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AT THE TROUBLESOME EDGE OF RECOGNISING THRESHOLD CONCEPTS OF ONLINE TEACHING

A Proposed Learning Threshold Identification Methodology

ABSTRACT

This chapter presents a proposed methodology for identifying threshold concepts within the context of professional development and online teaching. The chapter may be of particular interest to those responsible for designing professional development for online teachers in higher education contexts. Furthermore, scholars of the Threshold Concepts Framework may find the methodology outlined in this chapter to be useful when identifying threshold concepts in other disciplinary or professional contexts, especially for the purposes of curriculum design.

INTRODUCTION

Online courses dominate global educational offerings (Adams Becker et al., 2017) and, in terms of educational technology, the world of online learning continues to extend into many sectors, especially higher education (Means, Toyama, Murphy, Bakia, & Jones, 2010). As a result, the need for professional development of online teachers and course1 designers has never been greater. Additionally, the process of identifying the threshold concepts (Meyer & Land, 2003, 2006; Meyer, Land, & Davies, 2008) and troublesome knowledge (Perkins, 2006) experienced by online teachers has the potential to further inform the design of such professional development programmes.

Methods used to identify threshold concepts have recently become the focus of research in varied educational contexts. For instance, Osmond and Turner (2010) ‘chartered the identification of a threshold concept’ (p. 361) by interviewing staff and surveying and interviewing students in the context of transport and product design. By interviewing and surveying postgraduate supervisors, Kiley (2009) identified threshold concepts as a way to assist doctoral candidates ‘to become “unstuck” and to move on with a new sense of confidence and appreciation of themselves as learners and researchers’ (p. 293). Through semi-structured group interviews with students across two academic years, Orsini-Jones (2008) identified threshold concepts in grammar learning and Barradell and Peseta (2016) have offered advice and cautions about how to identify threshold concepts in the context of a higher education physiotherapy subject. Using a range of methods such as interviewing individual students and lecturers, focus groups, observations of teaching, document analysis and the Delphi technique, threshold concepts have also been identified in other educational contexts such as mathematics, occupational therapy and engineering (Jooganah, 2010; Nicola-Richmond, Pépin, & Larkin, 2016; Quinlan et al., 2012).

Despite the extent of previous research into threshold concepts, little research has been conducted to investigate the thresholds concepts developed by academic teaching staff as they engage in the process of learning to teach online. Subsequently, no definite methodology to identify threshold concepts of online teaching has been published to date. The methodology outlined in this chapter has been informed by the theoretical foundations of threshold concepts drawn from a range of sources, including current literature; advice from members of an Expert Reference Group² for the Office for Learning and Teaching (OLT) Australia research project described in this chapter,³ the authors’ previous research on threshold concepts (Gosselin & Northcote, 2013; Gosselin et al., 2016; Northcote, Reynaud, Beamish, Martin, & Gosselin, 2011), consultation with Professor Ray Land (R. Land, personal communication, April 16, 2016), and discussions with other threshold concepts researchers at the 6th Biennial Threshold Concepts Conference (June 15–17, 2016).

The quest for developing a methodology to identify threshold concepts of online teaching was initiated by the experiences and developing capacities of online teachers in higher education contexts. Online teachers typically undergo transformative processes as their online teaching capacities grow, and they develop threshold concepts about online teaching. Consequently, Mezirow's theory of Transformational Learning (1978, 1981, 1997, 2000) formed the foundational theoretical framework of the first stage of this study in which data were sought for the purposes of identifying the threshold concepts of online teachers with varied levels of experience. Within the realms of this project, the theory of Transformational Learning was supplemented by using the pedagogical lenses of threshold concepts (Land, Meyer, & Baillie, 2010; Meyer & Land, 2005) and Troublesome Knowledge (Perkins, 1999, 2006). This chapter addresses the following question: 'How can educational researchers identify threshold concepts of online teaching?'. To answer this question, a systematic methodology is proposed to guide educational researchers in their quest for an approach to identify the threshold concepts, or learning thresholds, experienced by higher education in online or blended environments.

