An Illustration of Teaching and Assessment Practices of the "Conceptual Framework" as a Threshold Concept

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Abstract: Threshold concepts are critical to student learning, providing gateways to understanding particular fields or disciplines. This paper adopts this idea of threshold concepts and relevant teaching and assessment practices to illustrate its use in postgraduate students' teaching and learning activities when developing a conceptual framework for their research. This paper addresses several key topics, namely: (1) How conceptual frameworks are introduced and explained; (2) Differentiating quantitative variance conceptual frameworks from qualitative process conceptual frameworks; (3) Explaining and illustrating how to conduct process theory in qualitative research using the case study method, grounded theory method, and critical incident technique; and (4) Illustrating the role of formative and summative assessment as a form of scaffolding in the teaching and learning process.

Keywords: threshold concepts, conceptual framework, leadership process, teaching research design

1. Introduction

Numerous challenges are encountered by lecturers, research supervisors and students alike in teaching and applying research methods at a postgraduate level (Sverdlik, Hall, McAlpine, & Hubbard 2018). Furthermore, research suggests that postgraduate students expect to be taught how to apply research-based knowledge rather than discover it themselves (Albertyn, van Coller-Peter, & Morrison 2018). Consequently, team teaching and supervision models are more effective than having a single supervisor guide a research candidate (Agné & Mörkenstam 2018). Research supervision is increasingly recognised as a form of teaching (Bruce & Stoodley 2013; McCallin & Nayar 2012). Structured programmes are often offered at a postgraduate level to support postgraduate research and the socialisation of research candidates (Sverdlik, Hall, McAlpine, & Hubbard 2018).

Some of the more challenging areas in teaching research methods include academic writing, reviewing the literature to demonstrate originality, conducting research in a manner that is coherent with the research paradigm, analysing and interpreting data, and conducting ethical research (Humphrey & Simpson 2012; Kiley 2009, 2015, 2017; Kiley & Wisker 2009; Smith 2016; Wilkins, Neri, & Lean 2019).

This paper aims to illustrate the teaching and assessment practices adopted in introducing postgraduate research students to conceptual frameworks, viewing the notion of a conceptual framework as a threshold concept. Firstly, the literature on threshold concepts is introduced as a perspective for educators to adopt in identifying and handling the complex and critical concepts that underpin these challenging research tasks. After that, the "conceptual framework" is introduced as an example of a threshold concept. Finally, the largest portion of the paper is dedicated to illustrating how the author taught conceptual frameworks as a threshold concept before ending with some implications and conclusions.

2. Threshold concepts

In the teaching and learning literature, threshold concepts are critical to student learning (Wright & Hibbert 2015). They serve as gateways to understanding, can be transformative, providing critical insights into the field or discipline, and shape how students "'think' in a particular discipline, or how they perceive, apprehend, or experience particular phenomena …" (Meyer & Land 2003, p. 424). According to Meyer and Land (2003), threshold concepts are transformative, irreversible, integrative, bounded, and troublesome. Firstly, they are transformative. By implication, not every concept in a field, discipline or subject is a threshold concept, but rather is limited to those concepts that change how students think. In learning and development, grasping threshold concepts has been compared to a rite of passage or a state of liminality, of being stuck and then getting unstuck, and has been applied to the development process of PhD candidates and research supervisors (Burger 2016; Maistry 2017; McKenna 2017). Threshold concepts are irreversible in that they are unlikely to be forgotten. They are integrative in connecting other learning that was thought unrelated to create a more holistic view (Kiley, 2019). Fourthly, threshold concepts are bounded in that they demarcate disciplinary areas and their

boundaries (Barradell & Fortune 2020), thereby differentiating them from other disciplines. According to Barradell and Fortune (2020), these boundaries help shape a disciplinary mindset and ways of thinking and practising within a discipline or profession. Finally, threshold concepts are troublesome in that they are often counterintuitive, alien to students' experiences or appear to be incoherent to them. As a result of this combination of characteristics, threshold concepts are critical for educators to address through their teaching and learning activities. However, simultaneously, they are hard for students to grasp.

The literature on threshold concepts has been expanding over the past 15 years or more, and a list of resources from 2003 to 2018 was compiled by Flanagan (see https://www.ee.ucl.ac.uk/~mflanaga/thresholds.html). Despite this interest in threshold concepts, few guidelines were available on how to identify and embed threshold concepts in curriculum design. Meyer and Timmermans (2016) then introduced their "Integrated Threshold Concept Knowledge" framework, which, more recently, has been further explicated (Timmermans & Meyer 2019). Much of the literature on threshold concepts was initially applied at the undergraduate level and later adopted at the postgraduate level (Kang et al. 2022; Lindsay, Jack, & Ambrosini 2018) and taught students about research. The research conducted at the postgraduate level has mainly been focused on the doctoral level (Kiley, 2019), and Flanagan's list includes a section on "Research Education and Doctoral Studies" (https://www.ee.ucl.ac.uk/~mflanaga/thresholdsR.html#resed). Research-related themes have focused on supervision (Keefer 2015) and the development of the research capacity and skills of the PhD candidate in general (Kang et al. 2022), but also examine specific topics such as academic writing (Iermolenko, Aleksandrov, Nazarova, & Bourmistrov 2021).

The few research concepts that have received attention as threshold concepts include writing up qualitative data, sustaining an argument, theory or theorising, research paradigms, knowledge creation/originality, data analysis and interpretation, research ethics, and conceptual frameworks (Humphrey & Simpson 2012; Kiley 2009, 2015, 2017; Kiley & Wisker 2009; Smith 2016). There is also some evidence suggesting that research-related skills develop sequentially, with skills related to the literature review (including formulating conceptual frameworks) developing first. In contrast, skills related to the analysis of data and drawing of conclusions develop later (Timmerman et al. 2013). However, there seem to be relatively few publications that illustrate the teaching and learning practices associated with threshold concepts in postgraduate research in general, let alone "conceptual frameworks".

Looking more broadly at the teaching of threshold concepts outside of postgraduate research, educators that have addressed the challenges of teaching threshold concepts have adopted various teaching and learning techniques. These techniques include providing readings to students and holding discussions or workshops (Kiley 2009), adopting active learning techniques such as role-plays and presentations (Nicola-Richmond, Pépin, Larkin, & Taylor 2018), conducting tutorials and creating communities of practice (Leshem 2007), contrasting the everyday frameworks of students with scientific frameworks (Davies 2019), and enabling peer to peer collaboration (Bhola & Parchoma 2016) to facilitate learning.

