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Experiential learning in doctoral training programmes: fostering personal epistemology through collaboration.

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Abstract

There has been increasing recognition for the need to reform doctoral training practices to foster students' personal epistemology. This study describes the design and evaluation of a learning experience designed to help students understand the scholarly publication process. Firstly, this study discusses the design of the learning experience, describing the collaborative process of writing an interdisciplinary publication using both online and face-to-face learning. Secondly, this study evaluates the effectiveness of the learning experience by examining students' reflections. We show that participation in the learning experience helped students to develop their academic writing proficiency, collaboration and teamwork, intercultural competence, and ability to engage in reflective practice. Importantly, we show that each student also created more individualised knowledge, gaining insight into how they and others think. This study, therefore, demonstrates that personal epistemology can be fostered through collaboration in a doctoral writing group context.

Keywords: experiential learning; collaborative learning; personal epistemology; doctoral writing groups; academic writing

Introduction

There has been increasing recognition for the need to reform doctoral training practices (see, for example, Aitchison and Guerin 2014; Bitusikova 2009; Cahusac de Caux et al. 2017; Gilbert et al. 2004; Nerad 2004; The Group of Eight 2013). In Australia, doctoral training programmes are predominantly based around a research apprenticeship model, where a student conducts an independent research project supervised by a team of at least two supervisors. This can result in a narrow educational experience, characterised by a focus on discipline-based knowledge.

It has been shown that current doctoral training practices emphasise disciplinary knowledge (Manidis and Goldsmith 2017), where skills 'may have elements in common across disciplines, but expert mastery [...] can only occur in the context of the discipline' (Gilbert et al.

2004, 381). This view considers the development of transferable skills as secondary in importance to disciplinary pursuits of inquiry (Gilbert et al. 2004). Other scholars, however, acknowledge that it is the transferable skills that 'give technical and disciplinary skills their real value' (Gilbert et al. 2004, 381). This view has led to the incorporation of more transferable skills development into doctoral programmes. At our university, for example, students are required to complete a compulsory professional development component in their doctoral programme designed to foster the knowledge, skills and abilities relevant to academia and beyond (Monash University 2018). This view of research inquiry, therefore, notes that disciplinary knowledge and skills are important, but that they are of greater value if they can be applied in a variety of contexts (Gilbert et al. 2004).

Further innovations are still needed to encourage the development of students' personal epistemology ('what individuals think knowledge is and how they think that they and others know', Hofer and Bendixen 2012, 227). This study describes the design and evaluation of a learning experience designed to help students understand the scholarly publication process. Firstly, this study discusses the design of the learning experience, describing the collaborative process of writing an interdisciplinary publication using both online and face-to-face learning. Secondly, this study evaluates the effectiveness of the learning experience by examining students' reflections. We show that participation in the learning experience encouraged collective, as well as individualised, knowledge creation. Therefore, this study demonstrates that personal epistemology can be fostered through collaboration in a doctoral writing group context.

Transferable skills and doctoral writing groups

A key transferable skill for graduate students intending to work in academia is a high level of academic communication, particularly in terms of scholarly writing. Successful completion of doctoral training is dependent on the completion of a high-quality written dissertation.

Publications are also often used as an early measure of career success for students, and are frequently viewed as indispensable for students to establish their own academic identities (Aitchison and Guerin 2014). Publications are also increasingly forming part of students' dissertations, as theses incorporating published works become more popular (Lee 2010). Students, however, enter doctoral programmes with different cultural backgrounds and varying levels of prior skills and experience. Furthermore, scholarly writing is often a source of significant anxiety for both students and their supervisors (Aitchison and Guerin 2014; Cahusac de Caux et al. 2017).

A collaborative pedagogical practice in doctoral education that is receiving increasing attention is the establishment of doctoral writing groups (Aitchison and Guerin 2014). Research shows that doctoral writing groups can be considered as postgraduate learning communities and that these communities are effective in developing academic writing proficiency and higher-order thinking skills such as analysis, problem-solving, and reflective practice (Cahusac de Caux et al. 2017). These doctoral writing groups are also effective in boosting doctoral students' confidence and decreasing anxiety associated with scholarly writing (Aitchison and Guerin 2014; Cahusac de Caux et al. 2017; Ferguson 2009; Guerin et al. 2013; Maher et al. 2008). Doctoral writing groups also place significant emphasis on giving and receiving feedback (Aitchison 2010; Cahusac de Caux et al. 2017), an innately collaborative activity. The process of giving and receiving feedback is central to improving academic writing proficiency, helping students to

verbalise their internal reflective thinking, and allowing them to organise and analyse ideas to present cohesive arguments (Cahusac de Caux et al. 2017). Ward (2013) advocates for the establishment of doctoral writing groups to empower students and increase their sense of agency. In particular, these types of groups allow students to learn together, discovering ‘how much they already know and [...] how much they have to learn’ (Ward 2013, 204). This collaborative sharing of understanding also provides students the opportunity to establish a more assertive and positive academic identity (Lee and Boud 2003).

