Tomorrow's Teaching and Learning
Thresholds Are Troublesome
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Few new ideas in the ongoing inquiry into effective teaching and learning have generated as much productive discussion as the idea of "threshold concepts" and its older sister, "troublesome knowledge." In a nutshell, the term gives a name to points in new learning that mark a departure from old ways of viewing the world and entrance into new ways that may be counterintuitive and thus upsetting ("troublesome") and yet they are ways that must be grasped in order to go forward in learning. The space between the first step over the threshold and the last step out of confusion and uncertainty is described as a "liminal" state, the state not before or after but within a rite of passage. The term threshold concept sprang up as a by-product of research Ray Land and Jan ("Erik") Meyer were doing on undergraduate education in the United Kingdom.

Coffee and Liminality

Ray Land, speaking via the Internet from the University of Durham, remembers: "Erik Meyer and I were talking and we were saying 'When did this thing start?' and I remember it distinctly . . . He coined this term, saying 'a threshold that people kind of have to move through,' and I'd known about liminality from my undergraduate days because my wife (my girlfriend as it then was) was studying anthropology for her degree and she used to tell me about rites of passage and liminal states and so on and that just sort of came into my mind in that coffee break conversation and I said 'Well yes, it could be a threshold, but it could be quite a long one, a bit like liminality in anthropology' and Erik said 'What's that? What does that mean?' and I said, 'Well 'lim' is Latin for being at a threshold so to speak, so that just sort of came to me on the wings of sleep as Wordsworth might say.'

"So we sat down and began to talk in a tentative sort of way, an interdisciplinary sort of way. We sort of threw each other little tidbits of food from our different disciplinary backgrounds. It's one of the benefits of a liberal education where you meet people from different areas of discourses, but there are points of intersection and that was one of them. And Erik, a very smart guy, said 'Well, I like the sound of this liminality' so he went off and read about it."

That was the start of the conversation ten years ago. Since that coffee break there have been several international conferences on "threshold concepts," numerous papers, and countless additional conversations between and among faculty.

Land runs an introductory faculty development course for new faculty at Durham, and as part of it, he asks participants to provisionally accept this view of learning as mapped by thresholds and to go and interview some of their colleagues from this point of view to see how they might go about identifying learning thresholds. "They all come back and say that these were the most interesting conversations we had in the course," says Land. "We didn't necessarily agree or reach a consensus, but we had a very interesting debate about what those thresholds should be.

"And I think," Land continues, "in a way the reason thresholds have caught on is that it connects with faculty in their area of interest. They are interested in math or physics or literature or whatever, and they will talk about that. They won't necessarily talk about constructivism or pedagogy, but if you say 'Let's have a look at freshman year history' or whatever, they will because that's where they are."
Probing Semantics

The growing thesaurus spinning out from that initial coffee break offers another index of the vigor of the discourse around "threshold concepts." It includes synonyms of course, but also a growing number of borrowed terms from other closely related lines of research. Land and Meyer embraced "troublesome knowledge," which comes from research published by Harvard's David Perkins in 1999, but it now includes Glynis Cousin's "emotional capital," Caryl Sibbet and William Thompson's "nettlesome knowledge," and David Chase and Joan Middendorf's "decoding the disciplines" and "bottlenecks," among others.

Land's current thinking reflects the ongoing energy of the conversation as well: "I think if we were starting again, we would probably use the term 'learning thresholds' because what we've realized later is that there are also what we might call threshold practices as well which also act equally in this rather portal-like way."

In the midst of the growing subtleties of understanding, the terms "threshold concepts" and "troublesome knowledge" continue to lead like Hansel and Gretel through this new liminal forest of insight into teaching and learning. They suggest the two sides of learning - the cognitive on one side and the affective on the other. "The term 'threshold concepts' has sort of stuck like a brand," Land admits, "and you're right, it does seem to signal a more cognitive dimension, but we've always been aware that all learning requires and occasions a change in subjectivity, a change in self and awareness of self: I think there's always an affective dimension to that, sometimes small, sometimes in disciplines like medicine, really quite powerful."