THEORETICAL FOUNDATIONS OF TRANSFORMATIONAL LEARNING

This chapter is built upon three foundational ideas: (1) authentic learning has the potential to be transformational for the learner (Herrington & Herrington, 2006); (2) the process of identifying threshold concepts in a field of learning may assist educators to recognise when learners reach these important learning milestones; and (3) the identification of a learner's experience of difficulty, 'stuckness', or liminality, has the potential to inform educators how to determine where serious learning challenges exist, or when progression towards learning is blocked. These three foundational ideas are reflected in Table 2.1 alongside a collection of terms and analogies which have been used to refer to various stages of developing understanding of a threshold concept: learning difficulty, liminality or stuckness, and the attainment of a threshold concept. No doubt, more of these terms and metaphors will emerge as researchers and educators search for the best ways to describe threshold concepts. This idea is noted by Perkins (2010) who reminds us of 'the very fecundity of threshold concepts, the evolutionary proclivity of the idea toward adventurous and fruitful mutation' (p. xliii) and who expects the concept to be 'stretched, challenged, revised, reconsidered' (p. xliv) in the future.

The idea of transformation is central to the proposed methodology outlined in this chapter. The experience of learning to teach online typically involves some form of transformation – either the transformation process of learning about online education or the process of adapting previous teaching beliefs and practices to the online realm. The process of developing understanding of a threshold concept has also been described as transformative by Meyer and Land (2003, 2005), especially when troublesome knowledge is encountered (Land et al., 2005; Meyer et al., 2008; Perkins, 2006). For transformational learning to take place, the learner needs to experience more than the development of a key understanding. Because the development or attainment of a threshold concept 'always involves an ontological as well as a conceptual shift' (Cousin, 2009b, p. 202), the recognition of a threshold concept must involve more than an observation that new knowledge has been learned. As Land et al. (2010) describe, the process of a threshold experience comprises a major change of view:

[...] a new perspective opens up, allowing things formerly not perceived to come into view. This permits 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, and results in a reformulation of the learners' frame of meaning. (p. ix)

Thus, in terms of academic teaching staff crossing learning thresholds as they come to learn about online teaching, a change in perspective about learners, online learning contexts, or even their identities as teachers may become the focus of their professional learning experiences. Consequently, the process of identifying such threshold concepts may be preceded by a state of confusion, liminality, or even frustration and signposted by a major change of view, a different way of thinking, or the development of a new perspective.

Fundamental to the threshold experience is the learner’s experience of being stuck or ‘stuckness’ (Ellsworth, 1997; McGowan, 2012; Savin-Baden, Sinclair, Sanders, & Wind, 2007) during which they may encounter troublesome knowledge (Perkins, 2006). Land et al. (2010) describe the space that often precedes the crossing of a learning threshold as: ‘a state of “liminality”, a suspended state of partial understanding’ (p. x). Timmermans (2010) further explains how this state of liminality may involve learners in ‘the emotional experience of self-doubt: the unsettling feeling that arises when one questions one’s ways of seeing, of being in the world’ (p. 10). Sometimes, learning can be defined as coming to see things in a different light, and this capacity to discern a new insight or experience is part of learning.

