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Understanding fully online teaching in vocational education

Deniese Cox*  and Sarah Prestridge

* Correspondence: Deniese.Cox@TeachingOnline.com.au
School of Education and Professional Studies, Griffith University, 176 Messines Ridge Road, Mount Gravatt, Queensland 4122, Australia

Abstract

Literature has previously reported that student-centred practices are the mark of good pedagogy in online education. In contrast, the competency-based nature of vocational education in Australia has been understood to encourage teacher-centred pedagogy. The likely tensions between these two teaching contexts are not yet understood, and little is yet known about the pedagogy of fully online vocational education teachers. To begin understanding pedagogy in this context, a wide-ranging digital survey was implemented. Findings revealed that online vocation education teachers conceived good online pedagogy as student-centred, yet student-student learning opportunities were rated lower than teacher-student practices. Notably, enacted practice was consistently more teacher-centred than teachers' ideal, and factors within the teaching context were perceived by teachers as a limitation. They reported their workload to be dominated by marking and administration ahead of student-centred practices such as building rapport. This work is of interest to researchers and institutions navigating the continued expansion of online education and the ongoing demand for effective student-centred practice.

Keywords: Online education, Vocational education, Conceptions of teaching

Introduction

It has been reported that teachers generally teach how they themselves were taught (Ellis & Hafner, 2003), and until recently, most of their education experience will have been in face-to-face classroom contexts (Brinthaupt, Fisher, Gardner, Raffo, & Woodard, 2011). However, online education is growing significantly across sectors (Sun & Chen, 2016), and there are reports that teachers are challenged when their familiar face-to-face teaching strategies are not able to be effectively enacted online (Banas & Velez-Solic, 2013). In essence, experienced teachers once again become novices during the shift to online education (Redmond, 2011), and online education is a teaching context that is understood to challenge existing conceptions about the teaching role (Kilgour, Reynaud, Northcote, McLoughlin, & Gosselin, 2019). As teachers navigate from classroom to online teaching contexts, they reconceptualise how to connect their teacher self with the different affordances and limitations of teaching online (Baran, 2011). This includes a reconceptualisation of their beliefs about what represents 'good' pedagogy in the different teaching context that is online education (Rodrigues, Almeida, Figueiredo, & Lopes,

2019). To understand pedagogy in any teaching context, Jensen, Price, and Roxå (2019) have recommended that it is important to understand the interplay between teachers, their practice, and their teaching context. This study investigates those three parts within an under-researched online teaching context—vocational education (Chang, 2016; Griffin & Mihelic, 2019). It contributes new knowledge about the nature of online vocational education and factors that result in enacted practice in this context being more teacher-centred than teachers conceived as ideal.

To develop a background for the presentation of this study, the relationships between conceptions of teaching, teaching context, and enacted practice are described next, including a brief summary about teacher-centred and student-centred classifications of pedagogy. Then, this study is introduced and situated within a wholly online vocational education teaching context. The survey instrument design and analysis is then described ahead of survey results being presented and discussed in three parts: (1) teacher characteristics and their relationship with enacted practice; (2) teaching profiles and relationships, alignments, and misalignments between conceptions of teaching and enacted practice; and (3) teaching context factors that affect enacted practice. The conclusion then summarises key outcomes, and directions for ongoing research are proposed.

Background

In this section, key concepts relevant to this study are introduced. These include relationships between conceptions of teaching, teaching context, and enacted practice, and the classification of pedagogy as teacher-centred or student-centred.

Teacher's beliefs about pedagogy are known as their conception of teaching. Conceptions of teaching represent the way a teacher is inclined to teach, or would prefer to teach, within a particular teaching context (Clark & Peterson, 1986; Samuelowicz, 1999). This is important because conceptions of teaching have long been known to directly affect enacted practice (Conrad, 2012) and the relationships between these two parts of pedagogy have been an important element of education research for three decades (Harshman & Stains, 2017). Enacted practice is different from conceptions of teaching in that enacted practice describes the teaching actions and interactions actually undertaken by the teacher (Gibbons, Villafañe, Stains, Murphy, & Raker, 2018; Westbrook et al., 2013). Importantly, enacted practice has been found to not always align with conceptions of teaching (Doyle, Seery, Canty, & Buckley, 2019). This is because enacted practice is also affected by the perceived affordances or limitations of each teaching context (Clark & Peterson, 1986). This means that the real or perceived affordances, limitations, or needs of a particular teaching context can cause teachers to shift their practice toward or away from their ideal (Eley, 2006; Samuelowicz & Bain, 1992). For example, Shi, Delahunty, and Gao (2018) found that large class sizes, an exam-driven teaching context, as well as the teacher's own confidence, experience, and knowledge, hindered the enactment of some idealised pedagogies. So important are the relationships between conceptions of teaching, teaching context, and enacted practice, that Kennedy (2010) recommended no understanding of pedagogy in any context can therefore be developed without considering all three parts.

Notably, both conceptions of teaching and enacted practice can be classified as teacher-centred or student-centred (Eley, 2006). Since the seminal work of Samuelowicz and Bain (1992), the nature of teacher-centred and student-centred pedagogy has

been much researched and debated for both face-to-face and online teaching contexts. Presenting the deeper review of those classifications is beyond the scope of this study. However, in summary, within face-to-face classrooms, teacher-centred pedagogy has been described as teachers transmitting information, which is often curriculum-bound, to students in structured ways and this may include handouts and giving examples from the teacher's own experience (Kember & Kwan, 2000). In contrast, student-centred pedagogy has been described as shifting the teacher role from instructor to facilitator (Regan et al., 2012) whereby students discover and create knowledge (Kember, 1997). Student-centred pedagogy is reportedly a complex undertaking (Sadler, 2012) and should not be mistaken for students being expected to teach themselves; rather, it is a "balance between teacher- and student-directed learning" (Gordon, 2016, p. 1081).

Moving to online education, González (2009) found that the differences between teacher-centred and student-centred online pedagogy can be seen in how learning management system (LMS) tools are utilised by teachers. He suggested that a feature of teacher-centred pedagogy online is providing structured learning materials to students for independent study. In contrast, student-centred online pedagogy focuses on providing students with communication spaces and opportunities to build knowledge. A defining feature of student-centred online pedagogy is reportedly the teacher facilitating collaboration between students for the purpose of knowledge discovery and creation (González, 2009, 2010, 2012).

It has been found that teachers with teacher-centred beliefs will normally choose technological tools that let them teach that way, and in contrast, teachers with student-centred beliefs will usually choose tools that support their enactment of student-centred practices (Tondeur, van Braak, Ertmer, & Ottenbreit-Leftwich, 2017). Importantly, González (2013) found that teachers who align with student-centred conceptions of teaching but who perceive their online teaching context to be constrained will shift their practice to be more teacher-centred. In this way, enacted practice can represent a compromise between teaching conceptions and teaching context (Kennedy, 2010; Norton, Richardson, Hartley, Newstead, & Mayes, 2005). Critically, Lowenthal, Nyland, Jung, Dunlap, and Kepka (2019) found that an important factor in the effect of teaching context on practice is the teacher's own perceptions about the affordance or limitation of that teaching context. In this way, the relationships between conceptions of teaching, teaching context, and enacted practice remain dynamic.

Student-centred pedagogies are considered best-practice online, and according to Sun and Chen (2016), this includes encouraging students to discuss learning content with each other in relation to their own experiences. However, not all students value such discussions, and some perceive student-student communication does not contribute to their learning (Jaggars & Xu, 2013). Furthermore, the nature of student-centred pedagogy continues to have inconsistent interpretations and understandings (Trinidad, 2019). Therefore, understanding what a teacher conceives as student-centred pedagogy is important.

As described next, this study investigated the centredness of what a team of wholly online teachers conceive as good pedagogy, how aligned or not aligned those conceptions are with enacted practice, and factors within the teaching context that affect enacted practice.

Research context and design

In this section, the research context is introduced and then the design and analysis of the implemented digital survey is described.

In Australia, the vocational education and training (VET) sector is understood to be fundamentally different from other post-secondary teaching contexts (Fowler, 2017). VET is governed by principles of student competence (Harris & Hodge, 2009) and the very nature of this competency-based framework reportedly encourages teacher-centred pedagogy (Brennan, McFadden, & Law, 2001). This is because the VET curriculum is enforced through audits that require teachers to prove they have conveyed occupation-specific, curriculum-bound skills (Black & Reich, 2010). Importantly, transmission of skill is privileged over development of underpinning knowledge within VET (Wheelahan, 2009). Therefore, direct-instruction and transmission of information are encouraged pedagogies within VET, and Griffin and Mihelic (2019) have anticipated that this may introduce unique tensions when VET teachers are asked to teach online.

