3-2018

Threshold Concepts about Online Pedagogy for Novice Online Teachers in Higher Education

Peter W. Kilgour
Avondale College of Higher Education, peter.kilgour@avondale.edu.au

Daniel Reynaud
Avondale College of Higher Education, daniel.reynaud@avondale.edu.au

Maria T. Northcote
Avondale College of Higher Education, maria.northcote@avondale.edu.au

Catherine McLoughlin
Australian Catholic University, catherine.mcloughlin@acu.edu.au

Kevin P. Gosselin
A T Still University of Health Sciences, kevin.p.gosselin@gmail.com

Recommended Citation

Kilgour, P., Reynaud, D., Northcote, M., McLoughlin, C., & Gosselin, K. (2018). Threshold concepts about online pedagogy for novice online teachers in higher education. *Higher Education Research and Development, 38*(7), 1417-1431. doi:10.1080/07294360.2018.1450360

Threshold concepts about online pedagogy for novice online teachers in higher education

The use of threshold concepts to define key points of curricula is a relatively recent development in educational research. Threshold concepts are viewed as representing crucial stages of learning, the acquisition of which enables learners to transform from one level of achievement to another. In this context, the learner is often described as passing through an unsettling liminal space in which they may encounter troublesome knowledge and experience uncertainty or anxiety. When applied to online pedagogy in higher education contexts, academic staff become the learners as they extend their on-campus teaching knowledge into the online realm. In this setting, the identification of threshold concepts has the potential to inform the content of professional development (PD) programs for novice online teachers. Because little research has yet been reported on threshold concepts associated with online teaching, this study investigated how to identify these threshold concepts as well as their specific nature. Funded by an [Name of funding body removed for refereeing process] Grant, the project employed a mixed methods research approach. A mixture of qualitative and quantitative data was gathered from responses to questionnaires and reflective journal entries provided by university educators who were teaching in online contexts. Also, experts in the fields of PD, online teaching and threshold concepts were consulted using a modified Delphi technique that incorporated two-rounds of surveys. Results of this study are discussed in association with potential applications to PD design for novice online educators, informed by the most fundamental learning experiences encountered by their more experienced colleagues.

Keywords: threshold concepts, online pedagogy, professional development, online course, novice teachers

Introduction

With online education expanding in universities, new challenges are emerging for higher education teachers. Traditional face-to-face delivery is increasingly supplemented and often supplanted by online learning platforms, with new technology, pedagogy and paradigms. Indeed, online learning represents one of the key growth areas in the use of educational technology (Means, Toyama, Murphy, Bakia, & Jones, 2010). A modified pedagogy is required to make full use of the affordances of online learning contexts. Moving into an online pedagogical environment involves confrontation with new concepts, some of which can be characterised as threshold concepts (Meyer & Land, 2005) as they are fundamental to a university teacher's capacity to master the online learning and teaching environment. These concepts are often deeply unsettling because they can run counter to the habits, conviction and experience gained in a non-online environment.

In order to help novice online teachers develop confidence and competence, it is important to understand the threshold concepts encountered as they first begin to teach online and learn about online pedagogy. However, previous research has not yet investigated threshold concepts associated with online pedagogy to any large extent. Additionally, applying the notion of threshold concepts to *teachers as learners* is an emerging field of research and can be useful, in a higher education setting, as a stepping stone to designing effective curricula for the professional development (PD) of novice online teachers.

Apart from the three phases of an earlier project (Northcote, Gosselin, Reynaud, Kilgour, & Anderson, 2015; Northcote, Reynaud, Beamish, Martin, & Gosselin, 2011) and a recent investigation into threshold concepts associated with course design (Boyd & Lonsbury, 2016), research is lacking about the specific threshold concepts of online pedagogy that are held by online educators who design and teach university courses.

Establishing the threshold concepts required by novice online teachers is a step toward providing research-informed PD programs, activities and resources that enable novice teachers to develop expertise in online pedagogy.

Literature review

The notion of threshold concepts was derived from the ideas advanced by Perkins (2006) about the existence of *troublesome knowledge* — knowledge that challenges preconceived ideas and is typically difficult to grasp. Meyer and Land (2003) linked the idea of troublesome knowledge to their notion of threshold concepts. They differentiated a threshold concept from a regular learning outcome, in that it represents new ways of thinking or new conceptual frameworks. Meyer and Land (2005) then went on to identify eight specific features of a threshold concept, some of which are accompanied by qualifying descriptors:

(1) transformative in that they affect a learner's views;
(2) troublesome for the learner;
(3) irreversible (likely to be);
(4) integrative (likely to be);
(5) bounded (probably);
(6) discursive, indicated by an extended use of language;
(7) reconstitutive, involving a shift in a learner's subjectivity; and
(8) entails a learner entering a state of liminality.

Threshold concepts, as described by King and Felten (2012), typically present as a challenge for learners and, furthermore, indicate the point when a learner reaches a higher level of learning: "This kind of knowledge is akin to a portal or doorway; once a learner has crossed the threshold, she is able to see and learn significant new things" (p.