Table 2.1 Analogies and metaphors used in association with threshold concepts

<i>Category</i>	<i>Term used and source</i>
Learning difficulty	troublesome knowledge (Land et al., 2005; Meyer & Land, 2006; Perkins, 1999, 2006) cracks and chasms of learning (Perkins, 2010, p. xliii) troublesomeness (Meyer & Land, 2005) disorienting dilemma (Mezirow & Associates, 2000, p. 22; Roberts, 2013) bumpy moments (Northcote et al., 2011; Romano, 2006) stumbling blocks (Orsini-Jones, 2008) blockages (Wisker, 2016) dissonance (Festinger, 1956) learning frustration (Boyd, 2015) blockers and sticking points (Simon McIntyre, University of NSW, Expert Reference Group member)
Liminality or stuckness	stuckness, stuck places (Ellsworth, 1997; Lather, 1998; McGowan, 2012; Osmond & Turner, 2010; Savin-Baden, Sinclair, Sanders, & Wind, 2007) conceptual bottlenecks (Pace & Middendorf, 2004), sticking points (various presentations at the 6th Biennial Threshold Concepts Conference, 15-17 June 2016) stuck at the threshold (Berg, Erichsen, & Hokstad, 2016) conceptual peristalsis (Boyd, 2015) stuck in the bubble (Osmond & Turner, 2010)
Threshold concepts	jewels in the curriculum (Meyer & Land, 2005) shifts in epistemological understanding (King & Felten, 2012) joyful breakthrough (Northcote et al., 2011) perspective transformation (Mezirow, 1978) a portal, a doorway (Meyer & Land, 2003, King & Felten, 2012) true essence of the curriculum (Cousin, 2006) transition moment (Osmond & Turner, 2010) the crossing of a learning threshold ‘rewires’ a person’s way of thinking and being (R. Land, personal communication, April 16, 2016) ‘the penny dropped’ (from data gathered from participants in the project outlined in this chapter) learning leaps, over the plateau, gateways, crossing the Rubicon, threshold experience, more than just a lightbulb moment (various presentations at the 6th Biennial Threshold Concepts Conference, 15-17 June 2016)

IDENTIFYING THRESHOLD CONCEPTS OR 'LEARNING THRESHOLDS'

The integrative quality of a threshold concept needs to be evident for a threshold concept to be identified. In terms of threshold concepts of online teaching, the researcher needs to look for evidence of a change in perspective, rather than simply the development of an idea. As noted by Ray Land (personal communication, April 16, 2016), the grasp of a threshold concept about online teaching by an online teacher will involve an ontological shift which will also impact the teacher's confidence, their sense of teacher presence and their identity as a teacher. The process may also involve the removal of some of their 'scholarly armour' as they come to understand the process of teaching online. The change in knowledge stance needs to be considerable: 'A successful transformative learning experience can lead ... to acquisition of powerful knowledge and to significant shifts in ontology and identity' (Land, 2016, p. 20).

When identifying the thresholds experienced by or entered into by learners in professional development contexts, it is important, as advised by Land (R. Land, personal communication, April 16, 2016), not to labour the point, and therefore become distracted as to whether threshold concepts entail practices, emotions, skills, competencies or forms of knowledge. The process of reaching a changed mode of thinking and practising, which will most likely entail an ontological shift, is the important issue to look for when identifying a threshold concept. For instance, to use Land's example, a swimmer approaching a certain level of aquatic confidence reaches a state that can be thought of as a learning threshold. Not only have new ways of reasoning and explanation developed, but attitudes and competencies or skills have evolved. It is likely that the swimmer's emotions or attitudes about the swimming process have changed, as has their subjectivity as a swimmer.

From an educational researcher's position, the process of identifying threshold concepts or learning thresholds also requires acknowledgment of the learner's state of uncertainty and the process of tussling with a new idea which may impact their knowledge and identity. Land (2016) cites the state of uncertainty almost as a precursor to the deep learning achieved through a process of transforming from one state of knowing and being to a different state of knowing and being.

In our previous research, the experiences of online teachers in higher education have been described as being transformative within a professional learning context (Northcote, Gosselin, Reynaud, Kilgour, & Anderson, 2015) because the process of engaging in online teaching often involves the process of changing routines, modifying approaches and reviewing ways of thinking about teaching. This process can be disturbing and unsettling. Some teachers entering the realms of online course design and online teaching have even reported feeling fearful (Shepherd, Alpert, & Koeller, 2007).

