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A Professional Learning Program for Novice Online Teachers Using Threshold Concepts

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Abstract

The professional development of online teachers is now commonplace in higher education. Alongside the relatively straightforward decision to provide professional learning support for novice and experienced online educators within universities, decisions about the nature and content of such support are not always as clear cut. The study aimed to gather evidence about the online teaching and learning experiences and views of current students and staff which, in turn, informed a set of pedagogical guidelines that could be used as the basis of professional learning programs for novice online teachers. Using a mixed methods research design, data were gathered using questionnaires, reflective journals, and focus groups to determine the threshold concepts about online teaching and perceptions of ideal online learning environments. As well as identifying threshold concepts about online teaching and perceptions of teachers' and students' ideal views of online learning contexts (reported elsewhere), the study produced curricular guidelines to inform the design of professional development outputs for online teachers in higher education. This article reports on an example of how these professional development guidelines, based on identified threshold concepts of online pedagogy, were implemented at one higher education institution to provide wide-scale implementation of a professional development program for academic staff engaged in online teaching.

Keywords: threshold concepts, online teaching, professional development curricula

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A Professional Learning Program for Novice Online Teachers Using Threshold Concepts

The professional development (PD) of online teachers is now commonplace in most universities. While the nature and delivery mechanisms of PD programs vary across institutions and countries, it is typically acknowledged by university administrators that faculty staff engaged in online course design, development, and teaching require support. For novice online educators, this support is crucial in that it not only can *make or break* the quality of the teacher's experience when facilitating online courses, it also has a direct impact on the quality of students' learning experiences in online courses. Support for the development of skills and knowledge about online teaching can be offered in the form of on-campus or online activities (such as workshops, guest speakers, mentoring programs) and resources (such as self-help and "how-to" instructions, and exemplars of good practice). Such provisions seek to maximise faculty staff engagement (Elliott, Rhoades, Jackson, & Mandernach, 2015). In many cases, the provision of activities and resources is structured within a goal-driven PD program, often administered by a central learning and teaching centre of a university. Other educators have used reflection models about teacher knowledge to evaluate their own online practices (Baran, Correia, & Thompson, 2013). While the actual need for professional learning support for novice and experienced online educators within universities is usually undisputed, decisions about the nature and content of such support are not always as clear. Furthermore, the evidence for such decisions is not always based on evidence or research findings (Hill, Beisiegel, & Jacob, 2013).

The authors of this paper have previously published in the area of establishing threshold concepts about online learning and their application to online teaching. A research-based method of identifying threshold concepts has been developed (Kilgour, Reynaud, Northcote, McLoughlin, & Gosselin P, 2018) and used to explain the connection between threshold concepts and the development of professional development for teachers in the online area (Northcote, Gosselin, Reynaud, et al., 2017) as well as how threshold concepts about online pedagogy can be used to improve the online learning environment (Gosselin, Northcote, Reynaud, et al., 2016). This paper contains our recommendations for practice and provides a specific example of how the prepared guidelines have been implemented on a college-wide basis for academic staff involved in online learning. Previous publications that have reported on earlier stages of the study have been used as building blocks to identify professional development recommendations.

More specifically, this article presents an example of how PD guidelines, drawn from investigating the threshold concepts of experienced online teachers, have been implemented in one specific institutional context especially for novice online teachers. Within this institution, threshold concepts were viewed as transformed ways of thinking about online teaching that can enable the teacher to progress to more advanced ways of thinking about and practising online teaching. This interpretation of threshold concepts is based on Meyer and Land's (2003) definition of a threshold concept as "akin to a portal, opening up a new and previously inaccessible way of thinking about something ... a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress" (p. 1). The identification of threshold concepts associated with online pedagogy formed a framework that was used to inform pedagogical guidelines to transform the capacities of novice online teachers in a specific institution. As well as using threshold concepts about online teaching as the basis of these guidelines, students' and teachers' perceptions of ideal online contexts were also considered. Together, the threshold concepts and perceptions of online environments informed a set of PD guidelines that were applied at one small higher education institution, Avondale University College, in NSW, Australia.