5). To explain the stage that learners typically experience before they cross a learning threshold, Meyer and Land (2003) use the term liminality — the idea that not being able to cross over the 'threshold' of understanding can leave learners in a "suspended state in which understanding approximates to a kind of mimicry or lack of authenticity" (p. 10). Thus, the experience of transitioning through a liminal space, which may be quite prolonged in some cases, usually precedes the attainment of a threshold concept.

While the eight features of threshold concepts are often applied to student learning contexts, novice online higher education teachers can be seen as students themselves, in a PD sense, as they learn how to facilitate online learning. They encounter their own set of threshold concepts associated with the pedagogy of online delivery, often experienced as blockages or troublesome knowledge.

Previous research has identified a group of threshold concepts that apply to academic staff who are new to the task of preparing online courses in tertiary education contexts. A preliminary study (Northcote, Reynaud, et al., 2011) produced a basic set of concepts that were grouped into themes: "1) pedagogical; 2) technical; 3) resources; 4) time; 5) strategic issues; and 6) fear" (p. 79). High quality online teaching was found to revolve around two key issues: firstly, how to foster an effective humanised online learning environment that builds relationships between students and teachers while recognising the flexibility of the online learning mode; and secondly, mastery of the technology involved.

When compared to the results of the earlier study, a later follow-up study conducted by Northcote et al. (2015) discovered that the type of threshold concepts encountered by academic staff had shifted from being largely technology-focused to being more focused on pedagogical issues such as engaging students and designing interactive courses. While findings from these previous studies (Northcote et al., 2015;

Northcote, Reynaud, et al., 2011) provide a starting point to investigations into online teachers' threshold concepts, the need remains to deepen our understanding of the threshold concepts in this area in order to better respond to the professional development (PD) needs of novice online educators.

The role of technology, as noted in the studies mentioned above, appears to have a major influence on the uptake or otherwise of online teaching methods. McGowan (2012) found that academic teaching staff often find barriers to online learning in the form of either an offhand disregard for technology, in which it is seen as irrelevant to successful teaching, or a misapprehension that a successful online teacher needs to be an expert in the use of technologies. McGowan (2012) also notes that "Technology enables faculty to not just do things better, but to do better things" (p. 26). In this way, the use of learning and teaching technologies may pave the way for teachers looking to attain advanced levels of teaching.

In fact, Englund, Olofsson and Price (2017) found that tertiary teachers who were novices in the use of educational technology showed a greater readiness to adapt to conceptual change than their more experienced colleagues. Englund et al. (2017) concluded that significant steps were needed to bypass what they call "pedagogical inertia" (p. 83).

With the use of technology being a misunderstood burden (McGowan, 2012) and an identified threshold concept for teachers of online courses (Northcote, Reynaud, et al., 2011), it is no surprise that Tummons, Fournier, Kits and MacLeod (2016) found that successful online teaching goes beyond competent use of technology. Common "social and cultural practices" (p. 837) can be blockages to successful learning using information and communication technologies. These blockages may be administrative, pedagogical, resourcing or resistance to change.

When gaining skills and understanding about online teaching, educators typically encounter the need to develop competencies in online course design. Boyd and Lonsbury (2016), who explored the process of online course design as a threshold process, suggest that by considering the threshold concepts learners develop, course designers and academic developers are able to identify the potential bottlenecks that learners may encounter. In addition to considering threshold concepts that have been identified in online education contexts, it is also useful to consider the threshold concepts that are applied to teaching in general. Bunnell and Bernstein (2012) discuss two particular threshold concepts they see as being central to pedagogy:

- 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" (p. 15).
- Teaching can be seen as a public, not private, act with open dialogue (p. 15).

These two threshold concepts associated with teaching and learning in general can also apply to online pedagogy, as online learning contexts, by their nature, often present opportunities to publicise teaching methods and to facilitate learning that goes beyond the mere transmission of knowledge.

Of relevance here is the study by Hitch, Mahoney and Macfarlane (2018) who pointed out that, when sessional lecturers are teaching online, they need professional development in specific areas such as assessment and feedback, communication and dealing with challenging students. They found that online teachers need PD in order to address difficulties such as “engaging academically diverse and time-poor student cohorts, and incorporating new pedagogies and technologies in both online and face to face teaching environments” (p. 12). Furthermore, Marshall, Orrell, Cameron,

Bosanquet and Thomas (2011) remind us of the institutional value of ensuring that teaching and learning are supported by supportive university management and leadership practices.

This literature review has focused on identified areas of difficulty or hurdles that online teachers typically encounter. This paper argues that these threshold concepts can be seen as hurdles in the online education arena that, when transcended, may open up new vistas of online teaching possibilities for novice online teachers.

Findings from the literature review determined that there was a lack of research into the specific threshold concepts about online pedagogy held by online educators who design and teach university courses. Nevertheless, a modest set of threshold concepts associated with online pedagogy were identified from previous literature. Building on this earlier research, the study set out to understand the threshold concepts encountered by online educators by seeking answers to the following research question:

What threshold concepts about online pedagogy are perceived as essential for higher education teachers who are novices in online pedagogy?