In addition to impacting the learner's sense of confidence and their confidence to challenge, the process of developing a threshold concept affects a learner's identity. This issue has been identified by other threshold concept researchers (Boyd, 2015; Cousin, 2006; Meyer & Land, 2005) and has been associated with 'a shift in learner subjectivity' (Land et al., 2005, p. 53). The change may also involve 'a sense of loss' of their identity (Meyer & Land 2003, p. 10; Osmond & Turner, 2010, p. 347). In relation to online teaching, the recognition of a teacher's acquisition of threshold concepts about online teaching may be signposted by commentary about their online presence as a teacher, their perceived lack of teacher presence, or references to issues related to their identity or lack of identity as a teacher, online or otherwise. As advised by R. Land (personal communication, April 16, 2016), such references may signpost the stage when a teacher is developing an online teaching threshold concept or having difficulty coming to terms with developing such a concept. Similarly, Boyd and Lonsbury (2016) recognise that while threshold concepts can assist in the design of online courses,

teachers may also sense an unsettling and subtle undermining, described as ‘a pernicious ethos deficit in online education’. Furthermore, McGowan (2012) reports that hesitancy expressed by those entering online teaching territories may cause barriers to the process of developing online teaching threshold concepts.

THRESHOLD CONCEPTS ABOUT ONLINE TEACHING IN A PROFESSIONAL DEVELOPMENT CONTEXT

While issues of stuckness, liminality, identity and confidence have been identified as indicators of the presence of threshold concepts or the demarcation of a learning threshold in general, more research is needed into the process of identifying threshold concepts of online teaching.

Online teaching presents new challenges for teachers and, apart from developing technological expertise, it is essential that novice online teachers have an understanding of practices, pedagogy and roles of learners and facilitators. Many recommendations on how to teach online have emerged in past decades, mostly by leading educators who have researched the experiences of teachers transitioning into the online space and adopting new pedagogies (Bonk & Dennen, 2003; Garrison & Anderson, 2000). In terms of identifying threshold concepts of online teachers, the features of threshold concepts (Meyer & Land, 2003, 2005) need defining within a professional development context. Accordingly, these features have been described below by situating them in the context of online teaching and professional development:

- Transformative: Changes our knowledge about online teaching and the way we view online teaching.
- Troublesome: The idea of online teaching can be counter-intuitive to the way we have always taught. Learning about online teaching may seem too difficult or too complex.
- Irreversible: Concepts learned about online teaching are difficult to unlearn.
- Integrative: Threshold concepts about online teaching are likely also to incorporate concepts about other teaching-related issues (e.g., learning, curriculum design, assessment, etc.).
- Bounded: A threshold concept about online teaching is related to an academic’s scholarly practice of teaching.
- Discursive: Evidence of threshold concepts about online teaching will be demonstrated incidentally in an academic’s use of language.
- Reconstitutive: The academic’s grasp of a concept may go back and forth across stages of being sure and not sure, as they develop, ‘undevelop’, construct, and reconstruct the concept for themselves.

Furthermore, in relation to liminality, as the online teacher crosses the liminal space between not teaching online and teaching online effectively, the teacher may experience some level of ‘stuckness’.

For a threshold concept to be clearly identified, there must be evidence that the concept is both transformative and integrative. The presence of these two features can almost be used as a ‘litmus test’ for the identification of a threshold concept, the result of which is that a person’s way of thinking and being is ‘rewired’ (R. Land, personal communication, April 16, 2016). Thus, the methodology adopted to guide researchers in the process of identifying and analysing threshold concepts from data gathered from online teachers must first seek to recognise these two features of threshold concepts about online teaching. To date, threshold concepts have been identified in many

