

2020

What do Master's students' structured reflections say about the learning processes involved in commencing a research project?

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Recommended Citation

Warner, R., & Picard, M. (2020). What do Master's students' structured reflections say about the learning processes involved in commencing a research project?. *Journal of University Teaching & Learning Practice*, 17(1). <https://doi.org/10.53761/1.17.1.7>

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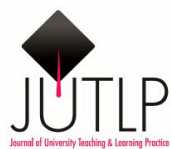
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Keywords

reflective learning, research design, research processes, professional reflective practice



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Introduction

In this paper, we explore the structured reflections of master's (by coursework) students enrolled in an interdisciplinary research-design course. Our aim is to investigate the learning processes involved in commencing a research project related to the students' own fields of study. The cohort comprised students studying their master's degrees in education, biomedical science, international business, entrepreneurship and linguistics. The "reflections of experience" recounted in this paper relate both to their experiences as teachers, scientists and businesspeople in training and to their experiences as new researchers. The aim of the course was not only to achieve the "the development of competent and reflective professionals" (Hatton & Smith 1995, p. 33), but also to activate student development towards becoming competent and reflective researchers.

Seldom has a concept, in this case the practice of reflection, attracted such a vast cross-disciplinary literature. Such literature ranges from the rationality focus of Dewey (1997), Kolb's (1984) four-stage experiential model for structuring reflections, the authentic learning pedagogy approach (Herrington, Parker & Boase-Jelinek 2014) and the humanising, holistic approach (Boud & Walker 1998). Furthermore, interpretations of both reflection and reflective practice are extended through Hatton and Smith's (1995) work on the problems of defining reflection in teacher education and Boekaerts and Corno's (2005) work on self-regulated learning and how structured reflection connects students to their goals and supports favourable interpretations of the classroom environment. Finally, more recently, Harvey, Coulson and McMaugh (2016) have developed an "ecology of reflection" that draws together key theoretical concepts from the literature, including reflective learning, critical reflection, critically reflective practice, critical thinking and metacognition, to reach a clear understanding of reflective practice. Although the complexities surrounding the issue of reflection are myriad, Harvey, Coulson and McMaugh (2016, pp. 9-10) suggest that this abstract concept needs defining in the specific context in which it occurs, and the "learner ecology, the learning ecology and the experiential learning ecology" must be understood to ensure effective reflective learning.

In the current study, the context and purpose of reflection is further complicated by its location within another abstract concept: research. Therefore, the "learning ecology" and its four "Ps" (Harvey, Coulson & McMaugh 2016, p. 12) are particularly important. The learner, lecturer and research supervisor require the "predisposition for reflection". The "program context" of the discipline and of the interdisciplinary research-design course require content, resources and pedagogies appropriate to the specific level of study and type of reflection. The "planned (intended) learning outcomes" need to incorporate both professional learning and learning about research; the "participation or experiential context" needs to effectively scaffold learning about the profession and research and, at the same time, link the disciplinary research context and the research-design course (Harvey, Coulson & McMaugh 2016, pp. 12-13). Although the literature suggests that, in general, reflection (if occurring within an appropriate ecology) supports learning, learners engage with reflective practice "at different levels ranging from shallow reporting to a deeper and critical level" (p. 14) where critical reflection is "related to both metacognition and transformative learning" (pp. 12-13).

Thus, learning manifests through both understandings and the processes leading to these understandings within the complex learning environment (Enomoto & Warner 2013). Various scholars have emphasised that for "transformational learning" to occur, reflection must be carefully underpinned through scaffolding – a methodology enabling "a student to solve a

problem, carry out a task, or achieve a goal through a gradual shedding of outside assistance” (Opencolleges.edu 2019) – within formal curricula and embedded into regular meaningful activity (Mirriahi et al. 2018). Emphasise facilitating students’ epistemological analyses of their own learning processes through collaborative learning and, ultimately, self-regulation of learning (Boekaerts & Cascallar 2006).

