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Inducting 'self' into the scholarship of teaching pre-service teachers: A self-study of a doctoral student in education

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Education doctoral programs in South Africa focus on inducting students into the scholarship of research. Opportunities for engaging doctoral students in work-integrated learning (WIL) to develop their scholarship of teaching are scarce for aspiring teacher educators. In response to the absence of induction programs for doctoral candidates how one can induct 'self' into the scholarship of teaching pre-service teachers using a self-study methodology and the community of practice (CoP) framework was investigated. Drawing from multiple data sources, findings suggest that self-study and engaging in specific practices in the CoP with the help of a mentor teacher educator, promotes self-directed induction on how to teach pre-service teachers. Therefore, a model that can be used to induct education doctoral students into the scholarship of teaching pre-service teachers is proposed. Recommendations for future research that can test the applicability of this model in varied disciplines and contexts are offered and discussed.

Keywords: Education doctoral students, pre-service teachers, self-study, community of practice, mentor, reflection

A survey of the literature shows that in education, a large number of those who do a doctorate become teacher educators, although the current prevailing doctoral programs focus on equipping doctoral students with research skills (see Ping et al., 2018). During their studies, doctoral students are only inducted in the scholarship of research and nothing about the scholarship of teaching in teacher education. Hence, authors such as Golde and Dore (2001) have questioned the objectives and structure of the traditional doctoral programs in education as they do not prepare doctoral candidates to teach pre-service teachers. In a survey by Fagen and Niebur (2000), many doctoral students indicated that they felt unprepared to teach as the emphasis in their studies was on research only. In Peercy and Troyan's study (2017), doctoral students indicated that, in addition to the lack of training and an explicit knowledge base, they, as prospective teacher educators, were not given work-integrated learning (WIL) opportunities to learn about teaching during their doctoral programs. There is therefore a gap on how education doctoral students can be afforded opportunities to learn about teaching and to be inducted into the scholarship of teaching pre-service teachers. WIL has been advocated as an approach for individuals to learn when attaining formal qualifications. However, research in this area has focused on teachers and how they gain professional knowledge for teaching (e.g., Martin et al., 2022; Pietersen & Langeveldt, 2024). Literature on WIL for doctoral students is scarce. Available studies have looked at how doctoral candidates are encultured into the scholarship of research as well as leadership skills (Areskoug Josefsson, 2024). In this study, considering that many education doctoral students end up becoming teacher educators (Abell et al., 2009), I investigated one possible way that doctoral candidates can engage in WIL during which they can learn to teach pre-service teachers while undertaking their doctoral studies. I explored the possibility of using self-study to induct self into the scholarship of teaching in biology teacher education. The following research question guided this study:

How do I learn and develop professional knowledge for teaching pre-service teachers while doing my doctoral studies in education?

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Through answering the above research question, I propose a model that can help doctoral students engage in WIL specifically to gain knowledge for teaching pre-service teachers.

CONCEPTUALISING PROFESSIONAL KNOWLEDGE FOR TEACHER EDUCATORS

What constitutes professional knowledge for teaching pre-service science teachers is not yet clear in the literature. Instead, the literature focuses on how future academics can be developed to conduct research and take up leadership roles either through WIL or structured programs (Areskoug Josefsson, 2024; Whitton et al., 2022). When the focus is on developing academics' teaching and learning capabilities, it is usually generalized (see Saroyan & Amundsen, 2023). It is for this reason that I conceptualise teacher educator professional knowledge from pedagogical content knowledge (PCK) literature. Drawing from Shulman's (1986, 1987) work, teacher professional knowledge (TPK) has been described by Gess-Newsome (2015) as the general knowledge of teaching that comes from research and practice and manifests through PCK components. I drew from several knowledge components reported in PCK literature (Carlson et al., 2019; Chan, 2022; Gess-Newsome, 2015). According to Nyamupangedengu (2015), for teacher educators, these knowledge domains exist at two levels – knowledge for teaching pre-service teachers as well as knowledge regarding the pre-service teachers' future context (see Table 1).

TABLE 1: Domains of teacher educator professional knowledge.

Knowledge domain	**Level 1**	**Level 2**
Content Knowledge	Knowledge of facts, principles and theories of science for pre-service teachers.	Knowledge of facts, principles and theories of science that the pre-service teachers will teach in schools.
Pedagogical knowledge	The teacher educator's knowledge of instructional strategies and techniques for teaching pre-service teachers.	Knowledge of instructional strategies and techniques that pre-service teachers are likely to use to teach science in schools.
Contextual knowledge	Awareness of the teaching settings starting with the classroom and the communities in which the pre-service teachers are located. This includes social forces that shape their students' lives, and how to create more inclusive and innovative classrooms.	Understanding the context in which one is teaching to envision the kind of context in which pre-service teachers are likely to teach after qualification.
Knowledge of students	Understanding the pre-service teachers' unique interests, abilities, and learning styles as well as the prior knowledge they bring to the classroom.	Knowledge of learners' abilities, unique interests, and learning styles as well as possible prior knowledge that learners may have about science topics.
Curriculum knowledge	Knowledge of how the module fits within the broader qualification as well as what should be taught in a specific module.	Knowledge of the school science curriculum structure.
Knowledge of assessment	Competencies for planning and enacting assessment in a teacher education context.	Knowledge of assessment strategies suitable for science school context.

