

7-2015

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Recommended Citation

Northcote, M., Gosselin, K. P., Reynaud, D., Kilgour, P. & Anderson, M. (2015). Navigating the learning journeys of online teachers: Threshold concepts and self-efficacy. *Issues in Educational Research*, 25(3), 319-344. Retrieved from <http://www.iier.org.au/iier25/northcote.pdf>

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Navigating learning journeys of online teachers: Threshold concepts and self-efficacy

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Higher education institutions are developing more and more online courses to supplement and augment the courses they offer in on-campus modes. In fact, some universities now offer the majority of their courses through online contexts. However, for academic staff who design and teach these courses, the transition from teaching on-campus courses to teaching in online learning environments is not always speedy or smooth. Academic teaching staff require support, mentoring and professional learning programs to develop their existing capacities and apply them to an online context. This paper reports on Phase 2 of a research project, which takes into consideration the cumulative effect of tailored professional development measures implemented in response to findings in Phase 1. The three aims were: 1) to identify the threshold concepts that teaching staff develop when they learn about online learning and teaching; 2) to compare self-efficacy levels and threshold concepts of staff who are experienced or inexperienced in online learning and teaching; and 3) to develop customised professional learning programs and resources to extend the online teaching and course design skills of academic staff. Findings from the study are outlined by identifying threshold concepts, threshold attitudes and self-efficacy levels of online educators and the implications these findings have for designing professional development programs in higher education contexts.

Introduction

The availability of online courses is growing on a global scale, as is the demand for online education (Allen & Seaman, 2007; Koch & Fusco, 2008; Means, Toyama, Murphy, Bakia & Jones, 2010). The growth of online learning in higher education necessitates supporting frameworks for students and academic staff. While students require guidance and support to access and interact with online materials in their courses, academic staff need ongoing professional learning opportunities to guide them through the processes of developing their competence and confidence in online course design and online teaching, or *e-moderation* (Salmon, 2011). The key understandings that inform the practical application of online teaching competencies can be described as *threshold concepts* (Meyer & Land, 2003, 2005) about online teaching. Threshold concepts are often thought of as “gateway concepts” because once they are understood, learners can go on to learn more difficult and complex concepts. This paper focuses on Phase 2 of an ongoing research study that aimed to identify the threshold concepts held by academic staff about online teaching, to inform the development of an evidence-based, research-informed professional learning

program which was designed specifically for academic staff who were experiencing bumps and breakthroughs in developing their knowledge, skills and self-efficacy as online educators.

Background and literature review

In the past, professional learning programs for academic staff in universities were typically made up of on-campus workshops, instructional resources, or featured showcases of course exemplars. However, recent trends indicate a preference by academic staff for *just-in-time* above *just-in-case* forms of professional development programs (de la Harpe & Mason, 2014; Fusco, Haavind, Remold, & Schank, 2011; Lefoe, Olney & Herrington, 2008; Wichert, 2002). Just-in-time programs are characterised by self-directed activities and resources which are often short, targeted and responsive to the ongoing needs of academic staff, by providing them with greater control over their learning (Brack, Samarawickrema & Benson, 2005).

By incorporating just-in-time components, many institutions purposefully design academic staff learning programs that are characterised by capacity-building intentions (Ruppert, 2001; Symes, 2005). Some of these programs are developed in online spaces (Fitzgerald & Steele, 2008; McConnell, 2006; Reushle & McDonald, 2012) by utilising online technologies (Bell & Morris, 2009), pedagogically-informed design frameworks (Bright, 2007; Doering, Veletsianos, Scharber & Miller, 2009) and online communities of practice (Koch & Fusco, 2008) as well as on-campus seminars (Fusco et al., 2011). The context of these activities has a direct influence on the quality of the outcomes of the professional learning program or activity (Matzen & Edmunds, 2007). For example, academic staff who use online resources or engage in online professional learning communities can develop online teaching knowledge and skills incidentally during their online practice (Salmon, 2013).

As well as taking into account the practical competencies and knowledge needed to be effective online educators, a revised awareness of the self-efficacy of online educators, drawing on Bandura's earlier work (1993, 1997), has been recognised by a number of scholars researching online teaching (Abbitt, 2011; Albion, 2001; Gosselin, 2009; Shepherd, Alpert & Koeller, 2007). For example, Robertson and Abdulrahman (2012) found that university teachers' perceptions of self-efficacy improved as their experience with technology increased.

Bandura (1997) defined self-efficacy as one's beliefs in his or her ability to organise and execute the courses of action required to manage prospective situations. Bandura contended that self-efficacy beliefs are formed through four primary sources: enactive mastery experiences; vicarious experiences; verbal persuasion; and physiological or affective state. Enactive mastery refers to experiences that an individual has had in the same or similar circumstance as the one of interest. Enactive mastery experiences are the most powerful source of self-efficacy beliefs (Bandura, 1997, p. 80). According to the theory, successes build a strong belief in one's personal efficacy while failures undermine it, especially if failures occur before a sense of efficacy is firmly rooted. Vicarious

experiences refer to the social comparisons made between an individual and an observed role model. Within the framework of this investigation, receiving instruction from a colleague on how to design an online course would provide a vicarious experience from which to judge one's own confidence to perform a similar task. Comments from an observer, or verbal persuasion, can also affect self-efficacy beliefs. Verbal persuasion has its greatest impact when the persuader is viewed as competent to provide feedback in the area of interest. For instance, a workshop facilitated by an educator with many years of experience in online instruction would provide an effective gauge of self-efficacy through their evaluation of workshop participants.

Self-efficacy is not necessarily uniform across different subjects or domains of instructional functioning and these beliefs are conceptualised to differ in generality (Bandura, 1997). Specific delineation of conceptualised domains of functioning in addition to differentiation of activities within one domain to another can elicit discriminate self-efficacy beliefs. For example, educators who judge themselves highly efficacious in face-to-face courses may be much less self-assured of their efficacy in teaching online or blended courses and vice versa. Bandura cautions against assessing self-efficacy by using measures that do not consider domain specific dimensions and tasks. Specifically, self-efficacy instruments that are too general in nature sacrifice predictive power.