Literature review

Before exploring how scaffolded reflections can impinge on learning processes, it is important to understand what is meant by the “learning ecology” of research, in a research-project context, as the term “research” can mean different things in different contexts. In academic contexts, research is characterised by analysis and the intention to put a value on discoveries. The plethora of definitions can be addressed in academic contexts by focusing on “formal research” (Leedy & Ormond 2010, p. 1) with its purpose of extending comprehension of an issue or phenomenon and an accompanying expectation of peer-sharing such findings. Leedy and Ormond (2010, pp. 1-2) have succinctly conceptualised formal research, in research projects, into eight dimensions:

- (1) Research originates with a question or problem.
- (2) It requires clear articulation of a goal.
- (3) It requires a specific plan for proceeding.
- (4) It usually divides the principal problem into more-manageable sub-problems.
- (5) It is guided by the specific research problem, question or hypothesis.
- (6) It accepts certain critical assumptions.
- (7) It requires the collection and interpretation of data in an attempt to resolve the problem that initiated the research.
- (8) It is, by its nature, cyclical; or, more exactly, helical.

Together, these dimensions give a comprehensive understanding of what formal research entails and relate to the topics given to our cohort, as described in the methodology below. Yet, as Dewey (1997) suggests, mere experience is insufficient; reflection must be included within the processes of learning, of which formal research is but one. Like all situated learning contexts, research education requires an environment in which belonging is developed alongside knowledge and mastery (Boekaerts & Corno 2005; Boekaerts & Cascallar 2006). Moreover, Smith and Trede (2013, p. 632) describe the “innate tendencies for reflection” that they attribute to professionals (such as teachers and medical practitioners) as integral to their identity. Likewise, doctoral education studies suggest that a key element of becoming a researcher involves assuming a “researcher identity” (Guerin, Kerr & Green 2015; Manidis & Goldsmith 2017), which the doctoral students achieve through a combination of reflection and structured, guided discussions led by lecturers and supervisors (Picard, Wilkinson & Wirthensohn 2011). Nascent researchers develop “metacognitive awareness and monitoring” so they can enhance “goal-setting” and examine the “motive or effect of their observed behaviour” (Mirriahi et al., 2018, p. 1). The combination of both feeling they belong (to the discourse community) and assuming a (reflective) researcher identity thus seems crucial for their development as researchers.

In the professional context, both the literature and anecdotal evidence from lecturers and employers suggest that students and practitioners either lack or struggle to conceptualise both reflection itself and its representation in reflective practice. The related literature suggests that this struggle is based in the fact that reflection can be defined at different levels, both theoretical (such as critical theory) and at the disciplinary level of professional practice (Ryan 2015; Howitt &

Wilson 2018; Wilson & Howitt 2018). A seminal systematic review by Rogers (2001) pulled together many of these critical approaches to reflection, from Dewey's (1997) initial rationality approach to reflection to its positioning within critical learning (Walker & Boud 1992; Brookfield 1995) and the active integration of these new understandings into one's own personal experience (Rogers 2001). Rogers insightfully synthesises these various theoretical approaches (including Boyd & Fales 1983; Boud, Keogh & Walker 1985; Mezirow 1990) into four common elements:

- 1) Reflection necessitates an individual's active engagement.
- 2) It is instigated by challenging or difficult circumstances.
- 3) It requires self-examination of viewpoints, reactions and suppositions.
- 4) It integrates this newly fledged understanding into the totality of the individual's experience (Rogers 2001, p. 41).

Rogers's common elements are extended by Enomoto and Warner (2013, p. 184), who posit that contemplation has value within the parameters of reflection, in that reflection incorporates "learning processes facilitated through the practice of contemplation, which transform individual experiences into learning". Such a transformation is reflected in the work of Dune et al. (2018) in the context of undergraduate health sciences, which focuses on the importance of a reflective task or scaffolded questions that encourage students to question their own depth of reflection. Moreover, Brookfield's (1995) "lens theory" extends the scope of Rogers's self-examination element by suggesting that aside from reflecting upon their own beliefs, individuals also use the critically reflective lenses of others to engage with different perspectives and theories. Thus, social interaction and context are essential elements of effective reflective practice (Boekaerts & Corno 2005; Smith & Trede 2013).