As can be seen in Table 1, the knowledge components are borrowed from PCK literature that looked at school teachers. What is important to note for teacher educators is that the acquisition of these

knowledge components is influenced by personal knowledge. Goodwin and Kosnik (2013) identified personal knowledge as a significant influence on how teacher educators construct their own practice. Therefore, I conform to Rios et al.'s (2007) assertion that beliefs and lived experiences shape teacher educators' pedagogical choices and build their practice. This assumption aligns with Lortie's (1975) apprenticeship of observation which describes the influences that teachers' experiences as students can have on their teaching practices. While TPK is complex and cannot be pinned to these few knowledge components, this list provides a starting point that can be developed further in future research. Even though the features of each knowledge component can be theoretically learnt, in this study, I argue that the development of these knowledge components in education doctoral students as prospective teacher educators rests upon the WIL opportunities afforded to them in the doctoral programs. Therefore, I view professional knowledge for teacher educators as the knowledge that is situated and can be effectively accessed through participation in a community of practice (CoP). As a doctoral student, learning about teaching pre-service teachers, I envisaged that I needed to be part of a CoP in the teacher education context.

LEARNING IN COMMUNITIES OF PRACTICE (COP)

To induct myself into the scholarship of teaching pre-service teachers, I took Lave and Wenger's (1991) view that learning is participation in a CoP. They define a CoP as a group of people sharing common interests and goals whose aim is to develop knowledge and themselves, both personally and professionally. New members enter a CoP as legitimate peripheral participants and gradually move towards the center as participation continues (Eberle et al., 2014). According to Loughran (2014), the framework of CoP has been the core of research in education seeking to understand how teachers can learn. Learning in CoP helps teachers understand the knowledge of and for practice (Akerson et al., 2009). I considered the WIL of doctoral students as seeking to develop a CoP where learning is situated and the development of knowledge for teaching is learning in practice. Learning in this case becomes situated because some practices are specific to the teacher education context. The practices and knowledge that govern a particular profession are specific to that CoP (Wenger-Trayner & Wenger-Trayner, 2015).

According to Lave and Wenger (1991), a CoP has three components; domain, community, and practice. In this study, I consider the domain to be teacher education in which I, as the doctoral student, am the apprentice seeking to induct myself. The domain is filled with social interactions that enable the sharing of values, norms and standards and the development of new ideas (Patton & Parker, 2017). The primary goal in the domain is to professionally develop through interaction with experienced teacher educators. The repertoire of practice includes the teaching and learning context, resources, and approaches that are underpinned by the professional knowledge for teaching pre-service teachers. According to Wendrich (2013), the domain does not only focus on the individual's learning (myself as a doctoral student in this case) but also on the activities that take place. As such, not only the knowledge gained in the domain through participation becomes significant but also the practices and process of observations, the performance of tasks, and initiations. Learning in the CoP is characterized by the sharing of knowledge in different ways including action (Wendrich, 2013).

RESEARCH DESIGN AND METHODOLOGY

This study was a self-study. In the self-study, I however also drew on elements of narrative inquiry and auto-ethnography (Hamilton et al., 2008). Self-study is a study of the self by the self. It is a methodology for studying and improving professional practice at personal levels (Samaras, 2011).

With the focus on practice, the action of self in relation to other(s) reveals the professional identity and knowledge of the researcher. In undertaking the self-study, I used a narrative inquiry approach to bring to the fore the untold; buried stories that have the capabilities to help us think of the present and the future (Clandinin & Connelly, 2000). It is the present that propels individuals to re-visit, re-tell and re-organize; to make sense of what the present and the future could mean as we imagine and envisage possibilities (Kitchen, 2009). In this study, I narrated stories about my authentic experiences in the CoP using narrative texts. While my stories focused on the personal as in auto-ethnography (Chang, 2016), they were not generated in relation to culture in the broad sense of culture as shared patterns of thought, symbols and actions of a particular group but rather in relation to practice (actions, thoughts and interactions of individual teacher educators in their classrooms). I foregrounded the practice rather than the cultural context of the study to generate knowledge about teaching practices. The practices, in the educational context that include language, actions and interactions, were used to reflect on the self. I therefore used stories of my authentic experiences to reveal the shifting aspects of the self not in relation to culture but in relation to practice which created ways to write about my developing understandings about teacher educator teaching practices. Although self-study has been critiqued for issues of subjectivity (Ritter & Hayler, 2020), this was minimized by gathering data from multiple sources and involving critical friends (see participants section).

Study Site

This study was conducted at a South African university (SAX) that follows a unique concurrent model of preparing pre-service teachers. As explained by Musset (2010), in the concurrent model, the pre-service teachers study the content of the discipline and the professional knowledge concurrently. The concurrent model that is followed at SAX, is one in which both the disciplinary and the professional components are taught to pre-service teachers within the same School of Education by the same lecturers. The pre-service teachers study the disciplinary component in what is referred to as the content stream and the professional component in the methodology stream. The academic calendar at SAX is divided into two semesters. Each semester has 12 weeks of teaching and learning and about four weeks of examinations. The 12 weeks of teaching and learning are divided into six-week blocks or terms separated by a one-week mid-semester break. The Science Education teaching program is organized around these teaching blocks and/or semesters. Each teacher educator is allocated a block's or a semester's teaching. This study was located in a biology content course. The role of teacher educators in biology includes the provision of lectures and conducting tutorials and practicals.