VET is a critical contributor to Australia's labour market (Wheelahan & Moodie, 2011) and is the country's largest education sector (Atkinson & Stanwick, 2016). More than half of all occupation qualifications in Australia need to be at VET rather than university level (Productivity Commission, 2011). Currently, 14–20% of VET units are taught online (NCVER, 2018, 2019; Reeson, Mason, Sanderson, Bratanova, & Hajkowicz, 2016). However, for VET to continue meeting its responsibilities to skill and upskill current and future workers, it is shifting to expand its online education offerings (Reeson et al., 2016).

This study is situated within a wholly online VET teaching context. It profiled teachers as they move from conceptualisation to enacted online practice, identified how ideal and enacted practice were aligned or not aligned, and examined what teaching context factors affect enacted practice.

Participants

Teacher participants for this survey were sought from a single online VET teaching context so that results would not be affected by different institution teaching contexts. The largest VET provider in the state of Queensland, Australia, agreed to host the project and provide access to what is considered a large team of fully online teachers. That team included 66 teachers who teach more than 40,000 subjects a year online. After survey piloting, ethical approvals were obtained from both the researcher's university and the host site. Following principles of informed, voluntary consent, a personalised invitation and survey access token was sent to each target teacher. After cleaning up data to remove surveys less than half complete, 46 survey responses were retained representing a 69% useable response rate. Participants represented six teaching disciplines. The largest group of respondents came from early childhood (33%) followed by business (28%), and the characteristics of participants are presented in Table 1. They were generally female, full-time teachers, and aged 51 years old which is normal for the VET sector where teachers are thought to perceive the role as a suitable transition to retirement (Productivity Commission, 2011). The typical teacher in this study would be teaching 12 different online classes at any one moment in time, with a total of 131 students across those classes. Some classes have only one student. At time of survey, participants had an average of 4.5 years online teaching experience and will not have studied online pedagogy.

Table 1 Survey participants

Typical participant overview	Range of participants
Female	75% females; 24% males
Aged 51	Range 32–66 years; \bar{x} = 51 years
Full-time teacher	89.1% full-time workers
12 classes at any one time	Range 2–57 classes; \bar{x} = 12 classes
131 students at any one time	Range 10–310 students; \bar{x} = 131 students
4.5 years online teaching experience	Range 0.5–15 years; \bar{x} = 4.5 years
11 years classroom teaching experience	Range 0–40 years; \bar{x} = 11 years
15 years industry work experience	Range 0–40 years; \bar{x} = 15 years
Will not have studied online pedagogy	84.8% have not; 15.2% have

Survey instrument

To investigate the pedagogy of online VET teachers, a digital survey was designed. The survey questions were developed from extensive reviews of online education and VET literatures conducted as part of a larger doctoral research project. The survey also incorporated previously validated survey tool components. The three investigative focuses for this survey were (1) what practices teachers conceive represent good online teaching, (2) is enacted practice aligned or not aligned with that ideal, and (3) what factors in this online VET teaching context affect practice.

The survey commenced with background and demographic questions to establish who VET online teachers are, their teaching experience, and the nature of their teaching role such as numbers of students. Teaching profiles were then built classifying conceptions of teaching and enacted practice along a continuum from teacher-centred to student-centred. Two different approaches were utilised to yield teaching profiles.

The first approach incorporated a validated survey tool that was obtained from Owens (2015) and then adapted with permission. Those adaptations included changing some language from the higher education sector in the UK to language more familiar to VET teachers in Australia (see the Appendix for adaptations made). Owens' 5-point scale disagree-agree questions incorporated topics posed from student-centred and teacher-centred perspectives. Those topics were posed twice. The first question set was designed to yield a composite result for each teacher to represent their conception of teaching profile from teacher-centred to student-centred. The composite result from the second question set then yielded a profile of enacted practice, thereby enabling comparisons between conceptions of teaching and enacted practice for each teacher and the group. By design, these conceptions of teaching and enacted practice question sets were presented within the online survey on different screens and separated by unrelated questions to reduce participant teachers consciously linking them.

The second approach to profile teaching in this context drew on Owens' design of directly comparing teaching conceptions and enacted practice. The questions for this second approach were original to this survey and were developed from a model purported to represent best-practice student-centred online pedagogy. That model was Bain's description of *what the best teachers do* (Bain, 2004) as updated for online education by Brinthaupt et al. (2011). Nine student-centred practices drawn from that work (see the Appendix) were presented to teachers twice. Firstly, using a 5-point scale, teachers were asked to rate the importance of each practice. Secondly, teachers were

asked to report the frequency with which they enacted each practice. Those two question sets were presented in the survey on different screens to reduce participant awareness of their relatedness.

Results from the two approaches were utilised to develop teaching profiles and enabled differences, similarities, and nuances between conceptions of teaching and enacted practice were identified.

Separately within the survey, teachers were asked whether particular teaching context factors affected their practice (see the Appendix). Given the lack of literature about online VET, those items were developed from a detailed review of literatures about higher education online teaching contexts and from face-to-face VET teaching contexts.

Analyses

Non-parametric tests were utilised in the analysis because they do not assume the sample is normally distributed (Field, 2013) and are therefore ideal for small sample sizes, especially with categorical and ordinal data (Pallant, 2016). The Wilcoxon Signed Rank Test was utilised to compare participants under two different conditions (Field, 2013; Pallant, 2016), such as when comparing conceptions of teaching and enacted practice responses. The results of this test were reviewed adjacent to Friedman Tests to confirm consistency of result. The magnitude of the effect was interpreted using Cohen (1998) as cited in Pallant (2016): 0.1 = small effect, 0.3 = medium effect, 0.5 = large effect.

Separately, the Kruskal-Wallis H Test is recommended to be suitable for comparing differences between more than two groups by using ranks (Field, 2013; Pallant, 2016). It was utilised in this analysis when comparing participants by group such as by age, years teaching experience, or discipline being taught. Such analysis identified if, for example, participants with higher level teaching qualifications had similar answers within a question or question set. This paper reports only those results relevant to the topic and that yielded a significant result, seeking < 0.05 .

The internal consistency of the survey items were tested using Cronbach's alpha coefficient (Pallant, 2016). Scales reported in this paper were deemed reliable and have alpha coefficients of between 0.67 and 0.91. However, an acknowledged limitation of this study is its small sample size. The survey has internal validity in that it accurately measures what it was intended to measure (Cohen, Manion, & Morrison, 2011; Creswell, 2011). However, with only 46 useable responses, the findings are informative in nature and not indicated as generalisable or transferable across teaching contexts.

Results and discussion

In this section, survey results are presented and discussed in three parts: (1) teacher characteristics, (2) teaching profiles using two different approaches, and (3) relationships between teaching context and enacted practice.

Teacher characteristics

The teacher's age, gender, seniority of teaching role held, level teaching and industry qualifications completed, or years teaching and industry experience were not found related to enacted practice. However, having been an online student was found related to enacted practice. It has been reported in literature that many teachers have not been an

online student (Niess, 2011). The teachers in this sample are different in that 71.7% reported they have been an online student. Breaking this down, 39.1% of teachers had previously completed a course online and 32.6% were currently completing a course online. This is notable because teachers in this study who had been an online student reported more frequently enacting the student-centred practices of creating a friendly, social learning environment ($H(1) = 4.02, p = 0.045$), developing group cohesiveness among students ($H(1) = 4.36, p = 0.037$), and consciously building rapport with each student ($H(1) = 10.10, p = 0.001$) than teachers who had not been an online student.

While teaching qualifications were not found related to enacted practice, other relationships were identified. Literature has reported that the mandated Certificate IV Training & Assessment is likely the highest-level teaching qualification held by VET teachers in Australia (Smith, Hodge, & Yasukawa, 2015). However, in this study, only 32.6% of teachers reported this certificate as their teaching qualification with the remaining teachers holding higher level teaching qualifications than required. Notably, 41.3% of participant teachers reported holding a university-level teaching qualification, and 21.7% of participants were currently undertaking study to obtain university-level teaching qualifications. Interestingly, 15.2% of participant teachers were currently studying a university qualification as an online student. The level of teaching qualification held is relevant because teachers without university-level teaching qualifications were found to more likely ($Md = 27$) want additional training for the development of pedagogical knowledge than teachers with university-level teaching qualifications ($Md = 17$). $H(1) = 7.68, p = 0.006$. However, it is important to note that regardless of teaching qualification held or currently being pursued, only 15.2% of teachers had studied online pedagogy as part of their qualification.