This paper aims to illustrate how postgraduate students are taught to conceive and apply a conceptual framework to process-based theories. Several key topics are addressed in lectures and provide a structure for this paper, namely:

- Explaining and illustrating conceptual frameworks.
- Differentiating quantitative variance conceptual frameworks from qualitative process conceptual frameworks.
- Explaining and illustrating how to conduct qualitative research on process-based theories.

In addition, the complementary role of assessment in the teaching and learning process is considered.

The paper specifically illustrates the research design of leadership studies, thereby complementing the work of authors, such as Fischer, Dietz, and Antonakis (2017), who focus is on the leadership phenomenon. However, given the emphasis in the paper on research design, researchers should be able to transfer the ideas presented here to phenomena other than leadership. In order to simplify this illustration of teaching and assessment, like Niederman and March (2018), a pragmatic approach is adopted in exploring *process*. That is, it is agnostic on matters related to ontology and epistemology. As Niederman and March (2018) point out, this stands in contrast to the philosophical approaches to process as advocated by, for example, Whitehead and Demir and Lychnell (2015).

3. Conceptual frameworks

A conceptual framework portrays the status and relationship of several concepts related to a phenomenon of interest (Grant & Osanloo 2014; Jabareen 2009). These frameworks can be investigated quantitatively or qualitatively (Miles, Huberman, & Saldaña 2014; Pearse 2019). The conceptual framework is often presented in the form of a "flowchart, web diagramme or other type of schemata" (Glatthorn, 1998, cited in Leshem & Trafford 2007, p. 98). It is derived through a review of the literature, which provides an overview of the state of the body of knowledge and the gaps in research that need to be addressed, thereby justifying the need for carrying out a particular study (Varpio, Paradis, Uijtdehaage, & Young 2020). In other words, it helps to answer two questions, namely: ""Why is this research important?" and "What contributions might these findings make to what is already known?"" (Varpio, et al., 2020, p. 990). Since the conceptual framework scopes and shapes the research by explicitly displaying the central concepts of a research study and their relationships, it is an essential reference point for supervision and a potential instrument to scaffold learning (Berman & Smyth 2015).

While the terms are sometimes used interchangeably, a distinction has been drawn between theoretical and conceptual frameworks (Wilkins, Neri, & Lean 2019). That is, the conceptual framework shows the relationships between the concepts of interest in a study, with these concepts typically having been drawn from a more comprehensive theoretical framework. The theoretical framework, therefore, shapes the study (Varpio, Paradis, Uijtdehaage, & Young 2020). However, it is quite feasible for researchers to draw upon the same theory and produce different conceptual frameworks for different studies (Wilkins, Neri, & Lean 2019).

When teaching students how to design a research study, a "conceptual framework" can be recognised as a threshold concept encountered in that students find it troublesome (Alpi & Hoggan 2016; Kiley 2017), and so not surprisingly, it has been a focus of attention in the examination of students' work (Leshem & Trafford 2007). However, a conceptual framework is also transformative in that it can help students shift their practical, applied way of thinking about research towards a more scholarly or academic mode of thinking (Kiley 2009). Since it is produced through reviewing the literature, a conceptual framework is integrative in nature but simultaneously boundary forming as it locates the study within the body of knowledge and sets up its boundaries (Kiley 2009).

The more specific framework and threshold concept of interest in this paper is a process-based conceptual framework. Process theories represent a distinct category or type of theory concerned with "process" and are differentiated from "variance" and "systems" as two alternative categories of theories (Burton-Jones, McLean, & Monod 2015). Given space limitations, the systems category of theory is not discussed here. Rather process and variance theories are compared. A variance perspective assumes that the nature or properties of concepts (or entities) do not change, only their value.

On the other hand, a process perspective recognises that the concepts of interest are changed by a series of events or over time, so the sequencing of these events in time is critical (Burton-Jones, McLean, & Monod 2015). That is, a series of conditions need to occur in a particular sequence for them to have the potential to cause a change (Markus & Robey 1988). Since the nature of the concepts themselves change over time and not only their value, with the unfolding of a series of events, it is not feasible to construct valid and reliable measures of these unstable concepts. Therefore, they can only be investigated using qualitative research approaches. By implication, variance studies' conceptual frameworks differ from those of process-based studies.

4. An illustration of teaching conceptual frameworks

This section of the paper illustrates the teaching of conceptual frameworks. Firstly, the idea of a conceptual framework is introduced, and students are encouraged to generate, illustrate, and discuss the conceptual frameworks for their research studies. After that, quantitative (variance) conceptual frameworks are described and differentiated from qualitative (process) frameworks. Finally, several approaches to developing qualitative, process-based leadership theories are introduced.

4.1 Introducing the basic building blocks

According to Burton-Jones, McLean, and Monod (2015), building a theory consists of two main components: concepts and relationships. These are also the basic building blocks for designing conceptual frameworks. Tom Wujec has developed a "Draw Toast" workshop (see https://www.drawtoast.com/) to apply systems thinking and address wicked problems. Here, the basic building blocks of a systems design are nodes and connectors, which closely resemble the concepts and relationships of Burton-Jones, et al. (2015). This activity is adapted to

a classroom exercise of "Draw how to make a cup of coffee". Students each draw their process diagrams and then compare them with the drawings of others. This comparison leads to further classroom discussion, emphasising the process of design.

After that, examples of conceptual frameworks used in management research are provided, and attention is also drawn to the distinction made in the literature between untested conceptual frameworks and tested conceptual models. Finally, students are asked to draw a diagram illustrating their conceptual framework, showing the main concepts of their research and the relationships between them. In degree programs such as the MBA, the research is of limited scope. Therefore, students are encouraged to identify a theoretical or conceptual framework in the literature and adapt it to derive a simplified conceptual framework representing their research, with far fewer concepts and relationships. Cooperative learning (Slavin 1995) then takes place with students presenting the conceptual frameworks to their peers, explaining what they have drawn, and making modifications in the light of feedback received and their further reviewing of the literature.