Methods

Research setting and participants

This research draws on data collected from novice and experienced academic teaching staff who were engaged in online teaching from three tertiary institutions, two in Australia (one public university and one private provider), and one public university in the USA. In this research project, a novice online teacher was defined as being either a teacher who was new to tertiary teaching and to online teaching or an experienced teacher who was new to online delivery. While experienced teachers may have a greater awareness of pedagogy and a higher self-efficacy level than novice teachers commencing in higher education, for the purposes of this research, different levels of

competence were not assumed. Instead, the research focused on the threshold concepts that both novice and experienced teachers encountered. From the three universities participating in the study, a total of 107 online teachers contributed their responses to the Online Teaching Self-Efficacy Inventory (OTSEI) (Gosselin, 2009) and 70 of these teachers contributed their responses to reflective journals. In addition, a select group of 16 national and international experts on PD, threshold concepts and online pedagogy were consulted via two online surveys to further validate the data contributed by the teacher-participants. The experienced teachers who participated in the study had taught for an average of 11 years in a higher education context and had taught an average of five semesters online or nine courses online.

Methodological approach

As with previous studies conducted in this area (Northcote et al., 2015; Northcote, Reynaud, et al., 2011), a multiphase mixed-methods case study approach was used as it had proved productive (Creswell & Plano Clark, 2011). Using such an approach ensured the continuity and validity of the research.

The methodological approach used to identify online teachers' threshold concepts began with identifying a set of threshold concepts about online teaching from previous research. Data were then gathered from the study's teacher-participants' about their views of online teaching which were then commented upon by a panel of experts. Lastly, by triangulating all the data gathered, a set of threshold concepts about online pedagogy were identified. Figure 1 explains the various stages of this methodological approach, followed by a more detailed explanation of the key stages.

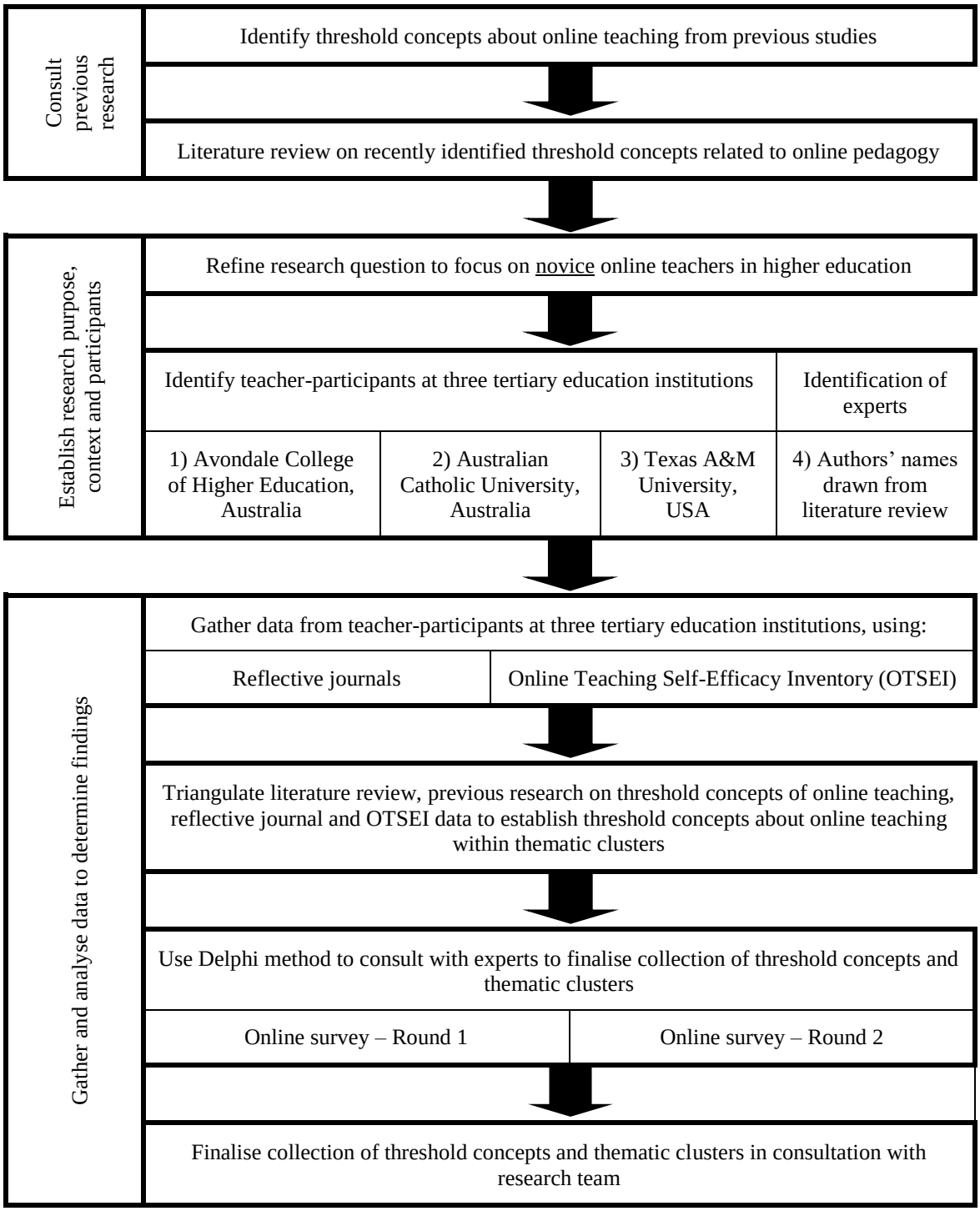

Figure 1: Research processes adopted to identify threshold concepts about online pedagogy.