Next, teacher profiles are reported.

Teaching profiles

This section presents teaching profiles that were captured in the survey through two different approaches. Within each approach, the centredness of teaching conceptions are profiled along the teacher-centred to student-centred continuum and then compared to centredness of enacted practice.

Teaching profiles using approach one

As presented in Table 2, 84.8% of teachers in this survey had intermediate conceptions of teaching about what a good online teacher does, and 15.2% had moderately student-centred conceptions.

Further analysis of conception of teaching profiles was undertaken by examining individual responses to establish a representation of what an intermediate profile meant. This revealed that an intermediate answer option was only selected by teachers for 14% of all responses. Instead, most teachers selected teacher-centred answers for some questions and student-centred answers for others. When summated, this resulted in an unexpectedly high number of intermediate profiles. That outcome was the result of Owens' incorporation of two questions types—some with student-centred language and others with teacher-centred language. When sorted from highest to lowest mean using Owens' topic groupings (Table 3), a pattern emerged whereby student-centred

Table 2 Conceptions of teaching profiles

Conception of Teaching	Frequency	Percent
Strongly teacher-centred	0	0.0
Moderately teacher-centred	0	0.0
Intermediate	39	84.8
Moderately student-centred	7	15.2
Strongly student-centred	0	0.0
Total	46	100.0

questions had yielded 89.1% student-centred responses, and teacher-centred questions had yielded 78.3% teacher-centred responses.

Some questions were reversed when posed to teachers, so having the participants simply agreeing with all statements was not the cause of the patterns within teacher-centred and student-centred questions. To explain the responses, three teacher-centred question topics are now unpacked.

Two questions were posed to teachers about the purpose of education within the topic *training for jobs*. The two questions were as follows: *The main aim of teaching should be job specific training* and *An important function of [VET] education is to produce graduates for specific jobs*. The publicly stated purpose of VET is to produce work-ready students to meet labour market demands (Productivity Commission, 2019), and therefore, it is not surprising that teachers agreed with this statement about the purpose of the education they provide. Following Owens' design, that agreement resulted in teacher-centred profiles for those questions.

Two questions were posed to teachers about *imparting information*. These two questions were as follows: *A good online teacher is one whose main role is to impart information to his/her students* and *Teaching is about the transmission of content or skills*. The nature of competency-based VET curriculum assumes that skills can be divided into isolated pieces which do not require underpinning or relational knowledge (Wheelahan, 2005) and as such, within VET job tasks are prioritised over knowledge (Wheelahan, 2009). Therefore, the VET teachers having agreed to these statements makes sense. Again, following Owens' design interprets that agreement as teacher-centred.

Table 3 Conception of teaching responses

Mean	Question Set	Percent of Responses		
		Teacher-Centred	Intermediate	Student-Centred
4.42	(SC) Problem Solving	1.10	3.30	95.60
4.40	(SC) Pastoral Interest	1.10	2.20	96.70
4.25	(SC) Motivating Students	0.0	10.90	89.10
4.20	(SC) Facilitative Teaching	2.20	10.90	87.00
3.98	(SC) Interactive Teaching	1.10	22.80	76.10
2.29	(TC) Training for Jobs	68.40	21.70	9.90
2.15	(TC) Use of Media	71.70	26.10	2.20
2.11	(TC) Imparting Information	75.00	20.70	4.30
1.63	(TC) Knowledge of Subject	94.60	5.40	0.0

Finally, a question was posed about *knowledge of subject*. That question was *It is fundamental that online teachers know the latest knowledge and skills related to their subject area*. Importantly, the main requirement to become a VET teacher is deep industry experience (Kemmis & Green, 2013; Kemmis, Hodge, & Bowden, 2014) which is privileged over teaching skills or knowledge (Simons, Harris, Pudney, & Clayton, 2008). Agreement with this sentiment fits the teaching context in which it was being answered, and resulted in teacher-centred profiles for this question.

The responses for these topics are likely embedded in the nature of VET teaching context. This highlights differences between VET and higher education where the questions were first developed by Owens. Separately, within the student-centred topics, the question set with the lowest-mean was the topic *interactive teaching* which relates to student-to-student interaction. This indicated that student-student practices were perceived as less important than teacher-centred practices.

The skewed results between the teacher-centred and student-centred question sets meant that using the composite results and Kruskal-Wallis H Tests to identify a relationship with enacted practice was not feasible. However, as presented in Table 4, Wilcoxon signed-rank tests, confirmed with Friedman tests, revealed statistically significant differences between eight of 16 paired conceptions of teaching and enacted practice questions sets. An important finding from these results is that enacted practice was less student-centred than conceptions of teaching for 13 of 16 question pairs. The differences between conceptions of teaching and enacted practice were significant for eight of 16 question pairs.

In summary, although not yielding a clear student-centred or teacher-centred conception of teaching profile, this approach revealed that enacted practice was less student-centred than conceptions of teaching for 13 of 16 question pairs. Notably, the nature of VET was found to affect the teaching conceptions of its teachers.

A different approach to finding teaching profiles is reported next.

Teacher profiles using approach two

This approach found that 71.7% of teachers profiled as having a student-centred conception of teaching, 19.6% as intermediate, and 8.7% as teacher-centred (Table 5).

Different to the strategy reported in the previous section, this second approach resulted in consistent responses across all nine questions. When examining individual questions to understand what a student-centred profile meant, it was identified that the three questions with the lowest means were the three questions related to student-to-student collaborative practices. This is an important observation because, as established previously, an identifying feature of student-centred pedagogy online is student-to-student collaboration. Table 6 presents conception of teaching responses sorted highest to lowest mean.

In contrast to the 71.7% of teachers profiled with student-centred conceptions of teaching, only 23.9% profiled as also enacting student-centred practice. Instead, 45.7% of teachers enacted intermediate practice and 30.4% teacher-centred. Teachers reported enacting teacher-centred practice for five of nine practices in this set.

Relationships between conceptions of teaching and enacted practice were found. Teachers with a student-centred conception of teaching reported a higher frequency

Table 4 Differences between conceptions of teaching and enacted practice

Topic	Aspect	Percent of Responses			Mean	Statistical Difference in Response
		TC	Inter.	SC		
Problem solving	Conception	0.0	4.3	95.7	4.37	Yes; Medium to large effect size ($r = 0.4$)
	Practice	4.3	32.6	63.0	3.70	
	Conception	2.2	2.2	95.7	4.48	Yes; Large effect size ($r = 0.5$)
	Practice	8.7	30.4	60.9	3.59	
Pastoral interest	Conception	2.2	4.3	93.4	4.30	Yes; Large effect size ($r = 0.6$)
	Practice	43.5	30.4	26.1	2.70	
	Conception	0.0	0.0	100.0	4.50	Yes; Large effect size ($r = 0.5$)
	Practice	2.2	19.6	78.2	3.96	
Motivating students	Conception	0.0	8.7	91.3	4.26	No
	Practice	0.0	15.2	84.7	4.07	
	Conception	0.0	13.0	87.0	4.24	Yes; Medium to large effect size ($r = 0.4$)
	Practice	8.7	41.3	50.0	3.52	
Facilitative teaching	Conception	2.2	10.9	87.0	4.20	No
	Practice	4.3	21.7	73.9	3.83	
Interactive teaching	Conception	2.2	23.9	73.9	3.93	Yes; Large effect size ($r = 0.6$)
	Practice	89.2	6.5	4.3	2.04	
	Conception	0.0	21.7	78.2	4.02	Yes; Large effect size ($r = 0.5$)
	Practice	28.2	39.1	32.6	3.09	
Training for jobs	Conception	63.0	21.7	15.2	2.43	No
	Practice	67.4	26.1	6.5	2.21	
	Conception	73.9	21.7	4.4	2.15	No
	Practice	87.0	8.7	4.3	1.91	
Use of media	Conception	71.7	26.1	2.2	2.15	Yes; Large effect size ($r = 0.5$)
	Practice	36.6	28.3	34.8	2.96	
Imparting information	Conception	73.9	21.7	4.3	2.13	No
	Practice	93.5	6.5	0.0	1.80	
	Conception	76.1	19.6	4.3	2.09	No
	Practice	82.6	13.0	4.3	1.93	
Knowledge of subject	Conception	95.7	4.3	0.0	1.54	No
	Practice	82.6	13.0	4.4	2.00	
	Conception	93.5	6.5	0.0	1.72	No
	Practice	84.7	13.0	2.2	1.87	