Participants

In self-study, the primary participant is the 'self' within the practice who is also the researcher and the researched (Samaras, 2011). I was therefore the main participant in this study since I was the researcher; a doctoral student and a tutor/demonstrator in science laboratories. The other participants were my mentor, four experienced biology teacher educators, third-year biology pre-service teacher students, and 2 critical friends. All the participants gave their consent to participate in this study. A mentor is an individual with particular expertise, involved in providing guidance as well as influencing and supporting the mentee (Smith-Ruig, 2014). In this case, the expertise is about the practices and knowledge for teaching pre-service teachers. Their role in the study was to help me unpack the participating teacher educators' practices and scaffold my understanding of these practices. Myself, the doctoral student as a prospective teacher educator was the mentee. The four teacher educators who were participants in this study were Leila, Gracious, John, and Alice (pseudonyms). These teacher educators were all members of the biology team in the department and had at least six years' experience

teaching biology to pre-service teachers. The 3rd year biology class was chosen because my mentor was the course coordinator and was also responsible for teaching a six-week module in the course. Gracious, Alice and John were teaching other modules to this 3rd year biology class. All 123 pre-service teachers became potential participants by registering for the 3rd year biology course. The class gave consent for me to observe my mentor and other teacher educators teaching them. The class also gave consent to video-recording of my lectures as long as the camera captured the lecturer and not them. Some of the pre-service teachers gave consent to be interviewed at the end of the study. In self-study, critical friends are important because they help the researcher reframe their practice by interrogating and critiquing their reflections on practice. They also critique the researcher's actions and ideas (Fuentealba & Russell, 2016), thus increasing rigor in self-study research (Alan et al., 2021). I had two critical friends (Celia and Jane). Jane is a high school biology teacher and Celia is a biology teacher educator at another institution. Both were also pursuing their doctoral studies. Ethical approval was granted by SAX under protocol number 2017ECE011D.

Data Sources and Data Collection Process

Data collection in this study was a yearlong process. As is required in self-study, to increase rigor, multiple data sources were used. The data were collected iteratively in five phases. Each phase involved collection and analysis, thus a hermeneutic and reflective approach. Table 2 indicates the phases with a description of what happened in each phase and the forms of data collected.

Table 2 illustrates how data collection was approached in this study. In phase 1, I decided to revisit and reflect on my experiences as an undergraduate student so that as indicated by Peercy (2014), I would become cognizant of my practice and draw insights from these reflections. In phases 2 and 4, I observed the experienced teacher educators' teaching and engaged in discussions with them. The difference between phases 2 and 4 is that phase 2, was an exploratory observation schedule whereby I was looking at everything that was happening, that is, the teaching, the interaction etc. In phase 4 however, the observations were now focused on specific aspects of teacher educators' teaching. For example, the kind of prompts that teacher educators use to promote interaction (see Khoza & Nyamupangedengu, 2018). After every episode of interacting with the teacher educators (either through observations or discussions), I would meet with my mentor for discussion and reflection to receive the necessary scaffold. During the discussion, I would ask the teacher educators questions and seek clarity on aspects of practice observed and they would also ask me questions and comment on my observations and thinking. Insights from my discussions with teacher-educator participants were shared with my critical friends for them to interrogate my developing understanding of teacher-educator practices. Journaling also happened throughout as I was capturing my reflections on the conversations with the teacher educators, the mentor and my critical friends.

TABLE 2: Phases of the study and data collection process.

Phase	Description of data source	Description of the data collection process	Forms of data collected
1.	Reflections on my undergraduate experiences (first teaching block)	Journaling: I narrated and reflected on my experience as an undergraduate student with the help of my critical friends and mentor.	Journal entries
2.	Observations of and discussions with the experienced teacher educators' (First and second teaching block)	Lecture observations: I observed experienced teacher educators teaching different topics at different levels. Oral discussions: After each lecture observation, I engaged with the teacher educators through discussions.	Written observation notes Entries in the reflective journal.
3.	Planning and teaching a biology topic for one week (One week of first teaching block)	I was allocated a one-week topic (human ear) to teach by my mentor to third-year Biology III Pre-service teachers. One week of teaching comprised two lectures (one single; 50min, and one double). At the end of each lecture, I asked the Pre-service teachers for written feedback on my teaching. My mentor also sat in the lectures and gave me oral feedback at the end of each lecture.	Teaching artefacts: PowerPoint presentations practical and tutorial sheets Audio-recordings of my lectures Written feedback from pre-service teachers Oral feedback from my mentor Entries in the reflective journal
4.	Focused observations of experienced teacher educators' teaching Focused discussions with experienced teacher educators (Third teaching block)	In this phase, I observed experienced teacher educators' teaching focusing on specific practices. I also engaged the teacher educators in a discussion.	Observation notes Audio-recordings of the discussions Entries in the reflective journal
5.	Planning and teaching a full module (Fourth teaching block)	I planned and taught the topic of population ecology for three weeks.	Planning notes (incorporated in the journal entries) Teaching and learning materials: PowerPoint presentations practical and tutorial sheets Video-recordings of my teaching.
6.	Focus group interviews of Pre-service teachers (Fourth teaching block)	Three groups of Pre-service teachers were interviewed at the end of my three weeks of teaching.	Audio-recordings of the interviews

Data Analysis

According to Samaras (2011), one of the key characteristics of self-study is the concurrent occurrence of data collection and analysis. They described this as a "hermeneutic process" (p. 197). Data analysis in this study happened during and at the end of each phase as outlined below as the results from each phase would inform the next phase. Table 3 summarizes the data analysis processes that I followed for each data set.

