London Review of Education
Vol. 5, No. 3, November 2007, pp. 237–248

The potential of threshold concepts: an emerging framework for educational research and practice

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This paper explores the notion of a 'threshold concept' and discusses its possible implications for higher education research and practice. Using the case of introductory accounting as an illustration, it is argued that the idea of a threshold concept provides an emerging theoretical framework for a 're-view' of educational research and practice. It is argued that this re-view both demands and supports several forms of dialogue about educational research and practice: within the disciplines (between lecturers and between lecturers and students) and between lecturers and educational developers. Finally, it is suggested that, rather than representing a research field in its own right, the threshold concepts framework may act as a catalyst, drawing together a variety of fields of research in a productive educative framework.

Introduction

It has long been accepted that insights into the nature of students' conceptions of disciplinary topics provide the foundation for successful curriculum development, class teaching and valid assessment methods. Consequently within the educational literature there has been a long-standing research focus on the nature of conceptual understanding, misconceptions and on how to achieve conceptual change (Limon & Mason, 2002, provide a good representation of the cumulative work in this area). However, there has been relatively limited research conducted on conceptual change within higher education. Most research on students' conceptions of disciplinary topics has been conducted within sciences with few studies from other disciplines. Where work has been carried out, it has tended to derive from a phenomenographic perspective, focusing on variation in student conceptions of particular disciplinary concepts (Prosser & Trigwell, 1999). However, a new perspective on students' conceptual understanding has been introduced through recent work in the

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ISSN 1474-8460 (print)/ISSN 1474-8479 (online)/07/030237–12

DOI 10.1080/14748460701661294

area of 'threshold concepts'. We shall discuss what is meant by a threshold concept below and then set out the aim and structure of this paper.

The notion of a threshold concept was introduced in a seminal paper by Meyer and Land (2003). It arose from ongoing research undertaken by the Economics team of the UK's Economic and Social Science Research Council's Teaching and Learning Research Programme 'Enhancing Teaching–Learning Environments in Undergraduate Courses' (Economic and Social Research Council, 2007). It has proved to be a fruitful and generative idea that has rapidly led to a lively discussion on the nature of a threshold concept within a variety of disciplines. This debate is evidenced in a recent publication *Overcoming Barriers to Student Understanding: Threshold Concepts and Troublesome Knowledge* (Meyer & Land, 2006a) and the organisation of an International Symposium held at the University of Strathclyde in Glasgow in 2006.

A threshold concept is distinguished from what might be termed a 'key' or 'core' concept as it is more than just a building block towards understanding within a discipline. Meyer and Land (2006b, p. 3) describe it 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. 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. This transformation may be sudden or it may be protracted over a considerable period of time, with the transition to understanding proving troublesome. 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). It might, of course, be argued, in a critical sense, that such transformed understanding leads to a privileged or dominant view and therefore a contestable way of understanding something. This would give rise to discussion of how threshold concepts come to be identified and prioritised in the first instance.

We have included this lengthy quotation since it sets out not only a definition of the term, but also raises important issues surrounding its identification and use. Meyer and Land (2006b) tentatively propose five main characteristics of a threshold concept. They suggest that it is, firstly, transformative. In other words it represents a significant shift in the perception of a subject, or part thereof. Secondly, it is probably irreversible, in the sense that it cannot be unlearned and represents a new world-view. Thirdly, it is integrative in that it exposes the previously hidden interrelatedness of something. Fourthly, it may potentially represent a boundary—a point at which the student would move into territory seemingly outside of the discipline. Lastly, it may potentially be troublesome to the student, that is, counter-intuitive, alien (emanating from another culture or discourse) or incoherent (lacking an obvious organising principle).