Learning communities in general, and doctoral writing groups specifically, have been shown to be effective in fostering higher-order thinking skills (Cahusac de Caux et al. 2017). In this study, metacognition, critical thinking, and reflection were identified as evidence of higher-order thinking, as all three involve the facets of analysis, evaluation and synthesis/creation (Pretorius and Ford 2016; Pretorius, van Mourik, and Barratt 2017). In particular, metacognition, critical thinking, and reflection necessitate the demonstration of skills such as interpretation, analysis, synthesis, evaluation, problem-solving, the ability to draw conclusions, self-awareness, and emotional awareness (Pretorius and Ford 2016; Pretorius, van Mourik, and Barratt 2017). For the purposes of this study, metacognition was defined as the ability of students to ‘engage and monitor the cognitive processes involved in their learning’ (Pretorius, van Mourik, and Barratt 2017, 382). Critical thinking was defined as the ability to ‘engage a range of cognitive skills such as interpretation, evaluation, analysis, and synthesis [...] to solve problems and draw conclusions’ (Pretorius, van Mourik, and Barratt 2017, 382). Reflection was defined as the students’ ability to utilise analytical and evaluative skills to explore personal experiences, beliefs or knowledge in order to promote self-discovery and encourage personal growth (Cahusac de Caux et al. 2017; Pretorius and Ford 2016). Therefore, reflection can be considered as

encouraging the development of students' personal epistemology, since it allows them to develop a better understanding of their own thinking.

An area that has thus far received less attention is the effect of doctoral writing groups on the development of intercultural competence. Intercultural competence can broadly be defined as the skill to 'accommodate cultural differences into one's reality in ways that enable an individual to move easily into and out of diverse cultures, and to adjust naturally to the situation at hand' (Sandell and Tupy 2015, 365). Effective and appropriate intercultural communication requires not only an advanced foreign language proficiency level but also an adequate level of cross-cultural understanding (Byram 1997; Deardorff 2006; Krajewski 2011). Hence, models of intercultural competence extend to various dimensions and components such as sociolinguistic awareness, an intercultural understanding of different world views, attitudes of respect and openness, as well as awareness of self and others (Byram 1997; Deardorff 2006; Krajewski 2011). Studies highlight that multicultural writing groups build a sense of belonging between their members, fostering the development of respect between participants (Guerin et al. 2013; Maher et al. 2008; Maher, Fallucca, and Halasz 2013). However, most studies evaluating multicultural writing groups focus on the improvement of writing proficiency, subject knowledge or academic skills, with intercultural competence often noted as an 'unexpected benefit' (Guerin et al. 2013, 77).

It has been suggested that a writing group provides its members with opportunities to experience similarities and differences between cultures (Tangen et al. 2011). Furthermore, peer discussions about writing throughout a student's study enhance opportunities for the development of mutual understanding between students from different cultural or linguistic backgrounds. Peer interactions in writing groups have also been shown to allow participants to

adopt a different thought pattern in their argument structure (Guerin et al. 2013; Tangen and Mercer 2012). It is, therefore, likely that multicultural writing groups would provide an authentic environment where students' intercultural competence can be nourished through interactions between multicultural group members.

Teaching approach

Theoretical framework

The learning activity described in this study is situated within the experiential learning paradigm, drawing on constructivist and collaborative learning pedagogies. In the experiential learning paradigm, learning is defined as a knowledge creation process that occurs through the 'transformation of experience' (Kolb 2015, 49). In the context of this definition of learning, knowledge can be understood in terms of information: the understanding of information, facts or skills as representative of the real world (Lehrer 2018). This highlights the various characteristics of learning in an experiential setting (Kolb 2015): firstly, learning should be considered as a process, not in terms of outcomes; secondly, all learning involves creation and re-creation of knowledge through experience; thirdly, learning occurs continuously; finally, learning involves adaptation and transactions between the learner and the environment. Kolb (2015) further describes experiential learning as a four-stage cycle composed of concrete experience (experiencing), abstract conceptualisation (thinking), reflective observation (reflecting), and active experimentation (acting).

Experiential learning environments encourage learners to create and re-create personal knowledge, in contrast with a more didactic form of knowledge transmission where pre-

determined and fixed ideas are transmitted to the student from knowledgeable sources (Kolb and Kolb 2009). Therefore, experiential learning activities have a balanced focus between the content and the process of learning (Kolb 2015). Doctoral training can be considered as experiential in nature, where students undertake activities such as reading, writing, analysing and experimenting in order to become experts in their field (see for example Cumming 2007).

Experiential learning is deeply rooted in constructivist pedagogy (Kolb 2015). Constructivist learning environments encourage students to actively build knowledge, reflect, and make their own interpretations, which leads to deeper engagement with the content (Fosnot 2005). In a constructivist setting, students play a critical role in their personal knowledge creation, assessing their own learning needs and constructing knowledge through the experience of mastering a task (Wurdinger 2005). Learning outcomes in these settings can, therefore, be varied, with students learning differently from the same approach (Wurdinger 2005).

The experiential learning paradigm has been criticised as containing an oversimplified understanding of learning because it describes a series of steps to conceptualise learning (see for example Seaman 2008; Holman, Pavlica, and Thorpe 1997). Kolb acknowledges this criticism, and has in recent years adapted his model, noting that learning is ‘a recursive process that is sensitive to the learning situation and what is being learned’ (2015, 51). The four stages described in Kolb’s (2015) model are, therefore, recursive and reflect how learners absorb, interpret and act on information.

Miettinen (2000, 70) critiques experiential learning in the context of adult education, concerned that it leads educators ‘away from the analysis of cultural and social conditions of learning’. Experiential learning theory is, however, influenced by the work of Vygotsky (1978), who noted that learning can be considered as a transaction between the learner and their social

environment. This highlights the importance of creating collaborative learning communities that allow the experiential construction of knowledge in a social environment. Vygotsky (1978) also demonstrated that learning occurs when a learner discovers a solution to a problem under guidance from, or in collaboration with, teachers and more capable peers. Research shows that collaborative learning activities allow individual learners to internalise knowledge through negotiation and coordination between group members (López-Yáñez et al. 2015). Collaborative communities that incorporate experiential knowledge construction, therefore, enable learners to socialise into the wider community of practice, develop their own identity and transition from novice to expert through experience (Kolb 2015).