Table 5 Conceptions of teaching profiles

Conception of Teaching	Frequency	Percent
Strongly teacher-centred	0	0.0
Moderately teacher-centred	4	8.7
Intermediate	9	19.6
Moderately student-centred	19	41.3
Strongly student-centred	14	30.4
Total	46	100.0

Table 6 Conception of teaching responses

Mean	Question Statement	Percent of Responses (Importance)		
		Not at all; Slightly	Moderately	Very; Extremely
4.09	Utilise engaging tasks students will find interesting	4.3	19.6	76.1
4.02	Create a friendly, social atmosphere where deep learning is encouraged	8.7	13.0	78.3
3.96	Utilise a variety of technologies such as videos or podcasts	4.3	26.1	69.6
3.89	Use introductory videos or other self-disclosure methods to humanise yourself to students	2.2	37.0	60.9
3.87	Consciously build rapport with each individual student	8.7	21.7	69.6
3.80	Utilise technology for real-time engagement with groups of students	17.4	15.2	67.4
3.52	Facilitate discussion forums where students explore concepts and develop deep knowledge together	17.4	23.9	58.7
3.50	Develop group cohesiveness, helping students to work together for mutual benefit	8.7	43.5	47.8
3.28	Utilise discussion forums to facilitate social interaction between students	21.7	41.3	37.0

($Md = 27$) of enacting the practice of using discussion forums to facilitate student-to-student social interaction than teachers with an intermediate ($Md = 14$) or teacher-centred ($Md = 17$) profile ($H(2) = 7.78, p = 0.02$). Teachers with a student-centred conception of teaching also reported a higher frequency ($Md = 26$) of enacting the practice of creating a friendly, social learning environment than teachers with an intermediate ($Md = 15$) or teacher-centred ($Md = 19$) profile ($H(2) = 6.30, p = 0.04$). Finally, teachers with a student-centred conception of teaching reported a stronger desire ($Md = 25$) for more training about how to effectively utilise technology to teach their discipline than teachers with an intermediate ($Md = 16$) or teacher-centred ($Md = 14$) profile ($H(2) = 7.42, p = 0.02$).

An important finding from this part of the survey was that all nine enacted practices were found to be less student-centred than their conception of teaching counterpart. Those differences were statistically significant for seven of nine pairs (Table 7).

In summary, using this second approach, conceptions of teaching were profiled as being student-centred and relationships between conceptions of teaching and enacted practice were found. Importantly, enacted practice was less student-centred than teachers' ideal, and statistically significant differences between teaching conceptions and enacted practice were identified.

Drawing on both survey approaches identified teachers conceived that student-centred practices represent good pedagogy online. Notably student-to-student collaborative learning was less important than teacher-student practices, and the context of VET resulted in teacher-centred conceptions regarding the nature and purpose of VET education. Furthermore, enacted practice was less student-centred than teachers perceived as ideal. Many of the shifts between conception and practice were statistically significant.

Table 7 Differences between conceptions of teaching and enacted practice

Topic	Aspect	Percent of Responses			Mean	Statistical Difference in Response
		TC	Inter.	SC		
Build rapport	Conception	8.7	21.7	69.6	3.87	No
	Practice	21.7	23.9	54.3	3.39	
Utilise variety of technology	Conception	4.3	26.1	69.6	3.96	Yes; Medium to large effect size ($r = 0.4$)
	Practice	21.7	45.7	32.6	3.17	
Create friendly learning environment	Conception	8.7	13.0	78.3	4.02	Yes; Large effect size ($r = 0.5$)
	Practice	30.4	32.6	37.0	3.13	
Utilise engaging tasks	Conception	4.3	19.6	76.1	4.09	Yes; Large effect size ($r = 0.5$)
	Practice	32.6	37.0	30.4	3.02	
Humanise self	Conception	2.2	37.0	60.9	3.89	Yes; Medium to large effect size ($r = 0.4$)
	Practice	34.8	32.6	32.6	2.93	
Discussion forums for social interaction	Conception	21.7	41.3	37.0	3.28	No
	Practice	39.1	30.4	30.4	2.87	
Utilise technology for real-time engagement	Conception	2.87	15.2	67.4	3.80	Yes; Large effect size ($r = 0.5$)
	Practice	50.0	23.9	26.1	2.67	
Discussion forums for knowledge	Conception	17.4	23.9	58.7	3.52	Yes; Medium to large effect size ($r = 0.4$)
	Practice	52.2	26.1	21.7	2.59	
Group cohesiveness for student benefit	Conception	8.7	43.5	47.8	3.50	Yes; Large effect size ($r = 0.5$)
	Practice	56.5	28.3	15.2	2.41	

Enacted practice being different from ideal has been previously suggested as related to the teaching context which can also affect enacted practice. Findings related to teaching context are presented next.

Teaching context

To understand teaching context effects on enacted practice in this online VET teaching context, eight factors were identified from literature; four of these were included directly in the survey through targeted questions, and four were investigated through relationships between variables.

Teacher workload has been identified in other teaching contexts to affect enacted practice (Conrad, 2012; Murphy & Rodriguez-Manzanares, 2012). That was supported in this survey where teacher workload was reported by 66.7% of teachers as *often* or *always* preventing them from enacting a teaching practice they believe would be beneficial. As illustrated in Table 8, which is presented highest to lowest mean for actual workload, teachers further reported that their two highest workload tasks were associated with assessing competency – marking assessments followed by helping students complete their assessments. Notably, only 31.0% of teachers reported wanting to spend less time on these tasks. The third highest workload task was administration and 61.9% of teachers would like to spend less time on this. Teachers would like to spend more time actively facilitating student learning.

Two teaching context factors that may be related to workload were investigated through analysis of relationships between variables. These are the number of classes

Table 8 Workload

Actual Workload			Workload Tasks	Ideal Workload Change		
Low	Medium	High		Less	Same	More
0.0%	4.8%	95.3%	Assess competency (marking)	31.0%	54.8%	14.3%
4.8%	19.0%	76.2%	Review draft assessments	31.0%	50.0%	19.0%
9.5%	31.0%	59.6%	Administration & reporting	61.9%	33.3%	4.8%
11.9%	33.3%	54.8%	One-to-one student interaction	11.9%	38.1%	50.0%
26.2%	28.6%	45.2%	Develop basic learning materials	11.9%	47.6%	40.5%
16.7%	47.6%	35.7%	Develop assessment tools	0.0%	50.0%	50.0%
23.8%	40.5%	35.7%	Give encouragement to students	7.1%	45.2%	47.6%
14.3%	59.5%	26.2%	Actively facilitate learning (teach)	0.0%	42.9%	57.1%
35.7%	28.6%	35.7%	Demonstrate curriculum compliance	31.0%	50.0%	19.0%
23.8%	45.2%	31.0%	System management (setup LMS)	45.2%	50.0%	4.8%
33.3%	38.1%	28.6%	Send students due date reminders	14.3%	83.3%	2.4%
33.4%	28.6%	26.2%	Build rapport with students	0.0%	42.9%	57.1%
42.8%	35.7%	28.6%	Develop multi-media materials	2.4%	38.1%	59.5%
57.2%	28.6%	14.3%	Facilitate student group interaction	4.8%	28.6%	66.7%
54.8%	38.1%	7.2%	Resolve technical issues	61.9%	38.1%	0.0%

and students per teacher. Teachers in this study reported being responsible for teaching between two and 57 online classes at any one time ($\bar{x} = 12$). However, enacted practice was not found to be affected by the number of classes per teacher. Furthermore, no relationship between the number of classes and workload responses was found. Different to the number of classes per teacher was the number of students they were each responsible for teaching. The number of students per teacher ranged from 10 to 310 students ($\bar{x} = 131$), and the number of students per teacher was found to have an effect on one conception of teaching variable and one enacted practice variable. Teachers with > 175 students were more likely than teachers with less students to agree that students should be helped to learn for themselves ($H(2) = 7.70, p = 0.02$). Teachers with < 75 students were more likely than teachers with higher student numbers to report more frequently enacting the student-centred practice of using technology to engage with students in real-time ($H(2) = 7.55, p = 0.02$).