4.2 Quantitative conceptual frameworks versus qualitative process frameworks

In quantitative leadership studies, an input-output model is dominant, with a questionnaire typically being the preferred data collection method (Bryman 2004). While quantitative researchers may frequently refer to leadership processes, according to the categories of Burton-Jones, et al. (2015), this research is classified as variance research and not process research. Explaining this distinction to students is an essential step toward explaining qualitative, process-based theories and how their conceptual frameworks differ.

From a quantitative perspective, leadership theories explain the causal relationship between inputs and outputs (Fischer, Dietz, & Antonakis 2017). Therefore, the most basic quantitative relationship is illustrated by an independent and a dependent variable. By definition, a change in the independent variable's level is responsible for a change in the level of the dependent variable. More complex quantitative conceptual frameworks build on this fundamental relationship, creating a configuration of various types of variables. A summary of the main types of variables is included in Table 1. These types of variables are illustrated in class through a lecture and supplemented with a reading that explains these various quantitative conceptual frameworks and provides research articles that exemplify each case.

Table 1: Illustrating the configuration of quantitative variables

Variable or Model Type	Explanation	Statistical tests	Examples
Situational variables	Situational variables incorporate physical and social surroundings, temporal and task dimensions, and various antecedent states that affect a variable of interest (Belk 1975).	Correlation analysis or ANOVA (James, Demaree, & Hater 1980).	Contingency theories of leadership in the 1970s and 1980s (House & Aditya 1997). Context in psychological leadership research (Liden & Antonakis 2009).
Moderating variables	Moderation occurs when another variable is introduced that modifies the relationship between an independent or dependent variable by either strengthening, weakening, negating, or otherwise altering the relationship (Allen 2017).	Moderated multiple regression (Jose 2013).	A meta-analysis of the Multifactor Leadership Questionnaire noted that significant moderators of the relationship between leadership style and effectiveness included the level of the leader (high or low) and organizational setting (public or private (Lowe, Kroeck, & Sivasubramaniam 1996).
Mediating variables	A mediating variable is understood as part of a causal chain that is built, whereby the mediator explains to a greater or lesser extent the relationship between the independent and dependent variable (Baron & Kenny 1986). A mediator is, therefore, a causal mechanism in the chain of variables.	Stepwise (Baron & Kenny 1986) or by an analysis of the coefficients of estimated regression equations (MacKinnon & Dwyer 1993).	Gottfredson and Aguinis (2017) established that leader-member exchange was a mediating mechanism between leadership behaviour and its effect on follower performance. Lu, Lau, and Yiu (2012) investigated multiple mediators in their study of transformational leadership.

Variable or Model Type	Explanation	Statistical tests	Examples
Nomological networks	"A lawful pattern of interrelationships that exists between hypothetical constructs and observable attributes …" (Colman 2009).	Structural equation modelling.	Numerous nomological network models for leadership exist, including ethical leadership (Brown, Treviño, & Harrison 2005), servant leadership (Eva et al. 2019), authentic leadership (Gardner, Cogliser, Davis, & Dickens 2011) and the implicit followership theories of leaders (Sy 2010).
Multilevel models	Provide a more integrated explanation of leadership phenomena across various levels (e.g., at a micro and macro level; or individual-, team- and organisational-levels).	Multilevel structural equation modelling.	Maynard, Gilson, and Mathieu (2012) provide a multilevel review of psychological empowerment at the individual, team, and organisational levels. Zhang, Lee, and Wong (2016) investigated servant leadership measures at both the individual and organization levels.

Source: Author's construction

4.3 Explaining and illustrating process theory as a qualitative process

As explained and illustrated earlier, according to Burton-Jones, McLean, and Monod (2015), the quantitative processes referred to above and summarised in Table 1 would be classified under a variance category of theory types. To illustrate to students the distinction between quantitative variance models and qualitative processes, several process models that show qualitatively different stages are explained in a lecture, including:

- The experience of change as a loss (Bridges, Bridges, & Lencioni 2016; Prochaska, Prochaska, & Levesque 2001). This process has been built upon the grieving process of Kübler-Ross (1973), which is characterised by qualitatively distinct phases of denial, anger, bargaining, depression, and acceptance. Not surprisingly, what is viewed as appropriate leadership behaviour in each phase of the process of change differs (see, for example, Kotter 1996).
- The classic forming, storming, norming and performing stages in the development of a team (Tuckman 1965) also require different types of behaviour from the leader at the different stages, to facilitate team development (Rickards & Moger 2000).

As a further example of the distinctly dynamic nature of concepts from a process perspective, the Horila and Siitonen (2020) paper is given as a reading. It shows that relational leadership was not stable, and nor was it developed linearly. Once students grasp the distinctive nature of process theories versus quantitative variance theories, they can develop conceptual frameworks that illustrate these types of processes. After that, the focus of attention in teaching turns to designing a qualitative process-based research strategy for process-based conceptual frameworks.

4.4 Approaches to developing qualitative leadership theories

In class, students are introduced to various qualitative research methods and techniques, with examples being provided of their use in leadership research. While a broader range of research methods can potentially be used, this paper only discusses three possibilities that are taught: the case study method, grounded theory method, and critical incident technique in theory building.

4.4.1 The case study method

Case study research is predominantly concerned about finding explanations to questions of "How?" and "Why?" (Yin 2014). Case studies of process-based explanations typically illustrate a series of unfolding steps or stages over time, with some also explaining the process or identifying its underlying causal mechanisms. The primary function of these mechanisms is not to predict but to explain "how?" (Davis & Marquis 2005). As Davis and Marquis (2005, p. 336) elaborate, "If a regression tells us about a relation between two variables - for instance, if you wind a watch it will keep running - mechanisms pry the back off the watch and *show how*." Several mechanisms can be identified, including situational, action formation, transformational, environmental, cognitive, and relational (Davis & Marquis 2005). For example, Beyer and Browning (1999) explained how

charisma was routinised through administrative structural arrangements, succession planning and strategic and cultural initiatives. These various types of mechanisms can be analysed using, among other methods, a case study approach.