Data collection and analysis

The data collection instruments for this study aimed to capture information about the issues faced by academic teaching staff as they developed online teaching skills. To ensure the final collection of identified threshold concepts about online teaching were reflective of both online teaching stakeholders and experts in the field, data were gathered from both groups.

Teacher-participants were invited to contribute to semi-structured reflective journals. Their responses provided qualitative data representing difficulties encountered as teachers developed their ideas and skills about online pedagogy. Additionally, responses by higher education teachers to the self–reporting OTSEI questionnaire provided quantitative data that measured the self-efficacy of novice and experienced teaching staff. Triangulation of the qualitative and quantitative data enabled the researchers to identify the threshold concepts that novice and experienced teaching staff encountered as they familiarised themselves with online pedagogy and gained experience teaching in online environments.

As explained earlier, it is difficult to arrive at a definition of a novice online teacher. Though experienced teaching staff were part of the sample used for this study, not all had extensive online teaching experience and, therefore, were considered to be novice online teachers. In personal correspondence with a member of the expert advisory panel for this research, Professor Ray Land (personal communication, April 16, 2016), it was deemed that there was little point differentiating between these novice and experienced teachers because, in some cases, a novice tertiary teacher may be a more effective online teacher than an experienced tertiary teacher. He urged the researchers in this project to focus more on the process of identifying threshold concepts of online teachers rather than on the process of identifying their level of online teaching

experience: ‘Their level of experience doesn’t matter as much as the quality and content of their learning thresholds’ (R. Land, personal communication, April 16, 2016).

The collections of online teaching threshold concepts that were identified from the teacher-stakeholders were used as items in an online survey that was distributed to a group of 16 internationally renowned experts in threshold concepts, PD and online pedagogy. This process of consulting with a group of recognised experts is known as the Delphi technique (Keeney, Hasson, & McKenna, 2006, 2011; Powell, 2003), and was designed purposely to supplement data gathered from teacher-participants by engaging evaluative input by relevant specialists. These experts were invited to indicate their agreement or disagreement with each of the listed threshold concepts as being relevant to online pedagogy in a higher education context. This process ensured that the final set of threshold concepts was directly informed by evidence-based research methods and multiple sets of data that represented views of both practising online teachers and renowned experts.

Results

Results from an analysis of the teacher-participants’ reflective journals

Responses from online reflective journal entries from 70 online teachers contributed to producing a set of 45 threshold concepts about online teaching which were categorised into six thematic clusters: 1) online pedagogy with a focus on learning (6 threshold concepts); 2) online pedagogy with a focus on teaching (8 threshold concepts); 3) the pedagogy of course design (6 threshold concepts); 4) course design, structure and organisation (14 threshold concepts); 5) interaction, communication and personalisation (6 threshold concepts); and 6) ongoing professional learning (5 threshold concepts). Table 1 outlines a sample of threshold concepts from each of these six clusters.

Table 1. Sample of threshold concepts about online pedagogy identified in reflective journals.

Thematic cluster	Threshold concept
Online pedagogy with a focus on learning	Equity can be achieved between online and face-to-face learning contexts. Online learning is unique and not the same as on-campus teaching.
Online pedagogy with a focus on teaching	Online presence is different from on-campus presence but both contexts require interactive elements. Students can learn without me, the teacher, being there.
Pedagogy of course design	An online course is an entity in itself that exists within an online context. Quality of course design is proportional to levels of interactivity and engagement.
Course design, structure and organisation	Good structure in an online course can compensate for lack of face-to-face interaction. Effective online teaching requires knowledge of online course design.
Interaction, communication, personalisation	Expectations of students and teachers should be clear. The teacher needs to feel connected with the students so that they don't feel like a machine.
Ongoing professional learning	Learning to be an online teacher requires some level of self-help professional development. Time and effort is required to learn how to use the technology.

Results from an analysis of the teacher-participants' responses to the Online Teaching Self-Efficacy Inventory (OTSEI)

Data from the OTSEI assessed self-efficacy beliefs within five areas of online pedagogy, including: (1) web-based unit structure; (2) online curricular alignment; (3) unit content migration; (4) virtual interaction; and (5) selection of technological resources. Within these five areas, participants rated each item on a scale from zero (no confidence) to 10 (complete confidence). From the original 107 completed, responses from 95 usable completed OTSEI surveys generated Alpha reliabilities ranging from .84 to .95, reflecting very high levels of internal consistency. The five single-factor scales of the OTSEI accounted for an average explained variance of 53.16% with ranges from 45.93% to 64.38%. Means and standard deviations for each of the five scales within the OTSEI are reported in Table 2.

Table 2: Means and standard deviations for the Online Teaching Self-Efficacy Inventory (OTSEI) scales.