Next, the effect of class size on enacted practice was investigated because, as reported by Cox, Black, Heney, and Keith (2008), “a teacher with over a hundred students will by necessity make different choices than one with only twenty students” (p. 380). Results from this survey supported and built on that assertion. Based on feedback from the institution prior to survey implementation, small class sizes were defined in this study as less than five students and large class sizes were defined as more than 75 students. Using those definitions, 52.6% of teachers reported that small class sizes do affect enacted practice. However, the reported nature of that effect was a mix of positive (31.6%), negative (7.9%), or both positive and negative (13.2%). In contrast, large class sizes were reported by 58.8% of teachers as negatively affecting their enacted practice, and 17.6% of teachers reported that large classes both positively and negatively affect enacted practice.

Course duration has been previously indicated by Akyol, Vaughan, and Garrison (2011) as an influence on enacted practice in a higher-education online teaching

context. However, a relationship between course duration and enacted practice was not found here. 51.4% of teachers in this study reported that they did not perceive their 12-week course duration affected their enacted practice, and 35.1% of teachers perceived course duration as a positive influence.

The discipline being taught affecting enacted practice has been suggested in higher-education online teaching contexts, and Arbaugh, Bangert, and Cleveland-Innes (2010) proposed that mathematics teachers, for example, may not attempt to enact student-centred practices. As suggested by Hornik, Saunders, Li, Moskal, and Dzuiban (2008), some teachers may perceive collaborative pedagogy is not an appropriate online strategy when teaching linear, fact-driven concepts. Some relationship between the discipline being taught and enacted practice was indicated here. Teachers in this study represented the disciplines of early childhood, business, accounting, education and library (schoolteacher aides), justice and government, and information technology (I.T.). Analysis revealed that I.T. teachers were more likely to report a higher frequency of using discussion forums to facilitate student-student social interaction ($H(5) = 11.26, p = 0.04$), of using technology for real-time student engagement ($H(5) = 22.00, p = 0.00$), and for getting students to participate in online discussions ($H(5) = 12.42, p = 0.03$). Justice and government teachers were more likely to report a higher frequency of facilitating discussion forums for students to explore concepts and develop deep knowledge together ($H(5) = 12.63, p = 0.03$). Accounting teachers were more likely to report a higher frequency of ensuring students are well skilled in the subject competencies ($H(5) = 17.16, p = 0.00$). However, given the small size of this study, generalisations cannot yet be drawn although these indicators warrant scaling the survey to a broader population.

It has previously been reported that compliance with Australia's federally mandated VET curriculum affects enacted practice for VET teachers who are expected to interpret that curriculum and make pedagogical decisions on the basis of that interpretation (Hodge, 2014). VET teachers must then formally demonstrate their compliance with that curriculum in how they teach and then assess student competency (Black & Reich, 2010). Relationships between VET curriculum and enacted practice were found from this survey. Teachers reported that complying with the mandated curriculum *sometimes* (51.2%) or *often* (14.6%) prevented them from enacting a teaching practice they believed would be beneficial for their students. Teachers further reported that complying with curriculum *sometimes* (46.5%) prevented teaching a concept they believed important for their students to learn. Notably, administration associated with proving curriculum compliance was ninth highest of 15 workload tasks, and 31.0% of teachers would like to spend less time on this. Compliance-related workload being time consuming and leading to a compromise in what teachers perceive as quality enacted practice has been reported previously for face-to-face VET teaching contexts (Black & Reich, 2010). More recently, Schmidt (2019) found that non-teaching workload tasks affect enacted VET practice through less time being available to teach.

Finally, literature has previously reported that professional development is lacking for VET teachers and is not always relevant for online teachers. Those perceptions were not supported by this group of online VET teachers who *agreed* or *strongly agreed* that professional development was regularly available (73.9%), that it was relevant to their online teaching role (54.3%), and that it was high quality (56.5%). Enacted practice was

not found to be affected by availability, relevance, and quality of professional development in this context.

In summary, of the eight teaching context factors investigated in this survey, five were found to affect enacted practice. These are teacher workload, small and large class sizes, compliance with the competency-based curriculum, the number of students per teacher, and the discipline being taught. The three investigated teaching context factors not found here to affect enacted practice are the number of classes per teacher, the availability, relevance, and quality of professional development, and course duration.

Conclusion

In Australia, VET is the largest education sector (Atkinson & Stanwick, 2016) and is an essential contributor to Australia's labour market (Wheelahen & Moodie, 2011). In recent years, 14–20% of all VET units have been taught online (NCVER, 2018, 2019; Reeson et al., 2016), and the continued expansion of VET requires an expansion of its online education (Reeson et al., 2016). However, it has been suggested that VET may not be well suited to online education (Griffin & Mihelic, 2019). VET competency-based underpinnings are understood to foster teacher-centred pedagogy (Brennan et al., 2001), and the nature of VET may introduce tensions when brought together with online education (Griffin & Mihelic, 2019) where student-centred practices are understood to be the mark of good online pedagogy (Sun & Chen, 2016). Like other education sectors, VET currently experiences lower successful completion rates for its online students than its face-to-face students (DET, 2016; Griffin & Mihelic, 2019). Despite the importance of VET as an education sector, and despite its move toward online education, VET remains an under-valued research sector (Waters, Simon, Simons, Davids, & Harreveld, 2015) and little is yet understood about the pedagogy of VET online.

The purpose of this small study was to contribute an understanding of pedagogy within the combined yet potentially disparate teaching contexts of online education and VET. The implemented digital survey profiled what VET teachers conceived as good online practice, how ideal and enacted practice was aligned or not aligned, and what teaching context factors affect enacted practice. This resulted in three clear outcomes.

The first outcome was the finding that online VET teachers conceived good online pedagogy as student-centred. However, two complexities within teaching profiles emerged when analysing individual questions. Firstly, student-to-student collaborative learning practices were consistently rated lower than other student-centred practices. This is notable because one defining feature of student-centred online pedagogy is the facilitation of collaborative learning opportunities (González, 2009, 2010, 2012). The second complexity is that teachers selected teacher-centred responses against three particular topics. Their responses reflected that teachers conceived the purpose of VET education is job-specific training rather than content knowledge, that the role of teachers is to impart their industry-specific skills to students, and that it is important for teachers to maintain strong subject knowledge. This supports previous assertions that the nature of VET encourages some teacher-centred conceptions, and supports the need for research that is specific to VET teaching contexts.

The second outcome from these survey results was that conceptions of teaching and enacted practice were not aligned, and those differences were statistically significant. Enacted practice was consistently more teacher-centred throughout the survey than teachers conceived was ideal. In particular, student-centred practices reported by teachers to be rarely or never enacted by them included teachers humanising themselves, using discussion forums for students to get to know each other and/or for building knowledge, utilising technology for real-time engagement, and developing group cohesiveness enabling students to work together for mutual benefit. Reasons for this gap between ideal and enacted practice likely include teaching context factors that, as described next, were found to affect enacted practice.

The third outcome was the identification of some teaching context factors that affect enacted practice. These factors were teacher workload, small and large class sizes, compliance with the competency-based curriculum, the number of students per teacher, and the discipline being taught. Teachers reported that workload, for example, prevented them from enacting practices they perceived would be beneficial for student learning. Furthermore, they reported that their highest workload tasks were marking assessments and reviewing draft assessments rather than other teaching practices.

This study contributes new knowledge about the pedagogy of online VET teachers and indicators about what influences their enacted practice. It has been contextualised within a large yet under-researched education sector, and results indicate a need for further VET-specific research. The results from this study will be used as a foundation to inform qualitative research to capture deeper teacher perceptions about their knowledge of online pedagogy, reasons for the differences between conceptions of teaching and enacted practice, and whether student-centred practices are encouraged or supported at their institution. Results from that subsequent research will be reported in due course.

The VET institution who provided access to online VET teachers for this study are navigating both the continued expansion of online education and the increased demand for its enhanced quality and effectiveness. That institution intends to use the results of this study to review their online teacher hiring, training, and management practices, and to better understand online education as more than simply a different mode of delivery. Their intent is that understanding and responding to factors that affect practice will support the enactment of online education that aligns to what is currently established in the literature as good online pedagogy for teachers, thereby subsequently enhancing student learning outcomes. An opportunity exists to investigate links between enacted practice and student outcomes within online VET.