Study context

Our writing group consisted of four doctoral students and one facilitator (a staff member responsible for academic skills development in doctoral training programmes). Each doctoral student came from a different field of expertise (Arts, Science, Education, and Medicine) and a different cultural and linguistic background. Three of the students were at the start of their second year of doctoral candidature, and one student was nearing completion of doctoral training. All the students had been part of the writing group for at least six months at the time of this study. The group facilitator initially established the writing group with the aim of fostering a learning community focussed on peer-to-peer learning. Students self-selected to be part of the writing group. It is important to note that participation in the writing group is a reflection of students' perceived self-efficacy in terms of academic writing, not their actual writing proficiency.

As the writing group became more established and students increasingly recognised the benefits of in-depth peer-to-peer feedback, they became more willing to participate in a collaborative learning experience. Discussions during group meetings highlighted that students felt under-prepared for the challenges of scholarly writing for publication. This provided a clear opportunity to implement the experiential learning activity described in this study.

Conceptualising a research question

The facilitator met with the doctoral students to discuss whether they would be willing to learn about the academic publication process by writing a research manuscript together. Students believed that this experiential activity would be ‘challenging’ and ‘difficult’, but were willing to participate provided that the facilitator was available for feedback and support. Given their disparate areas of expertise, the first challenge students faced was determining a research topic. Students determined that the only topic that they had in common was their participation in the writing group. Consequently, the students decided to conduct a literature review study investigating the benefits and challenges of participating in an interdisciplinary doctoral writing group. Four topics were investigated: the influence of doctoral writing groups on academic writing, intercultural competence, ways of thinking, and reflective practice skill development. Each student took ownership of one topic and through the research process became the group’s expert on that particular area of research.

Writing in an online learning environment

Skiba (2011) notes that informal learning is fostered through the ability to connect virtually. However, it is also true that online collaborative tools do not foster learning by themselves, but depend on the entire ecology of learning (Limbu and Markauskaite 2015). Teachers should, therefore, also take into account the students' interpretations and willingness to participate, the relationships between group members, and the learning environment (Limbu and Markauskaite 2015). Considering the students' pre-existing knowledge and willingness to participate, as well as the previously established working relationship through their writing group interactions, it was decided that an online environment would be a space where knowledge could be co-created by students. The facilitator created a Google Docs® document to enable all students to work on the manuscript at the same time. Students had not previously used Google Docs® as part of their participation in the writing group, so the facilitator provided basic instructions regarding Google Docs® (i.e. accessing the document and making comments).

Students conducted their research independently and each contributed approximately 2000 words to the draft manuscript using the Google Docs® platform. Students were encouraged to use the interactive comment feature of Google Docs® to provide feedback and suggestions for other group members. It is important to note that students likely felt comfortable making comments on their peers' work because of their previous experience in the writing group. As mentioned previously, writing groups are focussed on the process of giving and receiving feedback. The comment feature of Google Docs® asynchronously mimicked this feedback process, and allowed students to discuss any disagreements regarding their text. The facilitator's role was to provide guidance about the structure and organisation of the manuscript, and to

suggest areas for further exploration. Figure 1 provides an example of the use of the online commenting process.

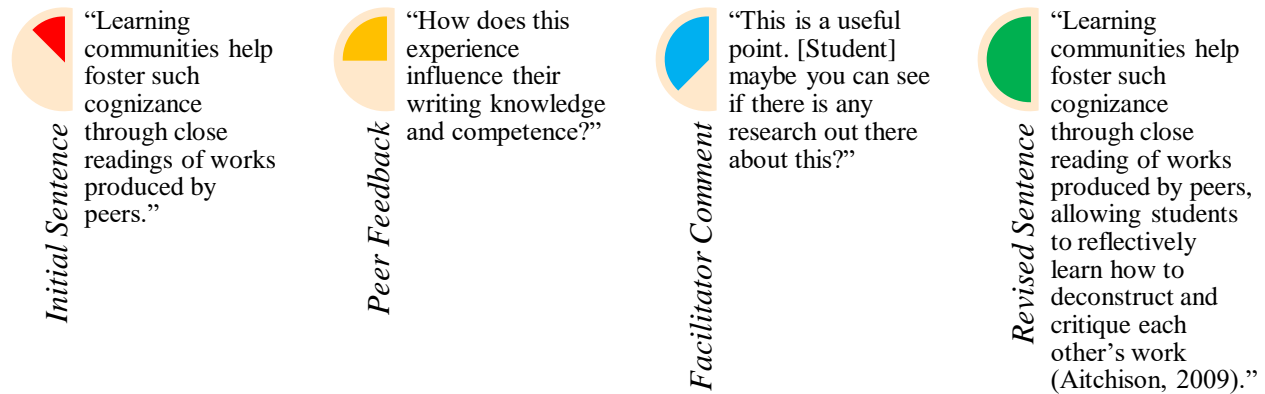


Figure 1. An example of changes to text based on suggestions from a peer in Google Docs®.

Students also had access to social networking through the writing group's existing Facebook® group to communicate with each other regarding their manuscript. This Facebook® group was previously used predominantly by the facilitator to communicate with students regarding meeting times. Students also all had personal Facebook® accounts, so they were familiar with the platform. They had not, however, previously used Facebook® as part of a learning activity. Consequently, the students co-created the expectations regarding the use of this social media platform.