The aim of this paper is to review the novel notion of a threshold concept and to discuss its possible fruitfulness for research and practice in higher education generally. The main argument and discussion, in the next section, centres on the argument that the idea of a threshold concept provides a valuable emerging theoretical framework for a 're-view' of educational practice and research. A central implication of this framework is that it demands and promotes forms of dialogue about educational research and practice that might not otherwise be taking place. In the following section we also briefly consider the

implications for research, arguing that the notion of a threshold concept may act as a catalyst, drawing together a variety of fields of research in a productive educative framework. To illustrate our arguments, we use the case of introductory accounting to draw on prior research and educational practice and consider how it may be re-viewed within a threshold concept framework.

Threshold concepts: an emerging theoretical framework that both demands and promotes dialogue

The first major publication on threshold concepts (Meyer & Land, 2006a) is split into two sections. The initial section 'Towards a Theoretical Framework' can only be discussed via the following section 'Threshold Concepts in Practice'. So far as the latter is concerned, the process of identification of threshold concepts has, so far, stimulated a significant amount of discussion within the disciplines. The idea of a threshold concept provides an emerging theoretical framework that encourages lecturers to view current concerns within the curriculum in a different, and productive, way. Such a re-view both demands and promotes several forms of dialogue: within disciplines (between lecturers and between lecturers and students) and between lecturers and educational developers. That dialogue, in turn, informs the development of the theoretical framework.

Dialogue within disciplines: between lecturers

Initially the process of identifying threshold concepts focuses attention on lecturers' views of the subject: the nature of key concepts, syllabi and their relationship with educative practice. In accounting, as in many other fields, lecturers operate within a context of a firmly established syllabus as represented within established textbooks and professional and higher education syllabi. However, the historical continuity of syllabus and textbook content may belie underlying dissension about the nature of conceptual frameworks within the discipline. A review of prior work within introductory accounting indicates that such disagreements certainly exist (Mladenovic, 2000; Lucas, 2002). Workshops with lecturers involving the identification of threshold concepts (Lucas & Mladenovic, 2006a) confirmed such variation and disagreement. Lecturers readily identified what they considered to be threshold concepts, but did not necessarily identify the same concepts or if they did agree, they often did not agree about *why* they might constitute a threshold. Accounting is not the only discipline to face this problem when discussing threshold concepts, as evidenced by disciplines as wide ranging as music, biology, philosophy and economics (Meyer & Land, 2006a). Within such discussions, as Davies (2003) points out, it is difficult not to take a social constructionist view of disciplines which recognises that such differences are endemic and unavoidable. However, such dissension appears to be productive in terms of requiring a developing dialogue within a discipline: one that involves a closer scrutiny of syllabi and curricular practice.

This dialogue between lecturers is also valuable in the way in which it directs attention to the nature of *student understanding*. Whilst most syllabi contain concepts that are central to the discipline or professional practice, these concepts are not necessarily central to the development of student understanding within the discipline (Davies, 2003).

Within the introductory accounting workshops on threshold concepts, lecturers' initial ideas about threshold concepts changed as they considered *why* such a concept might be transformative and the *nature* of misconceptions surrounding it. Thus, within introductory accounting, an initial identification of the concept of 'cost' changed to the identification of the difficulty that students had in realising that the term 'cost' might have a different meaning according to the intended purpose of the cost information. This, in turn, led on to the recognition that students were reluctant to admit to the subjectivity involved when the meaning of 'cost' might change between contexts. Consequently, this analysis of misconceptions identified more fundamental thresholds, such as students' unwillingness to acknowledge subjectivity in accounting, or to demonstrate a questioning attitude to 'certainties', or to accept that certain terms such as 'cost', 'value', 'profit' and even 'cash' might have different meanings in different contexts. Indeed, it appears that a focus on 'misconceptions' is a particularly good point of entry for the identification of threshold concepts. It forces an enquiry into the nature of the student understanding and, at the same time, involves a finer-grained attention to the nature of a lecturer's understanding of the concept in question.