Five analytic techniques of case studies have been proposed by Yin (2014), which can all be used in process-based research:

- Pattern matching may be employed to match the process observed in the data to a theoretical process derived from the literature or presented as a conceptual framework.
- Explanation building attempts to identify the causal links that explain "how" or "why" something occurred as it did.
- Time-series analysis seeks to map out changes over time by compiling a chronology of events and their causes.
- The logic model explains why a sequence of events unfolded as it did by referring to an existing theory that provides a causal explanation and determining if it applies to the case at hand. This causal explanation can be analysed at an individual, organisational or programme level. As such, it is a type of pattern matching.
- Cross-case synthesis is used to analyse multiple cases, such as investigating leaders' learning processes in international organisational settings (Bingham, Eisenhardt, & Davis 2007). It can also be helpful in analysing processes across levels, if the cases are nested, such as in the example of O'Kane's (2006) study on leading a turnaround.

4.4.2 The grounded theory method

Mechanisms explain the occurrence of a process. Therefore, in contrast to events-based stepwise processes, which answer the question "how?", mechanisms are distinct in addressing "why?" questions. One popular qualitative research method that aims to explicate mechanisms is grounded theory. That is, grounded theory intends to generate a theory or explanation for a basic social process (Goulding 2002). For example, in the grounded theory study of Kan and Parry (2004), "identifying paradox" emerged as a basic social process in their investigation of leadership overcoming resistance to change in a New Zealand hospital.

Processes can consist of a series of events and/or activities, where events refer to something that happens to leaders, while activities are initiated by leaders who demonstrate agency (Niederman & March 2018). In grounded theory studies, which seek to explicate basic social processes, this agency is reflected in the paradigm model as action/interaction strategies (Strauss & Corbin 1990). In their grounded theory study, Haque, Liu, and Titi Amayah (2017) showed how leaders who were patient during decision-making were better able to cultivate a collaborative culture, encourage growth, and attain organisational goals and objectives.

4.4.3 The critical incident technique

Originally designed as a quantitative observation-based technique by Flanagan (1954), the critical incident technique was subsequently adapted as a qualitative technique for gathering and analysing interview data (Chell 2004). The critical incident technique has also been used to provide structure to the collection of data, with an alternative method of data analysis being applied, such as content analysis (Ellinger & Cseh 2007), grounded theory (Hamlin & Whitford 2020), or thematic analysis (Ruiz, Hamlin, & Esparza Martinez 2014). The qualitative version of the critical incident technique provides one approach to exploring the unfolding of events and behaviours related to the occurrence of the critical incident.

For example, Bott and Tourish (2016) investigated the leadership dynamics in 18 diverse non-profit organisations. While the technique has tended to focus on significant events (Bott & Tourish 2016), a growing number of studies have used it to investigate the effects of routine activities in shaping behaviour (Ellinger & Cseh 2007; Ruiz, Hamlin, & Esparza Martinez 2014). For example, Parzefall and Coyle-Shapiro (2011) studied how employees made sense of a breach in the psychological contract and reported how employees attributed responsibility for the breach (typically to their immediate manager) and found an explanation for its occurrence.

4.5 The role of assessment

Having illustrated how conceptual frameworks are taught, it is now possible to explain the complementary assessment tasks that can support teaching and learning. For deep learning to occur, course outcomes, the teaching and learning activities, and the assessment tasks must all be aligned (Biggs & Collis 2014). Well-designed

formative and summative assessment tasks have been shown to facilitate student progress with their research projects (Pearse 2012; Vickerman 2009) and are a form of scaffolding. Scaffolding in education has its origins in the work of Vygotsky (1962) and refers to the interactional support that is provided to mediate learning in the zone of proximal development. Assessment can be used to drive student learning, especially when feedback is viewed as a dialogue between the student and teacher (or supervisor), then higher quality instruction, guidance and learning occur – including when feedback is about the mistakes that students have made (Ramsden, 1992). Well-designed assessment tasks, therefore, provide direction to students. Thus, Lovitts (2007) argues for greater transparency in the assessment of PhD research, suggesting that making the unspoken rules for assessment more explicit will make them more transparent to students. They will then be able to prepare more effectively and produce better quality work. In other words, detailed assessment guidelines provide postgraduate research students with much-needed structure, facilitating their learning and research endeavours.

Several formative and summative assessment tasks form part of the research course for which the teaching of conceptual frameworks has been illustrated. Firstly, students are taught how to search for and review relevant literature to design conceptual frameworks. They are then required to choose a research topic from a list provided by potential supervisors and develop a conceptual framework for a research topic that they may or not ultimately pursue. Detailed instructions are given, and this task is assessed against four main criteria, namely:

- *The Conceptual model*: A clear and concise figure representing the key concepts and their relationships is presented.
- *Definition of concepts*: Current, clear, and relevant formal definitions of the key concepts in the conceptual model are presented.
- *Statement of research proposition(s)*: Based upon the conceptual model, at least one proposition is stated in a manner that can be developed into a research question or hypothesis.
- *Description and log of search process*: A complete and detailed table is included logging the literature search process that was followed. Sound explanations are given for search decisions.

Students then have a second opportunity to develop the conceptual framework for their specific research topic. After students have received peer feedback on their conceptual frameworks, they prepare a presentation of their intended research that includes the conceptual framework and receive feedback from their supervisor on this research idea, including the conceptual framework. This formative assessment task is followed by another summative literature assignment built around the conceptual framework, and that is assessed using the following main criteria:

- *Clarity*. The conceptual framework is clearly explained and illustrated so that the relationships between the different elements/variables/phenomena are evident.
- *Soundness of the Framework*. The construction of the conceptual framework is well-argued and supported by the literature and research studies.
- *Conceptual clarity*. All key terms of the conceptual framework are clearly defined, referring to and using current and quality scholarly sources.
- *Research propositions*. Research propositions are clearly stated. It is evident how these propositions have been derived from the literature. The research propositions address a gap in the literature.
- *Theoretical underpinning*. The relevance of an underpinning theory to the framework is evident.

As illustrated by the sequencing of the assessment tasks, they are incremental, ensuring that appropriate scaffolding is provided in support of learning. Later assessment tasks build on earlier feedback provided to students and become more complex and demanding so that students can ultimately formulate a conceptual framework that forms the basis for their research proposal. Furthermore, this structured approach includes supervisors as assessors and supports and complements their supervision of the students.

