

How do people "get" it?

"A threshold concept can be considered as akin to a portal, opening up a new and previously inaccessible way of thinking about something. It represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress."

(Meyer and Land, 2006:3)

The title question clearly goes to the heart of what we do as teachers in vocational and professional areas; and really we know less about the answer than some of the text-books (and teacher trainers) pretend. We know, of course, that people do get to be highly proficient and even expert in their chosen area of practice, but if we are frank we also know that for many of those people, passing the courses we run does not necessarily mean that they are even fully competent by the time they complete them (despite the courses often being "competence-based", in the jargon).

In the first module of the course, and again in module 5, you will be discussing ways in which courses are planned and their content decided. Nowadays, it is common for "stakeholders" (employers, awarding bodies, perhaps unions) to get together and to decide what "competences" are required in order to perform a job. It is then argued that if we can identify those competences, and ensure that they are all covered by a course and all assessed, the person who comes out the other end must be competent. That assumption also underpins the central planning of the course you are taking. ([See the SVUK website for more details](#)) It is of course wrong; the whole process is more more complex than that.

First, some people would learn regardless of whether they ever went anywhere near a course. Indeed it has been argued in some quarters that old-fashioned models of "time-serving" on-the-job apprenticeships represent the best way of learning skills (and the knowledge which underpins them).

Second, disciplines and subjects are very different. There is no single curriculum design which will suit all of them, even in terms of their values. I want a fine artist to be creative; I don't want my pharmacist to be at all creative; whether or not I want my accountant to be creative is a matter for debate!

Third, trying to create a course on the basis of all these competences leads to what is vividly called a "stuffed curriculum". Not everything it contains is of equal value, but nothing gets thrown out. We shall return to the issue of what is important, later.

As one teacher of engineering put it, "that guy will pass his assessments and get his degree but he'll never **think like** an engineer." Fourth, what we are really trying to get to is not merely someone with a certificate which says he **can** plaster a wall, or she **can** cut down a tree, but someone who **is** a plasterer, or who **is** a tree surgeon. That is an important distinction, and it goes deeper than the simple acquisition of

competences. It goes into what one researcher calls "ways of thinking and practising" which characterise different occupations or disciplines.

It is in large measure because different disciplines have different ways of thinking and practising that we are trying to group you together in Interest Groups to discover what is distinctive about your areas of practice, because it may well be something which you take so much for granted that you do not recognise it. **You know only too well that some people emerge from your courses with their certificates, without ever having truly "got" the ways of thinking and practising which you have tried so hard to impart.** They have just managed to mimic satisfactory performance well enough to pass the assessments, which were not valid enough reliably to filter out these fakers.

Why? It is partly because of the "stuffed curriculum" we are expected to teach, which just confuses them about what really matters and what doesn't (and the basis on which it matters; clearly health and safety really matters, but it is not always part of the discipline itself.)

And frankly some of it is to do with the way we teach. Put yourself in the position of a student sitting through yet another PowerPoint (tm. blah-blah) lesson. Everything the lecturer says also appears on the screen. There is no sense of "this really matters" and "this is trivial". Instead the experience is like having a hangover; there is this incessant pile-driver of "bullet" points driving "facts" into your brain until you are on your knees screaming "STOP!!!" Unlike the hangover, there was no fun beforehand (nor, I concede, any risk); like the hangover, though, none of this does anything for memory or learning...

Linked to the stuffed curriculum are problems with assessments; we need to assess learning which is easy and clear to assess, and of course the students work towards passing the assessments, and we want them to pass and tailor our teaching to help them. But "ways of thinking and practising" are anything but clear and easy to assess. They are vague and muddy, and often of the "I may not be able to describe it but I know it when I see it" variety.

So we find it is very difficult to tackle directly the teaching of ways of thinking and practising. Often we resort to hoping that students will just

- "pick them up" or that they will
- "get it" and the
- "penny will drop" and things will
- "fall into place"

without extra help. Sometimes on courses which involve practical placements, for example, we leave it to practice teachers and supervisors to capitalise on the events of the placement to develop those necessary ways of thinking and practising.

