than fall back on lazy classifications of our students, teachers can cultivate a "third ear that listens not for what a student knows … but for the terms that shape a student's knowledge" (Land *et al.*, 2006, p. 200).

3. A holding environment for the toleration of confusion

Teachers must demonstrate that they can tolerate learner confusion and can 'hold' their students through liminal states. Moreover, in our research some students expressed the fear they were the only ones among their peers who did not comprehend difficult concepts. While it became a source of huge relief to discover eventually that other students were similarly confused, this awareness needed to be shared early on in the course. Unless teachers devise activities that uncover this, many students will suffer in silence. As we have seen, if students are stuck in a pre-liminal state for too long, they may resort to mimicry or indeed plagiarism to get them through the course.

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4. Recursiveness and excursiveness

It is not novel to point out that learning is a recursive process but in the insistence that there needs to be a number of 'takes' and looping back on the conceptual material to be grasped, the threshold concept perspective refreshes the critique of a simplistic, linear, learning outcomes approach. "We would argue, similarly" write Land *et al.* (2006, p. 202),

> "for the notion of learning as excursive, as a journey or excursion which will have intended direction and outcome but will also acknowledge (and indeed desire) that there will be deviation and unexpected outcomes within the excursion; there will be digression and revisiting (recursion) and possible further points of departure and revised direction. The eventual destination may be reached, or it may be revised. It may be a surprise. It will certainly be the point of embarkation for further excursion."

In short, there is no simple passage in learning from 'easy' to 'difficult'; mastery of a threshold concept often involves messy journeys back, forth and across conceptual terrain.

Conclusion

In introducing the idea of threshold concepts, I have tried to show that attention to what might be difficult, emotionally and conceptually, in any subject area will allow teachers to develop a focus for their teaching. There is growing international interest in the explanatory and practical potential of the threshold concept perspective and I hope I have given enough of a taster to prompt readers to explore the relevant literature.

References

Cousin, G. (2006), in Meyer, J.H.F. and Land, R. (eds.), *Overcoming Barriers to Student Understanding: threshold concepts and troublesome knowledge*, London and New York: Routledge.

Land, R., Cousin, G., Meyer, J.H.F. and Davies, P. (2005), Threshold concepts and troublesome knowledge (3): implications for course design and evaluation, in C. Rust (ed.), *Improving Student Learning – equality and diversity*, Oxford: OCSLD.

Meyer, J.H.F., Land, R. and Davies, P. (2006), Implications of threshold concepts for course design and evaluation, in Meyer, J.H.F. and Land, R. (eds.), *Overcoming Barriers to Student Understanding: threshold concepts and troublesome knowledge*, London and New York: Routledge.

Meyer, J.H.F. and Land, R. (2003), Threshold concepts and troublesome knowledge (1): linkages to ways of thinking and practising, in Rust, C. (ed.), *Improving Student Learning – ten years on*. Oxford: OCSLD.

Meyer, J.H.F. and Shanahan, M. (2003), *The Troublesome Nature of a Threshold Concept in Economics*, paper, Padova: European Association for Research on Learning and Instruction.

Shanahan M and Meyer, J.H.F. (2006), The troublesome nature of a threshold concept in economics, in Meyer, J.H.F. and Land, R. (eds.), *Overcoming Barriers to student understanding: threshold concepts and troublesome knowledge*, London and New York: Routledge.

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