OTSEI Scale	**M (SD)**
Selection of Technological Resources	6.65 (1.73)
Virtual Interaction	7.41 (1.30)
Unit Content Migration	7.32 (1.21)
Online Course Alignment	7.44 (0.78)
Web Based Unit Structure	7.25 (1.18)
TOTAL	**7.23 (0.97)**

The OTSEI's *Selection of Technological Resources* scale assesses beliefs related to selecting, utilising and assessing the appropriateness of technology in order to facilitate student learning. Of particular note in the OTSEI results is that participants rated items in the *Selection of Technological Resources* scale as the area in which they were least efficacious (M = 6.65, SD = 1.73), suggesting that technological knowledge was a primary concern. The *Virtual Interaction* scale measures online teachers' ability to effectively facilitate student-teacher interaction, engagement, and a positive learning environment while the *Online Course Alignment* scale encompasses instructors' self-efficacy beliefs in their ability to effectively align learning objectives, course assignments, assessment strategies and learning activities within the online environment. Both of these areas were shown to reflect higher levels of self-efficacy (VI: M = 7.41, SD = 1.30; OCA: M = 7.44, SD = 0.78).

Taken as a whole, the participants in this investigation held relatively high self-efficacy beliefs in their online teaching (M = 7.23, SD = 0.97) and these findings were used to reinforce the threshold concepts that were identified from the participants' reflective journals.

Comparison of reflective journal and OTSEI results

As shown in the reflective journal data, participants expressed concern over the time and effort needed to learn and adopt new technologies to enable them to design and teach online courses. These data also revealed their beliefs that effective teaching was

preceded by knowledge of learning technologies. The results from the OTSEI supported this concern, with faculty reporting the development, selection and application of technological resources and course design as the areas in which they felt least efficacious.

Recurring themes emerged from the reflective journal data of pedagogy and learning within the online environment as potential threshold concepts. Although these concerns were expressed in the participants' reflective journals, data from the OTSEI demonstrated higher self-efficacy ratings in the areas of online pedagogy, communication and course facilitation. However, overall, the process of triangulating the results of the analysis of the reflective journal data with the analysis of the OTSEI data did not reveal any major discrepancies between the two sets of data.

Results from an analysis of the Delphi technique

A two-round Delphi technique was implemented to finalise and further validate the threshold concepts about online pedagogy that were identified from previous literature and from the teacher-participants in the study (see Figure 2).

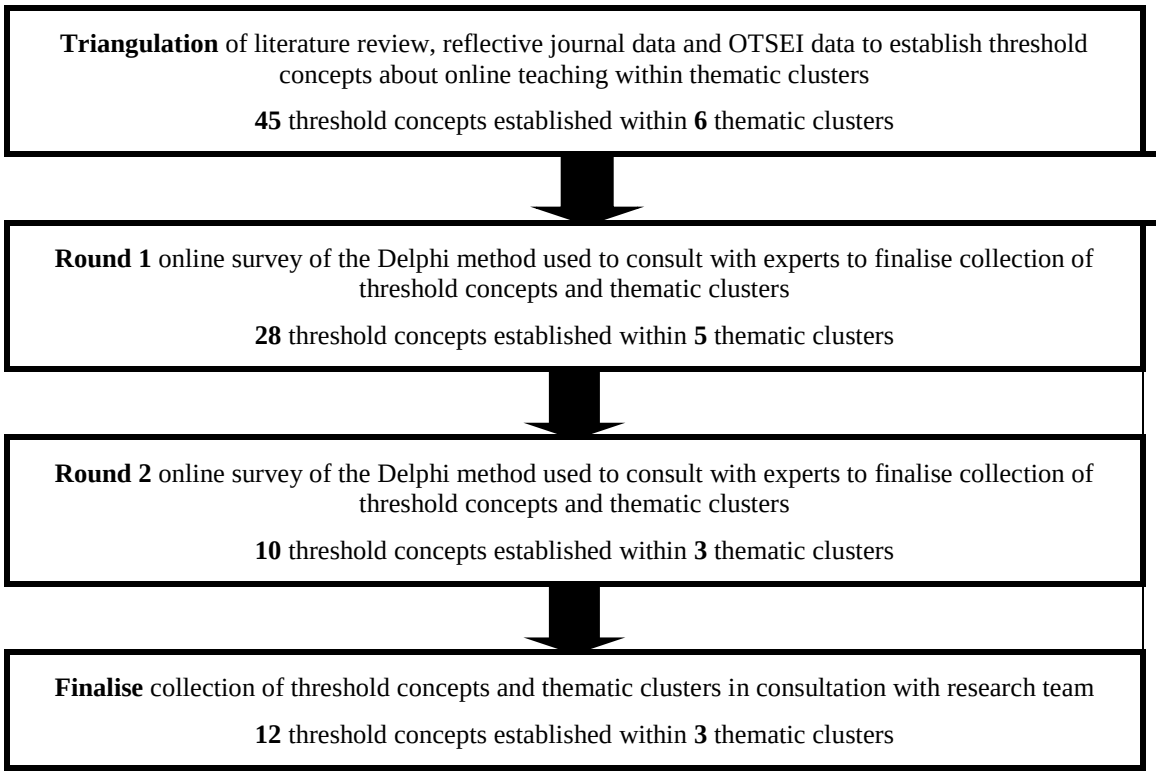

Figure 2: Use of the Delphi method to finalise identification of threshold concepts about online pedagogy.