The article that follows outlines a brief literature review that presents recent ways of thinking about PD and the use of threshold concepts to identify key points of PD curricula. The idea of using threshold concepts to identify key curricula components has been extended into the area of PD, with a particular emphasis on online teaching in higher education. Following the literature review, the methodology adopted in this research study is outlined, followed by the findings identified from an analysis of data gathered from higher education teachers and students through questionnaires, focus groups, and reflective journals. Finally, a set of PD guidelines is presented along with a description of how these guidelines were applied in the design of a professional learning program for novice online teachers in one higher education institution.

Review of Literature

Threshold concepts (Meyer & Land, 2005, 2006) and troublesome knowledge (Perkins, 2006) have been used as lenses through which to identify core knowledge in the curricula of a range of disciplines. This approach to analysing curricula in courses designed for university students has the potential to determine the most difficult or challenging concepts encountered during the learning process. Such concepts have been noted across many learning contexts as being especially significant or troublesome for learners in the past. Knowledge about these concepts has been used in a variety of disciplines, such as mathematics, economics, and physics (Davies & Mangan, 2008; Jooganah, 2010; Mills & Wilson, 2012), to assist teachers in the design of course curricula. Cousin (2006) suggests the study of threshold concepts can be used to overcome a “stuffed” curriculum by identifying “jewels in the curriculum” (pp. 4-5). While this approach has been used in the design of courses for students, the pedagogical lens of threshold concepts can be used to pinpoint the concepts that form the basis of knowledge held by experienced online teachers in relation to PD for faculty teaching staff. Consequently, this knowledge can be used to inform the design of PD curricula for novice online teachers, an important subset of faculty teaching staff.

In the past few decades, many researchers and educators engaged in PD have created best practice recommendations for the design and teaching of online courses. These have typically been put forward by educators who have investigated the experiences of teachers transitioning into online education (for example, Baran, Correia, & Thompson, 2011; Bonk & Dennen, 2003; Garrison & Anderson, 2000). Yet, apart from Boyd and Lonsbury’s (2016) recent investigation into the threshold concepts associated with course design and the three phases of an earlier project conducted by some of the researchers in this project (Gosselin, Northcote, Reynaud, et al., 2016; Northcote, Gosselin, Reynaud, Kilgour, & Anderson, 2015; Northcote, Reynaud, Beamish, Martin, & Gosselin, 2011), research is lacking about the specific threshold concepts held by online educators who design and teach university courses. To contextualise online teachers’ threshold concepts, the features of these need to be defined within a PD setting that recognizes, firstly, the unique nature of online education and, secondly, the transformative process that novice online teachers experience as they move from teaching in a traditional, on-campus mode to an online mode of teaching.

Nevertheless, a considerable amount of related literature on essential elements of online learning design can be connected to and augment the current perspective of the threshold concepts framework. This literature, based on empirical research, has also aimed to explore high quality teaching and learning approaches in order to improve student learning outcomes and the associated implications for professional learning. This literature helped us to consider the learner’s experience

where the learner is the novice online educator developing PD processes, a perspective essential for online teachers who espouse constructivist, learner-centred, online teaching pedagogies. For students new to online learning, they often encounter challenging situations or learning thresholds that are associated with communicating meaningfully using online communication tools (Conole, De Laat, Dillon, & Darby, 2008). These practices link to the Community of Inquiry model (COI) by Garrison, Anderson, and Archer (2000), a robust learner-centred approach to creating a deep and meaningful (collaborative-constructivist) learning experience through the development of three interdependent elements: social, cognitive, and teaching presence.

Following the seminal work of Garrison et al. (2000) we can see that theories and models of effective online teaching and learning agree on the fundamental qualities and features that differentiate online from face-to-face learning. By far the most recognised has been Laurillard's Conversational Framework (1993) which, again, provides an overarching framework for the design of online learning. For Laurillard, students are active participants constantly in the process of acquiring "ways of seeing the world" (in other words, grappling with threshold concepts) as they engage and learn how to learn in online spaces. Associated pedagogic strategies for teachers to teach online necessarily involve consideration of different forms of communication and associated interactive activities designed for students to engage in conversation through discussion, adaptation, interaction, and reflection using multiple media. Significantly, these elements are fundamental to the transformation of learner mindsets and practices, and also apply to teachers who need to learn how to engage students with social media, enabling creation of content and use of multiple media to express ideas and collaborate online. These practices require a transformation in how both teachers and students think and learn and therefore "can be considered as akin to a portal, opening up a new and previously inaccessible way of thinking about something. It (sic) represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress" (Meyer & Land, 2003, p. 1). Similarly, frameworks for e-learning created by Gilly Salmon (2013) are based on the assumption that teacher mindsets must be transformed to adopt new practices.