In recent years, models of blended learning that integrate aspects of both distance, face-to-face, and other modalities of educational delivery have been presented (Garrison & Kanuka, 2004; Garrison & Vaughan, 2013; Glogowska, Young, Lockyer & Moule, 2011; Niemiec & Otte, 2010). Our goal for this investigation was to explore teaching self-efficacy beliefs specific to online instruction. Accordingly, the *Online Teaching Self-Efficacy Inventory* (OTSEI) (Gosselin, 2009) was selected and administered to delineate the self-efficacy beliefs related to task-specific aspects of online instruction. The OTSEI has undergone psychometric evaluation and delineates five individual, coherent, and reliable factors for each of the inventory scales. Cronbach's alpha for the five scales ranged from .84 to .95, reflecting excellent internal consistency for each of the scales.

It is important to understand the nuances of online teaching self-efficacy beliefs in order to develop systems and resources to best meet faculty development needs. Accordingly, the analysis of threshold concepts held by online teachers can provide insight into their self-perceptions and confidence levels about how well they understand online education, in addition to their observations of their own practical skills. Since the self-efficacy of online educators can be adversely influenced by barriers such as a perceived lack of knowledge and deficits in practical and technical skills that can lead to anxiety about online teaching (Shepherd et al., 2007), the approach outlined in this paper recognises the important roles of technical, conceptual, attitudinal and identity-related issues that are crucial to the online educator's ongoing journey towards confidence and competence.

Higher education professional learning programs that focus on developing the online teaching abilities of academic staff have become increasingly multi-faceted – incorporating a greater variety of strategies, modes, resource types and human resources (Field, 2011; Fusco et al., 2011; Guskey & Yoon, 2009; Harasim, 2000; Northcote & Huon, 2009;

Rienties, Brouwer & Lygo-Baker, 2013). Many professional development activities associated with online learning incorporate principles of online communities of practice within online contexts (Koch & Fusco, 2008). Taking these trends into account, academic staff leaders at Avondale College of Higher Education adopted a multi-pronged approach to professional development, which aimed to support academic staff develop their capacities to design and teach online courses.

Theoretical positioning of the research

The theoretical framework on which this research is based draws firstly on Bandura's (1986, 1997) principles of *Social Cognitive Theory* which suggests that individuals learn through contextually-appropriate social experiences. Principles associated with cognitive dissonance (Festinger, 1956) supplement the principles of social cognitive theory by representing the tussles that some university teachers experience as they grapple with the transition from being a face-to-face to an online teacher. In light of Bandura's (1997) acknowledgement that individuals are their own agents of change, this study recognises how university teachers can develop their self-efficacy by observing others and engaging in varied professional learning opportunities. The movement from one state of significant learning to another has been further explored by Meyer and Land in the study of threshold concepts (2003, 2005). The theoretical basis of threshold concepts has been used to supplement our knowledge of how self-efficacy is developed alongside developments in understanding, skill levels and attitudes about online teaching. The importance of attitudes is highlighted by Kregor, Breslin and Fountain (2012): "A common element in these models is the pivotal role of beliefs of individuals. In general terms, an individual's behaviour is guided by their beliefs" (p. 1382).

Together these principles, set within a professional development context and drawn from theories of social cognition, cognitive dissonance and threshold concepts, provide the theoretical underpinning of this study which has influenced how the research aims and methodology were developed and how the findings have been reported. Furthermore, the theoretical framework of the study informed how the researchers evaluated the self-efficacy of academic staff about their online teaching abilities by recognising their "bumpy moments" (Northcote, Reynaud, Beamish, Martin & Gosselin, 2011; Romano, 2006) as they developed their self-efficacy, threshold concepts and attitudes about online teaching.

The research

The two phases of the research that have been conducted since 2010 (including Phase 2 which is reported in this paper) focused on the current needs, knowledge and skills of a group of academic staff as they developed online teaching skills. Their perceived growth in abilities and confidence levels ("breakthroughs") about online teaching were analysed, along with the problematic situations ("bumps") they encountered when designing and facilitating online courses in a higher education institution. The study utilised a mixed methods multiphase design (Creswell & Plano Clark, 2011) which ensured each phase was connected and that the combined qualitative and quantitative data were corroborated as

they were gathered, analysed, and interpreted. The research aimed to address the following research questions:

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

Through an international cross-institutional partnership between a researcher at the Texas University A&M Health Science Center and a group of researchers at Avondale College of Higher Education, the data gathering in Phase 1 of the research took place in 2010 and Phase 2 took place in 2012. Between Phase 1 and Phase 2, a number of staff and policy changes took place at Avondale. Policies were established which ensured all courses, including courses delivered in blended and face-to-face modes, incorporated online materials and activities. Approximately 30% more courses and degrees were offered online during Phase 2, compared to those offered online in Phase 1, and blended learning courses also increased as on-campus courses incorporated more online components during Phase 2. Additional support staff were also employed between Phase 1 and Phase 2 such as professional development officers and administrative staff who were responsible for setting up new versions of online sites within the institution's LMS. The nature of professional development activities offered to academic staff also changed; a greater variety of online and on-campus workshops, online and on-campus showcases and *just-in-time* support were offered to academic staff.

While each phase of the study, as outlined in Figure 1, was developed with similar questions and aims, it was the outcomes of each phase that informed the following phase, ensuring that each subsequent phase responded to the findings from the previous phase. In this way, the currency of staff needs were incorporated throughout the study's design and reflected within each new professional development program. Overall, the study's findings have been used to inform the design and provision of continuing professional learning programs for academic staff at Avondale in the areas of online course design and online teaching. An overview of the study design is provided in Figure 1.

Because the final aim of the study was to develop research-informed professional development strategies that were contextually relevant to the academic staff involved in the study, the research was situated within one higher education institution. For this reason, the authors do not claim that the findings of the study may be automatically generalised to wider populations of academic teaching staff. However, professional development staff and university administrators in other institutions are invited to consider the relevance of this study's findings, based on any parallel aims or conditions that exist between the institution described in this paper and their own institutions. The international collaboration that instigated the project, including selection and development of appropriate data gathering instruments, may also be of interest to other educators who

are involved in the provision of professional development for online teachers in the higher education sector.