So what is going on?

We have ample evidence that a proportion of students do eventually "get it". And once they complete their course and get into practice, a substantial majority get it. But it's not clear how we get them to get it, if you see what I mean. We seem to be trying to teach the unteachable (the ideas, not the students).

There is a growing body of research which suggests that within every discipline or subject there are some ideas which are key to students getting it. They are different for each discipline. They are not the whole story, but they are necessary. If these ideas have not been understood, the student will never get it.

Understanding one of these ideas is, according to Jan Meyer and Ray Land, the principal researchers in the field, like opening a door, revealing all kinds of other aspects of the subject which have been hidden, and showing how they slot into place. They call these ideas "threshold concepts".

In some cases threshold concepts are relatively easily recognised, and feature strongly in a syllabus. Those of you teaching basic skills numeracy will be aware that there is a succession of ideas people have to understand in order to grasp basic arithmetic. First comes the concept of number, then counting, then addition, subtraction, multiplication and division. It is some testimony to their threshold nature that they have to be learned in that order. Learning the names and symbols of the numbers is important, of course, but it is meaningless without understanding how counting works. But once you do understand how counting works, it becomes absolutely necessary to learn those names and symbols—and if no-one will teach you a ready-made set, you may well make up your own.

That's utterly obvious, you cry! Yes, it is pretty obvious, but that in itself points to another feature of threshold concepts. Once you have understood one, it is very difficult or even impossible to imagine life without its insight. Once you have gone through the door, you can't go back. Once you have learned to read (a particular script, of course), it is impossible **not** to read it. I can no longer see these symbols on the screen in front of me as anything other than letters, making up words and sentences and carrying meaning. Reading is a very basic threshold skill.

Indeed, [some gypsies are reported to be deeply distrustful of their children becoming literate](#) for precisely this reason. Once they have learned to read they will **have to** rely on writing to remember and make sense of their world, they argue; and they will never be able to function without it.

But there are also occasions on which the sheer "obviousness" of a threshold concept (to us, who passed that threshold long ago) means that we do not pay enough attention to it, and students go through their course deprived of this critically important idea. One example may be found in economics, and the concept of "price". Price is a function of supply and demand, and there is no absolute and natural correspondence between say, the cost of producing something and what it can be

sold for. Until students understand that, nothing else in economics will make any sense. Meyer and Land go on to suggest that at a slightly more advanced level, "opportunity cost" is another threshold concept in economics.

On the other hand, not all threshold concepts are obvious.

Cooking is fundamentally a process of using heat (in various degrees and sources) to effect desired outcomes. In physics one encounters the concept of heat transfer and its mathematical formalisation (as an equation) that represents heat transfer as a function of something called the temperature gradient. It is not necessary to have a sophisticated understanding of physics to have this principle quite simply illustrated. Imagine that you have just poured two identical hot cups of tea (i.e. they are at the same temperature) and you have milk to add. You want to cool down one cup of tea as quickly as possible because you are in a hurry to drink it. You add the milk to the first cup immediately, wait a few minutes and then add an equal quantity of milk to the second cup. At this point which cup of tea will be cooler, and why? (The answer is the second cup, 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.) When the physics of heat transfer is thus basically grasped by people in terms of things specific to what goes on in the kitchen, it will fundamentally alter how they perceive this aspect of cooking, and they might consequently even filter out what to look for (the signified!) when they watch the better class of television cookery programmes; for example, a focus on the pots and pans that are selected by the chef in context (the heat source in relation to the cooking process to be applied as a function of time and its regulation to the ingredients) rather than simply on the ingredients and, superficially, the 'method'. So it could be said that, as a stand-alone example, heat transfer or, more precisely, controlling the rate of heat transfer, is a threshold concept in cookery *because it alters the way in which you think about cooking*.