Novice online educators, like the students they will teach, must transform their thinking and online practices in the light of these principles. This pedagogic transformation, to create learning environments where social, cognitive, and teaching presence are essential, is a vital element of the teaching and learning process in virtual learning spaces and has underpinned the perspectives of the current researchers as they developed PD concepts and processes for novice online teachers.

In addition, the perceptions of teachers and students about online learning environments also need to be considered. Earlier studies on perceptions of teachers towards online education have revealed the reluctance of teachers to teach online because of concerns that web-based delivery may have an impact on the quality of pedagogy, learning, and student-teacher interaction (Ward, Peters, & Shelley, 2010). Similar studies identified other factors that tend to contribute to teachers' concerns about online teaching: entrenched approaches to instruction and/or lack of confidence with online pedagogy, and perceived inadequacies of online environments to enable effective learner engagement (Green et al., 2010).

The current investigation into threshold concepts relating to online education and the preceding investigations of the distinct features of online learning are based on evidence-based inquiry into what constitutes effective web-based pedagogy. The earliest instruments were advocated by Fraser (1998) as a means of investigating learning environment perceptions in

guiding pedagogy and taking into consideration students' preferences. Later, Trinidad, Aldridge, and Fraser (2005) reported on how the development and use of an instrument (Online Learning Environment Survey, OLES) was designed to help educators assess the quality of e-learning environments that they were creating. The OLES used eight scales that were considered important in an e-learning environment, including 1) computer usage; 2) teacher support; 3) student interaction and collaboration; 4) personal relevance; 5) student autonomy; 6) authentic learning; 7) equity; and 8) asynchronicity. A revised version of this instrument was developed in the current study, with permission from the original authors, to assess instructors' perceptions of effective online pedagogy and, from this perspective, to develop threshold concepts as they could be applied to online pedagogy. Young and Norgard (2006) reiterated the need for universities to pay close attention to learner perceptions in order to ensure retention and active participation in online education. Later recommendations regarding effective instructor pedagogy have emphasised personalisation and the need to foster self-regulation among learners (McLoughlin & Lee, 2009). More recently, Ashong and Commander (2012) and Mbatl and Minnaar (2015) have emphasised the unique features of online learning and the need to take into consideration how students learn and the challenges they experience when transitioning to online delivery of courses.

In light of recent developments in PD programs for online teachers within universities and the lack of clarity regarding decisions about the selection of content for these programs, there remains a need to establish an evidence-based, research-informed approach to guide the development of professional learning programs for novice online teachers. The method by which a set of PD guidelines for online novice teachers was developed has been outlined in a previous publication (Northcote, Gosselin, Kilgour, McLoughlin, & Boddey, 2017); this article outlines an example of how these guidelines have been applied in one higher education institution. Consequently, the research reported in this article answers the following research question: Having identified teachers' threshold concepts about online teaching, and students' and teachers' perceptions of online learning contexts, how can a set of PD guidelines be applied to design PD curricula to transform the capacities of novice online teachers in higher education?

Method

This article reports on the culmination of a series of investigations that systematically derived a set of threshold concepts that are seen to be essential for beginning online higher education teachers. From the start, this project adopted a mixed methods multiphase design (Creswell & Plano Clark, 2011) which ensured that each phase was linked and that the combined qualitative and quantitative data were connected as they were gathered, analysed, and interpreted. The research aimed to address the following overarching research questions:

- 1) What are the threshold concepts that teaching staff encounter when they learn about online learning and teaching?
- 2) Is there a difference between self-efficacy and threshold concepts encountered by staff who are experienced or inexperienced in online learning and teaching?
- 3) How can the identification of the threshold concepts be used to inform future academic staff development programs and processes?

The entire study took place across three phases. The specific methodology, participants, and outcomes are provided to inform the current study aim of describing the initial application of professional development guidelines.

Phase 1: Threshold concepts about online teacher were identified by using the OTSEI (Online Teaching Self-Efficacy Inventory) questionnaire (Gosselin, 2009) together with reflective journals kept by faculty staff. Ninety-five faculty staff completed the OTSEI and 70 faculty staff completed reflective journals. By triangulating these sources of data, a set of threshold concepts for novice online teachers was developed. Using a modified version of the Delphi Method (Keeney, Hasson, & McKenna, 2006, 2011; Powell, 2003), this collection of threshold concepts was then distributed to 16 specialists with expertise in the area of threshold concepts and online learning who were asked to indicate their agreement or disagreement with each threshold concept that had been developed. Where 80% or more of the experts agreed with each proposed threshold concept, it was adopted into the list of threshold concepts for novice online higher education teachers.