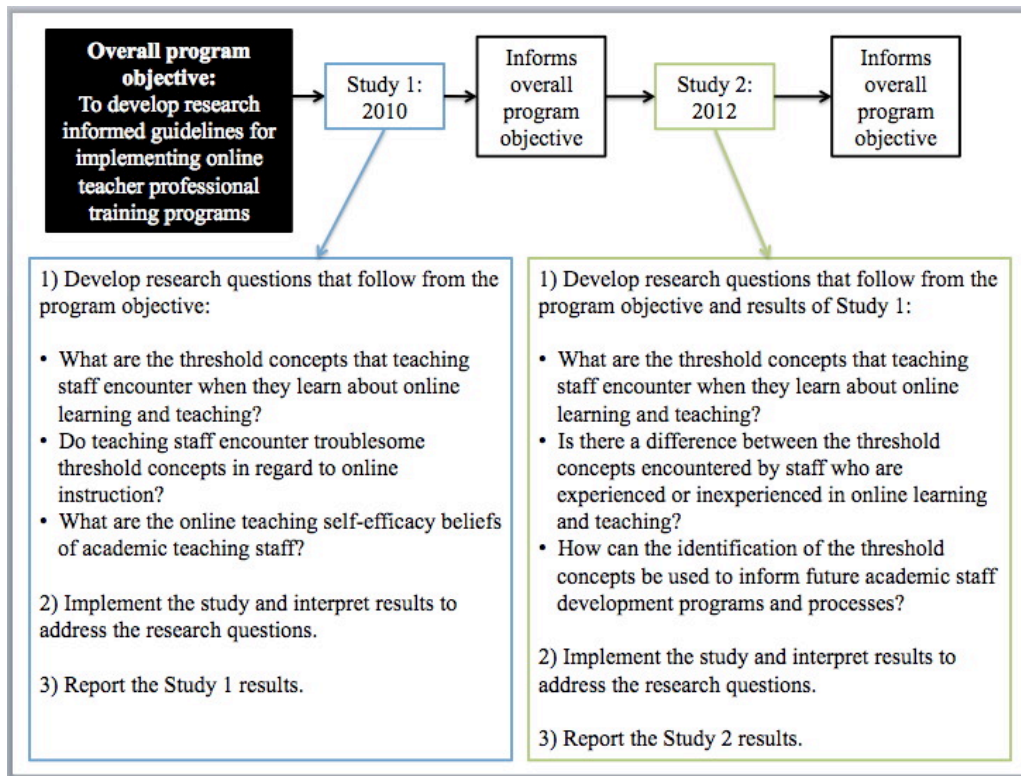


Figure 1: Flowchart for the mixed methods multiphase design (Creswell & Plano Clark, 2011). For detailed findings of Study 1, see Northcote et al. (2011)

The early and most recent phases of the research are now outlined.

Phase 1 of the research

Phase 1 of the research (Northcote et al., 2011) identified the ‘bumpy’ threshold concepts that most unsettled tertiary lecturers as most of them moved for the first time to an online teaching environment. Initial surveying showed lecturers were concerned about their capacity to handle technology in an educational context, but were confident about effectively transferring face-to-face teaching materials to online modes. Towards the end of Phase 1, academic staff had a relatively high level of self-efficacy in creating effective online learning environments, which was attributed to the effectiveness of the professional development strategies and personal experience gained during the research project. As such, the study not only highlighted areas of concern with online teaching, but also demonstrated that training, support and personal experience can facilitate breakthroughs by improving the competence and confidence of online teachers. Phase 1

of the research revealed that academic staff required a professional learning approach which acknowledged their need to develop skills and knowledge, as well as their identity struggle to come to terms with *being* an online educator and *being confident about* their new online roles as course designers and teachers. The findings and outcomes of Phase 1 (outlined in more detail in Northcote et al., 2011) informed the design of professional development initiatives at Avondale.

Phase 2 of the research

The recommendations of Phase 1 of the study were to put pedagogy above technology, to cater for diverse levels of development, to allow teachers to lead, and to recognise the emotional issues involved in the process of change. These were implemented through nine strategies in a professional learning program (reported in Northcote et al., 2011). The purpose of Phase 2 of the study was to explore what new expertise and confidence had been developed, and what new bumps and breakthroughs emerged as the online teachers advanced their self-efficacy levels and developed threshold concepts associated with their online teaching and course design abilities.

The data gathering was extended across three faculties for Phase 2 of the research, encompassing the Faculty of Nursing and Health, as well as the two faculties involved in the first research phase: the Faculty of Arts and Theology, and the Faculty of Education and Science. The extension of the study also enabled comparison between the experience of a new pool of lecturers at the start of their online experience with those of the beginners in Phase 1 of the research. Data were gathered during Phase 2 of the research project during the 2012 [Australian] academic year and analysed during 2012-2013.

As in the first phase of the study, Phase 2 involved the collection of data through two main sources: reflective journals and questionnaires. Reflective journals were kept by the researchers, and the *Online Teaching Self-Efficacy Inventory* (OTSEI) (Gosselin, 2009) used in the first study was administered. The journals, completed monthly, captured the researchers' experiences and their observations of colleagues at various stages of experience in their online delivery of courses. The reflective journal data were collected during Semester 1, 2012 and the questionnaires were administered in Semester 2, 2012. Demographic data, presented in Table 1, were collected through administration of the OTSEI to provide an overview of academic staff participating in this phase of the research (N = 54). Additional employment data, presented in Table 2, were collected to examine faculty's teaching experiences in both face-to-face and online contexts.

Descriptive statistics were calculated on the data gathered from the five OTSEI scales for all study participants, to evaluate current online teaching self-efficacy beliefs. Each of the OTSEI scales encompasses a unique dimension of online instruction and employs a 0-10 response rating for each scale item with 0 indicating "no confidence" and 10 indicating "complete confidence" in one's ability to carry out the task. Repeated measures comparisons on the OTSEI scales were conducted to evaluate the effects of the professional

development programs on participants' self-efficacy scores from the initial phase of the investigation. All tests of significance were one-tailed at an alpha level of .05.