The six thematic clusters of 45 threshold concepts about online teaching (identified in the literature and evident in the data gathered during the project) were converted into an online survey which formed the first of two questionnaire rounds that comprised the Delphi research component of this project (Keeney et al., 2006, 2011). This process elicited feedback from a group of experts about the validity of the threshold concepts identified to date. They were asked to filter the concepts identified into those which were clearly threshold concepts and those which were not. Their responses to the first set of threshold concepts about online teaching were analysed, using 80% or above as an indication of consensus. Results of this first survey were used to further condense the list of online teaching threshold concepts into a more concentrated collection, resulting in a reduced collection of 28 threshold concepts within five thematic clusters. These threshold concepts were incorporated into the second online Delphi survey. Analysis of the experts' responses to these 28 threshold

concepts were consolidated into ten threshold concepts about online teaching within three thematic clusters. The repeated process of requesting expert input enabled the researchers to establish a collection of threshold concepts upon which a select group of experts had reached consensus.

Of the 16 experts who were invited to contribute to the two online Delphi surveys, ten contributed to Round 1 and nine to Round 2. In each round, the research team removed any threshold concept with a weighted average response below three on a 1-4 disagreement-agreement Likert scale, or an overall agreement level less than 75% in Round 1 and 80% in Round 2. Combined, these inclusion and exclusion criteria were used to determine a numeric consensus among the experts about which of the listed threshold concepts were in fact threshold concepts about online pedagogy. Their qualitative commentary was then used to polish the wording of some of the threshold concepts to ensure a close match between the data gathered in the study and the experts' comments.

In addition to the two rounds of Delphi technique, two further checks were applied to the remaining group of threshold concepts: each member of the research team checked to determine whether each of the remaining threshold concepts did in fact represent a learning transformation and an ontological shift of understanding by online teachers; and that each of the remaining threshold concepts was relevant to *novice* online teachers. As a result, the wording of some of the threshold concepts underwent further refinement, others were split into two concepts for clarification and one threshold concept was removed altogether.

Summary of results

The systematic process of analysis, outlined above, distilled the collection of threshold concepts about online teaching down to 12 threshold concepts, grouped within three

thematic clusters, as outlined in Table 3. These 12 threshold concepts were perceived as essential for novice higher education teachers teaching in online contexts.

Table 3: Remaining 12 threshold concepts about online pedagogy.

Thematic cluster		Threshold concept
Preparation and course design (including curriculum design, instructional design, planning, teacher and course preparation)	1	An online course must be designed to have specific mechanisms to communicate, monitor and give feedback to groups of students as well as individual students.
	2	Online course design is critical to the success of online teaching and learning.
	3	Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.
	4	Preparation for designing and planning online teaching may take longer than preparation for on-campus teaching.
Online presence (including teaching presence, social presence and cognitive presence)	5	Students can learn without the teacher being present
	6	Online presence is different from on-campus presence.
	7	Online presence, while elusive, must be pursued.
	8	Students need to be encouraged to be more self-regulated in an online course than in an on-campus course.
	9	Online presence requires interactive elements.
Interaction and relationships (including teacher-learner, learner-learner, and learner-content interaction and relationships)	10	Online learning contexts require a new mode of interaction between facilitators, students and resources.
	11	Online teaching requires facilitating interaction, not only presenting content.
	12	Synchronous communication methods in online learning contexts, while sometimes challenging to facilitate, have many learning benefits.

Discussion and recommendations

The purpose of this research was to identify threshold concepts in online pedagogy alongside evidence for claims regarding these threshold concepts. Though most empirical studies using threshold concepts are found in the disciplines in association with student learning (e.g., economics, mathematics, physics), there are fewer studies in online pedagogy for teachers; this is where this research breaks new ground.

In teaching and moderating aspects of their online programs, novice teachers have been found to face challenges, gaps in their expertise and troublesome knowledge, (Gosselin et al., 2014; Northcote, Reynaud, et al., 2011; Northcote, Seddon, Brown, 2011). Results of this Office for Learning and Teaching (OLT) -funded project confirm that online pedagogy is unlike face-to-face teaching and presents significant challenges to teachers who are novices in online learning spaces. This project has presented evidence that shows how teacher perceptions of these roadblocks or challenges can be considered threshold concepts in online pedagogy. The challenges and new concepts encountered in online teaching contexts have the potential to conflict with teachers' existing models and approaches to teaching. Such experiences can be considered akin to being in liminal spaces. A similar perspective here is reflected in Major's (2010) study which confirms that the challenges of online teaching can often be sources of trepidation and uncertainty for faculty staff when they are encountering changes.

While the focus of this current research sought to identify threshold concepts associated with online pedagogy, debate remains in the literature regarding methodologies for accurate identification of threshold concepts. Baillie and Johnson (2008) maintain that not all troublesome knowledge within a discipline can be construed as threshold concepts, but can be viewed as skills or capabilities. This expanded definition of threshold concepts could be applied as another lens with which to view the

results of this study, for example, by considering the results inTable 3 Table 3 as capabilities required by novice online teachers. This finding aligns with the research by Salmon (2011) who describes the essentials of online moderation as “promoting human interaction and communication through modelling, conveying and building knowledge and skills” (p. 5).