The writing group also met face-to-face fortnightly to discuss individual students' progress and to provide feedback on writing. These meetings were conducted in a local café on the university campus, to further highlight the social nature of collaboration in an academic environment. Meetings were conducted on Friday afternoons when the café was only partially occupied, to ensure that noise was at an acceptable level for group discussion. Online and offline

interactions were used together to help facilitate the feedback process. Discussions during the face-to-face meetings could be continued online, and any online discussions could be clarified during face-to-face meetings.

Once all the sections of the article were completed, the group worked together to establish a single author voice in the manuscript. Six months after the project was started, the manuscript was submitted for peer review. The facilitator was responsible for direct contact with the journal editors to maintain continuity of communication as students completed their doctoral candidature or left for fieldwork. However, all communication between the facilitator and the journal editors also included all the students in order to demonstrate the submission and revision process. Furthermore, students were responsible for addressing all required revisions prior to publication. The facilitator was a guide for the students throughout the manuscript revision process and also acted in a pastoral care capacity to help students manage any negative reviewer feedback or potential manuscript rejection. Approximately 12 months after the initial completion of the manuscript, the article was published (see Cahusac de Caux et al. 2017).

Methods

Research design

The second stage of this study used a qualitative research approach to investigate the effectiveness of the learning experience by evaluating students' learning. The design, data collection, and analysis procedures of this project were approved by the University's Human Research Ethics Committee. A self-study research approach was applied, where research participants self-reflected on their own experiences and analysed these experiences to connect

their learning to the wider doctoral training environment. Participants in this study are, therefore, the primary data sources in their own research. To increase the credibility of the research findings, an independent researcher (a doctoral student not involved in the learning activity) participated in data analyses.

The effectiveness of the online learning environment

The effectiveness of using an online collaborative environment in addition to face-to-face meetings was evaluated by analysing students' Google Docs[®] and Facebook[®] comments and interactions. In particular, this study investigated whether collaborative knowledge creation was fostered in similar or distinct ways through the use of these platforms. It is important to note that students did not initially anticipate that their contributions on Google Docs[®] and Facebook[®] would be analysed to evaluate the online learning environment. Since the students' comments reveal changes and development over time, they can be considered representative of the learning that occurred in the online environment.

The effectiveness of the experiential learning activity in fostering transferable skills

Students' learning experiences as they participated in the activity were examined through analyses of personal reflective responses from each of the writing group participants. It has been previously shown that students gain significant value from reflecting on their academic learning, as it allows them to contextualise and improve their learning (Pretorius and Ford 2016). The importance of reflective practice in developing doctoral students' personal epistemology and

professional practice was also recently highlighted (Cahusac de Caux et al. 2017). The facilitator, therefore, included this reflective writing exercise at the end of the experiential learning activity to give students the opportunity to practice reflection for learning (Pretorius and Ford 2016). Students were provided with a basic framework for reflection ('Do you think it was a useful activity and why or why not? What did you learn through this experience? What were the challenges you experienced?'), but were given the freedom to discuss any experiences they wanted to highlight. Therefore, these reflective responses were considered as short narrative accounts of the students' experiences during the experiential learning activity. This study presents analyses of these reflective responses from the perspectives of theme and content, as described below.

Theme analysis

In order to evaluate students' learning experiences, the writing group facilitator and an independent researcher examined each student's personal reflective response using a thematic analysis approach. This identified the latent content of each response. Each reflective response was read to obtain a general understanding of the main concepts highlighted. Significant statements pertaining to each of the main concepts were extracted and organised into theme clusters. The credibility of the research findings was established through agreement between the facilitator and participants, as well as with an independent researcher.

Content analysis

The incidences of interpretation, analysis, synthesis, evaluation, problem-solving, the ability to

draw conclusions, self-awareness, and emotional awareness in students' reflective responses were quantified. For example, if a student highlighted that they used a particular strategy to address a previously identified concern, the sentence would be identified as demonstrating problem-solving. It is important to note that sentences could demonstrate multiple elements of higher-order thinking. For example, in order to effectively problem-solve, a student may have also needed to effectively analyse the situation or synthesise a plan of action.

Results

Collaborative learning in an online environment

Both Google Docs[®] and Facebook[®] were used extensively throughout the researching and writing process. It was, however, surprising to see that students used these two platforms for distinct purposes (Figure 2). Analysis of students' use of these collaborative tools revealed that Google Docs[®] was used to provide fine-editing and proofreading suggestions on written text (Figure 2). Students also anecdotally commented that they felt a sense of accomplishment when they could click the 'Resolve' button in Google Docs[®] after successfully addressing a peer's comments. This is likely a consequence of the fact that Google Docs[®] removes the comments from the document once the 'Resolve' button is pressed. In contrast, Facebook[®] was primarily used by students to gain general feedback about ideas for their particular section of the paper, to provide links to useful resources, or to manage the logistics of face-to-face meetings (Figure 2).