For other researchers, although the small sample size within this study means the findings are not generalisable across other online teaching contexts, the survey is scalable. Broadening the application of this survey would contribute more to our understanding of what teachers conceive as good practice online and what shapes pedagogy as teachers in different online teaching contexts as teachers move from conceptualisation to enactment.

As a final note, this research was conducted before the 2020 pandemic. The shift to online education has moved more rapidly this year than ever before and unprecedented numbers of educators are currently navigating new online teaching contexts. These shifts make research such as this study all the more relevant because of the lessons that can be learned from the perceptions and practices of educators working in established online teaching contexts.

Appendix

Table 9 Approach one to identifying conceptions of teaching and enacted practice. Adaptation of student-centred questions from Owens (2015)

Student-centred topics	Owens (2015) conception of teaching questions	Adaptation for this survey	Owens (2015) enacted practice questions	Adaptation for current survey
Problem solving	1. Higher education should convert students from secondary-school type learning (e.g. memorisation) into tertiary type (e.g. problem solving). 5. The most important skill graduates can develop is the ability to carry on learning when they leave higher education.	1.1 Teaching should help convert students from school type memorisation to problem-solving type learning. 1.5 The most important skill students can develop is the ability to carry on learning when they leave TAFE.	35. I use online environments to teach my students how to use logical and rational thinking. 42. I use the online environment to teach my students how to analyse information critically.	2.8 I teach my online students how to use logical and rational thinking. 2.15 I teach my online students how to analyse information critically.
Interactive teaching	9. A good lecturer should incorporate student discussion as part of his/her teaching. 13. Lecturers should encourage participation from their students.	1.9 A good online teacher incorporates student-to-student discussion of content. 1.13 Online teachers should encourage students to interact.	28. I spend more time in online environments directing discussion than giving information. 30. I get students to participate in online discussion as much as possible.	2.1 I spend more time giving information than directing discussions [consciously reversed question]. 2.3 I usually get students to participate in online discussions.
Facilitative teaching	8. Teaching is about providing an environment in which students are encouraged to do the learning themselves.	1.8 Teaching is about providing an environment in which students are encouraged to construct knowledge rather than receive content.	31. One of my principal aims in the VLE is to provide an environment in which students are helped to 'learn for themselves' rather than be taught.	2.4 One of my principal aims is to provide an environment in which students are helped to 'learn for themselves' rather than be taught.
Pastoral interest	3. A good lecturer is one who recognises the personal needs of his/her students. 7. Good lecturers should have a genuine interest in their students' well-being.	1.3 A good online teacher is one who recognises the personal needs of his/her students. 1.7 Good online teachers have a genuine interest in their students' well-being.	32. When use online learning environments to keep in touch with students' pastoral problems. 37. I use online environments to show that I am concerned with my students' well-being.	2.5 I keep in touch with students' personal problems. 2.10 I show my students that I am concerned with their well-being.
Motivating students	10. It is really important that a lecturer is able to enthuse his/her students. 12. A good lecturer is one who can motivate students to learn.	1.10 It is important that an online teacher is able to enthuse his/her students. 1.12 A good online teacher is one who can motivate students to learn.	33. I use online environments to encourage my students to become self-motivated individuals. 40. In my online environment I spend much of my time trying to present subject material in a way which will stimulate the interests of students.	2.6 I encourage my students to be self-motivated individuals. 2.13 I spend much of my time trying to present subject material in a way that will stimulate the interests of online students.

Table 10 Approach one to identifying conceptions of teaching and enacted practice. Adaptation of teacher-centred questions from Owens (2015)

Teacher-centred topics	Owens (2015) conception of teaching questions	Adaptation for this survey	Owens (2015) enacted practice questions	Adaptation for current survey
Training for jobs	2. The main aim of higher education should be to prepare students for their future careers. 14. An important function of higher education is to produce graduates for certain professions within the community.	1.2 The main aim of teaching should be job specific training. 1.14 An important function of TAFE education is to produce graduates for specific jobs.	36. I use online environments to ensure that by the end of their course my students will be well qualified in their particular subject. 41. I use the online environment to prepare students for the roles they will have when they leave the institution.	2.14 I prepare online students for the roles they will have when they leave TAFE. 2.9 I ensure that by the end of their course my students are well skilled in the unit competencies.
Use of media	15. Lecturers present information more effectively if audio-visual materials are used. 17. New technology is going to revolutionise teaching.	1.15 Online teachers present information more effectively if audiovisual materials are used.	29. I use audio-visual stimuli in online environments. 44. I use online environments to expose my students to new technologies.	2.2 I regularly use or provide audiovisual stimuli for my online students.
Imparting information	4. A good lecturer is one whose main role is to impart information to his/her students. 6. Teaching is about the transmission of knowledge.	1.4 A good online teacher is one whose main role is to impart information to his/her students. 1.6 Teaching is about the transmission of content or skills.	34. I use the online environments to pass on what information I know to students. 39. Within the online environment I give as much information as possible to my students.	2.7 I pass on what information I know about the topic to students. 2.12 I try to give as much information as possible to my online students.
Knowledge of subject	11. It is fundamental that lecturers know the latest advances in knowledge related to their subject area. 16. A good lecturer has to be an expert in their subject matter.	1.11 It is fundamental that online teachers know the latest knowledge and skills related to their subject area. 1.16 A good online teacher is an expert in their subject matter.	38. To prepare for my online environment I spend a lot of time ensuring that I have a thorough knowledge of my subject. 43. For my online teaching I keep abreast of my field of knowledge all the time.	2.11 To prepare for my online teaching, I spend a lot of time ensuring that I have a thorough knowledge of my subject. 2.16 For my online teaching, I keep abreast of my subject specialty all the time.

Table 11 Approach two for identifying conceptions of teaching and enacted practice. Nine student-centred indicators developed from Bain's 'what the best teachers do' (Bain, 2004) adapted to online education by Brinthaup et al. (2011)

Category	Question prompt
Stimulate intellectual development	Utilise engaging tasks students will find interesting. Utilise a variety of technologies such as videos or podcasts. Facilitate discussion forums where students explore concepts and develop deep knowledge together. Utilise technology for real-time engagement with groups of students (e.g. Live Rooms)
Foster student engagement	Develop group cohesiveness, helping students work together for mutual benefit. Use discussion forums to facilitate social interaction between students. Create a friendly, social atmosphere where deep learning is encouraged.
Build rapport with students	Use introductory videos or other self-disclosure methods to humanise yourself to students. Consciously build rapport with each individual student.

Table 12 Survey questions regarding teaching context factors that affect enacted practice

Question	Answer options
How often does workload prevent you from implementing teaching a practice you think would be beneficial?	Never; Rarely, Sometimes; Often; Always.
Do small online classes (< 5 students) negatively or positively influence what teaching practices you use?	Positive—small class sizes allow me to implement my preferred teaching practices; Negative—small class sizes prevent me from implementing my preferred teaching practices; Neither—small class sizes have no influence on what teaching practices I implement; Both—small class sizes positively support some practices I like to use but prevent other practices I like to use.
Do large class sizes (< 75 students) negatively or positively influence what teaching practices you use?	Positive—large class sizes allow me to implement my preferred teaching practices; Negative—large class sizes prevent me from implementing my preferred teaching practices; Neither—large class sizes have no influence on what teaching practices I implement; Both—large class sizes positively support some practices I like to use but prevent other practices I like to use.
Does the 12-week course duration negatively or positively influence what teaching practices you implement?	Positive—12-week course duration enables me to implement my preferred teaching practices; Negative—12-week course duration prevents me from implementing my preferred teaching practices; Neither—course duration has no influence on what teaching practices I implement.
Complying with unit of competency prevents me from teaching content that I think is important for my students.	Never; Rarely; Sometimes; Often; Always
Complying with units of competency prevents me from implementing preferred teaching practices.	Never; Rarely; Sometimes; Often; Always

Abbreviations

I.T.: Information technology; LMS: Learning management system; SPSS: IBM Statistical Package for the Social Sciences; VET: Vocational education and training

Acknowledgements

We acknowledge and thank the contributions from the online VET teachers who freely gave of their time and shared their perspectives, thereby enabling this work to be completed.

Authors' contributions

DC conceived the study, carried out the data collection and its analysis, and drafted this manuscript. SP guided the design of the study, supervised its analysis, and helped draft the manuscript. Both authors read and approved the final manuscript.