Dialogue within disciplines: between lecturers and students

Such an enquiry highlights the need for a form of dialogue between student and lecturer. The identification of a threshold concept requires the merging of two views: those of the lecturer who possesses normative expectations about what a student should be able to 'understand' by the end of a course (a top-down approach) and the experience of the student whose path towards learning is generally opaque (a bottom-up approach). One way in which this dialogue can take place is via an analysis of a typical classroom exercise. A study into student understandings of cash, profit and depreciation illustrates this well (Lucas & Mladenovic, 2006b). Our attempt to analyse student understandings of the terms 'cash', 'profit' and 'depreciation' provided us with an insight into the difficulties that may arise when lecturers attempt to map their normative expectations of student understandings for a particular concept. We set students a task of providing an explanation of the difference between cash and profit and of the nature and role of depreciation. The explanation was for a new business owner. Before we could assess levels of student understanding we had, firstly, to compile our own explanation. We had to ask ourselves: what is it reasonable to expect from a student within an introductory course? The attempt to answer this question involved a dialogue, not only with the student responses, but with introductory accounting textbook explanations as well as the authors' own experience as teachers of introductory accounting. As this progressed, it was found necessary to develop a comprehensive explanation for the purposes of identifying the range of possible responses that might be exhibited by the students. This acknowledged the fact that an analysis of student responses is always foregrounded against a backdrop of normative expectations.

The development of a comprehensive explanation was difficult. When compiling such an explanation for research, as opposed to teaching, purposes, we found that there was substantially more underpinning required for such an explanation than we had anticipated.

This arose as we found that we had to make explicit all assumptions underlying such an explanation. Much that we had taken for granted (and was thus implicit) started to emerge. A survey of textbooks showed that they varied in the way in which they explained these concepts, if, indeed, they did. Whilst most texts addressed the individual elements within such an explanation, none provided a complete, or simple, overview. The SOLO (Structure of Observed Learning Outcomes) categories (Biggs & Collis, 1982) were used to inform our work, since prior work within accounting indicated that the SOLO categories provide a useful way to establish whether accounting students can reason at higher levels, thus indicating whether they have understood a concept (Ramburuth & Mladenovic, 2004). We found that we required an organising structure for our explanation. This structure involved the identification of a basic problem or issue and the disciplinary way of responding to that issue. The latter would involve the adoption of fundamental principles (or assumptions) that would allow the problem to be addressed (rather than solved). Any change in the fundamental principles would lead to a different response. This exercise highlighted the implicit expectations of lecturers and textbooks and, given their implicit nature, the extent to which such expectations were unlikely to have been conveyed to students.

Once we had established the full extent of our expectations we were then in a position to analyse what might be causing the students difficulty—and preventing their understanding of accounting. The notion of an *explanation*, involves, firstly, the identification of a basic issue or problem (e.g. *periodicity*—the need for *periodic* reports of financial performance). Secondly, it involves the adoption of an organising structure to address this basic issue, that is, the adoption of fundamental principles or assumptions about what comprises an *event* and when it is *recognised* and *realised*. An awareness of the need for such an organising structure was not apparent from most student responses. Key qualitative variation in their responses arose from whether they did, or did not, identify such an organising structure within which individual principles and examples could be located. Only a minority of students demonstrated this (Lucas & Mladenovic, 2006b). It appeared that many students were willing to provide a series of (often inaccurate) textbook definitions and accounts of techniques, rather than an explanation. Many explanations provided by students were far from coherent and quite difficult to understand, containing inconsistencies and misunderstandings. Sometimes one point correctly explained might be contradicted by a later explanation. Meyer and Land (2006a, p. xvi) term this in-between state as a state of 'liminality', from the Latin meaning 'within the threshold'. They characterise one outcome of liminality as the partial, limited or superficial understanding of the concept to be learned as a form of 'mimicry'.