5. Implications for postgraduate teaching

Several implications emerge from this brief overview of teaching and assessment activities to introduce postgraduate students to conceptual frameworks as a threshold concept. Firstly, research supervisors should acknowledge that their students expect to be taught how to design and conduct research (Albertyn, van Coller-Peter, & Morrison 2018). Therefore they should embrace the teaching role within their supervisory practice (Murphy, Bain, & Conrad 2007; Van Veldhuizen, Oostdam, Enthoven, & Snoek 2021). One way to do so is to identify those concepts and skills that are both difficult and critical to successfully conducting research. Supervisors can then provide teaching and learning opportunities in these areas. If supervisors identify these as

threshold concepts, it can be a helpful framing of these challenging areas and provide postgraduate students with the scaffolding they need.

Secondly, a distinction is evident between quantitative and qualitative understandings of, and approaches to, the idea of process in theory building and testing. This distinction must be made explicit to students so that they can successfully navigate their review of the literature. For example, the research methods utilised in the literature need to be identified and included in reviews. This will ensure that the nature and (in)stability of the investigated concepts are clearly understood. By extension, when identifying the gaps in the literature, researchers may find it necessary to view quantitative and qualitative studies as two separate bodies of literature. This may aid in problematisation or gap-spotting (Sandberg & Alvesson 2011) to demonstrate the intended contribution of the research. For example, adopting a different research approach to that prevalent in the literature can also create an opportunity to make an original contribution to the existing body of knowledge.

6. Conclusion

This paper has aimed to illustrate how postgraduate students are taught to conceive of and apply a conceptual framework to their research studies. In describing these teaching and assessment practices, given the space limitations of this paper, a pragmatic approach was adopted. As a result, this paper did not, for example, get to explore the philosophical underpinnings of process-based research. For a more detailed discussion of the ontology and epistemology of the topic of "process", readers are referred to the work of Demir and Lychnell (2015). Furthermore, it has not been possible to include mixed-method research designs that focus on the leadership process, even though there are examples of such studies (see Karsten & Hendriks 2017; Lyndon, Pandey, & Navare 2020; Serban & Roberts 2016).

Hopefully, in teaching how quantitative and qualitative researchers differ in their approaches to the investigation of leadership behaviour, this paper has achieved a greater appreciation of conceptual frameworks as a gateway or "portal" (Meyer & Land 2003) to understanding *process* in leadership behaviour research. In addition, it is hoped that educators and supervisors alike can adopt some of these ideas in their teaching and supervision practices.

References

Allen, M (ed.), 2017, 'Variables, Moderating Types', in *The SAGE Encyclopedia of Communication Research Methods*, SAGE Publications, Inc, Thousand Oaks California. doi: 10.4135/9781483381411.n666.

Agné, H & Mörkenstam, U, 2018, 'Should first-year doctoral students be supervised collectively or individually? Effects on thesis completion and time to completion', *Higher Education Research & Development*, vol. 37, no. 4, pp. 669–682, doi: 10.1080/07294360.2018.1453785.

Albertyn, R, van Coller-Peter, S, & Morrison, J, 2018, 'A multi-level researcher development framework to address contrasting views of student research challenges', *South African Journal of Higher Education*, vol. 32, no. 1, pp. 13–30, doi: 10.20853/32-1-1639.

Alpi, K & Hoggan, C, 2016, 'Recognizing the Value of Threshold Concepts: Application of a Conceptual Tool to Professional Students Learning to Be Researchers', *The Reference Librarian*, vol. 57, no. 2, pp. 114–130. doi: 10.1080/02763877.2016.1121070.

Baron, RM & Kenny, DA, 1986, 'The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations', *Journal of Personality and Social Psychology*, vol. 51, no. 6, pp. 1173–1182.

Barradell, S & Fortune, T, 2020, 'Bounded – The neglected threshold concept characteristic', *Innovations in Education and Teaching International*, vol. 57, no. 3, pp. 296–304, doi: 10.1080/14703297.2019.1657034.

Belk, RW, 1975, 'Situational Variables and Consumer Behavior', *Journal of Consumer Research*, vol. 2, no. 3, pp. 157–164. doi: 10.1086/208627.

Berman, J & Smyth, R, 2015, 'Conceptual frameworks in the doctoral research process: a pedagogical model', *Innovations in Education and Teaching International*, vol. 52, no. 2, pp. 125–136. doi: 10.1080/14703297.2013.809011.

Beyer, JM & Browning, LD, 1999, 'Transforming an industry in crisis: Charisma, routinization, and supportive cultural leadership', vol. 10, no. 3, pp. 483–520.

Bhola, S & Parchoma, G, 2016, 'Threshold concepts and conceptual change processes', *Learning and Teaching*, vol. 1, no. 12, pp. 33–40.

Biggs, JB & Collis, KF, 2014, Evaluating the quality of learning: The SOLO taxonomy (structure of the observed learning outcome), New York: Academic Press.

Bingham, CB, Eisenhardt, KM, & Davis, JP, 2007, 'Opening the black box of organizational expertise: understanding what firms learn from their process experience and how that learning unfolds over time', Retrieved from https://www.researchgate.net/profile/Jason-Davis-8/publication/228852423.

Bott, G & Tourish, D, 2016, 'The critical incident technique reappraised: Using critical incidents to illuminate organizational practices and build theory', *Qualitative Research in Organizations and Management: An International Journal*, vol. 11, no. 4, pp. 276–300. doi: 10.1108/QROM-01-2016-1351.

Bridges, W, Bridges, S, & Lencioni, P, 2016, *Managing transitions: making the most of change*, 4th edition, Da Capo Lifelong Books, Boston, MA.

Brown, ME, Treviño, LK, & Harrison, DA, 2005, 'Ethical leadership: A social learning perspective for construct development and testing', *Organizational Behavior and Human Decision Processes*, vol. 97, no. 2, pp. 117–134.

Bruce, C & Stoodley, I, 2013, 'Experiencing higher degree research supervision as teaching', *Studies in Higher Education*, vol. 38, no. 2, pp. 226–241, doi: 10.1080/03075079.2011.576338.

Bryman, A, 2004, 'Qualitative research on leadership: A critical but appreciative review', *The Leadership Quarterly*, vol. 15, no. 6, pp. 729–769. doi: 10.1016/j.obhdp.2005.03.002.