TABLE 3: Summary of how each data set was analyzed.

Data collected and sources	**Analysis process**
My undergraduate experiences (Journal entries)	1. Reading the journal entries and isolating key experiences 2. Producing reflective vignettes of each experience 3. Presenting the reflective vignettes of each experience to my mentor for a discussion and further reflection
Observations of experienced teacher educators' teaching (Observation notes)	1. Production of detailed descriptions from the observation notes 2. Isolating the key practices that stood out for me in the lectures and writing my initial thoughts about the practice 3. Discussing the practice with the teacher educator I observed 4. Production of reflective vignettes about the practice and my discussion with the teacher educator observed 5. Presentation of the reflective vignettes to my mentor for a discussion and further reflection
My teaching (audio and video-recordings)	1. Transcription and annotation of the transcripts 2. Isolation and grouping of the key practices/incidents that took place in my lectures 3. Production of reflective vignettes for each of the categories of practices isolated 4. Presentation of the reflective vignettes to my mentor for a discussion for further reflections
Formal discussions with experienced teacher educators and interviews of pre-service teachers (Audio-recordings)	1. Transcription of the discussion/interview recordings and reading the transcripts 2. Coding of the transcripts and validation of the codes with my mentor 3. Categorization of the codes into practices that capture principles of planning/student experiences 4. Production of reflective vignettes for each principle of planning/category of students' experiences 5. Presenting the reflective vignettes to my mentor for a discussion and further reflection

In Table 3, I illustrated an overview of the steps followed when analyzing each data set. It is important to note that I have combined the description of the analysis of formal discussions with experienced teacher educators and interviews of pre-service teachers because the analysis steps of these two data sets were similar.

FINDINGS AND DISCUSSION

The aim of this study was to explore the possibility of using self-study and the CoP approach to induct self into the scholarship of teaching pre-service teachers. I investigated WIL practices that can provide a doctoral student with opportunities to gain professional knowledge for teaching pre-service teachers.

Although the data sets (Table 2) were analyzed separately, the insights that emerged cumulatively show how I developed the knowledge for teaching pre-service teachers. In presenting the findings, therefore, I used the data collection phases as headings to structure the practices that supported my learning.

Reflecting on my Experiences as an Undergraduate Student With the Help of a Mentor

Revisiting my experiences brought to the fore both positive and negative authentic experiences and attitudes. In turn, this helped me to identify key pedagogies that were used by teacher educators during my time as a pre-service teacher. The identified pedagogies became catalysts for reflection and shifting aspects of the self (Hamilton et al., 2008), thereby creating a foundation for learning and induction into the scholarship of teaching pre-service teachers and gaining pedagogical knowledge for teaching. The excerpt in Box 1 below, shows an example of how the discussion of experiences with my mentor provided a space for learning about teaching:

BOX 1: An example of a discussion between myself and the mentor.

Journal entry of teacher educator practice: *In my second year as a pre-service teacher, I did not do well in Physical Sciences because I did not understand the teacher educator.*
Mentor: *I can see in this entry that you are saying you didn't do well because you could not understand the teacher. What exactly caused you not to understand?*
Climant: *I did not understand what he was saying because he would read directly from the PowerPoint slides in lectures which were populated with a lot of text*
Mentor: *Do you think reading from the slides was the problem?*
Climant: *Furthermore, he did not have time for questions during classes.*
Mentor: *I don't think providing time for questions during class would necessarily promote understanding*
Climant: *So what are you saying?*
Mentor: *I want you to go back into that classroom and listen to your mind and body and try and capture your feelings and experiences as the lecturer was reading his slides one after the other and describe them*
Climant: *I would become overwhelmed with information/in fact I would quickly get saturated with information. I would struggle to keep pace with the lecturer/struggling to pay attention/Getting bored and eventually stop paying attention*
Mentor: *Great! Well done. Can you see what the problem was? It was the impact of continuous talk by the teacher educator. Always remember that in a lecture, if you talk continuously for more than 5 minutes without allowing for processing of the information by the students, you will soon lose them as their short memory would be overloaded.*
Climant: *Five minutes! That's so short. What do you do after every five minutes to allow for processing?*
Mentor: *That's for you to find out*

In the discussion above, while the tone of my journal entry was pointing to the teacher educator as being ineffective, my mentor scaffolded my understanding and turned this around and focused on the practice itself and its impact on students' learning. Some of what I had viewed as unpleasant experiences were, therefore, used as a basis for interrogating the teaching practice. Therefore, identifying teaching practices and reflecting on them with a mentor can provide a doctoral student with opportunities to learn about teaching pre-service teachers. However, the reflections need to focus on the affordances and the limitations of the practices that were experienced, not on the teacher educators (Khoza & Nyamupangedengu, 2023). In that regard, not only do these authentic experiences provide a starting point for learning but also an effective basis for gaining pedagogical knowledge for teaching pre-service teachers. This kind of exercise is important as it enables interrogation of the professional knowledge that is gained through the apprenticeship of observation (Lortie, 1975). It ensures that the

knowledge gained during WIL is not rooted in the unexamined theories, perceptions, and attitudes that can negatively impact what one learns (Mitchell & Pithouse-Morgan, 2014). Interrogation and reflection on my undergraduate experiences helped me to think of "what this could mean for me when I start teaching." Insights from this discussion with my mentor formed a foundation that informed the rest of my WIL reflections.