Table 1: Summary of gender, ethnicity, and employment data (N = 54)

Variable		Frequency	Percent
Gender	Female	34	63.0%
	Male	20	37.0%
Ethnicity	Australian	42	77.8%
	European	9	16.7%
	Other	2	3.7%
	Asian	1	1.9%
	Pacific Islander	0	0
	Aboriginal or Torres Strait Islander	0	0
Employment status	Full time	41	75.9%
	Part time	10	17.5%
	Sessional or casual	2	3.7%
	Ongoing	1	1.9%
	Contracted	0	0
	Other	0	0
Institution type	Private tertiary college	51	94.4%
	Public university	2	3.7%
	Public tertiary college	1	1.9%
	Private university	0	0
	Other	0	0

Table 2: Summary of participants' teaching, design, and transfer information (N = 54)

	M	SD
Years teaching in higher education	11.97	9.36
Years teaching in current position	7.57	6.92
Semesters teaching online	3.00	3.49
Online units taught	2.25	2.51
Online units designed	2.04	2.54
Units adapted from face-to-face to online formats	1.78	1.99

All researchers in the project recorded responses to a number of prompt questions, set within a reflective journal on a monthly basis. These prompt questions included:

- From my point of view, what are the major concerns or areas of “troublesome knowledge” that staff talk to me about or that I observe?
- What typical questions do staff ask me or others about online learning?

- Do staff ask about or comment on the following concepts?
 - the distinctive nature of the online learning environment
 - student attention
 - the nature of online communication
 - relationships
 - identity
 - high quality learning
 - humanisation
 - sense of place
 - technological concerns

Due to the nature of the prompts and questions used as the basis of the reflective journal template, the data collated from these journals were largely focused on the problematic issues and troublesome knowledge (Meyer & Land, 2003, 2005; Perkins, 2006) that teaching staff encountered as they designed and taught online courses. Just over 2000 words were collated from reflective journals kept during Phase 1 and almost 4000 words were collated from the Phase 2 journals. Researchers who kept these journals typically wrote between 100-500 words in each of their monthly journal entries. The raw data from the reflective journals were collated and analysed using aspects of grounded theory methodology (Strauss, 1987; Strauss & Corbin, 1998), and then constantly compared to determine categories of focus. The emerging trends that were revealed as a result of this process were compared with current social cognitive theory literature on the links between self-efficacy levels and professional development of online teachers, and the recently developed principles of threshold concepts.

Analyses of the questionnaire and journal data enabled the researchers to determine the threshold concepts and attitudes that teaching staff encountered and developed as they learned about online learning and teaching. While the findings from analyses of the reflective journals provided evidence of concerns held by the online teachers, outcomes of the questionnaire analyses indicated areas of confidence. Subsequently, the combined findings were used to inform the design and provision of an ongoing online teaching development program for academic staff.

Findings

The findings of this study provided insight into the journeys that educators face when working in online environments. The data from the reflective journals were firstly analysed, followed by an analysis of the participants responses to the OTSEI. Finally, the data analyses were combined to answer the research questions which aimed to identify the threshold concepts held by teaching staff, to determine any differences between self-efficacy and threshold concepts and, as a result, to inform the formation of academic staff development programs.

Findings from an analysis of the reflective journal data

Comments recorded in the researcher's reflective journals indicated academic staff had experience which ranged across conceptual, skill-based and attitudinal issues. Staff were more aware of the institutional infrastructure issues that impact the efficiencies and effectiveness of online education, as compared to their awareness evident in Phase 1 of this research, reflecting significant 'breakthroughs' in staff capacity. Enrolment systems, technical support, professional development needs, workload and time issues, and role clarification among administrative and academic staff were all identified as "institutional infrastructure issues" throughout Phase 2 of the research project, reflecting the nature of the 'bumps' in this stage of the research. Many breakthrough moments and bumpy moments were recorded throughout the journals from the more positive stances ...

There is no question in my mind that online education is the way to go.

There is a willingness of staff to genuinely engage with a different pedagogy for online learning, especially in regard to creating an engaging interpersonal environment for students, and in providing timely feedback to student interactions, questions and assignment submissions.

Students seem to be engaging well. It is also much easier to identify who is not engaging!

I find it creates a really good learning environment to be able to give face-to-face lectures one period a week and an online lecture another. It allows me to provide links to readings, imbed *YouTube*/video clips I want them to watch, provide graphics etc in a reply detailed interactive lecture which provides a different learning experience than the one they have with me face to face.

I think my units have never been as rigorous as now. Online helps me create & monitor student learning much more than before. I can now see who has been doing weekly readings etc.

... through to bumpy moments:

What concerns me is that the online service tends to provide a very mechanically-techno environment. It's so easy to respond to this challenge by simply improving technological expertise (I believe this is vitally important and necessary). However, my personal one-on-one online dialogue with students opened my eyes to a different world, a place where academic pursuits confront the challenge emerging from student's personal struggles with life.

Staff are still very focused on lecturing online and have not engaged fully in the idea of designing learning activities as the central focus of their *Moodle* sites.

The presentation of factual knowledge is not a major problem, engaging in dialogue at depth from an online perspective can be difficult although appropriate use of forums, etc, help alleviate this concern.

Analyses of data identified concerns by staff about course design issues, including the design of effective activities and interaction in online courses, online assessment, online communication, course materials, the distinctive nature of online education, and student-teacher relationships in online contexts. The attitudes held by academic staff about online teaching and learning was also a salient theme that emerged from analysis of the reflective journal data. While some staff had a strong desire to learn more about online education, there were others who clearly lacked the motivation to become involved or were resistant, fearful or apprehensive about teaching online. Some staff were anxious about being expected to perform well in the new online teaching context.