Burger, N, 2016, *Liminal spaces : the tacit dimension of the doctoral supervisory relationship*, Southern Cross University, Lismore, Australia, Viewed 25 June 2022, https://researchportal.scu.edu.au/discovery/delivery/61SCU_INST:ResearchRepository/1267161850002368?l#13674 53850002368.

Burton-Jones, A, McLean, ER, & Monod, E, 2015, 'Theoretical perspectives in IS research: from variance and process to conceptual latitude and conceptual fit', *European Journal of Information Systems*, vol. 24, no. 6, pp. 664–679. doi: 10.1057/ejis.2014.31.

Chell, E, 2004, 'Critical Incident Technique', in *Essential Guide to Qualitative Methods in Organizational Research*, Sage Publications, London.

Colman, AM, 2009, 'Nomological network', in *A dictionary of psychology: over 11,000 entries*, Oxford Univ. Press, Oxford, Retrieved from https://www.oxfordreference.com/view/10.1093/oi/authority.20110803100237532.

Davies, P, 2019, 'The construction of frameworks in learners' thinking: Conceptual change and threshold concepts in economics', *International Review of Economics Education*, vol. 30, p. 100-135. doi: 10.1016/j.iree.2018.05.002.

Davis, GF & Marquis, C, 2005, 'Prospects for Organization Theory in the Early Twenty-First Century: Institutional Fields and Mechanisms', *Organization Science*, vol. 16, no. 4, pp. 332–343. doi: 10.1287/orsc.1050.0137.

Demir, R & Lychnell, L-O, 2015, 'Mangling the process: a meta-theoretical account of process theorizing', *Qualitative Research*, vol. 15, no. 1, pp. 85–104. doi: 10.1177/1468794113517390.

Ellinger, AD & Cseh, M, 2007, 'Contextual factors influencing the facilitation of others' learning through everyday work experiences', *Journal of Workplace Learning*, vol. 19, no. 7, pp. 435–452. doi: 10.1108/13665620710819384.

Eva, N, Robin, M, Sendjaya, S, van Dierendonck, D, & Liden, RC, 2019, 'Servant Leadership: A systematic review and call for future research', *The Leadership Quarterly*, vol. 30, no. 1, pp. 111–132. doi: 10.1016/j.leaqua.2018.07.004.

Fischer, T, Dietz, J, & Antonakis, J, 2017, 'Leadership process models: A review and synthesis', *Journal of Management*, vol. 43, no. 6, pp. 1726–1753.

Flanagan, JC, 1954, 'The critical incident technique.', *Psychological Bulletin*, vol. 51, no. 4, p. 327.

Gardner, WL, Cogliser, CC, Davis, KM, & Dickens, MP, 2011, 'Authentic leadership: A review of the literature and research agenda', *The Leadership Quarterly*, vol. 22, no. 6, pp. 1120–1145. doi: 10.1016/j.leaqua.2011.09.007.

Gottfredson, RK & Aguinis, H, 2017, 'Leadership behaviors and follower performance: Deductive and inductive examination of theoretical rationales and underlying mechanisms: Leadership Behaviors and Follower Performance', *Journal of Organizational Behavior*, vol. 38, no. 4, pp. 558–591. doi: 10.1002/job.2152.

Goulding, C, 2002, Grounded theory: a practical guide for management, business and market researchers, SAGE, London.

Grant, C & Osanloo, A, 2014, 'Understanding, Selecting, and Integrating a Theoretical Framework in Dissertation Research: Creating the Blueprint for Your "House"', *Administrative Issues Journal Education Practice and Research*, vol. 4, no. 2, pp. 12–26. doi: 10.5929/2014.4.2.9.

Hamlin, RG & Whitford, S, 2020, 'Perceived managerial and leadership effectiveness within the Canadian public sector', *Human Resource Development Quarterly*, vol. 31, no. 4, pp. 423–448. doi: 10.1002/hrdq.21406.

Haque, MD, Liu, L, & TitiAmayah, A, 2017, 'The role of patience as a decision-making heuristic in leadership', *Qualitative Research in Organizations and Management: An International Journal*, vol. 12, no. 2, pp. 111–129. doi: 10.1108/QROM-01-2015-1263.

Horila, T & Siitonen, M, 2020, 'A Time to Lead: Changes in Relational Team Leadership Processes over Time', *Management Communication Quarterly*, vol. 34, no. 4, pp. 558–584. doi: 10.1177/0893318920949700.

House, RJ & Aditya, RN, 1997, 'The social scientific study of leadership: Quo vadis?', *Journal of Management*, vol. 23, no. 3, pp. 409–473.

Humphrey, R & Simpson, B, 2012, 'Writes of passage: writing up qualitative data as a threshold concept in doctoral research', *Teaching in Higher Education*, vol. 17, no. 6, pp. 735–746, doi: 10.1080/13562517.2012.678328.

Iermolenko, O, Aleksandrov, E, Nazarova, N, & Bourmistrov, A, 2021, 'The "Bermuda triangle" of academic writing', *The International Journal of Management Education*, vol. 19, no. 2, p. 100511, doi: 10.1016/j.ijme.2021.100511.

Jabareen, Y, 2009, 'Building a Conceptual Framework: Philosophy, Definitions, and Procedure', *International Journal of Qualitative Methods*, vol. 8, no. 4, pp. 49–62. doi: 10.1177/160940690900800406.

James, LR, Demaree, RG, & Hater, JJ, 1980, 'A statistical rationale for relating situational variables and individual differences', *Organizational Behavior and Human Performance*, vol. 25, no. 3, pp. 354–364. doi: 10.1016/0030-5073(80)90033-1.

Jose, PE, 2013, *Doing statistical mediation and moderation*, The Guilford Press, New York.

Kan, MM & Parry, KW, 2004, 'Identifying paradox: A grounded theory of leadership in overcoming resistance to change', *The Leadership Quarterly*, vol. 15, no. 4, pp. 467–491. doi: 10.1016/j.leaqua.2004.05.003.

Kang, J, Baker, R, Feng, Z, Na, C, Granville, P, & Feldon, DF, 2022, 'Detecting threshold concepts through Bayesian knowledge tracing: examining research skill development in biological sciences at the doctoral level', *Instructional Science*, vol. 50, no. 3, pp. 475–497, doi: 10.1007/s11251-022-09578-5.