Land *et al*. (2005, p. 55) use the term 'threshold conception' to describe a situation where students may grasp individual concepts but the barrier to their learning appears to lie at a deeper level of understanding. From our study we postulate what might be termed a threshold conception, that is, the recognition of the interrelatedness of aspects of the techniques of accounting within an organising, or explanatory, structure. The recognition of this interrelatedness is demonstrated when a student follows a mode of reasoning whereby techniques are explicitly seen as an attempt to operationalise certain fundamental principles. Land *et al*. (2005) refer to the work of Perkins (2006) and his use of the term

'underlying game' to describe more deep-seated assumptions underpinning individual concepts. Within accounting, the underlying game appears to be the basic issue of periodicity. Periodicity arises from the need to provide timely information to the various users of financial statements (e.g. shareholders and creditors), so the life of an entity is broken up into reporting periods of at least one year. Periodicity as an organising structure is based on the more generally acknowledged principles of recognition and realisation which determine when and how economic events (e.g. income and expenditures) should be recorded in the accounts. Periodicity is covered in texts, but the reason for its adoption is generally not explicated. Its fundamental role in underpinning financial accounting practice appears to be almost completely taken for granted.

So far we have seen that a dialogue between the normative expectations of lecturers and the understanding evidenced by students has led to a productive re-viewing of lecturers' expectations, the curriculum and textbooks within introductory accounting. As a consequence, students' problems in coming to an understanding of accounting are viewed differently. However, student understandings expressed in response to a classroom task are likely to be different from those expressed in response to other situations. Moving away from enquiry into classroom tasks to an immersion in student experience in a broader context can also be of value. A more leisurely enquiry into student understandings through the use of semi-structured interview (Lucas, 2000) revealed conceptions of profit, cash and depreciation that were at variance with disciplinary or 'authorised' views. Labelled as 'alternative' views, and identified as deriving from everyday experience, these can now become the focus of attention. For example, several students expressed a personal, experiential view of assets which led to a conception of depreciation (writing down to a second-hand value) that was at variance with the authorised conception (allocating the cost of an asset over its economic life). What emerges from these interviews are 'alternative views' of accounting concepts. However, generally students did not *recognise* that they held these views and thus might express them, inappropriately, within a disciplinary context. We speculate that the recognition that one holds such views, and that they are alternative views, may also comprise a threshold conception. Such a recognition involves an acknowledgement of separate explanatory rationales in different areas of operation. In other words, that there exist different ways of thinking in different contexts.

However, it may be that students are resistant to an acknowledgement of the contextual nature of ways of thinking. The key characteristics of a threshold concept identified by Meyer and Land (2006b), discussed above, are not all of the same order. A central aspect is that the concept is transformative in terms of providing a new world-view or way of thinking about something. A recognition of a new world-view is often integrative, linking previously hidden or separate aspects of thinking. We have argued above that this may be evidenced within accounting. However, it follows on from this central transformative aspect that it may well be *troublesome* for the student, involving a moving on, the crossing of a boundary and away from the known and the comfortable to the unknown and challenging. Its troublesomeness may also arise from the fact that it is seen as alien, counter-intuitive or that it opens up the notion that alternative viewpoints exist. It is the notion of 'troublesomeness', as well as the notion of 'difficulty in understanding', that provides an interesting diagnostic challenge for lecturers and which may be particularly

productive. A reflection on the nature of troublesomeness within different disciplines may identify the location of a threshold concept. Thus, particular aspects of student behaviour that might have previously been regretted or ignored now become a focus for enquiry.

In other words, dialogue with students is required in areas that we might previously have avoided: areas concerned with emotions such as resentment, anger and fear. These emotions may indicate a more interesting phenomenon—a threshold concept in the vicinity. Moreover, emotion is often productively related to issues of identity. A number of educational commentators have reflected upon this. Brookfield (1987, p. 17) observes that 'making the attitudinal shift to reinterpret as culturally induced what were initially held to be personally devised value systems, beliefs, and moral codes can be highly intimidating'. Consequently there may be denial, or defensive responses, before other belief or value systems are considered (if at all) (Lucas, forthcoming, 2008). Perry (1981) talks about the process of grief and the sense of loss that is involved in moving through stages of intellectual development. It is possible that conflicting feelings and ideas have to be integrated or reconciled and the student has to become comfortable with the new situation. Savin-Baden (2000, p. 87) characterises this as involving 'disjunction', involving a fragmentation of part or all of the self. The belief systems involved may be so fundamental that the students see themselves as different persons as a consequence of the change. Notably, this can be linked to phenomenographic research on conceptions of learning. A sixth conception of learning identified by Marton *et al.* (1993) is that of learning as comprising changing as a person.