The approach of 'returning' to one's experiences has been noted in self-study and WIL research (e.g., McDonough, 2017; Shircore et al., 2013). Critically reflecting on my experiences with my mentor enabled me to revisit the teacher educators' practices that I had experienced as an undergraduate student from the perspective of both a student and a biology teacher educator. This led to a shift in my thinking from a student's way of thinking to that of a teacher educator. Sharing my experiences with a mentor enabled a shift from naïve and uni-directional ways of looking at my undergraduate experiences to the generation of new pedagogical and personal knowledge for teaching pre-service teachers. This finding indicates that a doctoral student's own undergraduate experiences as a pre-service teacher gained through the apprenticeship of observation can be powerful objects for learning and developing professional knowledge for teaching during WIL. Therefore, as part of inducting self into the teacher education CoP during WIL, it is important for a doctoral student to interrogate past experiences with a mentor to bring in other perspectives on the same experiences.

Immersion Into a Community of Practice

As is reflected in Table 2 above, in this study, I immersed myself in a community of experienced teacher educators by observing their teaching and discussing their teaching practices with them and with my mentor. Immersion in this case involved being part of and paying special attention to every activity that was being carried out by the members of the CoP (the experienced teacher educators). By immersing myself in the community of experienced teacher educators, I also grounded myself in their discourse which as indicated by Feiman-Nemser (2001) in turn, inculcated in me a culture of inquiry and support. A good example that illustrates this claim was when I observed Gracious continue with a lecture with less than half the students present in class. I initiated a conversation with my mentor. My view at that point was that it was nonsensical to continue with the lecture because, with just about half of the students present, the teacher educator was bound to repeat it. I also was of the view that the absent students had a genuine reason which needed Gracious's consideration; working on an assignment which was due that afternoon. Discussing this observation with my mentor again revealed that I was still thinking and reasoning like a student. The discussion again facilitated a gain of both pedagogical knowledge and contextual knowledge (Chan, 2022) that enabled me to move from the naïve ways of thinking that I was exhibiting in the CoP. Insights from this discussion motivated me to review many previous decisions by the teacher educators that I had experienced and to think of how a different decision could impact the teaching and learning process. The knowledge of pedagogy I was gaining elevated my inquiry and challenged me to continuously think of how I would use the knowledge that I had gained in my own future teaching practice. Findings from this phase of the study, therefore, show that immersion into a CoP during WIL offers an opportunity for meaningful engagement with industry stakeholders (Ferns et al., 2024) – experienced teacher educators in this case. This can be an effective way of helping a prospective teacher educator to interrogate observed teaching practices and in the process gain knowledge of pedagogy, students and context.

Practicing Teaching for a Short Period and Requesting Feedback from Students

It was during this short period of teaching that I became aware that the 'taken-for-granted' pedagogical practices that I had observed experienced teacher educators using with ease were not that easy to implement. I struggled to put into practice the repertoire of practices that I had gained from the explorative observations, for example, facilitating question and answer sessions, dealing with the biology terminology and providing coherent explanations (Khoza & Nyamupangedengu, 2023; Khoza, 2024b). In addition, although I had started to build a repertoire of practices for teaching pre-service teachers from the observations and conversations with experienced teacher educators, I had not built an understanding of the thinking that goes into the planning for lectures. Planning for the one-week teaching in close collaboration with my mentor provided a starting point on how to determine the content knowledge that I needed to teach about the human ear. I also got to understand that I needed to plan for not just the lectures but also for the tutorial and the practical activities all of which should be aligned to each other. The involvement of my mentor served the purpose of validating the quality of these materials leading to a preliminary understanding of how I can plan and align my lectures to the tutorial and practical activities. As noted by Arnsby et al. (2023), the collaboration between a mentor and mentee offers new authentic perspectives on teaching. The involvement of a mentor has been advocated by WIL literature as a way of exposing apprentices to real-world challenges in an authentic environment (Smith-Ruig, 2014), thus facilitating the development of professional knowledge.

Through teaching the one-week topic, I encountered teaching practices that I had not been exposed to such as students' response to the use of complex biology terminology. This is because, in the one-week of teaching, I was exposed to authentic work-focused tasks where I could engage in the process of "synthesizing learning from the experience" (Ferns et al., 2024, p. 2). The experience resulted in the reframing of my thinking about certain practices. For example, I had designed PowerPoint slides that I thought would lead to interaction only to realize that the effect was not as envisaged. I had imagined a highly interactive lecture with the tasks and questions that I had incorporated in my PowerPoint slides. The interaction did not occur and I got stuck as I had not anticipated this. These experiences started to trigger reflection about pedagogies of teaching biology to pre-service teachers. I learnt that as one plans and teaches, you need to anticipate many things and be in a position to make instant pedagogical decisions. These attempts and quests to find how to do things in teaching were a foundation for learning and developing one's professional practice (Oleson & Hora, 2013). The short period of teaching, as a trial run, is therefore significant process in a model of WIL for engaging doctoral students in teaching preservice teachers. This observation is supported by Rowe et al. (2023) who argued that short term WIL opportunities is an opportunity for students to understand their own professional capabilities and reflect on those. In this case, it allows the prospective teacher educator to try out those observed pedagogies and the new ways of thinking that would have emerged from reflecting on authentic experiences. As I tried out these pedagogies, I started to see how certain aspects of practice had manifested in my teaching in the same and/or in different ways to those of my mentor and other experienced teacher educators thus beginning to build my professional identity as a teacher educator (Khoza & Nyamupangedengu, 2023).