The usual description of "thresh-old concepts" lists these five characteristics:

1. Integrative
2. Transformative
3. Irreversible
4. Bounded
5. Troublesome

Often they're listed in a different order and sometimes Land adds two others - "re-constitutive" and "discursive." The meaning of most of these descriptors seems immediately clear. New conceptual understandings pull together (integrate) various stands of understanding into a new understanding that fundamentally changes (transforms) the way students think about the subject. Because the process involves the loss of a familiar way of thinking and the security it provided, the process of crossing the threshold commonly causes some mental and emotional discomfort (troublesome). There's some debate about whether these new understandings are reversible or not, but once a student "gets it," it seems hard for them to "un-get it." "Bounded" seems the least obvious descriptor perhaps because its meaning derives more from contextual concerns than specifically conceptual ones. Land explains: "Uncertainty is a concept many disciplines come up with as a threshold, but uncertainty is very different in climate studies from what it is in law or surgery. And the way it is connected to other concepts is bounded differently in different disciplines."

Land's "re-constitutive" seems an extension of "integrative" and "transformative," but his "discursive" opens a window on some of the complexity involved in separating "threshold concepts" from "key points" or "important facts." Some concepts, like aspects of physics for example, seem embedded in nature and have been surrounded by language in an effort to understand them. Other concepts seem to have been created out of language itself in the course of following thought. "When I did literature in the late '60s," Land recalls, "there weren't many threshold concepts, to be honest. We did plot, character, and theme, you know. So academics sort of went into overdrive after that: 'You want theory? Okay here comes Derrida, Foucault, et al.'" Both the study of literature and history have become much more conceptual in the last decade, in Land's view. In short, crossing a conceptual threshold often means learning to think
in and speak a new language because in some areas such thresholds are being created and broken and reformed all the time by thinkers like Derrida and Foucault. "Derrida was once asked, 'What is the role of academics?' "Land recalls with a laugh," and he answered immediately 'to complicate things.'"

Structural Barriers

Just as the discussions catalyzed by the terms "threshold concepts" and "troublesome knowledge" excite faculty and engage them in deeper inquiry into the dynamics of teaching and learning in their subjects, they also bring faculty quickly up against a realization of the social and structural barriers higher education currently puts in the way of their capitalizing on their new insights. The recursive nature of deep learning, the kind of learning generally required to "get it" when it comes to assimilating new conceptual frameworks, stands at the center of those insights and forms the foundations of most of those barriers. Land: "Certain aspects that we would regard as part of education – deliberation, contemplation – they belong, historically, to a kind of cloistered age of slower time, as perhaps does the notion of liminality. It does sit uneasily with a kind of semesterized, compartmentalized almost McDonaldized set of fragments where you have eight weeks of teaching, an examination, and then that's it, and then you are into the next module. Within that kind of model, the notion of recursiveness gets broken up. Semesterizing is problematic." Significant, transformative learning almost always takes time.

In many ways the consumerist model and view of education as a product has skewed understanding of learning as a process and blunted the general view of what's possible in ordinary college teaching. "There's quite a bit of suggestive evidence about students who pass with minimal borderline grades," Land continues. "We're keeping them moving in the system, but they probably have not got the concept. And then they move into the next area of conceptual terrain, and the tutor presumes they know about something and they really don't. "We know that the recursive nature of this learning can take a long time, and the reason for that is that we have these prior ways of seeing things and the brain likes that, likes closure, likes to be settled, and letting go of that requires a lot of mental energy. It's uncomfortable and we don't like doing that for too long, so that can take time. And I think that's the major source of troublesomeness in shifting your schema which new concepts require. Teachers know that, in a way: they feel eventually [students will] get it. They'll hang in there."

But in fact even some faculty admit to having only a weak grasp of some of the more difficult concepts they teach. "I met an engineer this week," Land tells me. "And when you talk with engineers quite frequently Fournier's Transform comes up, and the one I met last week said, 'To be honest, I never really got that. I teach it. I can teach what they need, but if you probe me too far on that the limits of my understanding would become apparent.' I think there are a number of areas like that where even the academics are in a liminal state."

What Faculty Can Do

So what then can faculty do? Having felt the excitement of getting down to cases, identifying threshold concepts in their disciplines, how can they go about teaching them more effectively given the recursive character of the learning and the time constraints they work within? What pedagogical maneuvers offer the best hope of success?

