

Course Design Series

2/2013

Threshold Concepts: Student Learning Bottlenecks



What is a Threshold Concept?

Meyer's notion of a *threshold concept* was introduced ... as a particular basis for differentiating between core learning outcomes that represent 'seeing things in a new way' and those that do not. A threshold concept is thus seen as something distinct within what university teachers would typically describe as 'core concepts'. Furthermore, threshold concepts may represent, or lead to, what Perkins (1999) describes as *troublesome knowledge* – knowledge that is conceptually difficult, counter-intuitive or 'alien' (Meyer and Land, 2003).

Student learning involves occupying a liminal space while mastering difficult concepts. The learner who enters this space is engaged, but the learner who is not finds the concepts to be vague at best.

Not mastering these concepts is problematic and creates a "bottleneck" in the student's progress in the discipline. Crossing the threshold of understanding changes a student's perspective, and often serves an integrative function, leading to seeing interrelationships in knowledge.

Example:

"When students cannot 'see' particles they cannot really understand chemical reactions and so the fabric of chemistry is lost to them in a haze of impenetrable events completely at odds with their every day experiences of a "continuous" world." (Barker, 2005)

<http://www.heacademy.ac.uk/assets/ps/documents/events/vce07presentations/moss.pdf>

Threshold Concepts are defined as:

Troublesome: Students in the midst of learning a troublesome concept are in an uncomfortable place, before understanding occurs. They are wrestling with something that is conceptually difficult and may be counter-intuitive.

Transformative: Once understood, a threshold concept changes the way in which the student views the discipline and perhaps positions him or herself. This change opens up "a new and previously inaccessible way of thinking about something . . . it represents a transformed way of understanding" (Meyer and Land, 2003).

Integrative: Threshold concepts, once learned, are likely to bring together different aspects of the subject that previously did not appear, to the student, to be related.

Bounded and discursive: The new knowledge and language is specific to the discipline, providing some boundary, that is distinguished from common knowledge.

Irreversible: Given their transformative potential, threshold concepts are also likely to be irreversible, i.e. they are difficult to unlearn.

Understanding a threshold concept involves a change in self, in perspective, and is more a process than an immediate recognition (such as the identification of a logo). Students typically go back and forth between using their old lens ("common sense") and their new lens (the threshold concept) until the new concept is comfortable and familiar enough to rely on.

Students who are faced with a Threshold Concept can respond in various ways:

- Meaning-making may involve shallow questions from which a student's conclusion can be false.
- Cognitive coincidence is possible, so they don't really understand (My answer is correct but my reasoning is flawed or my understanding is wrong).
- Compensative strategy is adopted ("I'm learning something" even if I don't get it all).
- "Coping" through conscious mimicry or outright plagiarism. "Quasi-plagiarism ... copying it out of books and shoving it in...that's the student's default position"

(Cousin 2006).

References

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<http://www.ee.ucl.ac.uk/~mflanaga/thresholds.html>.
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Threshold Concepts in the Curriculum

1. Identify threshold concepts in a course.

List and rate concepts taught in the course. Which ones are central to the course and the discipline? Which ones seem most difficult for students?

2. Listen to students describe particular difficulties with learning.

Gather formative feedback from students around the concept.

3. Compare expert knowledge to novice knowledge.

Engage in reflective practice, recording your own impressions as students go through the learning process.

4. Design the course to focus on these concepts.

During the course, maintain a "holding environment for the confusion." Allow it to occur rather than moving on.

Devise activities that show the student that they are not the only one confused.

Refresh the threshold concept—loop back to it (learning is a recursive process).

TRY THIS POWERFUL EXERCISE: Agree to be interviewed. In a process developed by the Indiana University History Department and Instructional Consulting, interviewers help the interviewee describe difficult concepts and uncover their own expert processes, then diagnose applications to student learning (Diaz, Middendorf, Pace, and Shopkow, 2008). For an interview opportunity, contact the TennTLC.