Requesting feedback from students after every lecture helped me to continually reflect on my practice and to improve it on an ongoing basis. For example, students wrote a reflection after the first lecture where some pointed out how the way I had handled terminology inhibited their understanding of content: "You introduced a lot of concepts without explaining them. Therefore, this led to my confusion. Please try to explain deeper or give definitions to the biology terms" Student 1 and "Too much content and too many terms that you did not explain in detail" Student 2.

As can be seen from the two pre-service teachers' feedback, they pointed out a problematic pedagogical aspect of my practice that could have escaped my notice. Their feedback, therefore, helped me to not only gain knowledge of how pre-service teachers learn but also to become aware and to interrogate the pedagogical practices that I had implemented. Students' feedback acted as a lens that enabled me to look into my teaching which in turn helped me to learn about practices that would eventually form a foundation for my subsequent teaching (Khoza, 2024a). While the feedback that I was collecting was in written form, one could also engage in conversation with the pre-service teachers verbally after the lectures. The written feedback was however suitable in this case as it enabled me to review the feedback together with the mentor in search of trends to inform planning and modification of the next lesson. It is therefore important for the doctoral student, during the short teaching period, to be in continuous conversation with the pre-service teachers.

Focused Observations of Experienced Teacher Educators Followed by Discussions of Observed Practices

Observing experienced teacher educators through immersion and exploration within the CoP laid a foundation and a repertoire of practices for teaching pre-service teachers. Furthermore, getting a 'taste' of planning and teaching pre-service teachers, accompanied by continuous reflection helped me to see where I was still lacking. As argued by Ferns et al. (2024) and Smith et al. (2016), reflection is a significant component of WIL as one continues to reshape their understanding of practice in relation to the authentic experiences. I was now in a position to focus my observations on specific practices and this increased my chances of learning in-depth, how to do certain things as opposed to the learning that had happened during the exploratory stage. I was able to gain more insights into specific practices for example, how to 1) promote interaction, 2) effectively facilitate a question and answer discussion, 3) deal with biology terminology, and 4) model teaching practices. The focused observations helped me to 'zoom in' on specific pedagogical practices and to see subtle things that I would not have seen with the general observation that I had done in phase 2 of the study. The observed practices contributed further to the development of my repertoire of practices for teaching biology to pre-service teachers.

Learning through focused observations from experienced teacher educators provided me with invaluable opportunities for my professional development because I was able to see how a similar practice can be effectively implemented by one teacher educator and not so successfully by another. Discussing and reflecting on these observations, provided learning gains about the effective use of specific teaching practices underscoring the role of obervations, to notice important and 'hidden' aspectsof practice during WIL (Goldshaft, 2024). This study therefore showed that engaging in focused observations of experienced teacher educators' teaching after a short teaching practice, enables a doctoral student to learn more about the specific aspects of teaching they would have experienced during the teaching practice stint.

Continuous Dialogue and Collaborative Discussions with Experienced Teacher Educators

As shown in the previous section, although the one-week teaching was not long enough for me to gain insights into all aspects of my developing teaching practices, it revealed the importance of the opportunities provided by WIL, as it enabled me to identify aspects of practice that needed further consideration. One such aspect that the earlier steps had not revealed was how a teacher educator plans for lectures. I therefore had discussions with experienced teacher educators with a focus on the steps that they follow when planning their teaching (see Khoza, 2020). The discussions revealed that how teacher educators determine the breadth and depth of the content knowledge when teaching pre-service teachers, was a grey area with no guidelines. Discussions indicated that teacher educators did

not have a uniform procedure for deciding on the depth and breadth of taught content. This discovery then motivated me to explore how one can decide on the depth of content to teach pre-service teachers. This exploration led me to gain knowledge of curriculum for both teacher education and school contexts. The discussions involved the teacher educators posing questions for me to think about. They also voiced why they do certain things as well as their uncertainties in undertaking certain tasks when planning. This made the process collaborative, which is a key element of acquiring knowledge in a CoP (Monaghan, 2010; Patton & Parker, 2017). Therefore, what emerged from discussions was not only knowledge and skills about planning, but also agency to explore further problematic aspects of teacher educator practices even for experienced teacher educators.

Planning and Teaching a Full Module

The short teaching practice gave me a feel of what it means to first gather the content knowledge for teaching pre-service teachers and a feel of being in front of pre-service teachers. However, the timeframe restricted me from fully implementing what I had come to know about teaching pre-service teachers. In addition to learning the knowledge of context, the planning and teaching of a full module enabled me to put into practice the repertoire of teaching and learning practices that I had accumulated throughout all the phases of inducting self. Putting into practice the knowledge I had gained made me realize that teaching pre-service teachers is not a 'one size fits all' endeavour, one has to continuously exercise professional judgement (Cooper, 2019). I found out that certain teaching practices acquired through immersing myself in the CoP would not work. For example, I had to change the way I designed PowerPoint slides to come up with a structure that promoted interaction and meaningful engagement (see Khoza & Nyamupangedengu, 2018). I had to exercise professional judgements when planning and during teaching. What this step achieved, therefore, was the development of what Cooper (2019), described as practical wisdom. Practical wisdom is the capacity of a practitioner to make informed decisions, involving professional judgements, about practice in the absence of a formal set of knowledge (Lunenberg & Korthagen, 2009). As Furman (2015) states, it is about "respond [ing] thoughtfully to complex circumstances…drawing on skills and prior knowledge" (p. 140). During WIL, in making professional judgements based on experiences and drawing from theory, one develops this wisdom (Stenberg & Maaranen, 2022). The skill of making professional judgements does not only inform one's current practice but also helps one to re-imagine and conceptually reconstruct future practices, thus, bridging the gap between theory and practice. Engaging in planning a full module helped me to develop this kind of practical wisdom.