These themes that emerged from an analysis of the data gathered from the reflective journals ranged across conceptual and attitudinal issues; as well as revealing the threshold *concepts* held by academic teaching staff, threshold *attitudes* were also evident. Some of the threshold concepts (TC) and threshold attitudes (TA) identified during Phase 2 include:

- TC: Technology is used for pedagogical purposes.
- TC: Personalised learning can be achieved in an online context.
- TC: Teaching is more than telling, learning is more than absorbing.
- TC: The online environment is not necessarily messy and difficult.
- TC: Online learning requires interaction, not just piles of materials.
- TC: Understanding of institutional support and technology available.
- TA: Concern for online teaching becomes confidence about online teaching.
- TA: Fear and suspicion of online teaching becomes interest in (and sometimes enthusiasm for) online teaching.
- TA: Frustration with technology becomes appreciation for technology.

Data analysis of Phase 1 and Phase 2 data indicated that threshold concepts tended to be evident in the academic staff comments and questions about online learning before their self-efficacy levels increased. To respond to the professional needs reflected by the concerns and questions expressed by academic staff, these issues were addressed within the design of the professional development activities (in 2011 in Phase 1 and in 2013 in Phase 2). After the professional development activities were made available, the self-efficacy of staff increased. For example, data gathered in Phase 1 suggested that academic staff were very concerned about losing opportunities in online learning spaces to develop professional relationships with their students. In response to this concern, workshops and course exemplars were developed to help staff personalise their online courses and to facilitate online interaction.

As well as identifying a number of threshold concepts and attitudes held by the academic staff at Avondale, analysis of the reflective journal data gathered in Phase 2 of the project revealed that academic staff at the institution represented three “generations” of experience:

First-generational experience

Academic staff with little-to-no in-service training appear to be wary of online learning. They are doubtful about its capacity to equal the perceived quality of face-to-face learning and question the capacity of online learning to deliver learning outcomes based on skills and/or personal growth. Their issues are primarily fear of the unknown, a lack of confidence in e-learning, and a lack of awareness of pedagogy and skills. Staff at this stage of development can be likened to Rogers' (2003) adoptive categories of either "late majority", those who adopt technology after most staff, or "laggards", those who resist change.

Second-generational experience

Academic staff who have training and some experience in online learning and teaching have shifted from asking largely philosophical questions to asking technical questions. They have an increased level of confidence in their capacity to deliver pedagogically-sound learning experiences and are now addressing issues around their capacity to handle the technology to manage their time as online educators. Staff at this stage of development can be likened to Rogers' (2003) adoptive categories of either "early majority", those who adopt technology after the "innovators" or "early adopters", or "early adopters", those who are positive about technology and make choices about technology based on need.

Third-generational experience

With more experience in online learning, academic staff increasingly ask questions about creative delivery and learn through experimentation. They evaluate the effectiveness of what they have already done and make decisions about the processes that are or are not effective. They are likely to use and experiment with technical training and support at a higher level. The issues they report revolve around the capacity or limitations of institutional factors: mostly IT support and the 'system's' capacity to deliver what they have created and planned in their courses. Staff at this stage of development can be likened to the Rogers' (2003) adoptive categories of either "early adopters", those who adopt technology first, or "innovators", those who are willing to take risks even though they may fail.

Subsequently, a thematic structure was developed (see Figure 2) to represent the two sets of outcomes that emerged from an analysis of the reflective journal data: 1) identification of threshold concepts and attitudes; and 2) evidence of three generations of online teachers. As illustrated in Figure 2, while staff with first, second and third-generational experience expressed concern about a range of issues associated with blended and online learning, staff with third-generational experience tended to be more focused on student issues, whereas staff with less experience were more focused on institutional infrastructure issues such as the provision of IT services.

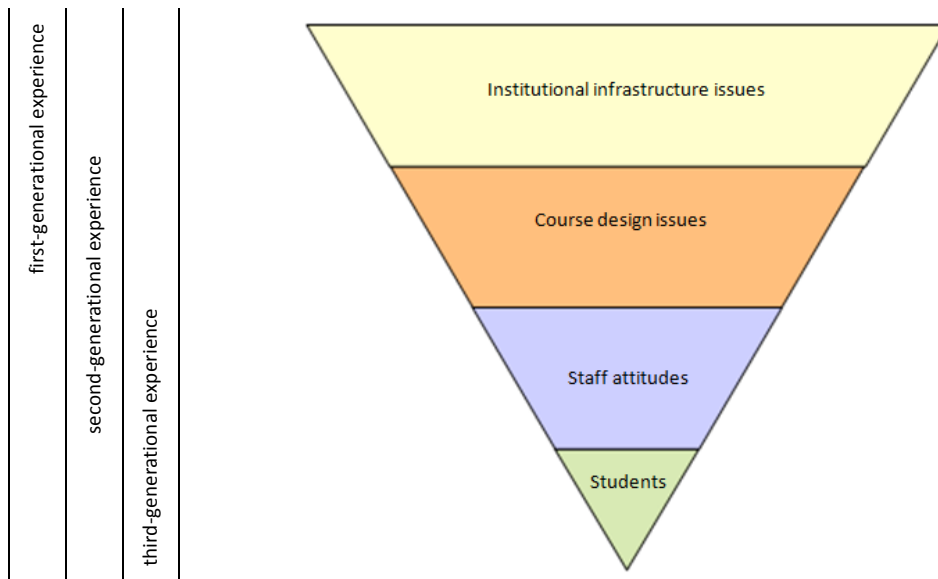


Figure 2: Thematic structure that emerged from coding reflective journals

Findings from an analysis of the questionnaire data

Data gathered from the participants' responses to the items on the OTSEI instrument were analysed to determine perceptions of their abilities to design and teach online courses. Each of the OTSEI scales encompasses specific facets of online instruction:

1. The *Selection of Technological Resources Scale* examines online teachers' self-efficacy in their ability to select, utilise and determine the appropriateness of technology to enhance student learning and enrich instruction.
2. The *Virtual Interaction Scale* assesses the self-efficacy beliefs of faculty to effectively facilitate teacher-student interaction, meaningful student cooperation and the ability to establish a positive social climate that engages students through fostering motivation, intellectual commitment and personal development.
3. The *Unit Content Migration Scale* measures self-efficacy beliefs in the ability to effectively transfer their developed instructional materials from face-to-face to online units.
4. The *Online Course Alignment Scale* considers faculty's self-efficacy beliefs in their ability to effectively align learning objectives, course assignments, assessment strategies, and learning activities within online courses.
5. The *Web Based Unit Structure Scale* determines self-efficacy beliefs that comprise the ability to construct and design online units that include clear organisational structure, facilitates straightforward navigation and communication guidelines, and is consistent with the institution's mission.