During this phase of the study, data were gathered from higher education faculty staff and students to discern their views of ideal online learning environments. Permission was sought from the original researchers of the OLES (Online Learning Environment Survey) instrument (Pearson & Trinidad, 2005; Trinidad et al., 2005) to modify the existing questionnaire for Australian culture and practice. This instrument was administered to teachers and students. As well as this quantitative measure, focus groups were conducted with experienced and novice teachers in the online domain. The OLES data were analysed using factor analysis, descriptive statistics and correlations while content analysis was used for the focus group data.

Phase 2: For the second phase, the threshold concepts were considered individually by the research team through the lens of novice online teachers, and questions were asked about each threshold concept as to whether it would help novice teachers “know, apply, understand, or accept.” PD curriculum guidelines were then developed using the data collected across earlier project phases from 54 faculty participants. These were categorised into two groups, including guidelines at the: 1) institutional level; and 2) academic staff level.

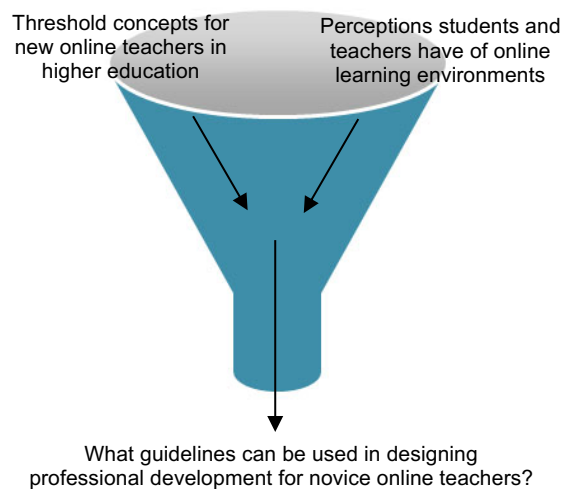


Figure 1. Arriving at PD guidelines using results from data collected earlier in the project

As can be seen from Figure 1, establishing guidelines for a PD curriculum for novice online teachers in higher education was the outcome of considering the threshold concepts developed in the study's first phase, along with student and teacher perceptions of online learning environments arrived at during the second phase of the study. Results were identified from the earlier stages of the study by triangulating data gathered from two validated quantitative questionnaires, teacher reflective journals, focus groups, and an international panel of experts to arrive at recommendations for developers of curriculum materials to upskill novice teachers of online courses in higher education.

Phase 3: Phase 3 is the focus of this article and reports on the initial implementation of derived evidence-based PD program. Although this article reports on the use of these PD guidelines in one higher education institution, outcomes from this final phase of the study were arrived at by collating and building upon data gathered from the earlier phases, including a consultation with a group of experts in the field of threshold concepts during Phase 1.

For the purposes of this article, the earlier stages of the project were used to guide the content and format of an institutional PD program, including relevant resources and activities, that were designed to further develop the capacities of novice higher education online teachers.

Results: Application of the PD Guidelines

The research processes described above have drawn together diverse sets of data from the voices of many stakeholders in online education including students, teachers, experts, administrators, and researchers. These varied views were used to produce a set of pedagogical design guidelines for novice online educators in universities. The construction of these guidelines drew upon the twelve threshold concepts that were identified early in the project (Kilgour et al., 2018). For example, these threshold concepts of online pedagogy were grouped into three clusters, including preparation and course design, online presence, and interaction and relationships. The PD guidelines also reflected these three main areas of online teaching. Some of the threshold concepts about online pedagogy have been noted below, in relation to the most relevant PD guidelines.