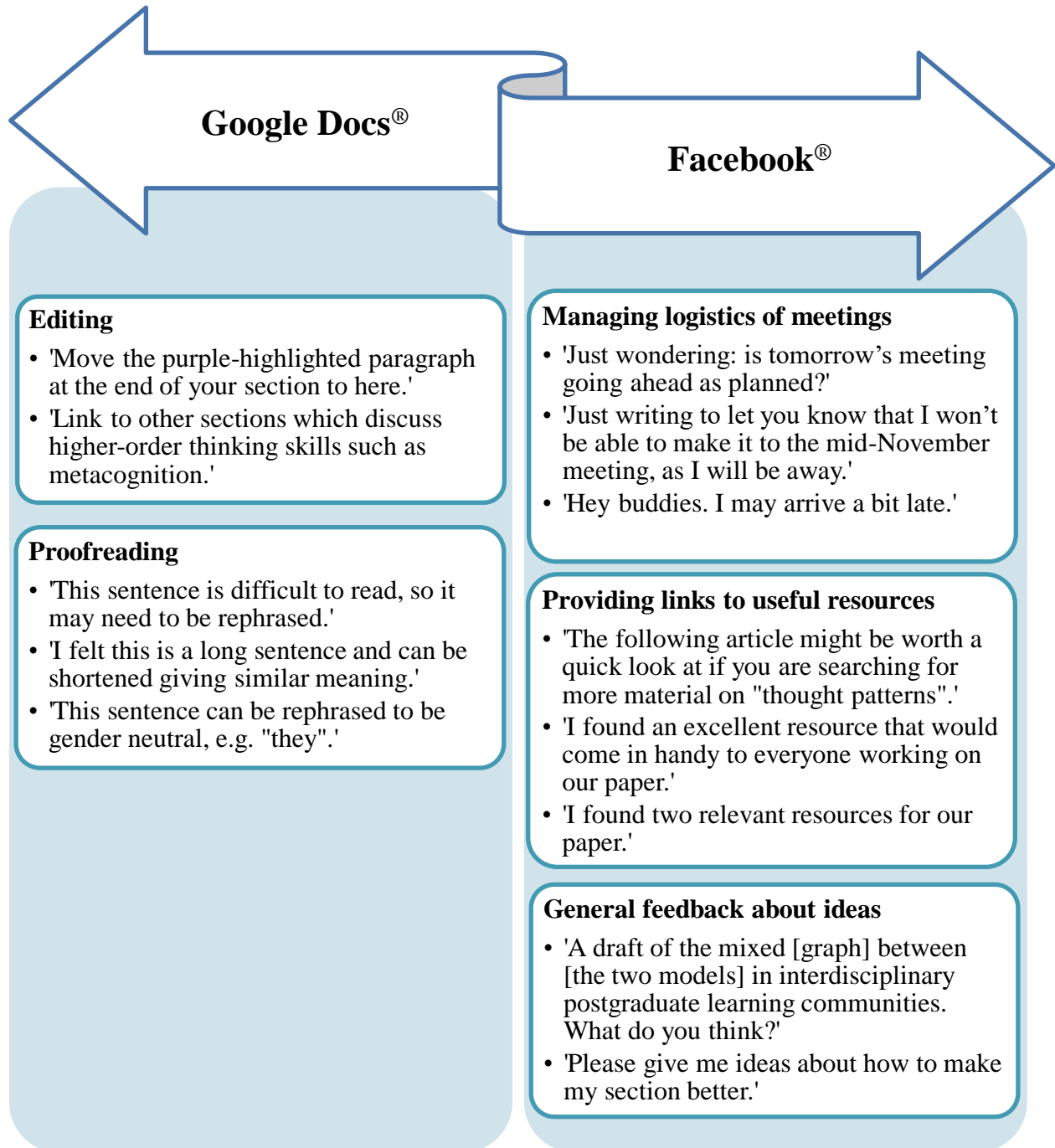


Figure 2. Differences in the use of online learning platforms during the manuscript preparation process.

It is currently unclear what affordances from Google Docs[®] and Facebook[®] influenced students' choice to use a particular platform. However, it is likely that the similarity in function and appearance of Google Docs[®] to other word processing software made it more suitable for in-depth editing and proofreading than Facebook[®]. Furthermore, the innate social nature of Facebook[®] likely influenced students' choices to use it as a way to get general feedback or manage face-to-face meetings. Finally, the embedded sharing tools on various websites likely made Facebook[®] more useful than Google Docs[®] for resource sharing.

Evaluating students' learning experiences

Benefits of participating in the experiential learning activity

Students' reflective responses about the learning activity were analysed to identify those benefits most valued by the study participants. Eight themes were identified (see Table 1): improved academic writing proficiency, increased understanding of the publication process, improved collaboration and teamwork skills, learning how to work with peers with different perspectives, being prepared for the future, pastoral care and a sense of belonging, learning about reflective practice, and time-management skills.

Benefits relating to scholarly writing were highly valued among students, particularly an improvement in academic writing proficiency and an increased understanding of the publication process (Table 1). Students noted that the learning activity provided them with the opportunity to master the skills necessary to produce peer-reviewed publications, and that they consequently felt more prepared to write future publications. Students also noted that a key benefit of participating in the experiential learning activity was an increased writing proficiency in an

Table 1. Selected significant statements representing the themes identified in students' reflective responses.