As with any psychometric instrument, the interpretation of data must be considered within the context of the population and environment in which it was administered. Specifically, the ongoing refinement of scale items that map to current theoretical, conceptual, and contextual dimensions and subsequent validation must be considered. The nature of distance learning is dynamic with rapid developments in technology, delivery modalities (that is, platforms such as *Moodle* or *Blackboard*; blended approaches, etc.), and continued delineation of research-informed pedagogical best-practices situated in the context of distance education. Accordingly, questions on the *Selection of Technological Resources* scale from the OTSEI were evaluated within the scope of the current investigation. While scale items may appear to be commonplace with advances in technology usage, Bandura recommends that a range of difficulty for questions be included on any self-efficacy assessment to better account for variation in self-confidence (Bandura, 1997). Because self-efficacy is situated within the context of social cognitive theory that takes into account the interaction of individual perspectives, behaviours, and the environment, the OTSEI questions provided a means to evaluate self-held beliefs and practices while also taking into account the institutional culture in which academic staff were teaching.

To examine the impact of professional training programs on online teaching self-efficacy over the initial two phases, comparisons were made using repeated measures t-tests on the OTSEI scales from participants involved in both phases of the research ($N = 17$). The *a priori* alpha level was set to 0.10 (one-tailed). With the Bonferroni correction applied ($0.10/5$), the adjusted alpha for the comparisons across the five individual OTSEI scales was .02. The initial repeated measures t-test indicated that there was a significant difference in mean scores for the *Virtual Interaction* scale at pre-test ($M = 4.78$, $SD = 1.87$) than at post-test ($M = 6.33$, $SD = 1.79$), $t(16) = 2.53$, $p = .02$, $d = 0.61$. Although increases in mean scores were seen across the remaining OTSEI scales, statistical differences in mean scores were not found. Taken collectively, the average scores from Phase 2 ($M = 5.84$, $SD = 1.51$) were higher than in Phase 1 ($M = 4.89$, $SD = 1.64$) on the combined OTSEI scales. The results of the repeated measures t-test indicated a significant difference, $t(16) = 1.86$, $p = .08$, $d = 0.45$. Table 3 summarises the comparisons across each of the OTSEI scales from Phase 1 to Phase 2 of the investigation.

Table 3: Comparisons on the OTSEI Scales for participants ($n = 17$)

Scale	Phase 1: 2010 M (SD)	Phase 2: 2012 M (SD)	t	p	d
Selection of technological resources	3.77 (1.77)	4.46 (1.88)	1.42	.18	0.34
Virtual interaction	4.78 (1.87)	6.33 (1.79)	2.53	.02	0.61
Unit content migration	4.94 (1.88)	5.77 (1.49)	1.49	.16	0.36
Online course alignment	5.68 (2.24)	6.55 (1.82)	1.29	.21	0.31
Web based unit structure	5.27 (1.72)	6.07 (1.91)	1.31	.21	0.32
Total	4.89 (1.64)	5.84 (1.51)	1.86	.08	0.45

Descriptive data from the OTSEI were examined over each phase and were contrasted with the qualitative findings. Table 4 provides the means and standard deviations across

each phase of the research on the five OTSEI scales for all study participants (N = 21 and N = 54, respectively). Taken collectively, mean scores on the OTSEI were similar across phases. As with Phase 1, data from Phase 2 revealed that the selection of technological resources was an area in which faculty felt least efficacious, while highest self-efficacy ratings were reported for online course alignment. As noted previously, data from Phase 2 were inclusive of additional faculty groups and provided additional insight from a broader institutional perspective surrounding the collective self-efficacy beliefs of online instructors.

Table 4: Means and standard deviations for the OTSEI scales across research phases

Scale	Phase 1: 2010(a) M (SD)	Phase 2: 2012(b) M (SD)
Selection of technological resources	4.13 (2.74)	4.00 (2.13)
Virtual interaction	5.30 (2.44)	5.44 (2.16)
Unit content migration	5.29 (2.51)	5.28 (1.95)
Online course alignment	6.03 (2.53)	5.92 (2.26)
Web based unit structure	5.56 (2.77)	5.33 (2.09)
Total	5.36 (2.65)	5.26 (2.69)
a. N = 21; b. N = 54		

Combined findings from data analyses

Bryman (2007) stated that mixed methods research should be analysed, interpreted and reported "in such a way that the quantitative and qualitative components are mutually illuminating" (p. 8). As such, we have attempted to mutually illuminate the results that have been presented. Both the qualitative and quantitative findings of the study were used to develop a professional development program that was based on an acknowledgement of the perceived levels of expertise in threshold concepts and confidence in self-efficacy that academic staff had developed in online teaching, as well as taking into consideration their concerns about online teaching, building on the implementation of the four recommendations from the Phase 1 study. The findings of this study and the way they have been used to develop a tailored professional learning program within the institution may also be relevant to other higher education institutions grappling with the challenges associated with equipping academic staff to teach online which has been identified as a global issue (Archambault, 2008; Baran, Correia & Thompson, 2011; Bennett & Lockyer, 2004; De Gagne & Walters, 2009; Ward & Kushner Benson, 2010).