If we consider emotions as providing possible evidence that a threshold concept is in the vicinity, then we can consider further why students might be reluctant to cross. Thus enquiry into what appear to be *barriers* to engagement within a discipline is of value. It is arguable that accounting students face a difficult challenge in accepting that accounting is not an objective science and that representing financial events through numbers is not as certain as they may think. Prior work within introductory accounting has identified a variety of student preconceptions about the nature of accounting (Lucas, 2000; Mladenovic, 2000). These preconceptions include perceptions of accounting as: primarily numerical, objective and involving little judgement. Such preconceptions can be re-viewed as *threshold barriers*. Further research indicates that these preconceptions are related to a focus on learning the technique, rather than on learning the organising, or underlying conceptual, framework of accounting (Lucas & Meyer, 2005). Assumptions of objectivity signalled by an emphasis on numbers are related to beliefs about knowledge as being discrete and factual (Baxter Magolda, 1992). In addition, for non-specialist students, accounting is perceived as involving mathematics and associated with worry (Lucas & Meyer, 2005). This may indicate that students do not see themselves as individuals who have the capacity to cope with the mathematics or numbers involved. Research has found that, after a year of studying accounting, non-specialist students conceded that it was more conceptual, and less numerical, than they thought (Lucas, 2000). However, none wanted to take up the option of studying accounting in subsequent years. So it may be that there is a more subtle rejection of accounting that we have yet to tap into.

It is not solely students' preconceptions that may set up barriers. Lecturers' responses to these preconceptions can be problematic if they lack a full appreciation of what might be involved. Interviews with lecturers have revealed that, in an attempt to overcome such

preconceptions, they endeavour to make accounting look 'easy' and avoid the use of technical terminology, 'jargon' as they term it (Lucas, 2002). However, it may be that it is the explicit introduction of complexity, in the form of organising structures, that is needed.

Dialogue between lecturers and educational developers

Observation at conferences or workshops where threshold concepts are discussed leaves no doubt about the powerful impact that the discussion of threshold concepts has on lecturers. Hence Beaty (2006, p. xi) talks of threshold concepts as an idea that '… seems to fire the imagination of teachers and researchers and which, for whatever reason is seen as having immediate relevance to issues within their own practice'. She also refers to its '… conceptual ideas that are essentially both simple and memorable and yet which are also highly generative, in that they contain richly layered implications for all kinds of educational contexts'. She uses the term 'action poetry' (Perkins, 2002) to describe this strong effect. Indeed, the metaphor surrounding threshold concepts with its vista of a journey with new territories in the distance and the central idea of a threshold into that new world is compelling.

However, there may be more to it than this. Cousin (2007) also speculates that its impact may arise from the fact that it asks subject specialists to talk about their subject, rather than education. Rather than being compelled to become an amateur in another discipline (that is, education), threshold concepts

> … place[s] the subject specialist at the centre of an inquiry into the difficulty of their subject. In this way, there is a restoration of dignity for academics and a reconfiguration of the relationships between students, academics and educational researchers and developers within a framework of 'transactional curriculum inquiry'. (p. 5)

She perceptively observes that in discussing threshold concepts, academics are asked to deconstruct their subject, rather than their educative practice, thus leaving them within 'both safe and interesting territory' (p. 6).

This provides fertile ground for educational developers to enter into a dialogue with lecturers and to enter into a mutually supportive relationship. In this relationship, lecturers derive their identity from their role as subject specialists. This allows the educational developer to act as a critical friend. The issue of threshold concepts provides an entrée into a rich discussion where probing questions may be welcomed rather than avoided. Educational developers may employ student misconceptions as a way to help lecturers to focus on student understanding and the student experience. At the same time, this can provide a context within which lecturers are enabled to question their own conceptions, those of textbooks, the normative nature of the syllabus and the presence of authorised and alternative conceptual views.