Teaching a full module enabled me to put into practice the knowledge, skills and practices of teaching pre-service teachers that I had learnt. This study therefore shows that once a doctoral student has been encultured into a CoP, they should be given a chance to showcase the expertise gained through WIL as it denotes a move from an apprentice to an expert and fosters self-directed learning that extends beyond the CoP.

Student Feedback as a Powerful Resource for Tracking one's Developing Teaching Competencies

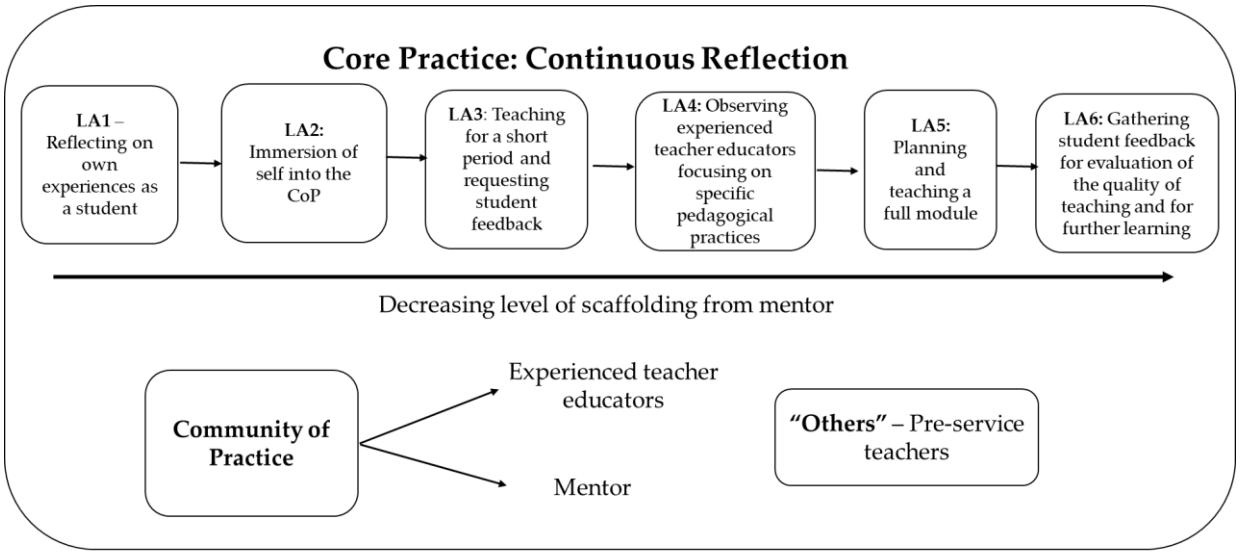
Gathering students' feedback and analyzing it is an effective way of tracking one's professional development. When I compared students' feedback during the one-week teaching and at the end of the three-week module, I was able to recognize the change to my teaching. For example, in the one-week teaching, the students highlighted my inability to facilitate question-and-answer sessions. After the one-week teaching practice, this became one of my focus areas of practice during the focused observations. I ultimately learnt how to effectively facilitate a question-and-answer discussion

(through observations and discussions with experienced teacher educators) and the pre-service teachers confirmed this learning at the end of teaching the module (Khoza, 2024a; Flodén, 2017). In addition to being an effective way of tracking one's developing teaching expertise, the students also critiqued the pedagogies that I used in relation to the content chosen, leading me to further reflect on these critiques and learn more about teaching biology to pre-service teachers. As Flodén (2017) states; student feedback is more beneficial when the lecturer views them as learning opportunities. While this practice provides a transformative way to learn about teaching, it is not common in individuals engaging in WIL. Instead, the reliance is on feedback from mentors (see Goldshaft, 2024; Smith-Ruig, 2014). It is, therefore, significant for the doctoral student to gather and critique student feedback following WIL to assess their learning and gain professional knowledge for future practice.

A MODEL FOR ENGAGING EDUCATION DOCTORAL STUDENTS INTO WIL OF TEACHING PRE-SERVICE TEACHERS

Using the findings from this study, I propose a model that can be adopted or adapted to engage education doctoral students in WIL (Figure 1). The proposed model suggests learning approaches that can be systematically undertaken by education doctoral students, in order to gain the professional knowledge for teaching pre-service teachers

FIGURE 1: A model of engaging education doctoral students in work-integrated learning.



Note. LA refers to learning approach.