Karsten, N & Hendriks, F, 2017, 'Don't call me a leader, but I am one: The Dutch mayor and the tradition of bridging-and-bonding leadership in consensus democracies', *Leadership*, vol. 13, no. 2, pp. 154–172. doi: 10.1177/1742715016651711.

Keefer, JM, 2015, 'Experiencing doctoral liminality as a conceptual threshold and how supervisors can use it', *Innovations in Education and Teaching International*, vol. 52, no. 1, pp. 17–28, doi: 10.1080/14703297.2014.981839.

Kiley, M, 2009, 'Identifying threshold concepts and proposing strategies to support doctoral candidates', *Innovations in Education and Teaching International*, vol. 46, no. 3, pp. 293–304. doi: 10.1080/14703290903069001.

Kiley, M, 2015, '"I didn't have a clue what they were talking about": PhD candidates and theory', *Innovations in Education and Teaching International*, vol. 52, no. 1, pp. 52–63, doi: 10.1080/14703297.2014.981835.

Kiley, M, 2017, 'An emerging PhD curriculum and what this might mean for doctoral level threshold concepts', *Practice and Evidence of Scholarship of Teaching and Learning in Higher Education*, vol. 12, no. 2, pp. 294–312.

Kiley, M, 2019, 'Threshold Concepts of Research in Teaching Scientific Thinking'. In: Murtonen, M., Balloo, K. (eds) *Redefining Scientific Thinking for Higher Education*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-24215-2_6

Kiley, M & Wisker, G, 2009, 'Threshold concepts in research education and evidence of threshold crossing', *Higher Education Research & Development*, vol. 28, no. 4, pp. 431–441, doi: 10.1080/07294360903067930.

Kotter, JP, 1996, *Leading change*, Harvard Business School Press, Boston, Mass.

Kübler-Ross, E, 1973, *On death and dying*, Routledge, New York.

Leshem, S, 2007, 'Thinking about conceptual frameworks in a research community of practice: a case of a doctoral programme', *Innovations in Education and Teaching International*, vol. 44, no. 3, pp. 287–299. doi: 10.1080/14703290701486696.

Leshem, S & Trafford, V, 2007, 'Overlooking the conceptual framework', *Innovations in Education and Teaching International*, vol. 44, no. 1, pp. 93–105, doi: 10.1080/14703290601081407.

Liden, RC & Antonakis, J, 2009, 'Considering context in psychological leadership research', *Human Relations*, vol. 62, no. 11, pp. 1587–1605. doi: 10.1177/0018726709346374.

Lovitts BE, 2007, Making the implicit explicit: Creating performance expectations for the dissertation. Sterling, Virginia: Stylus.

Lowe, KB, Kroeck, KG, & Sivasubramaniam, N, 1996, 'Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature', *The Leadership Quarterly*, vol. 7, no. 3, pp. 385–425. doi: 10.1016/S1048-9843(96)90027-2.

Lu, SYP, Lau, HYK, & Yiu, CKF, 2012, 'A hybrid solution to collaborative decision-making in a decentralized supply-chain', *Journal of Engineering and Technology Management*, vol. 29, no. 1, pp. 95–111. doi: 10.1016/j.jengtecman.2011.09.008.

Lyndon, S, Pandey, A, & Navare, A, 2020, 'Shared leadership and team creativity: Investigating the role of cognitive trust and team learning through mixed method approach', *Personnel Review*, vol. 49, no. 9, pp. 1805–1822. doi: 10.1108/PR-05-2019-0262. doi: 10.1108/PR-05-2019-0262.

MacKinnon, DP & Dwyer, JH, 1993, 'Estimating mediated effects in prevention studies', *Evaluation Review*, vol. 17, no. 2, pp. 144–158.

Maistry, S, 2017, 'Betwixt and between: Liminality and dissonance in developing threshold competences for research supervision in South Africa', *South African Journal of Higher Education*, vol. 31, no. 1, pp. 119–134, doi: 10.20853/31-1-841.

Markus, ML & Robey, D, 1988, 'Information Technology and Organizational Change: Causal Structure in Theory and Research', *Management Science*, vol. 34, no. 5, pp. 583–598. doi: 10.1287/mnsc.34.5.583.

Maynard, MT, Gilson, LL, & Mathieu, JE, 2012, 'Empowerment—Fad or Fab? A Multilevel Review of the Past Two Decades of Research', *Journal of Management*, vol. 38, no. 4, pp. 1231–1281. doi: 10.1177/0149206312438773.

McCallin, A & Nayar, S, 2012, 'Postgraduate research supervision: a critical review of current practice', *Teaching in Higher Education*, vol. 17, no. 1, pp. 63–74, doi: 10.1080/13562517.2011.590979.

McKenna, S, 2017, 'Crossing conceptual thresholds in doctoral communities', *Innovations in Education and Teaching International*, vol. 54, no. 5, pp. 458–466, doi: 10.1080/14703297.2016.1155471.

Meyer, JHF & Land, R, 2003, 'Threshold Concepts and Troublesome Knowledge: linkages to ways of thinking and practising within the disciplines', in C. Rust (ed.), *Improving Student Learning – Ten Years On.*, pp. 412–424, OCSLD, Oxford.

Meyer, JHF & Timmermans, JA, 2016, 'Integrated threshold concept knowledge'. In R. Land, J. H. F. Meyer, & M. T. Flanagan (Eds.), *Threshold concepts in practice* (pp. 25–38). Rotterdam: Sense.

Miles, MB, Huberman, AM, & Saldaña, J, 2014, *Qualitative data analysis: a methods sourcebook*, Third edition, SAGE Publications, Inc, Thousand Oaks, California.

Murphy, N, Bain, JD, & Conrad, L, 2007, 'Orientations to research higher degree supervision', *Higher Education*, vol. 53, no. 2, pp. 209–234, doi: 10.1007/s10734-005-5608-9.

Nicola-Richmond, K, Pépin, G, Larkin, H, & Taylor, C, 2018, 'Threshold concepts in higher education: a synthesis of the literature relating to measurement of threshold crossing', *Higher Education Research & Development*, vol. 37, no. 1, pp. 101–114. doi: 10.1080/07294360.2017.1339181.