Land, Meyer, and colleagues have been looking for those answers and have found at least three encouraging approaches. Two of them involve better assessment of the students and the third harnessing the power of the student community itself.
"One of the things we've been looking at: Are some students more able to cope with liminality . . . whatever it demands of you? Are some students better equipped or able? Some students give up or drop out or just stay in that liminal state. There's some work being done in the States at the moment around what they call 'psychological capital.' Could you measure that in some way, improve that? What the US group is saying is that there is a sort of cocktail of ingredients, and you need all of them. You need resilience because learning is recursive: if you don't 'get it,' you come at it a different way. And you need a certain degree of self-efficacy; you need a certain belief that 'Okay I don't get this, but I know if I hang in there I will get it.' But this US group says this resilience has to be linked to these emotional/affective qualities of hope and optimism. Some kids are tough, but if they don't see a way through or have some kind of hope, they may not make it.

"I think there are ways to build that capacity. We don't quite know how to do that yet, but that's what we are looking at in that regard. I think liminality is a necessary element of transformative learning. It is the space of learning, isn't it? But helping students to deal with that more competently, more comfortably – we're not too good at that. Academics are often too busy. They just don't look into that directly. They've got other concerns. And some universities say 'Oh come on . . . they're grown-ups; they don't need spoon feeding.' It's a problem. "[See the related article in this issue on "self-knowledge" and a possible approach to measuring student readiness for liminality.] A second, related-though less quantitative-approach may lie in cultivating a faculty skill which some undoubtedly have already and most surely want to have.

Land and his colleagues call it "pre-liminal listening." To describe it perhaps less pretentiously they borrow a phrase from American feminist theorist Patti Lather, who speaks of the need for faculty to develop a "third ear" attuned to who their students really are and how the ones actually before them need to be engaged. And even for faculty with an excellent "third ear," as Land admits, the situation is "problematicized by a consumerist notion of higher education that is speeded up, and of course if you have 200 students that's another aspect of it."

But perhaps the burdensome size of some student communities may offer an approach to addressing the problem. "Another approach to coping with the problem is getting students themselves to review each other's understanding. It looks like a very profitable line of activity. There's some work being done in Scotland by David Nichol on peer review, not peer assessment. Students doing a draft of their work and having two fellow participant students anonymously reviewing it and they in turn review two others. What he's finding is students gaining much more insight by giving the feedback than in receiving it

Receiving is helpful, but they develop a very different set of skills by giving the feedback, by actually reviewing others' work. That seems to have a more important learning function. So one of the things we have to look at in a massified system to address this 'third ear' needed for understanding may have to be done in the peer group itself to some extent.

"Student review goes very much with the grain of active learning techniques—explain, represent, explain, apply, etc. David Perkins has done research in this area, having students review other students' work and then has interviewed them and transcribed what they say is going on when they do this, and it's very interesting. The phrase 'in the back of my mind' keeps appearing in reference to how what they are seeing done and not done in their peers' work compares with that they've done or not done in their own work. They are making comparisons between the two they are reviewing AND themselves. It's quiet a sophisticated process. Going back to old Bloom's taxonomy: it's right at the top of that. It's about evaluative judgment of a
very high order actually.”

[For a successful example of systematic, large-scale student peer review, see Al McLeod, "In Lieu of Tests," NTLF 4(4), 1995.]

What Not To Do

Traditional good pedagogy presents perils in helping students understand threshold concepts. Simplifying, for example, may lead students eager to move on to become adept at mimicking the concept or to develop a “false proxy” of their own invention that will only frustrate them later when it proves inadequate. Likewise, trying to relate the concept to everyday phenomena or personal experience has sometimes proven ineffective. Introductory accounting students, for example, have not generally had enough personal experience with budgeting and finance in their lives to help them fully grasp "depreciation."

Students can now easily get the facts off the Web. Threshold concepts and troublesome knowledge present the core challenges of higher learning. "Troublesome knowledge sounds very negative,” says Land, "but in some sense knowledge needs to trouble you. It needs to unsettle you so that you do become open to new possibilities, that you do let go of your prevailing view to some extent so that you can admit the possibility of seeing otherwise."

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