Theme identified	Representative significant statements
Improved academic writing proficiency	<ul style="list-style-type: none"> • ‘I witnessed my written work gradually gain clarity as feedback from my peers, and contributions made by myself, prompted me to think through my ideas and readings of written texts.’ – Student A • ‘I began to write for my peers and, therefore, an audience.’ – Student A • ‘I learned [...] the way to develop an academic argument.’ – Student C • ‘I learnt that writing is a skill rather than an inborn talent that cannot be improved.’ – Student B • ‘I learned to reduce [jargon] in my writings and focus on explaining the implications of my PhD study.’ – Student D
Increased understanding of the publication process	<ul style="list-style-type: none"> • ‘By learning the process of writing a collaborative research paper, it prepared me to write future research papers.’ – Student D • ‘I learnt from this experience that [a] peer-reviewed international publication normally required rigorous work of researching and writing.’ – Student C • ‘I recognised that in order to have a good article I need to have a good review of the literature, an effective methodology, and an excellent argument.’ – Student C
Improved collaboration and teamwork skills	<ul style="list-style-type: none"> • ‘It allowed me to further my understanding about the process of academic collaboration.’ – Student B • ‘The experience provided me with a great opportunity to carry out research in a team.’ – Student C • ‘This exercise improved my ability as a researcher to work in a team.’ – Student D
Learning how to work with peers with different perspectives	<ul style="list-style-type: none"> • ‘I learned to appreciate the viewpoints of students from different cultural backgrounds and disciplines.’ – Student D • ‘This was my first time [working] in a team consisting of members from different ethnic backgrounds and disciplines.’ – Student C • ‘Writing a paper with people of vastly different backgrounds was not without its challenge. [...] We all wrote in a different style that was influenced by our disciplines and ways of thinking.’ – Student D

Being prepared for the future	<ul style="list-style-type: none"> • ‘I felt more prepared for my future peer-reviewed publication.’ – Student C • ‘The experience [gave] me a great opportunity [...] to prepare for my future academic life.’ – Student C • ‘It prepared me to write future research papers with colleagues.’ – Student D
Pastoral care and sense of belonging	<ul style="list-style-type: none"> • ‘The experience was conducted under a “safe” and fun environment.’ – Student B • ‘The peer support from other writers was important as well.’ – Student B • ‘[It] made me [feel] a sense of belonging to a learning community.’ – Student D
Learning about reflective practice	<ul style="list-style-type: none"> • ‘I also learned about the use of reflective practice in PhD studies.’ – Student D • ‘I found my voice through the reflexive processes being undertaken by others.’ – Student A • ‘I could reflect on my language when I read my fellow’s comments on my writing.’ – Student C
Time-management skills	<ul style="list-style-type: none"> • ‘The challenges I faced were to effectively find a balance between working on my PhD project and participating in the production of the article manuscript.’ – Student B • ‘The shortage of time and the overwhelming feeling from reading other members’ writing put me under pressure.’ – Student C

Note: Reflective responses generally included multiple themes.

academic context. This is not surprising, given the well-established benefits of doctoral writing groups in improving students' academic writing quality, predominantly through the provision and receipt of feedback (Cahusac de Caux et al. 2017). The students also highlighted that the experience helped them improve their communication skills not only within their own discipline, but also to a broader audience.

The development of research collaboration and teamwork skills was also highly valued by students (Table 1). The importance of such collaborative writing is underscored by the increasing global focus on interdisciplinarity (Rylance 2015), particularly for research projects that warrant research synthesis from various fields to address societal problems (van Noorden 2015). Since some participants attended the writing group longer than others, these more senior members became mentors to more junior members. This can be considered as further real-life collaborative experience, similar to the way early-career researchers are mentored by more senior researchers. This mentorship model likely contributed to the success of this learning experience. The facilitator also played an important role here, as this was only possible through the creation of an environment that fosters personal relationships and dialogue.

Students also highly valued learning how to work with peers with different perspectives (see Table 1), with several quotes highlighting aspects that we consider representative elements of intercultural competence. In particular, students' quotes reflected sociolinguistic awareness ('We all wrote in a different style that was influenced by our disciplines and ways of thinking'), awareness of self and others ('This was my first time [working] in a team consisting of members from different ethnic backgrounds and disciplines'), and an attitude of respect and openness to difference ('I learned to appreciate the viewpoints of students from different cultural backgrounds and disciplines'). It is interesting to note that these quotes also highlighted disciplinary differences in writing style

(Table 1). Importantly, the students' reflections presented the concepts of understanding different cultures, ways of thinking, and disciplinary differences together; they considered them as indivisible.

This experiential learning activity expressly required group members to work collaboratively with students from different cultural and disciplinary backgrounds. The shared purpose of the students who participated in this experiential learning activity makes the exchange of knowledge and understanding between group members more authentic. It has been noted that language and culture are inseparable and that language is strongly connected to a person's cultural way of understanding the world (Lussier 2011). In order to write the research manuscript together, students needed to collaboratively construct a shared language. This process served as a significant mediation tool for cultural awareness as well as the development of students' personal epistemology; they became more aware of their own (and their peers') ways of thinking. Consequently, we propose that participating in this learning experience fostered the development of elements characteristic of intercultural competence and personal epistemology via a process of integration of culture and ways of thinking through the means of language.

Application of higher-order thinking during the learning experience

All reflections showed a high incidence of higher-order thinking skills. In particular, analysis, synthesis, self-awareness, and evaluation skills were prominent. The level of higher-order thinking is perhaps not surprising, given that these students have extensive previous training in academic settings. Students were, however, more capable of identifying the skills they were using. It is likely that students' understanding of higher-order thinking was developed through their increasing thematic awareness of the topics they researched. For example, as

students became more aware of the benefits of reflective practice, it is likely that they would have directed more effort on incorporating reflection into their own thought processes. This can be clearly seen in Student D's reflection:

Previously, reflective practice was something that I might have subconsciously implemented in my own PhD journey. By acknowledging different reflective practices and making a deliberate effort to employ those strategies, it helped me handle the setbacks of my PhD research.