The impact of institutional infrastructure issues was a major 'bump' that emerged from this study, with academic staff being concerned about student enrolment, technological issues, and faculty and student support. A noteworthy finding from the empirical aspect of the study was that academic staff rated themselves as ineffective in managing technological issues, based on the *Selection of Technological Resources Scale*. The qualitative findings provide expansion of our understanding of what this means for academic staff across the three generations of experience. Academic staff with first generational

experience had little to no in-service in online learning and therefore could not be expected to understand the technical issues involved. They could be likened to Rogers' (2003) adoptive categories of either "late majority", those who adopt technology after most staff, or "laggards". Those with second and third generation experience were confident with the pedagogy of online learning but faced technical issues that were seen as being largely beyond their control. They could be likened to Rogers' adoptive categories of "early majority", "innovators" or "early adopters". However, the professional development activities and resources developed as a result of this research have resulted in the development of communities of practice (Koch & Fusco, 2008; Wenger, 1998) among teaching staff, some of whom have also taken on mentoring roles (Israel, Kamman, McCray, & Sindelar, 2014) while guiding new or less confident staff in their development of online teaching abilities.

The changes that took place in the academic staff's increase in self-efficacy and confidence to teach online across the three phases of the project reflect some of the categories in Rogers' (2003) *Diffusion of innovations* concept whereby staff are characterised by their responses to innovation including, for example, "laggards", "innovators" and "early adopters". Encouragement of their abilities through workshops (verbal persuasion), having the experience of teaching a few semesters of online courses (mastery experiences), and instruction from mentors and colleagues (vicarious learning) appear to have resulted in increased confidence. Given that self-efficacy of online educators is often reduced by their lack of practical and technical skills in online learning (Shepherd et al., 2007), the challenge for Avondale is to cater for these needs through ongoing professional development and further upgrades to the institution's technological infrastructure in order to facilitate further 'breakthroughs' for staff.

The findings showed that academic staff were fairly confident with online course alignment, virtual interaction, web based unit structure and unit content migration respectively. In particular, staff felt most confident with online course alignment, or the ability to align learning objectives, course assignments, assessment strategies and learning activities within an online course. In contrast they were concerned about other course design issues that related to establishing relationships with students. Some were resistant to adopting new teaching approaches and were suspicious about the quality of online learning. A plausible explanation might be that first generational lecturers are yet to fully appreciate the nature of online courses and the delivery options available to them.

Comparison of Phase 1 and Phase 2 findings

When considering the findings from Phase 1 (2010-2011) and Phase 2 (2012-2013) of the study, the main difference noted was the wider awareness of institutional infrastructure issues shown by the participants during Phase 2, as reflected in their threshold concepts *and* threshold attitudes about online teaching. Participants were aware of a wide diversity of curriculum design issues in the online teaching and learning context. In Phase 1, participants reported on issues that were more teacher-focused, such as the way they thought about themselves as teachers, the link between on-campus and online learning, and how to establish their expectations of students. However, the Phase 2 findings

revealed the participants' understandings and attitudes were more focused on student-centred issues such as learning activities, students' use of multimedia, and communication in online courses. This shows how Phase 2 of the study has converted what constituted 'bumps' into 'breakthroughs' for some staff, which reflects the institution's ability to facilitate change in attitudes to online teaching and learning by adopting an ongoing professional development program comprised of multi-faceted learning activities.

From Phase 1 we learned that, where training and support were provided, most academic staff were willing to venture into the world of online learning and, relatively quickly, were able to demystify the space and develop assurance and skills in handling the online teaching context. The skills and capacities already held by these staff were applied to the new online environment, with some adjustment. The findings from Phase 2 provided specific information about what type of professional training and support was needed to enable academic staff to design online courses and teach in online contexts.

Findings from Phase 1 of the research clearly identified threshold *concepts* that academic staff held about online learning. For example, the view academic staff had of themselves as on-campus teachers, compared to the way they thought of themselves as online teachers, was noted as a point of threshold understanding about how online teaching *could* occur. There was also some evidence of threshold *attitudes* held by the academic staff who participated in Phase 1 of the research study. Their attitude about themselves as online teachers and course designers changed as their confidence levels increased: "the attitudes of the online teachers had undergone a significant shift from concern to confidence in their ability to deliver effective pedagogy online" (Northcote et al., 2011, p. 84). Similarly, it was evident from the data gathered during Phase 2 that staff held threshold *concepts* and threshold *attitudes* about online teaching.

While the findings of our Phase 1 research revealed that academic staff had an awareness of a wide range of issues related to online education, they were primarily issues that were focused on themselves as online teachers and course designers, with some awareness of wider institutional and strategic issues. However, the findings of Phase 2 of the research indicated that staff were more aware of online education issues that affected the institution as a whole, such as professional development and online systems. Furthermore, in Phase 2 of the research, the threshold *concepts* and *attitudes* that were held by staff reflected their understanding and awareness of the interactive nature of online teaching. They had moved on from viewing the online learning context as a space to store a set of learning materials, to seeing online learning as a series of interactions in which learning and teaching could take place.

All in all, as the research progressed through two phases to date, the increase in the academic staff's self-efficacy about their online teaching skills has been associated with personal issues, such as attitudes to online teaching and identity as online teachers, behavioural issues such as observable technical skills, and environmental issues such as institutional policies and support structures. These findings suggest that threshold *concepts* and self-efficacy were variables that changed over time as the institution adopted online teaching and learning as part of its education strategy.

Recommendations for practice

The findings from Phase 2 of this research are currently being used to develop a customised professional learning program and associated resources to reduce the 'bumps' and extend the 'breakthroughs' in the online course design and teaching experiences of academic staff at Avondale. To align with the findings from this stage of the project, opportunities for development of lecturers' knowledge about pedagogy, content and technology, as suggested by Mishra and Koehler (2006) in their TPACK (technological, pedagogical and content knowledge) framework, have been incorporated into the institution's professional learning activities and resources. Many other educators and researchers have utilised the TPACK model in online education based on its capacity to integrate the use of technology into teaching and learning (Alsofyani & Aris, 2011; Rocha, Mota & Pereira Coutinho, 2011; Ward & Kushner Benson, 2010). A consideration of the participants' current attitudes and beliefs were also taken into account, as attitudes to and changes in attitudes to technology have been associated with intentions to integrate technology into teaching (Banas & York, 2014).