Niederman, F & March, ST, 2018, 'An Exposition of Process Theory and Critique of Mohr's (1982) Conceptualization Thereof', *Philosophy of Management*, vol. 17, no. 3, pp. 321–331. doi: 10.1007/s40926-017-0082-x.

O'Kane, C, 2006, 'Management Styles of a Newly Appointed Leader in a Turnaround Context', *Irish Journal of Management*, vol. 27, no. 1, pp. 111–144.

Parzefall, M & Coyle-Shapiro, JA, 2011, 'Making sense of psychological contract breach', *Journal of Managerial Psychology*, vol. 26, no. 1, pp. 12–27. doi: 10.1108/02683941111099592.

Pearse, NJ, 2012, 'Utilising Assessment Tasks to Support the Research of MBA Students'. Presented at the 11th European Conference of Research Methods. University of Bolton, Bolton, UK, 28-29 June 2012.

Pearse, N, 2019, 'An Illustration of a Deductive Pattern Matching Procedure in Qualitative Leadership Research', *The Electronic Journal of Business Research Methods*, vol. 17, no. 3, pp. 143–154.

Prochaska, JM, Prochaska, JO, & Levesque, DA, 2001, 'A Transtheoretical Approach to Changing Organizations', *Administration and Policy in Mental Health*, vol. 28, no. 4, pp. 247–261.

Ramsden, P, 1992, *Learning to teach in higher education*. Cornwall: TJ International Ltd.

Rickards, T & Moger, S, 2000, 'Creative Leadership Processes in Project Team Development: An Alternative to Tuckman's Stage Model', *British Journal of Management*, vol. 11, no. 4, pp. 273–283. doi: 10.1111/1467-8551.00173.

Ruiz, CE, Hamlin, RG, & Esparza Martinez, L, 2014, 'Managerial and leadership effectiveness as perceived by managers and non-managerial employees in Mexico', *Human Resource Development International*, vol. 17, no. 3, pp. 258–276. doi: 10.1080/13678868.2014.896127.

Sandberg, J & Alvesson, M, 2011, 'Ways of constructing research questions: gap-spotting or problematization?', *Organization*, vol. 18, no. 1, pp. 23–44. doi: 10.1177/1350508410372151.

Serban, A & Roberts, AJB, 2016, 'Exploring antecedents and outcomes of shared leadership in a creative context: A mixed-methods approach', *The Leadership Quarterly*, vol. 27, no. 2, pp. 181–199. doi: 10.1016/j.leaqua.2016.01.009.

Slavin, RE, 1995, *Cooperative learning: theory, research, and practice*, 2nd ed, Allyn and Bacon, Boston.

Smith, J, 2016, 'Reflections on teaching research ethics in education for international postgraduate students in the UK', *Teaching in Higher Education*, vol. 21, no. 1, pp. 94–105, doi: 10.1080/13562517.2015.1115968.

Strauss, AL & Corbin, JM, 1990, *Basics of qualitative research: Grounded theory procedures and techniques*, Sage Publications, Newbury Park, California.

Sverdlik, A, Hall, NC, McAlpine, L, & Hubbard, K, 2018, 'The PhD Experience: A Review of the Factors Influencing Doctoral Students' Completion, Achievement, and Well-Being', *International Journal of Doctoral Studies*, vol. 13, pp. 361–388, doi: 10.28945/4113.

Sy, T, 2010, 'What do you think of followers? Examining the content, structure, and consequences of implicit followership theories', *Organizational Behavior and Human Decision Processes*, vol. 113, no. 2, pp. 73–84. doi: 10.1016/j.obhdp.2010.06.001.

Timmerman, BC, Feldon, D, Maher, M, Strickland, D, & Gilmore, J, 2013, 'Performance-based assessment of graduate student research skills: timing, trajectory, and potential thresholds', *Studies in Higher Education*, vol. 38, no. 5, pp. 693–710, doi: 10.1080/03075079.2011.590971.

Timmermans, JA & Meyer, JHF, 2019, 'A framework for working with university teachers to create and embed "Integrated Threshold Concept Knowledge" (ITCK) in their practice', *International Journal for Academic Development*, vol. 24, no. 4, pp. 354–368, doi: 10.1080/1360144X.2017.1388241.

Tuckman, BW, 1965, 'Developmental sequence in small groups.', *Psychological Bulletin*, vol. 63, no. 6, pp. 384–399. doi: 10.1037/h0022100.

Van Veldhuizen, B, Oostdam, R, Enthoven, M, & Snoek, M, 2021, 'Reflective movements in the professional development of teacher educators as supervisors of student research in higher education', *European Journal of Teacher Education*, vol. 44, no. 4, pp. 452–467, doi: 10.1080/02619768.2020.1777977.

Varpio, L, Paradis, E, Uijtdehaage, S, & Young, M, 2020, 'The Distinctions Between Theory, Theoretical Framework, and Conceptual Framework', *Academic Medicine*, vol. 95, no. 7, pp. 989–994, doi: 10.1097/ACM.0000000000003075.

Vickerman, P, 2009, 'Student perspectives on formative peer assessment: an attempt to deepen learning?', *Assessment & Evaluation in Higher Education*, vol. 34, no. 2, pp. 221–230, doi: 10.1080/02602930801955986.

Vygotsky, LS, 1962, *Thought and Language*. Cambridge, Mass.: MIT Press.

Wilkins, S, Neri, S, & Lean, J, 2019, 'The role of theory in the business/management PhD: How students may use theory to make an original contribution to knowledge', *The International Journal of Management Education*, vol. 17, no. 3, p. 100316, doi: 10.1016/j.ijme.2019.100316.

Wright, AL & Hibbert, P, 2015, 'Threshold Concepts in Theory and Practice', *Journal of Management Education*, vol. 39, no. 4, pp. 443–451. doi: 10.1177/1052562915574866.

Yin, RK, 2014, *Case Study Research, Design and Methods*, 5th edn, SAGE Publications, Thousand Oaks.

Zhang, Z, Lee, JC-K, & Wong, PH, 2016, 'Multilevel structural equation modeling analysis of the servant leadership construct and its relation to job satisfaction', *Leadership & Organization Development Journal*, vol. 37, no. 8, pp. 1147–1167. doi: 10.1108/LODJ-07-2015-0159.