The PD guidelines produced from this project are intended to provide advice to PD staff and university administrators about support for novice online teachers in their ongoing professional learning about being a course designer and teacher, both tasks being integral to the work of a university educator involved in virtual education. Specifically, these guidelines provide advice for how to support the development of the capacities of novice online teachers by attending to both wide-scale institutional support mechanisms, such as policies and support services, as well as support at the academic staff level, including assisting novice teachers, to develop their capacity to prepare and design courses, to establish presence in online courses, and to promote interaction and the development of relationships in their courses. When considering the context in which to apply these guidelines, educators, administrators, and researchers are encouraged to note two levels of influence in which these guidelines are presented; they are intended to cross-link at both the institutional *and* academic staff level, as outlined in an earlier publication associated with this project (Northcote, Gosselin, Kilgour, et al., 2017).

To date, the PD guidelines have been applied to one higher education context, at the institutional level to some extent and to the academic staff level. These guidelines, published in full elsewhere (Northcote, Gosselin, Kilgour, et al., 2017), are summarised below alongside a selection of illustrative examples that demonstrate how each of these recommendations has been

applied in practice in one institution. The wide-scale recommendations that have been applied across the institution have been grouped into the following five categories, with some examples of the threshold concepts of online pedagogy identified in an earlier stage of the project (Kilgour et al., 2018).

1) Manage student expectations about engaging in online courses

Example 1: Student expectations are articulated and integrated into course outlines, course expectations and assessment task instructions.

Example 2: Assessment-related policies have been revised to establish student expectations regarding participation in online courses.

Relevant threshold concepts:

- Students can learn without the teacher being present.
- Students need to be encouraged to be more self-regulated in an online course than in an on-campus course.

2) Course equity across on-campus and distance courses

Example 1: Separate on-campus and distance courses have now been combined, enabling fluidity between modes of study.

Example 2: Alternative but equitable learning experiences and materials are offered for distance and on-campus students within the combined courses, with some overlaps.

Relevant threshold concept:

- Online presence is different from on-campus presence.

3) Instructor Support enabling teachers time and resources to practise online skills

Example 1: Online tutorials and on-campus workshops have been offered to faculty staff to learn and practice their online communication skills.

Example 2: Videoconferencing software has been installed across the institution, with supporting manuals being available for teaching staff. This change in the institution's infrastructure facilitates online "face-to-face" interaction between distance and on-campus lecturers and students.

Relevant threshold concept:

- Preparation for designing and planning online teaching may take longer than preparation for on-campus teaching.

4) Set clear expectations for students about receiving communication from teachers

Example 1: Online courses provide information to students at the beginning of the semester regarding expectations of communication reply times.

Example 2: Students are provided modelled guidelines about corresponding with other students and their teachers.

Relevant threshold concepts:

- Students can learn without the teacher being present.
- Students need to be encouraged to be more self-regulated in an online course than in an on-campus course.
- Synchronous communication methods in online learning contexts, while sometimes challenging to facilitate, have many learning benefits.

5) Workload planning and allocation for online teaching staff

Example 1: Workload allocations for academic teaching staff allow for additional time to design and facilitate online courses.

Example 2: Academic teaching staff are encouraged to set time aside for teaching online students, equivalent to time allocated for teaching on-campus students.

Relevant threshold concepts:

- Online course design is critical to the success of online teaching and learning.
- Preparation for designing and planning online teaching may take longer than preparation for on-campus teaching.

Based on the wide-scale recommendations implemented across the institution, current policies were updated and new policies were developed to address assessment, attendance, and technology for online teaching and learning. To support the implementation of wide-scale institutional recommendations, several recommendations regarding support services have been instituted. These support services are particularly useful to provide training to novice online teachers in why, how, and when to teach online. The recommendations regarding support services applied at the institution have been grouped into the following seven categories, with an example that illustrates how each of these recommendations has been applied in practice.

1) Online communication software and tools

Example: Introduction of video-conferencing software across the institution

Relevant threshold concepts:

- Online presence requires interactive elements.
- Online learning requires a new mode of interaction between facilitators, students and resources.
- Online teaching requires facilitating interaction, not only presenting content.
- Synchronous communication methods in online learning, while sometimes challenging to facilitate, have many learning benefits.

2) Online assessment and feedback-provision tools

Example: Introduction of Turnitin software and staff training for how to use assessment feedback provision tools.

Relevant threshold concept:

- 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.

3) Meet needs of online and on-campus students in the same LMS

Example: Combined courses (for distance and on-campus students) have been implemented for all courses.

Relevant threshold concepts:

- Students can learn without the teacher being present.
- Online presence is different from on-campus presence.
- Students need to be encouraged to be more self-regulated in an online course than in an on-campus course.