Phase 1 of the research indicated a common problem across the institution: academic staff felt disempowered through a lack of knowledge and skills about online teaching, and either wanted to be released from the obligation of online teaching, or rescued by experts. In Phase 2, among other outcomes, academic staff increasingly felt empowered in themselves, but the perceived incapacity lay in the technical ability of the system to support what they wanted to do. Consequently, a range of professional development strategies were required that catered for the different needs of the three generations of staff identified during the study, alongside an institutional focus on the scholarship of learning and teaching in blended, online and face-to-face contexts. Research into issues associated with online and blended learning (such as assessment and course design) has also been initiated at the College to provide a platform for socially constructing knowledge and values around the scholarship of teaching.

The following recommendations for practice in course design, online teaching and professional development emerged from this study and are currently being implemented:

- *Online presence for each course*
An expectation has been established that every course will have a strong online presence beyond merely posting course outlines, basic resources links. It is expected that online activities become core to the learning experiences of students.
- *Blended learning research*
Research groups have formed across all Faculties within the College to investigate issues associated with online and blended learning of staff and students. Two of these projects are funded by the Office of Learning and Teaching (OLT) in 2014-2015.
- *Single course sites*
A single online site now exists for each course which integrates the experiences of both on-campus and distance education students.

- *Benchmarks*
Clearly communicated minimal benchmarks for online course sites encompass some aspects of standardised templates to create a consistent, easily navigable appearance, as well as making broader use of the interactive technical capacities of online tools, such as forums.
- *Self-paced resources*
A variety of on-campus, online, directed and self-paced professional development support resources have been created and made available to cater for the differing generational stages of lecturers, with emphasis on providing training for those involved in skills-based or transformational-oriented courses. For example, an online self-help site, *Moodle's Little Helper*, is available for staff to access resources and practical tips about how to design and facilitate online courses, and links to exemplar courses. Staff can also self-evaluate their knowledge and skills about online teaching by consulting the MOOBRIC (<http://moobric.net/>), an online rubric resource of online teaching and course development abilities, developed by Avondale researchers for academic teaching staff.
- *Policy review*
Earlier institutional policies that focused on learning and teaching have been reviewed with a greater emphasis on the scholarship of learning and teaching, and the teaching-research nexus.
- *Responsive professional development*
Provision of more *just-in-time* (specific instruction provided at the point when skills are used) instead of *just-in-case* (general workshops offered in a blanket approach) support and professional development.
- *Workshops*
Small workshops are organised for groups of staff to facilitate the development of skills and concepts about online teaching, including self-reflection of current and anticipated skill levels.
- *Extension of available systems*
To cater for the more advanced professional development needs of staff with third-generational experience, the institution is currently streamlining their online enrolment processes and investigating options that will allow them to offer a wider variety of online learning and teaching resources.
- *Collaborative scholarship*
A range of activities have been implemented at the institution to consider how academic environments can be designed to facilitate the scholarship of teaching and learning. Visiting scholars, applications for teaching fellowships and funded collaborative research projects that focus on higher education teaching are examples of such scholarship-focused initiatives that are currently underway.

While these recommendations were identified as an outcome of the data analyses process that took place during the two phases of the research to date, readers of this article are invited to consider how these recommendations may be applied to their own contexts and how this research approach may be enacted in other higher education institutions that require a customised professional development program for online teachers.

During 2013 and 2014, there has been ongoing development at Avondale from administration through to Faculty levels of staff, including academic course restructuring and a move away from having a 'distance education centre' to having an 'online support department'. This has been evidenced by new policies for online learning and the employment of an Online Professional Development Officer. The institution has also been granted the autonomy to accredit its own courses which has made it necessary to make its internal processes more rigorous.

Conclusions

Academic staff at Avondale College of Higher Education displayed a range of attitudes, understandings and confidence levels associated with the design and facilitation of online courses. Staff with first-generational experience often had a negative, resistant or suspicious attitude towards online education in general. They need reassurance that online learning is a legitimate method of pedagogy, and should be given on-going support to develop the skills required. Importantly, our research showed 'breakthroughs', with staff attitudes and perceptions of self-efficacy improved with the introduction of professional development programs in this area. Those with second and third-generational experience held or had developed a more positive outlook to online learning and teaching in general. Furthermore, third-generational teachers had high levels of confidence in their skills, were prepared to mentor others and employ new and innovative teaching methods.

There was uniform agreement across the three generations that institutional infrastructure issues constituted the major 'bump'. In particular, staff rated themselves as ineffective in managing technological issues when attempting to create an online environment that supported student learning. The use of online technology between teachers and students should be a seamless experience rather than a functional barrier. The challenge is not only to support teachers with ongoing professional development in online pedagogy, but also to provide a supportive technological infrastructure at an institutional level.

The outcomes of the research continue to be incorporated into the construction of a professional development program that supports academic staff to extend their online teaching capabilities. Phase 1 indicated a lack of self-confidence in working in the online learning space, whereas Phase 2 recorded frustration by the same staff with the technological obstacles that prevented them from using their new pedagogical tools. Their changed outlook from Phase 1 to Phase 2 indicated that academic staff at this institution had developed a wider awareness of online teaching issues and had raised their threshold conceptual level, in addition to an advancement of their online teaching self-efficacy levels. There remain opportunities to evaluate future progress in the online and blended learning area, and to extend our research into other contexts at other institutions to

further refine our understanding of how self-efficacy levels of academic staff are associated with their development of threshold concepts in online and blended contexts. More research is required to further refine the use of threshold concepts in association with academic staff self-efficacy levels. The existence of threshold *attitudes* may provide an avenue by which to predict the development of threshold *concepts* and *skills*. Although the results of the faculty development training workshop were positive, statistical power may have limited identifying additional differences. Accordingly, future research in online faculty development programs should be carried out across additional sites and with larger sample sizes

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Please cite as: Northcote, M., Gosselin, K. P., Reynaud, D., Kilgour, P. & Anderson, M. (2015). Navigating the learning journeys of online teachers: Threshold concepts and self-efficacy. *Issues in Educational Research*, 25(3), 319-344.

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