The findings of this study can be considered alongside the research on teacher concerns about online pedagogy as described by Redmond (2011) who points out that instructional strategies for presenting content and engaging students online requires a transformation of practice. However, what is new, significant and evident from the findings of this OLT project is that moving into the realm of online teaching requires shifts that are both ontological *and* epistemological. The results confirm that teachers who are new to web-based teaching need to engage deeply with technology *and* pedagogy. In this way, this project was a macro-level investigation of online pedagogy, prompting both experienced and novice teachers to question and evaluate their practice when confronted with the new possibilities and complications of teaching online. Both their views of knowledge and learning were challenged.

The findings of this project have implications for threshold concepts in curriculum design and scholarly teaching, the importance of which are expounded by Bunnell and Bernstein (2012). When discussing the attributes of scholarly teaching, Bunnell and Bernstein identify two interrelated threshold concepts which may conflict with traditional modes of teaching. Scholarly teaching, whether online or face-to-face, involves a shift in practice from transmission of information to a transactional and relational pedagogy that is inquiry-based. Such a shift often engages teachers in dialogue and questioning about teaching and learning. They advocate the adoption of inquiry-based teaching and a movement away from transmissive pedagogy, just as the

respondents in this study viewed engagement and relationship building as very important concepts in online teaching. In this regard, one might view the outcomes of this research as having potential to inform face-to-face teaching as well, noting that transactional and relational pedagogy forms the crucial part of both modes of delivery. The need to pay attention to these qualities in online teaching reminds the teacher that intentionality here is as much needed in the face-to-face mode as in online education, especially as in the former it is often taken for granted.

The evidence from this study suggests that there are implications for the design of PD for novice online teachers. Many participants commented on the need for PD and support, recognising that the development of skills in online pedagogy is part of the learning journey for many higher education teachers. Novices to online learning environments face a range of challenges, as identified in the findings of this study, including role definition, relationship building and personalisation of the learning space. In addition to teaching novice teachers how to facilitate online learning, and providing them a repertoire of moderation strategies, PD needs to provide "how-to skills" that will encourage and support reflection on practice and re-evaluation of beliefs about teaching and learning.

These approaches to professional learning (i.e., professional reflection, and reflection on practice) are linked to the notion of scholarly teaching and the scholarship of teaching and learning (SoTL) (King & Felten, 2012). This means that online pedagogy becomes a discursive activity, not a private act, but a public one that requires accountability and dialogue about pedagogy and practice. A key implication of this project for PD is that staff need to reflect on changes (both publicly and privately) required for effective online pedagogy and to develop relational strategies to connect

with students in virtual environments. In this way, reflection on their teaching can be transformative.

The literature is very clear about one feature of threshold concepts: that while they are transformative, they are also troublesome, causing uncertainty and bringing about epistemological shifts (Perkins, 2006). McGowan's (2012) study on threshold concepts is similar, considering technology integration as a threshold concept, as it compels faculty to question their roles and competence. McGowan advocates PD based on "playful experimentation" which is not threatening, but instead allows staff to explore the affordances of technology. Through dialogue and reflection on practice, such PD enables teaching staff to alter, extend, and even transform their conceptions of the online teaching and learning process. The focus of much PD for online pedagogy must shift from using technology to replicate traditional teaching practices to provision of exemplars and experiential opportunities where teaching practices can be transformed to maximise the potential affordances offered by new and developing technologies (Wilson & Stacey, 2004). These models of PD emerge as productive possibilities from this research.

Conclusion

The study described in this paper has identified a collection of threshold concepts that university educators form as they develop their online pedagogies. Data were drawn from the multiple perspectives of educators with varied levels of online teaching experience, as well as experts from the fields of PD, online pedagogy and threshold concepts. The threshold concepts identified in this paper can be used to inform the design of PD programs for supporting novice online teachers in higher education. The process of attaining threshold concepts challenges the novice online educator or course designer, and may involve entering a state of liminality, or "stuckness", frequently

associated with uncertainty and anxiety. Once through the state of liminality, there is scope for pedagogical transformation for the academic as an online educator. Understanding the key points of learning during an educator's online teaching journey, including potential barriers as well as possible moments of success, can inform the content of PD activities and the design of supporting resources. While the findings of this research have contributed to knowledge of threshold concepts associated with online pedagogy, future researchers may consider extending this investigation by trialling the application of these threshold concepts in other PD contexts. Lastly, the process used in this study to identify threshold concepts may be further applied and tested within other PD contexts or specific disciplines.

Funding

The research project reported in this paper was funded by the Office for Learning and Teaching (OLT) under the Seed Grant Program [Grant no. SD-15-5203]. Grant title: Using online teaching threshold concepts in transformative professional learning curricula for novice online educators. In-kind research support was provided by Avondale College of Higher Education, NSW, Australia; Texas A&M University, Texas, USA; and The Australian Catholic University, ACT, Australia.

References

Baillie, C., & Johnson, A. (2008). A threshold model for attitudes in first year engineering students. In R. Land, J. H. F. Meyer, & J. Smith (Eds.), *Threshold concepts within the disciplines* (pp. 129-141). Rotterdam: Sense Publishers.