4) Ensure courses are structured in an engaging manner

Example: Professional development on-campus workshops, online tutorials, and showcases have been provided to instruct faculty staff how to structure an online course.

Relevant threshold concepts:

- Online course design is critical to the success of online teaching and learning.
- Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.
- Online presence requires interactive elements.
- Online teaching requires facilitating interaction, not only presenting content.
- Synchronous communication methods in online learning, while sometimes challenging to facilitate, have many learning benefits.

5) Professional development about clarifying instructions

Example: Support for faculty staff about how to clarify instructions and expectations in online courses has been integrated into many PD materials and activities.

Relevant threshold concept:

- Students can learn without the teacher being present.

6) Develop an online teaching presence that does not dominate

Example: Online course templates have been developed and made available for all teaching staff, with modifications to suit different disciplines.

Relevant threshold concepts:

- Online presence is different from on-campus presence.
- Online presence, while elusive, must be pursued.
- Online presence requires interactive elements.

7) Scaffold, guide and stage learning activities and processes

Example: Provision of PD materials including instructions on how to scaffold, guide and stage learning activities.

Relevant threshold concept:

- Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.

Finally, to further support the implementation of wide-scale institutional recommendations and the recommendations regarding support services, a set of guidelines at the academic staff level were also employed at the institution. These have been grouped into three curriculum-related categories with some examples of how these guidelines have been applied in practice.

1) Preparation and course design

Example 1: Peer-review templates and checklists have been developed to ensure alignment to course learning outcomes.

Example 2: Current policies and PD activities are currently being developed that clarify expectations regarding regular interactive nature of communication between lecturers and their students.

Relevant threshold concepts:

- Online course design is critical to the success of online teaching and learning.
- Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.
- Online teaching requires facilitating interaction, not only presenting content.

2) Online presence

Example 1: Faculty staff are regularly offered PD in the methods associated with monitoring online students' participation.

Example 2: Increasing numbers of faculty staff are engaging in PD activities in which they learn how to engage students in the process of leading online discussions and communication interactions, both synchronously and asynchronously.

Relevant threshold concepts:

- Online presence is different from on-campus presence.
- Online presence, while elusive, must be pursued.
- Online presence requires interactive elements.

3) Interaction and relationships

Example 1: Increased use of formative evaluation mechanisms in online courses has been implemented to ensure that student and teacher expectations can be aligned as much as possible earlier, rather than at the close of, in the semester.

Example 2: A number of research projects are currently underway that are investigating successful forms of communication in online courses.

Relevant threshold concepts:

- Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.
- Online presence requires interactive elements.
- Online learning requires a new mode of interaction between facilitators, students and resources.
- Online teaching requires facilitating interaction, not only presenting content.
- Synchronous communication methods in online learning contexts, while sometimes challenging to facilitate, have many learning benefits.

Furthermore, to enable the application of the recommendations related to support services, the institution has employed a part-time Professional Development Officer whose role incorporates many of the above PD activities and development of PD resources which are incorporated into the institution's self-help resource, *Moodle's Little Helper*.

Discussion

Curricular and programmatic development and implementation challenges highlight the need for targeted, adaptable, and effective services for faculty teaching in online environments. Ambiguity and contradictions surrounding academic PD has been cited as potential shortfalls (Lee & McWilliam, 2008) along with differing conceptions of leading and management in the areas of instruction and learning (Marshall, Orrell, Cameron, Bosanquet, & Thomas, 2011). Academic PD needs to focus on quality, inclusion of offerings, and support to part-time, casual faculty, and sustainability of program efforts to support ongoing excellence in education (Hitch, Mahoney, & Macfarlane, 2018). Despite the need for research-informed professional training program development, decisions associated with PD have not always been informed by evidence.

Consideration of the guidelines and method of application reported in this investigation may serve as an initial framework from which other organizations may approach PD development and refinement, especially in relation to the design and facilitation of online education by faculty staff. The results of this investigation can inform discussions and considerations related to PD training programs and materials for other online educational institutions, but do not replace the obligation to tailor PD to the specific needs and expectations of nascent online instructors within unique educational environments by first determining their specific threshold concepts. In a Delphi study to delineate the best practices for professional development of faculty teaching online, Mohr and Shelton (2017) highlighted the application of professional, organizational, and topic-specific areas as standards for consideration. It was noted, however, that each identified standard was not evidence based and that research is needed to substantiate the efficacy of each application. The results of this investigation provide an example of how research-informed guidelines can be applied as a foundation for developing curricula for PD activities, resources, and programs aimed at novice online teachers in higher education institutions.