Authors' information

Deniese Cox is a full-time scholarship PhD candidate and sessional lecturer in online pedagogy at Griffith University. Her PhD research is situated in the largest education sector in Australia, vocational education, and is focused on the fastest growing field of education, teaching online. Deniese's thesis investigates factors that affect teaching practice online. She transitioned to adult education in 2011 when called on to utilise her two decades' experience in executive corporate roles to develop and teach management and leadership programs firstly in China and later online. In 2014, Deniese added a Master of Learning and Development to her 2010 MBA (Hon), and she has been awarded by Griffith University for her work building university-industry relationships.

Sarah Prestridge is a Senior Lecturer at Griffith University, Brisbane. Sarah's principle research contributions are in the area of self-generating professional learning, teacher beliefs, and digital pedagogies. She has extensive experience in teacher change theory, core processes of professional development and an understanding and application of technological environments to engage and direct constructive discourse, reflection and investigation. Conceptualising what is considered effective pedagogy in a digital world has been a major part of her research. Since the completion of her PhD in 2007, Sarah has developed and refined a model of technology-supported professional development which enables teachers to change their pedagogical beliefs and practices. She has been exploring the benefits of virtual tools for teacher professional development and the conceptualisation of continuous professional learning through social

networks. Sarah has developed a typology of teacher's beliefs and practices concerning the use of technologies in twenty-first century classrooms.

Funding

Not applicable.

Availability of data and materials

Participant consent was obtained with the understanding that data sets resulting from the digital survey would remain available only to these authors. Therefore, data cannot be made available.

Ethics approval and consent to participate

All participation in this research project was voluntary, and written informed consent protocols were followed throughout. Ethics approval was granted by the authors' university in November 2017 and by the research host site in November 2017. Data was collected in 2018.

Consent for publication

The authors consent for this manuscript to be published by *Research and Practice in Technology Enhanced Learning*.

Competing interests

The authors declare that they have no competing interests.

No funding was obtained or utilised to complete this research; however, the first author is a 3-year doctoral candidate receiving a scholarship stipend.

Received: 15 January 2020 Accepted: 6 July 2020

Published online: 14 July 2020

References

- Akyol, Z., Vaughan, N., & Garrison, D. R. (2011). The impact of course duration on the development of a community of inquiry. *Interactive Learning Environments*, 19(3), 231–246.
- Arbaugh, J. B., Bangert, A., & Cleveland-Innes, M. (2010). Subject matter effects and the Community of Inquiry (CoI) framework: An exploratory study. *The Internet and Higher Education*, 13, 37–44.
- Atkinson, G., & Stanwick, J. (2016). Trends in VET: Policy and participation. Retrieved from https://www.ncver.edu.au/__data/assets/pdf_file/0017/60722/Trends-in-VET.pdf.
- Australian Department of Education and Training. (2016). Redesigning VET FEE-HELP: Discussion paper. Canberra: Australian Government. Retrieved from <https://docs.education.gov.au/documents/redesigning-vet-fee-help-discussion-paper>.
- Bain, K. (2004). *What the best college teachers do*. Cambridge, Mass: Harvard University Press.
- Banas, J. R., & Velez-Solic, A. (2013). Designing effective online instructor training and professional development. In J. Keengwe, & L. Kyei-Blankson (Eds.), *Virtual mentoring for teachers: Online professional development practices*, (pp. 1–25). Hershey, PA, USA: IGI Global.
- Baran, E. (2011). The transformation of online teaching practice: Tracing successful online teaching in higher education. (Doctor of Philosophy Ph.D.), Iowa State University, Ann Arbor. ProQuest Central; ProQuest Dissertations & Theses Global database.
- Black, S. R., & Reich, A. J. (2010). The elephant in the room: Audit culture and TAFE teachers. Paper presented at the 13th Annual Conference VT Research: Leading and responding in turbulent times, Gold Coast, Australia.
- Brennan, R. E., McFadden, M., & Law, E. (2001). *All that glitters is not gold: Online delivery of education and training*. Adelaide: National Centre for Vocational Education Research.
- Brinthaupt, T. M., Fisher, L. S., Gardner, J. G., Raffo, D. M., & Woodard, J. B. (2011). What the best online teachers should do. *MERLOT Journal of Online Learning and Teaching*, 7(4), 515–524.
- Chang, W. W. (2016). Digital competence and professional development of vocational education and training teachers in Queensland. (Master of Art (Research)), Queensland University of Technology, Brisbane. VOCEDplus database.
- Clark, C. M., & Peterson, P. L. (1986). Teachers' thought processes. In M. C. Wittrock (Ed.), *Handbook of research on teaching*, (3rd ed.,). New York: Macmillan Library Reference.
- Cohen, J. W. (1988). *Statistical power analysis for the behavioral sciences*, (2nd edn). Hilldale, NJ: Lawrence Erlbaum Associates.
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education*, (7th ed.,). Oxon, UK: Routledge.
- Conrad, B. (2012). Intentions and beliefs: Why they matter and a conceptual framework for understanding them in culturally responsive teachers. *Curriculum and Teaching Dialogue*, 14, 87–99.
- Cox, S., Black, J., Heney, J., & Keith, M. (2008). Promoting teacher presence: Strategies for effective and efficient feedback to student writing online. *TETYC*, 42(4), 376–391.
- Creswell, J. W. (2011). Controversies in mixed methods research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (pp. 269–283). California: SAGE Publications.
- Doyle, A., Seery, N., Canty, D., & Buckley, J. (2019). Agendas, influences, and capability: Perspectives on practice in design and technology education. *International Journal of Technology and Design Education*, 29(1), 143–159.
- Eley, M. G. (2006). Teachers' conceptions of teaching, and the making of specific decisions in planning to teach. *Higher Education*, 51(2), 191–214.
- Ellis, T. J., & Hafner, W. (2003). Engineering an online course: Applying the 'secrets' of computer programming to course development. *British Journal of Educational Technology*, 34(5), 639–650. <https://doi.org/10.1046/j.0007-1013.2003.00356.x>.
- Field, A. (2013). *Discovering statistics using IBM SPSS Statistics*, (4th ed.,). London: SAGE Publications.
- Fowler, C. (2017). The boundaries and connections between the VET and higher education sectors: 'confused, contested and collaborative'. Retrieved from Adelaide: https://www.ncver.edu.au/__data/assets/pdf_file/0027/158706/Boundaries_-and_-connections_between_VET_-and_-higher_ed_sectors.pdf.