disciplines such as mathematics, science, nursing, economics and physics (Flanagan, 2018) in relation to their challenging nature and the meaning of scholarly teaching (Bunnell & Bernstein, 2012). They have also been employed to explore the difficulties experienced by faculty engaged in professional development programmes (King & Felten, 2012). Wilcox and Léger (2013), identified four potential threshold concepts in postsecondary teaching by analysing the written responses to questions about threshold concepts provided by a group of postsecondary teachers. These threshold concepts were not intended to represent teachers who worked in online learning contexts. However, apart from the work of McGowan (2012) who reported on threshold concepts in association with faculty's perceptions of technology, and Boyd and Lonsbury (2016) who are investigating online course design as a threshold concept, very little research, apart from the authors' previous research (Gosselin et al., 2014; Northcote et al., 2011, 2015, 2017) has been conducted into the threshold concepts experienced by teachers who work in online teaching and learning contexts in higher education. In summary, the previously identified threshold concepts about online teaching and online course design are outlined in Table 2.2. Some of these threshold concepts are relevant to both online and on-campus teaching. Those less distinctive to online teaching were not omitted from Table 2.2 for two reasons: (1) these concepts are important for all forms of teaching, including online teaching; and (2) the researchers did not assume that online teachers were already experienced in on-campus teaching and, as such, may not yet have developed threshold concepts that were typically developed during on-campus teaching experiences. This reasoning has also been applied to the presentation of threshold concepts about online teaching throughout this chapter.

A PROPOSED LEARNING THRESHOLD IDENTIFICATION METHODOLOGY

The development of the Proposed Learning Threshold Identification Methodology outlined in this chapter was designed within a research project that utilised a mixed methods case study design (Creswell & Plano Clark, 2011) augmented with a modified Delphi approach⁴ (Keeney, Hasson, & McKenna, 2006; Nicola-Richmond et al., 2016; Powell, 2003) to incorporate expertise from a group of esteemed online teachers and scholars. These experts were identified through the process of a comprehensive literature review at the beginning of the project, and in consultation with the project's Expert Reference Group. The project was funded by a Seed Grant from the Office for Learning and Teaching (OLT) Australia and involved two institutions in Australia and one in the USA. Although the study was designed to answer three research questions in all,⁵ the aspect of the study's methodology, as presented in this chapter, was designed to particularly seek answers to the study's first research question: What threshold concepts about online pedagogy are perceived as essential for novice higher education teachers teaching in online contexts? The mixed methods case study approach, a form of which was applied in previous iterations of this research study (Gosselin et al., 2016; Northcote et al., 2011), enabled the project's researchers to focus their investigations on three bounded groups of academic teaching staff from three institutions.⁶ These case studies constituted groups of 'learners' (in these cases, the learners were teachers who were learning to teach online) who were experiencing the process of developing threshold concepts about online teaching. Questionnaire responses and reflective journal data were gathered from academic staff who had experience in teaching in online contexts. These data were gathered, firstly, to identify threshold concepts about online teaching. The secondary purpose of gathering these data was to inform the future design of professional development curricula which aligns with Cousin's (2009b) acknowledgement of the purpose of a threshold concept which, in her words, is to 'explore difficulties in the learning and teaching of subjects to support the curriculum design process' (p. 201). Barradell and Peseta's work (2016) has also built upon Cousin's (2008) ideas of 'Transactional Curriculum Inquiry' by presenting an example of how threshold concepts can be identified by broadening the groups of stakeholders involved in the process.

Table 2.2 Previously identified threshold concepts about online teaching and online course design