The content analysis of the reflective responses shows that all the students had applied skills that can be considered metacognitive, reflective and representative of critical thinking to address each of these individual challenges. In the following short narrative quotes, each student highlights a particular challenge that they faced, as well as their chosen strategy to address this concern. The key elements of higher-order thinking demonstrated in each reflective response have been identified in italics in brackets within each quote. The elements identified in the brackets, therefore, demonstrate which skills students used to address their personal learning needs. This bracketed information was added by the facilitator and the independent researcher for data analysis purposes, and is provided to demonstrate how higher-order thinking skills were classified in reflective responses.

Each student described a different learning outcome as part of this learning experience. Student A learnt to analyse and synthesise different ways of examining literature, creating new hybrid forms of expression:

One exciting development I noticed during this process was the variety of interpretive mechanisms available to researchers and writers [*interpretation, analysis, synthesis*]. Directly quoting a source was no longer the only viable means of revisiting a previous study in the literature [*interpretation, analysis, synthesis, evaluation*]. Hybrid forms such

as adaptation and the thematic melding of knowledge were also valid expressions of what the scholarship had to contribute to our understanding – and what we had to contribute to it [*analysis, synthesis, evaluation, drawing conclusions*]. This new awareness triggered a wave of creativity in my thinking that saw me producing original content (written and illustrative) in new ways [*analysis, synthesis, evaluation, self-awareness*].

Student B found it challenging to balance the work required for the manuscript and their own research project. This student noted how it was necessary to be aware of one's personal capabilities and wellbeing in order to balance competing demands:

The challenges I faced were to effectively find a balance between working on my PhD project and participating in the production of the article manuscript [*analysis, synthesis, evaluation*]. I worried initially that I would not be able to devote too much time on the article [*analysis, self-awareness, emotional awareness*] [...] In the end, I contributed reasonably well to the writing process without overloading myself with stress from both sides [*analysis, evaluation, self-awareness, emotional awareness*]. This reinforced my awareness in prioritisation and the importance in looking after my wellbeing [*interpretation, analysis, synthesis*]. Moreover, learning from this experience, I will always assess my own capacity before agreeing to overly participate in other research projects during my PhD [*problem-solving, analysis, synthesis, evaluation, drawing conclusions*].

Student C discussed the challenges associated with setting personal goals that may be unrealistic, leading to unnecessary stress:

This opportunity was also accompanied by some challenges and to me the most major one was to meet my own expectation [*analysis, self-awareness*]. I recalled that I got quite stressed out sometimes [*emotional awareness*] because I wanted to produce a good piece of writing [*analysis, self-awareness*]. At that time, my fellows had finished their writing parts while I was collecting data for my own PhD study [*interpretation, analysis*]. The shortage of time and the overwhelming feeling from reading other members' writing put me under pressure [*analysis, synthesis, evaluation, self-awareness, emotional awareness*]. I did not want to be the reason to pull my friends back (or slow them down) but at the same time I could not allocate my time to do a rigorous literature reading [*analysis, self-awareness*]. Finally I decided to trade off by spending [all of my] new

year break in [my home country] (where I went for field trip) to finish my part [*problem-solving*].

Finally, Student D noted the challenge of having to do research in an unfamiliar field:

Writing a paper outside my discipline required me to come out of my comfort zone and read journal articles that were not in my field [*analysis, self-awareness, emotional awareness*]. At first I found it difficult to grasp the concept of reflective practice [*analysis, evaluation, self-awareness*]. However, I spent substantial time understanding the literature [*problem-solving*], and managed to identify the knowledge gap of reflective practice in postgraduate writing groups [*synthesis, evaluation, drawing conclusions*].

It has been noted that experiential learning environments foster varied learning, as students assess their individual learning needs and construct their own knowledge to address these needs (Wurdinger 2005). The students' reflective responses highlight this, with each student noting a different learning outcome. While students all noted that they had gained common benefits from participating in this experiential activity (see Table 1), each student also gained more personalised knowledge specific to personal contexts. Students created shared knowledge in relation to the content of the manuscript they developed. However, students also developed their own personal understanding of how they and others think. For example, Student A noted that 'I realised that writing in a group does not strictly mean thinking in a group. It did not necessarily mean handing oneself over to the will of the majority. Instead [it is] simply working toward group-oriented goals.' Similarly, Student D highlighted that the students 'all wrote in a different style that was influenced by [their] disciplines and ways of thinking'. Learning in our context was, therefore, both collective and individual. This study, therefore, demonstrates that personal epistemology can be fostered through collaboration in a doctoral context.

Discussion

This study describes the design and evaluation of a learning activity specifically created to provide students with a mastery experience to understand the scholarly publication process from research conceptualisation to final publication. This learning activity was situated within the experiential learning paradigm, drawing on constructivist and collaborative pedagogy to foster knowledge creation. Figure 3 presents our interpretation of Kolb's (2015) experiential learning cycle during the experiential learning activity described in this study. In particular, we draw attention to the role of the facilitator and the students in this process, noting that this distinction became less clear as the creation of the manuscript progressed.

As the students researched their individual topics, they became subject experts, allowing them to transit from concrete experience, through reflective observation to abstract conceptualisation (Figure 3). Once students reached this stage, they and the facilitator engaged in active experimentation as they provided feedback on each participant's writing. This experience helped students to pre-empt the comments of journal reviewers, allowing them to position their research within the wider discipline. Importantly, both the facilitator and the students acted as coaches for each other (Figure 3), promoting a peer-to-peer environment where the line between facilitator and student became blurred. This fostered student-led knowledge creation. It is also important to note that, while we have presented learning as a process in Figure 3, the learning that occurred in this study was recursive. As noted by Kolb (2015, 56), 'experiencing, reflecting, thinking, and acting are not separate independent entities but inextricably related to one another'. Learning in our context was dynamic and ongoing, particularly during the provision and receipt of feedback.