- Gibbons, R. E., Villafañe, S. M., Stains, M., Murphy, K. L., & Raker, J. R. (2018). Beliefs about learning and enacted instructional practices: An investigation in postsecondary chemistry education. *Journal of Research in Science Teaching*, 55(8), 1111–1133.
- González, C. (2009). Conceptions of, and approaches to, teaching online: A study of lecturers teaching postgraduate distance courses. *Higher Education*, 57(3), 299–314. <https://doi.org/10.1007/s10734-008-9145-1>.
- González, C. (2010). What do university teachers think eLearning is good for in their teaching? *Studies in Higher Education*, 35(1), 61–78. <https://doi.org/10.1080/03075070902874632>.
- González, C. (2012). The relationship between approaches to teaching, approaches to e-teaching and perceptions of the teaching situation in relation to e-learning among higher education teachers. *Instructional Science*, 40(6), 975–998.
- González, C. (2013). E-teaching in undergraduate university education and its relationship to approaches to teaching. *Informatics in Education*, 23(2), 92–92.
- Gordon, M. (2016). Why should scholars keep coming back to John Dewey? *Educational Philosophy and Theory*, 48(10), 1077–1091. <https://doi.org/10.1080/00131857.2016.1150800>.
- Griffin, T., & Mihelic, M. (2019). Online delivery of VET qualifications: Current use and outcomes. Retrieved from Adelaide: https://www.ncver.edu.au/__data/assets/pdf_file/0040/7682296/Online-delivery-of-VET-qualifications.pdf.
- Harris, R., & Hodge, S. (2009). A quarter of a century of CBT: The vicissitudes of an idea. *International Journal of Training Research*, 7(2), 122–133. <https://doi.org/10.5172/ijtr.7.2.122>.
- Harshman, J., & Stains, M. (2017). A review and evaluation of the internal structure and consistency of the Approaches to Teaching Inventory. *International Journal of Science Education*, 39(7), 918–936. <https://doi.org/10.1080/09500693.2017.1310411>.
- Hodge, S. (2014). Interpreting competencies in Australian vocational education and training: Practices and issues. Retrieved from Adelaide: https://www.ncver.edu.au/__data/assets/file/0026/9098/interpreting-competencies-2696.pdf.
- Hornik, S., Saunders, C. S., Li, Y., Moskal, P. D., & Dzuiban, C. D. (2008). The impact of paradigm development and course level on performance in technology-mediated learning environments. *Informing Science: the International Journal of an Emerging Transdiscipline*, 11, 35–58.
- Jaggars, S. S., & Xu, D. (2013). Predicting online student outcomes from a measure of course quality. Retrieved from New York: <https://ccrc.tc.columbia.edu/media/k2/attachments/predicting-online-student-outcomes.pdf>.
- Jensen, L., Price, L., & Roxå, T. (2019). Seeing through the eyes of a teacher: Differences in perceptions of HE teaching in face-to-face and digital contexts. *Studies in Higher Education*, 45(6), 1149–1159.
- Kember, D. (1997). A reconceptualization of the research into university academics' conceptions of teaching. *Learning and Instruction*, 8(3), 255–275.
- Kember, D., & Kwan, K.-P. (2000). Lecturers' approaches to teaching and their relationship to conceptions of good teaching. *Instructional Science*, 28(5), 469–490.
- Kemmis, R. B., & Green, A. (2013). Vocational education and training teachers' conceptions of their pedagogy. *International Journal of Training Research*, 11(2), 101–121. <https://doi.org/10.5172/ijtr.2013.11.2.101>.
- Kemmis, R. B., Hodge, S., & Bowden, A. (2014). Transferable skills in Technical and Vocational Education and Training (TVET): Implications for TVET teacher policies in Australia. *The Online Journal for Technical and Vocational Education and Training in Asia*, 3.
- Kennedy, M. M. (2010). Attribution error and the quest for teacher quality. *Educational Researcher*, 39(8), 591–598.
- Kilgour, P., Reynaud, D., Northcote, M., McLoughlin, C., & Gosselin, K. P. (2019). Threshold concepts about online pedagogy for novice online teachers in higher education. *Higher Education Research and Development*, 38(7), 1417–1431. <https://doi.org/10.1080/07294360.2018.1450360>.
- Lowenthal, P. R., Nyland, R., Jung, E., Dunlap, J. C., & Kepka, J. (2019). Does class size matter? An exploration into faculty perceptions of teaching high-enrollment online courses. *American Journal of Distance Education*, 33(3), 152–168.
- Murphy, E., & Rodríguez-Manzanares, M. A. (2012). Rapport in distance education. *International Review of Research in Open and Distance Learning*, 13(1), 167–190.
- National Centre for Vocational Education Research. (2018). Total VET students and courses 2017: Data slicer. Retrieved from Adelaide: <https://www.ncver.edu.au/research-and-statistics/data/all-data/total-vet-students-and-courses-2017-data-slicer>
- National Centre for Vocational Education Research. (2019). Total VET students and courses 2018. Retrieved from Adelaide: https://www.ncver.edu.au/__data/assets/pdf_file/0031/6925090/Total-VET-students-and-courses-2018.pdf
- Niess, M. L. (2011). Investigating TPACK: Knowledge growth in teaching with technology. *Journal of Educational Computing Research*, 44(3), 299–317. <https://doi.org/10.2190/EC.44.3.c>.
- Norton, L., Richardson, J., Hartley, J., Newstead, S., & Mayes, J. (2005). Teachers' beliefs and intentions concerning teaching in higher education. *Higher Education*, 50(4), 537–571.
- Owens, T. (2015). Practising what they preach? An investigation into the pedagogical beliefs and online teaching practices of National Teaching Fellows. *International Journal for Academic Development*, 20(1), 76–92.
- Pallant, J. (2016). *SPSS survival manual*, (16th ed.,). Sydney: Allen & Unwin.
- Productivity Commission. (2011). Productivity Commission research report: Vocational education and training workforce. Retrieved from Canberra: <https://www.pc.gov.au/inquiries/completed/education-workforce-vocational/report>.
- Productivity Commission. (2019). Report on government services 2019: Chapter 5 Vocational education and training. Retrieved from Canberra: <https://www.pc.gov.au/research/ongoing/report-on-government-services/2019/child-care-education-and-training/vocational-education-and-training/rogs-2019-partb-chapter5.pdf>
- Redmond, P. (2011). From face-to-face teaching to online teaching: Pedagogical transitions. Paper presented at the ascilite 2011, Hobart. <http://www.ascilite.org/conferences/hobart11/downloads/papers/Redmond-full.pdf>
- Reeson, A., Mason, C., Sanderson, T., Bratanova, A., & Hajkovicz, S. (2016). The VET era: Equipping Australia's workforce for the future digital economy. Retrieved from <http://www.tafeqld.edu.au/resources/pdf/about-us/research-papers/vet-era.pdf>
- Regan, K., Evmenova, A., Baker, P., Jerome, M. K., Spencer, V., Lawson, H., & Werner, T. (2012). Experiences of instructors in online learning environments: Identifying and regulating emotions. *The Internet and Higher Education*, 15, 204–212.
- Rodrigues, H., Almeida, F., Figueiredo, V., & Lopes, S. L. (2019). Tracking e-learning through published papers: A systematic review. *Computers & Education*, 136, 87–98. <https://doi.org/10.1016/j.compedu.2019.03.007>.

- Sadler, I. (2012). The challenges for new academics in adopting student-centred approaches to teaching. *Studies in Higher Education*, 37(6), 731–745. <https://doi.org/10.1080/03075079.2010.543968>.
- Samuelowicz, K. (1999). Academics' educational beliefs and teaching practices. (PhD), Griffith University, Brisbane.
- Samuelowicz, K., & Bain, J. D. (1992). Conceptions of teaching held by academic teachers. *Higher Education*, 24(1), 93–111.
- Schmidt, T. (2019). When the whole is more than the sum of its parts: Investigating ways that advanced skills for VET teachers are conceptualised and how they are developed. (Doctor of Philosophy), Griffith University, Brisbane, Queensland.
- Shi, L., Delahunty, J., & Gao, X. (2018). Constraints preventing Chinese EFL teachers from putting their stated beliefs into teaching practice. *Professional Development in Education*, 45(15), 774–789.
- Simons, M., Harris, R., Pudney, V., & Clayton, B. (2008). Careers in vocational education and training: What are they really like? Retrieved from Adelaide: https://www.ncver.edu.au/__data/assets/file/0018/10782/careers-in-vocational-education-and-training-2114.pdf
- Smith, E., Hodge, S., & Yasukawa, K. (2015). VET teacher education in Australian universities: Who are the students and what are their views about their courses? *Research in Post-Compulsory Education*, 20(4), 419–433. <https://doi.org/10.1080/13596748.2015.1081752>.
- Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research*, 15(2016), 157–190.
- Tondeur, J., van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review of qualitative evidence. *Educational Technology Research and Development*, 65(3), 555–575. <https://doi.org/10.1007/s11423-016-9481-2>.
- Trinidad, J. E. (2019). Understanding student-centred learning in higher education: students' and teachers' perceptions, challenges, and cognitive gaps. *Journal of Further and Higher Education*, 44(8), 1–11.
- Waters, M., Simon, L., Simons, M., Davids, J., & Harreveld, B. (2015). A case for scholarly activity in vocational education in Australia. *Higher Education, Skills and Work-Based Learning*, 5(1), 14–31. <https://doi.org/10.1108/heswbl-08-2014-0038>.
- Westbrook, J., Durrani, N., Brown, R., Orr, D., Pryor, J., Boddy, J., & Salvi, F. (2013). Pedagogy, curriculum, teaching practices and teacher education in developing countries (Final Report). Education Rigorous Literature Review (2110). Retrieved from Sussex: <https://eppi.ioe.ac.uk/cms/Portals/0/PDF%20reviews%20and%20summaries/Pedagogy%202013%20Westbrook%20report.pdf?ver=2014-04-24-121331-867>.
- Wheelahan, L. (2005). Theorising the relationship between the individual, knowledge and skill. Paper presented at the AVET RA 2005 - Emerging futures: Recent, responsive and relevant research, Brisbane. <http://www.avetra.org.au/documents/PA037Wheelahan.pdf>
- Wheelahan, L. (2009). The problem with CBT (and why constructivism makes things worse). *Journal of Education and Work*, 22(3), 227–242.
- Wheelahan, L., & Moodie, G. (2011). The quality of teaching in VET: Final report and recommendations: Australian College of Educators.

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