Category	Threshold concept	Source
Use of technology	Intellectual play and experimentation are an essential part of teaching with technology. Technology enables faculty not just to do things better, but to do better things.	(McGowan, 2012)
	Technology is used for pedagogical purposes. Development of technological skills for teachers and students is essential. Understanding of institutional infrastructure (support and technology) available.	(Gosselin et al., 2014; Northcote et al., 2015; Northcote et al., 2017; Northcote et al., 2011)
Humanisation	Online learning requires interaction between all participants (teacher-student; student-student). Online students need same levels of attention. Personalised learning can be achieved in an online context.	(Gosselin et al., 2014; Northcote et al., 2015; Northcote et al., 2017; Northcote et al., 2011)
Pedagogical	Teaching is more than telling; learning is more than absorbing. Clear pedagogical justification needed for teaching online. Online cannot simply replicate on-campus. Conceive how students may navigate through online courses. Threshold attitudes (e.g., good teaching online is possible) affect online course design and delivery.	(Gosselin et al., 2014; Northcote et al., 2015; Northcote et al., 2017; Northcote et al., 2011)
	Rather than transmission of knowledge, teaching is ‘an active, inquiry-based process, in which the teacher engages in data-driven investigations into teaching and learning’. Teaching can be seen as a public act, with open dialogue, instead of seeing teaching as a private act.	(Bunnell & Bernstein, 2012, p. 15)
	‘Students as co-inquirers’ as ‘a requisite threshold concept’ in the process of educational development.	(Werder, Thibou, & Kaufer, 2012, p. 34)

In order to identify threshold concepts about online teaching that were evident in the data gathered during this study, the following Proposed Learning Threshold Identification Methodology was developed. This process was developed by drawing on a range of sources, including previous literature about threshold concepts (especially that which reported on research focused on the identification of threshold concepts); advice from threshold concepts experts, experienced online teachers and current researchers of online course design and professional development; theories of transformational learning and transactional curriculum design; and the Delphi method of drawing together a collection of knowledge from a panel of experts. The seven stages in the Proposed Learning Threshold Identification Methodology are outlined below.

Stage 1: Identify Pre-existing Threshold Concepts

The first stage of the methodology involves developing a draft list of threshold concepts from previous research, recognised experts and experienced stakeholders. The identification of pre-existing threshold concepts aligns with Cousin’s (2009a) description of the first stage of analysis: identifying variations in the ways the group under study experience the phenomenon (in our case, the experience of becoming an online teacher). She calls these variations ‘categories of description’ (p. 185). Furthermore, in her advice for identifying threshold concepts, Cousin (2009b) advises

researchers to 'get subject specialists to identify likely threshold concepts' as 'a very good starting point for threshold concept inquiry' (p. 206).

Stage 2: Categorise Draft List of Threshold Concepts

Secondly, the draft list of threshold concepts is categorised into meaningful categories that reflect the context of the phenomenon being investigated. This aligns with Cousin's (2009a) second concern in phenomenographic forms of research: 'to inter-relate these "categories of description", often in hierarchical form, in order to capture "the dimensions of variation" they suggest' (p. 185). This categorisation of threshold concepts also allows for Cove, McAdam, and McGonigal's (2008) supposition that 'there is probably a chronological element to crossing some of these thresholds' (p. 207). This process of categorisation was also recommended by Jan Herrington during an Expert Reference Group consultation for the project outlined in this chapter (J. Herrington, personal communication, May 4, 2016).

Stage 3: Gather Further Data from Specified Context

Once the threshold concept categories are formed, further data are gathered about threshold concepts from a defined set of participants within a specified context. The context and participants should be described to define the boundaries of the research setting and to ensure that data collection and analysis methods can be devised to suit the research setting. Researchers should select or devise data collection methods that allow threshold concepts to be expressed by participants within the specified context. Methods that especially reveal commentary about identity, confidence and/ or stuckness should be favoured, as these issues are often associated with the grasp of threshold concepts.