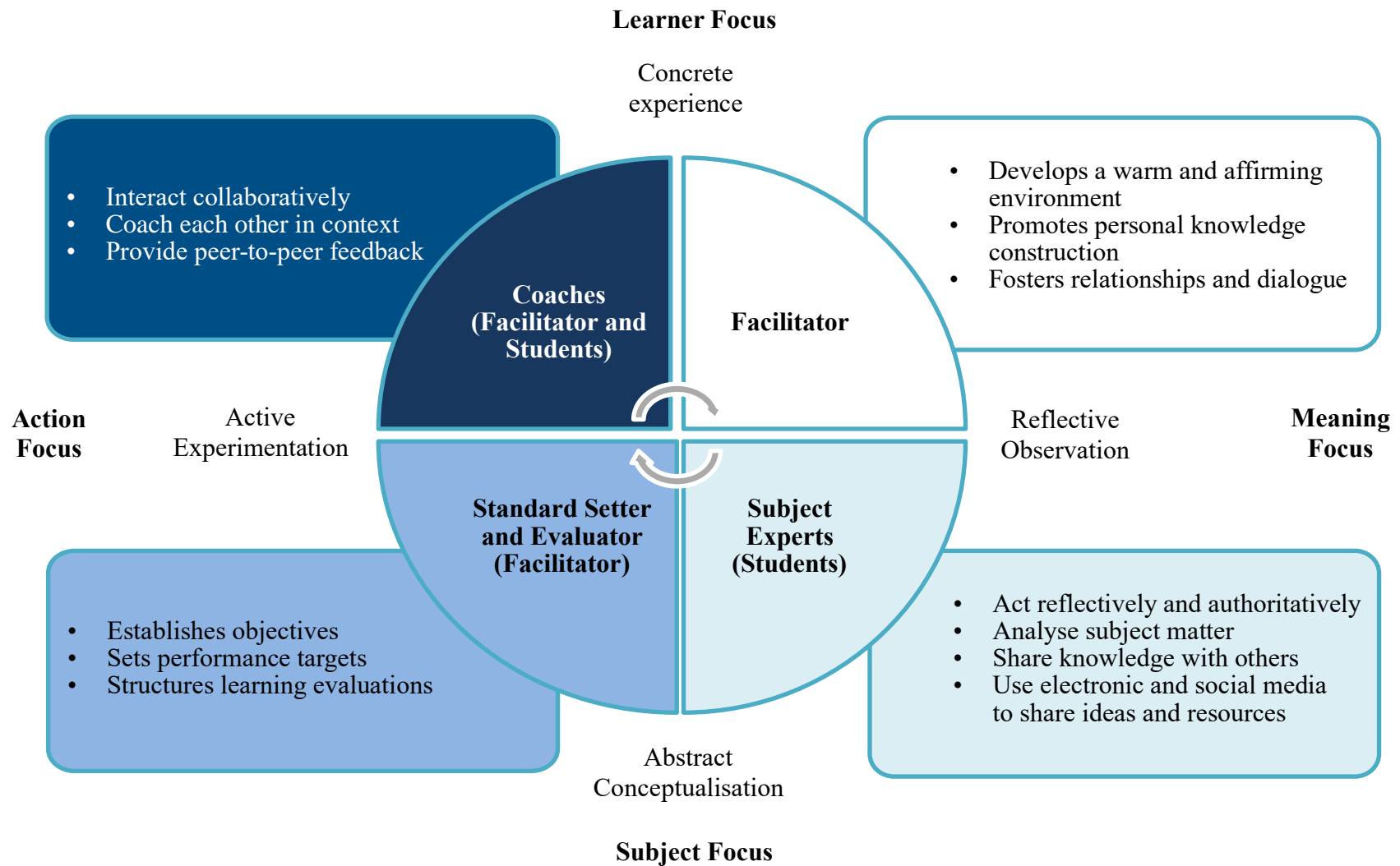


Figure 3. Experiential learning cycle during the learning experience described in this study, highlighting the role of the facilitator and students. This figure was adapted from KOLB, DAVID A., EXPERIENTIAL LEARNING: EXPERIENCE AS THE SOURCE OF LEARNING AND DEVELOPMENT, 2nd, ©2015. Reprinted by permission of Pearson Education, Inc., New York, New York.

An important limitation of the current study should be noted. In this study, students identified that they developed transferable skills related to scholarly writing, academic collaboration and teamwork, as well as the ability to work with peers with different perspectives. It is important to highlight that the skills students felt they learned were relevant to the context of writing an interdisciplinary collaborative research paper. While these skills are transferable to other disciplinary contexts, they would have to be contextualised or learned anew within any new setting (see for example Price 2013; Price, Scheeres, and Boud 2009).

Conclusion

There has been increasing recognition for the need to reform doctoral training practices to foster students' personal epistemology. This study describes the design and evaluation of a learning experience designed to help students understand the scholarly publication process. Using experiential and collaborative learning in an online and face-to-face environment, we were able to show that that students' personal epistemology could be fostered in a doctoral writing group context. It should be noted that this study does not advocate for a redesign of doctoral programmes as vocational qualifications. However, we do believe disciplinary knowledge and skills are of greater value if they can be applied in various contexts. Therefore, we advocate for the incorporation of collaborative practices such as writing groups into doctoral training programmes to help foster students' personal epistemology.

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