Boyd, D. E., & Lonsbury, J. (2016). *Guiding on the Edge: Online and F2F course design as a threshold process*. Paper presented at the 6th Biennial Threshold Concepts Conference: Thresholds on the Edge, Dalhousie University, Halifax, Canada.

Bunnell, S. L., & Bernstein, D. J. (2012). Overcoming some threshold concepts in scholarly teaching. *Journal of Faculty Development. Special Issue: Threshold Concepts in Educational Development, 26*(3), 14-18.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

Englund, C., Olofsson, A. D., & Price, L. (2017). Teaching with technology in higher education: understanding conceptual change and development in practice. *Higher Education Research & Development, 36*(1), 73-87.
Gosselin, K. P. (2009). Development and psychometric exploration of the online teaching self-efficacy inventory (PhD). Texas Tech University.
Gosselin, K. P., Northcote, M., Reynaud, D., Kilgour, P., Anderson, M., & Boddey, C. (2014). Threshold concepts about online teaching: Progress report on a five year project. Paper presented at the Threshold Concepts in Practice: 5th Biennial International Threshold Concepts Conference, Collingwood College, Durham University, UK. Retrieved from http://www.ee.ucl.ac.uk/~mflanaga/abstracts/TC14Abstract70.pdf
Hitch, D., Mahoney, P., & Macfarlane, S. (2018). Professional development for sessional staff in higher education: a review of current evidence. *Higher Education Research & Development*, 37(2), 285-300.
Keeney, S., Hasson, F., & McKenna, H. (2006). Consulting the oracle: Ten lessons from using the Delphi technique in nursing research. *Journal of Advanced Nursing, 53*(2), 205-212.
Keeney, S., Hasson, F., & McKenna, H. (2011). *The Delphi Technique in nursing and health research*. Oxford: Wiley-Blackwell.
King, C., & Felten, P. (2012). Threshold concepts in educational development: An introduction. *Journal of Faculty Development. Special Issue: Threshold Concepts in Educational Development, 26*(3), 5-7.
Major, C. H. (2010). Do virtual professors dream of electric students? University faculty experiences with online distance education. *Teachers College Record, 112*(8), 2154-2208.
Marshall, S. J., Orrell, J., Cameron, A., Bosanquet, A., & Thomas, S. (2011). Leading and managing learning and teaching in higher education. *Higher Education Research & Development, 30*(2), 87-103.
McGowan, S. (2012). Obstacle or opportunity? Digital thresholds in professional development. *Journal of Faculty Development. Special Issue: Threshold Concepts in Educational Development, 26*(3), 25-28.
Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Retrieved from Washington, D.C.: http://www.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf
Meyer, J. H. F., & Land, R. (2003). *Threshold concepts and troublesome knowledge: Linkages to ways of thinking and practising within the disciplines*. Retrieved from Edinburgh: http://www.etl.tla.ed.ac.uk//docs/ETLreport4.pdf
Meyer, J. H. F., & Land, R. (2005). Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning. *Higher Education, 49*(3), 373–388.
Northcote, M., Gosselin, K. P., Reynaud, D., Kilgour, P., & Anderson, M. (2015). Navigating learning journeys of online teachers: Threshold concepts and self-efficacy. Issues in Educational Research, 25(3), 319–344.
Northcote, M., Reynaud, D., Beamish, P., Martin, T., & Gosselin, K. P. (2011). Bumpy moments and joyful breakthroughs: The place of threshold concepts in academic staff development programs about online learning and teaching. ACCESS: Critical Perspectives on Communication, Cultural & Policy Studies, 30(2), 75–90.
Northcote, M., Seddon, J., & Brown, P. (2011). Benchmark yourself: Self-reflecting about online teaching. In G. Williams, P. Statham, N. Brown, & B. Cleland (Eds.),

Changing demands, changing directions. Proceedings ASCILITE Hobart 2011 (pp. 904–908). Hobart: Australasian Society for Computers in Learning in Tertiary Education.

Perkins, D. (2006). Constructivism and troublesome knowledge. In J. Meyer & R. Land (Eds.), *Overcoming barriers to student understanding: Threshold concepts and troublesome knowledge* (pp. 33-47). New York: Routledge.

Powell, C. (2003). The Delphi technique: Myths and realities. *Journal of Advanced Nursing, 41*(4), 376-382.

Redmond, P. (2011). From face-to-face teaching to online teaching: Pedagogical transitions. In G. Williams, P. Statham, N. Brown, & B. Cleland (Eds.), *Changing demands, changing directions. Proceedings ascilite Hobart 2011* (Vol. 2011, pp. 1050- 1060).

Salmon, G. (2011). *E-moderating: The key to teaching and learning online* (3rd ed.). New York: Routledge.

Tummons, J., Fournier, C., Kits, O., & MacLeod, A. (2016). Teaching without a blackboard and chalk: conflicting attitudes towards using ICTs in higher education teaching and learning. *Higher Education Research & Development, 35*(4), 829-840.

Wilson, G. S., & Stacey, E. (2004). Online interaction impacts on learning: Teaching the teachers to teach online. *Australasian Journal of Educational Technology, 20*(1), 541-549.