Stage 4: Analyse Data Gathered

During Stage 4, the newly gathered data (see Stage 3 above) should be analysed to identify the presence of threshold concepts from the specified context and participants. The analysis of data should be guided by a clear set of indicators for the purposes of identifying new threshold concepts. The following indicators, drawn from previous research and expert voices, may be used for this analysis:

- Transformative ideas that represent epistemological and ontological shifts: Evidence of changed knowledge about online teaching as well as changes in views about online teaching and being an online teacher.
- Evidence of integrative thinking, where new ideas are melded onto and interconnected to previously held ideas: Threshold concepts about online teaching are likely also to incorporate concepts about other teaching-related issues (e.g., learning, curriculum design, assessment, etc.).
- Mention of teacher identity or loss of identity.
- References to teacher presence, including either on-campus or online presence.
- Indications of increases or decreases in confidence or a 'confidence to challenge' (Osmond, 2014, p. 24) in relation to problems and solutions.
- Comments about uncertainty, unsettling feelings, feeling stuck, annoyance or frustration: These can be an indicator that a threshold concept is almost grasped. Commentary provided by participants that reflect aspects of the above indicators may provide evidence that a learning threshold is being entered into or crossed. Nonetheless, the process of identifying the thinking

processes of another is not always straightforward. For this reason, the proposed methodology in this chapter incorporates a set of indicators by which researchers may recognise the development of a threshold concept, the concept itself or the learner's state of liminality. Learners may express themselves using key phrases and sentiments that may be evident in the responses offered in interviews, reflective journals, questionnaires, or surveys. However, researchers should be cautioned about using the above list of indicators as a checklist or a set of criteria. Rather, data should be considered holistically.

Stage 5: Refine Draft List and Categories of Threshold Concepts

After the newly gathered data are analysed for the purpose of identifying further threshold concepts, those identified in Stage 1 are incorporated and the categories are further refined to reflect the content of both the previous and the newly identified threshold concepts. Before this newly categorised collection of threshold concepts is shared with the Delphi expert group in Stage 6, some justifying commentary and quotations from the original data should be added to each threshold concept to explain why the members of the research team believes each listed threshold concept is indeed a threshold concept.

Stage 6: Consult Experts

Stage 6 of the methodology involves consulting with experts, using the Delphi technique (Keeney et al., 2006; Powell, 2003). Experts in online teaching, professional development and curriculum design in higher education should be consulted and asked to filter the threshold concepts identified into those which are clearly threshold concepts and those which are not. In the case of our research, we used an 80% and above agreement level to indicate consensus among the experts. At this stage, experts should also be provided with opportunities to comment on the wording of any threshold concepts and to suggest any threshold concepts that may be missing from those identified thus far. This process, which may need to be repeated a number of times to reach a consensus list of threshold concepts, will ensure that the final set of threshold concepts reflects a strong foundation by being directly informed by recent research, experts in the field and relevant stakeholders.

Stage 7: Publish

Once the list of threshold concepts, validated by a panel of experts, is identified, the threshold concepts should be published for scrutiny and critical consideration by the scholarly community to ensure that further development of knowledge about threshold concepts and contextualisation of the threshold concepts may occur. Further evaluation of the threshold concepts by relevant experts should continually be sought.

SOME PRELIMINARY FINDINGS

To date, the authors have adopted the Proposed Learning Threshold Identification Methodology to identify a group of threshold concepts about online teaching during the most recent phase of the project. Table 2.3 lists the top ten of the 46 threshold concepts identified during a combined analysis of the threshold concepts that were derived from the data gathered during the project and the average numerical rating of agreement levels given by the expert reference group to the 46 threshold concepts. These threshold concepts will be further refined and reported in future publications as further rounds of consultation are employed. These findings are presented for the appraisal of other researchers in the anticipation that our research may change how people see threshold concepts that are developed by academic teaching staff who may also be online course designers and teachers. Furthermore, the identification of threshold concepts of online teachers that

result from the use of our methodology may change the way professional development curricula are designed for novice or developing online teachers. As well as extending our knowledge and appreciation of the learning thresholds of online teachers, the proposed methodology may change how other educational researchers identify threshold concepts of online teachers. Depending on the transferability of the methodology, it may be adapted and applied in practical research contexts to identify threshold concepts in other disciplines.