(Meyer and Land, 2003; 1. My emphasis)

Perhaps the fact that I do not find that obvious accounts in some measure for my failings as a cook! Despite the reference to the physical equations about heat transfer, there is no suggestion that it has to be "understood" at that academic level. The important feature of a threshold concept is that *it alters the way in which you think about* a subject.

So it is not necessarily the same as a "key", "core", "central" or even "very important" idea or fact. In physics it is very important to know that objects fall with an acceleration of one g , which equals approximately 9.80665 m/s^2 , but that is not a threshold concept. It does not alter the way you think. (On the other hand it is quite possible that realising that acceleration is to speed as speed is to rest may be a threshold concept—but don't take my word for it, I'm not a physicist either.)

Nor is it an instant insight, [an "ah-ha" experience](#). Again, perhaps there may be some occasions on which threshold concepts are understood like that, but they don't have to be. Indeed, we shall see that they often have to be worked at very hard.

And they don't illuminate everything about a subject; they may only show the way forward for a few steps beyond the door.

"Troublesome Knowledge"

If threshold concepts do open up doors to new understanding, you would think that we would latch on to them with enthusiasm and celebration—and of course wonder why teachers have not made them the key feature of their curricula for centuries. In many cases, of course, they have—the case of arithmetic, above, is a case in point. But...

- Sometimes we do not even know what the threshold concepts are in a particular discipline. They may creep up on us as we practise and we may find it difficult to identify them or separate them out from all kinds of other learning.
- Sometimes the concepts are academically difficult; Heston Blumenthal notwithstanding, most chefs are not well up on physics. As teachers, of course, sometimes we fudge the issue and miss out because we see students struggling; ultimately of course, that does them a disservice.
- They may run counter to common sense; the price of something is clearly related to how much it costs to make it, isn't it? Well, no.
- And "changing the way you think" can be disconcerting, to say the least. Threshold concepts are not like other ideas or facts, which you can just accumulate. They change the way you look at whatever you thought you knew about a particular topic, and if that has implications for your practice, your belief-systems or your life-style, then they may well be resisted. Learning becomes about more than what you know, it becomes about what you are. Learn to think like an engineer and you are a long way to becoming an engineer.

So threshold concepts may well not be greeted with open arms. They embody what David Perkins has called "troublesome knowledge". Knowledge can be troublesome in many different ways, and I am not going to list them, but as teachers we need to be aware of the problems of engaging with it.

It follows that students may engage only tentatively with the ideas. They may not be prepared to take the plunge all at once. They may dip their toes in and then back off. To change the metaphor, providing the support to go all the way through the portal, across the threshold, may well call for a new approach to teaching.

Conclusion

This has been only the most basic and cursory an introduction to a fascinating topic. Threshold concepts are themselves threshold concepts, and so they are not easy to grasp; but they really do repay study. They are not just theoretical, by any means. If you can identify the threshold concepts in your discipline, and if you can find better

ways to teach them, and to assess whether students have really got them or not, your students will get much further.

Sometimes, threshold concepts are not taught best through a full frontal approach; you may have to approach them indirectly. For that reason, this is just one take of the idea; you will find a link below to another angle on the same thing.

If you have got the idea, then you are ready to fill in the detail in a rather more formal way; so the references to this introduction will point you to several more short papers by people at the forefront of developing the ideas.

References and further reading

Cousin, G (2006) "An introduction to threshold concepts" *Planet* No 17 December 2006, [on-line, UK] available <http://www.gees.ac.uk/planet/p17/gc.pdf> (accessed 3 October 2007)

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Perkins D (forthcoming 2007) "Beyond Understanding" in Land R, Meyer J H F and Smith, J. (eds), *Threshold Concepts within the Disciplines* Rotterdam; Sense Publishers

<http://www.tla.ed.ac.uk/etl/publications.html> is an excellent source for these and other papers.

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