While threshold concepts have been applied to assist the design of student learning (Boyd & Lonsbury, 2016; Bunnell & Bernstein, 2012; Carmichael, 2012; Mills & Wilson, 2012), the innovation of the research reported here has been its focus on how to improve the skill set of novice online teachers who, in the context of online delivery, were themselves learners. Recognising that novice teachers and novice learners faced similar hurdles was a conceptual breakthrough that permitted significant progress in identifying the issues facing these novice teachers during professional learning programs, and the processes best adapted to overcoming the threshold conceptual challenges.

At Avondale University College, the home institution of three of this paper's authors, the research was used to customize the PD programs for novice online educators in the institution. Rather than attempting to implement the recommendations of generic research on the topic, the specific needs identified in the research at Avondale became the fulcrum for the College's professional development. Using such targeted research permitted the intervention to address three separate but interlocking issues. First, by isolating needs in a particular context, the PD could more effectively provide appropriate and highly targeted intervention and support at the actual rather than the theoretical point of need. This approach also ensured that that the PD offered was able to encompass both the institution's needs and the individual academics' needs in designing the nature, quality, and timing of the support. Second, by recognizing the various levels of experience in those it was seeking to support, this approach proved both more effective and more efficient in delivering appropriate intervention. In doing so, the research recognizes that its specific interventions are not necessarily applicable models for other institutions; rather, the fact that the

interventions were customized to local needs identified by local research is the key takeaway point. The methodology and methods outlined in this article may be replicated in other universities to establish foundational research-informed evidence for tailored PD programs for online teachers. Future research should aim to identify commonalities for effective implementation and assessment of outcomes for both educators and their students.

Conclusions

The main purpose of this study was to develop guidelines to inform the design of PD curricula to transform the capacities of novice online teachers in higher education. This article outlines an example of how these PD curricula guidelines were applied for one specific higher education institution. The investigation was built around evidence-based data gathered in several phases over two years of a substantial, international investigation of the threshold concepts about online teaching and learning held by novice teachers and students as they engaged with a new and, at times, challenging, mode of learning. From in-depth, qualitative and quantitative data gathered from a number of universities, evidence was gathered to inform and direct recommendations about the threshold concepts experienced by teachers and learners regarding online learning. In this study the context was online pedagogy. Although much has been written about the practice of teaching and learning online, the study adopted a different and insightful theoretical lens (that of threshold concepts), as described in the literature review section.

The research methodology was multidimensional, drawing together multiple perspectives and diverse views relating to online pedagogy. These included both expert and practitioner views of stakeholders including students, instructional designers, administrators, and researchers. This data led to the production of curriculum design guidelines intended for application in PD programs. The guidelines are developmental insofar as they aim to support novice teachers in developing their capacity, not only to teach and assess learning in online courses, but also to design online environments which foster student-to-student engagement and interaction. The guidelines can be flexibly aligned to provide support at the institutional and faculty and individual academic staff level. An important caveat to mention is that the guidelines are not prescriptive, but instead offer a flexible framework enabling the development of timely and relevant professional development to faculty staff teaching online. The application of these guidelines in one institution has been outlined in the Results section of this article to serve as a potential framework for initial implementation of an evidence-based program in other institutions and organizations. To have wide-reaching and lasting impact, the dissemination of evidence-based programs needs to be paired with strategies that build educators' capacity to adopt and implement guidelines within their diverse and dynamic instructional contexts. The processes provided offer much needed guidance about customizing capacity-building strategies that address individual and institutional variations in teaching and learning. However, ongoing evaluation and research is needed to address challenges related to implementation such as sustainability, capacity, and institutional alignment.

A further significant contribution of this research was the finding that teachers new to online pedagogy face similar hurdles to novice learners, for example, feelings of disconnection, lack of visual cues and the challenge of creating a feedback loop that enables relationships to be established. This finding was a conceptual breakthrough that enabled the research team to gain insight into the challenges and threshold concepts experienced by teachers and students alike, and thereby provide a grounded, evidence-based framework for professional development aimed at

improving the online experience for both teachers and learners. These insights further assisted in the application of the PD guidelines in the design and development of the PD program at Avondale.

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