Research on threshold concepts: a new field or a catalyst for linking more established fields?

We have argued so far that the idea of a threshold concept has been particularly productive in the sense of demanding and promoting dialogue within and between the disciplines.

This arises because it provides an emerging theoretical framework that encourages us to view our current concerns within the curriculum differently by focusing our attention on the social construction of disciplines and disciplinary knowledge and the nature of student understanding in relation to those bodies of disciplinary knowledge. At present many of the current developments around threshold concepts appear to be taking place within this area of dialogue rather than by means of educational research (Meyer & Land, 2006a).

This raises a central question that is frequently asked about threshold concepts: to what extent does it comprise a field that will develop its own theoretical framework? It may be, however, that rather than representing a field in its own right, it may act as a catalyst, drawing together fields of research in a productive educative framework. Cousin (2006) addressed this issue in a keynote presentation at the International Symposium on Threshold Concepts. She identified a wide range of areas where the threshold concepts framework overlaps with other fields, referring to 'resonances' that threshold concepts has with other theories. It is likely that the relevance of other fields of research may vary according to the discipline concerned. From an accounting perspective, our discussion here highlights fields of research that are of particular relevance. One such field is that of phenomenographic research. Much prior work on student understanding has tended to be phenomenographic, being 'the empirical study of the limited number of qualitatively different ways in which various phenomena in, and aspects of, the world around us are experienced, conceptualized, understood, perceived and apprehended' (Marton, 1994, p. 4424). The student experience is the object of its attention. However, in analysing student conceptions the viewpoint of the analyser is often that of the normative expectations of disciplinary understanding. Phenomenography has been critiqued in this respect, as casting on one side its phenomenological roots (Davies, 2003). A closer attention to these phenomenological roots would highlight the need to 'bracket' normative disciplinary expectations, in so far as this is possible (Ashworth & Lucas, 2000). Davies (2003, p. 13) thus points out that the notion of a threshold concept '… offers a theoretical construct that enables the results of phenomenographic studies to be reinterpreted from the perspective of the social construction of disciplines'.

Given the potential for taking a social constructionist perspective, it is important to note that the theoretical development of threshold concepts can, and should, draw on other fields of research such as academic literacies (Lea & Street, 1998), communities of practice (Lave & Wenger, 1991) and alienation (Mann, 2001). Further, the transformative and troublesome nature of threshold concepts brings to the fore other areas of academic enquiry that may be relevant, for example, epistemological beliefs (Hofer, 2004), transformative learning (Mezirow, 1991) and reflection (Moon, 2004). However, it would be disappointing if an emphasis on the social construction of the disciplines and on the contextual nature of student understanding meant that existing research within the conceptual change field were neglected (Limon & Mason, 2002). That research, with its emphasis on cognitive psychology, may also inform discussion on threshold concepts. Research into threshold concepts thus offers a variety of possibilities, in the sense that it requires a connection with existing bodies of work that have not previously been linked. Whether it develops its own distinctive theoretical framework remains to be seen.

Conclusion

We have outlined here, providing illustrations from the case of introductory accounting, why we consider threshold concepts to be a fruitful emerging theoretical framework for a re-view of educational research and practice. Such a framework demands and promotes forms of dialogue: within disciplines (among lecturers, and between lecturers and students) and between lecturers and educational developers. It remains to be seen whether this dialogue will take place across a broad range of disciplines and, as a result, support the development of a theoretical framework. It also remains to be seen whether educational developers can utilise this opportunity to engage lecturers in a renewed interest in the subjects they teach. Both Beaty (2006) and Cousins (2007) claim that lecturers appear to find the threshold concepts framework particularly empowering, meaningful and engaging. Hence it can be argued that this framework may provide a powerful tool for lecturer engagement and educational change.

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