Firstly, the model shows that WIL for education doctoral students requires a CoP that is composed of experienced teacher educators and a mentor. Access to the CoP and the movement from the periphery to the core (Lave & Wenger, 1991) are negotiated with experienced teacher educators and scaffolded by the mentor. The mentor also serves as a way of neutralizing the power dynamics between the doctoral student and the experienced teacher educators. Immersion into a CoP, mentoring, and reflection are core practices of the model. Secondly, the 'others' – the pre-service teachers taught – are included in the model as they serve to validate the learnings of the doctoral student during the WIL. The assumption regarding the inclusion of this component is that student feedback has proved to be an effective catalyst for transforming one's teaching practices (Khoza, 2024a; Zhao et al., 2022). The student feedback should however be interpreted with the help of a mentor. Thirdly, continuous

reflection of the doctoral student is of utmost importance and hence, a core practice in this WIL model. The continuous reflections assisted me in integrating theoretical and practical knowledge (Veine et al., 2019) but it was not easy. Thus, the scaffolding of this process from the onset of WIL by the mentor cannot be over-emphasised. Lastly, the model consists of six learning approaches that a doctoral student needs to follow in order to be inducted into the scholarship of teaching pre-service teachers. Learning Approach 1 involves the doctoral student reflecting on their undergraduate experiences in close collaboration with a mentor. This reflective exercise helps the candidate interrogate the views and attitudes developed from the apprenticeship of observation (Lortie, 1975). This would lay a foundation for the development of the practices of teaching pre-service teachers based on examined past experiences. Learning Approach 2 involves immersing oneself into the CoP by becoming an active participant observing and conversing extensively with experienced teacher educators. This provides the candidate access to the CoP comprising of the teacher educators and their teaching practices. Learning Approach 3 requires the candidate to engage in 'assisted' teaching for a short period coupled with written feedback from students. This approach provides a gentle and effective way of learning to teach. The short teaching period also provides a space for 'testing' or to 'trial run' the practices of teaching pre-service teachers that the candidate gained from immersing into the CoP. Learning Approach 4 is about focusing on specific aspects of teaching during observations as opposed to open observations (phase 2). This enables the candidate to see subtle teaching practices and increase their awareness of how to perform or implement specific teaching aspects. Therefore, the induction process should allow the apprentice to move from general to focused observations of teaching practices that may require in-depth observations in order to gain adequate knowledge. Discussions with a mentor would therefore be focused on specific teaching practices to reveal subtle practices that are often taken for granted and help an apprentice to get a deeper understanding of that practice. Learning Approach 6 involves planning and teaching a full module. It is envisaged that Learning Approach 6 will enable the candidate to gain practical wisdom. In this approach, the candidate gets an opportunity to exercise professional judgement as they showcase the acquired expertise.

CONCLUSION RECOMMENDATIONS AND LIMITATIONS OF THE STUDY

As argued by Storey (2018), there is a need to rethink how professional doctorates are structured. The purpose of this self-study was to investigate how a doctoral student can induct 'self' into the scholarship of teaching pre-service teachers. I proposed a model that can be used to engage education doctoral students in WIL teaching pre-service teachers. Although the model is developed from a context of self-study in the teaching of a biology content course, the learning approaches are universal in the sense that any doctoral student can use this model to gain professional knowledge for teaching pre-service teachers. However, questions that arise with regard to the proposed model include: What would be the adequate time the doctoral student should spend at each stage as denoted by the learning approaches? What kinds and/or the extent of professional knowledge for teaching pre-service teachers can be gained at each stage? For example, what sorts of pedagogical knowledge for teaching pre-service teachers can a doctoral student gain when reflecting on their experiences as an undergraduate student? To what extent would this framework be adopted/adapted in the context of teaching a methods course? In light of questions like these, I recommend further research that tests the model, to help in answering the above questions. The model of WIL can also be used for students undertaking professional doctorates in preparation for teaching pre-service teachers.

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About the Journal

The International Journal of Work-Integrated Learning (IJWIL) publishes double-blind peer-reviewed original research and topical issues related to Work-Integrated Learning (WIL). IJWIL first published in 2000 under the name of Asia-Pacific Journal of Cooperative Education (APJCE).

In this Journal, WIL is defined as:

> *An educational approach involving three parties – the student, educational institution, and an external stakeholder – consisting of authentic work-focused experiences as an intentional component of the curriculum. Students learn through active engagement in purposeful work tasks, which enable the integration of theory with meaningful practice that is relevant to the students' discipline of study and/or professional development* (Zegwaard et al., 2023, p. 38*).

Examples of practice include off-campus workplace immersion activities such as work placements, internships, practicum, service learning, and cooperative education (co-op), and on-campus activities such as work-related projects/competitions, entrepreneurships, student-led enterprise, student consultancies, etc. WIL is related to, and overlaps with, the fields of experiential learning, work-based learning, and vocational education and training.

The Journal's aim is to enable specialists working in WIL to disseminate research findings and share knowledge to the benefit of institutions, students, WIL practitioners, curricular designers, and researchers. The Journal encourages quality research and explorative critical discussion that leads to the advancement of quality practices, development of further understanding of WIL, and promote further research.

The Journal is financially supported by the Work-Integrated Learning New Zealand (WILNZ; www.wilnz.nz), and the University of Waikato, New Zealand.

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Types of manuscripts sought by IJWIL is primarily in two forms: 1) *research publications* describing research into aspects of work-integrated learning and, 2) *topical discussion* articles that review relevant literature and provide critical explorative discussion around a topical issue. The journal will, on occasions, consider good practice submissions.

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