Table 2.3. A sample of threshold concepts about online teaching

<i>Cluster</i>	<i>Category</i>	<i>Threshold concept about online teaching</i>
Pedagogy - teaching	What is online teaching?	Course design is critical in online teaching. It may take longer to prepare for online teaching than on-campus teaching. Online teaching is more than just course design and course structure.
Pedagogy - learning	Relationships	A new mode of interaction between facilitators, students and resources is required.
	Unique nature of online learning	Online learning is unique and not the same as on-campus teaching.
Course design, structure and organisation	Interaction	Online teaching requires facilitating interaction, not only presenting content. While synchronous communication can be difficult to incorporate into an online course, there are benefits in doing so.
	Commitment and motivation	The design of a course should include ways to motivate and engage students actively in their learning.
Interaction, Communication, Personalisation	Communication and expectations	It's important to have mechanisms to be able to communicate and give feedback to students. Expectations of students and teachers should be clear.
	Feedback	Good online teachers provide feedback to students about their involvement in the course and their submitted assessment tasks. Timeliness of feedback is important and may be more important in an online course to counteract perceived lack of contact with students.

CONCLUSIONS

While Perkins (2010) described the outcomes of the study of threshold concepts as adventurous and fruitful, the very concept of a threshold concept or learning threshold has been described as being beneficial as a 'very useful starting point for opening up a research dialogue' and as a way of providing 'a "way in" to conducting pedagogical research with staff who may have had little or no engagement of knowledge of existing pedagogical research or theory' (Osmond & Turner, 2010, p. 348). By continuing to publish in this field, the authors anticipate that future researchers may build upon and extend the collection of threshold concepts of online teaching that have been identified to date. This chapter reported on the first phase of an international, cross-institutional project that aimed to identify threshold concepts of online teachers. As suggested by Davies and Mangan (2008), the value of identifying threshold concepts comes when this identification leads to course design implications and curriculum renewal. Similarly, Barradell and Peseta (2016) suggest that a study of threshold concepts embodies great potential for rethinking curriculum design in a way that highlights the most important aspects of learning. By identifying the threshold concepts developed by online teachers, the researchers involved in this study aim to integrate these threshold concepts in the future into professional development curricula for novice online teachers. While the

identification of threshold concepts about online teaching and their subsequent classification into meaningful, contextualised categories may assist in the research-informed development of professional development curricula, the authors anticipate that the future of identifying threshold concepts may traverse 'beyond the edge' of traditional disciplinary boundaries and may even, in Perkins's (2010) words, become 'more exploratory and eclectic than categorical or taxonomic' (p. xlv). In the future, the methodology outlined in this chapter may be applied in other disciplinary or professional contexts to identify threshold concepts, especially in relation to online teaching environments.

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NOTES

1 The word 'course' in this chapter is being used to mean a component of a degree program. For example, a student may enrol in four courses in their first semester of a degree.

2 Professor Ray Land (Durham University, UK), Professor Jan Herrington (Murdoch University, Australia), Dr Sarah Howard (University of Wollongong, Australia), Dr Simon McIntyre (University of New South Wales, Australia), Dr Tony Rickards (Curtin University, Australia) and Patricia Powers (University of Wollongong, Australia)

3 Using online teaching threshold concepts in transformative professional learning curricula for novice online educators, a research project funded by the Office for Learning and Teaching, Australia.

4 The Delphi Method has proved to be a particularly helpful research method for researchers "who are seeking a judgement of consensus on a particular issue" (Keeney, Hasson, & McKenna p. 205). Typically, a group of renowned experts are identified and consulted in a number of 'rounds' until consensus is reached.

5 (1) What threshold concepts about online pedagogy are perceived as essential for novice higher education teachers teaching in online contexts? (2) How do higher education teachers' and students' perceive online learning contexts? (3) Having identified teachers' threshold concepts about online pedagogy, and students' and teachers' perceptions of online learning contexts, how can curricula for professional development programs be designed to transform the capacities of novice online teachers in higher education?

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