Researchers also suggest a need for "searching questions" (Bourner 2003) as a scaffolded guide to inform reflective learning processes. The value of such questions is exemplified by Enomoto and Warner (2013), who, in a Japanese language learning context, provide examples such as: "among the study methods you used in learning new vocabulary, which do you think worked best and least for you and why?" (p.188). Such starter questions can help promote student awareness of how to reflect by cross-examining their own learning experiences. Moon (1999) also stresses the importance of scaffolded preparation, including the development of starter questions and the need for continued guidance throughout the reflection focused task(s).

However, even the provision of scaffolded prompt questions presumes students actually value the process of reflection and putting reflection into practice, in relation to their own learning development; that they can attach a pragmatic, mark-determined view. This element is addressed by Harvey, Coulson and McMaugh (2016) as the "learner ecology", which, although affected by the learner's cognitive capacity and communicative skill, still relies heavily on the learning and experiential learning ecologies. Boud and Walker (1998) note that incorporating ideas pertinent to reflection can sometimes result in incomplete comprehension and pedagogic contexts that do not enable these learners to explore, thus causing students to experience "'inner discomforts' (Brookfield 1987), 'disorienting dilemmas' (Mezirow 1990), uncertainties, discrepancies and dissatisfactions which precipitate, and are central to, any notion of reflection" (p. 192).

Promoting reflections should not stop at scaffolding questions that promote "guided responses"; rather, reflections should trigger further critical analysis on the part of the individual. This links into the field of transformative learning, whereby the learner is "...experiencing a deep structural shift in the basic premises of thought, feeling and action" (O'Sullivan 2002, p.11, in Illeris, 2009,

p. 98). The transformative learning that is essential to a researcher's development requires the researcher to tap into the "disorientating dilemmas" (Mezirow 1990), that the learner is experiencing and scaffold the process of reinterpreting prior and current experiences and the development of new comprehensible constructs. Students require support in examining issues at the micro and macro levels; moreover, both *the action of* research and *the reflection on* research and its ethical, social and practical considerations require scaffolding (Sakinofsky, Amigó & Janks 2018).

Zimmerman (2002, p. 68) provides a further exposition of the possible parameters of reflection is provided by. The author builds on both the important role of feedback in self-regulated learning outlined by Butler and Wynne (1995) and Winne and Hadwin's (1998) seminal four-phase model (task definition, goal setting, learning "tactics" and metacognitive adaptations), phases that are based on the cognitive processes involved in self-regulation, within which reflective practices sit. Zimmerman (2002) determines that the ability to (self-) reflect can be sub-divided into *self-judgement* and *self-reaction*. Self-judgement can be seen as a standards-based self-evaluation, while self-reaction can relate to "adaptive/defensive responses" (p. 68). Indeed, Dune et al. (2018) found positive adaptive responses in health science students' reflective capacity when the reflection development process enabled them to increase self-understanding, a requisite for improving self-efficacy.

Also, studies have emphasised the need for the development of critical reflection, with its implications of accepting particular ideologies, alongside their associated assumptions and epistemologies (Hatton & Smith 1995) and how learners learn to challenge their own beliefs through critical self-analysis and taking ownership of their actions (e.g., Sockman & Sharma 2008). However, this critical self-analysis must be "contextually and practice-bound" and used to understand and develop practice (Smith & Trede 2013, p. 632). At the very least, in a tertiary context, such activities should be scaffolded with starter questions and instructions that are explicit and focused on tapping into students' self-efficacy (Zimmerman 2002).

If reflective learning strategies that take the student beyond pragmatic paradigms and into increasing student self-efficacy can be scaffolded, then instructors must at the very least inhabit the students' world. To that end, numerous studies have explored academic and other reflective tasks and their relationship to the autonomous learning that research requires and to the development of reflective practitioners (Hourigan & Murray 2010). As Churchill (2011) notes, the literature upholds the value of blogs (e.g. Richardson 2006, in Churchill 2011) as indicating student-centred learning, of which reflection is an element. In other postgraduate contexts, Masek and Mokhdin (2016) found that blogs helped facilitate postgraduate engineering students' confidence and self-efficacy. Moreover, Mansouri and Piki's (2016) study of postgraduate business students and Churchill's (2011) study of postgraduate information technology students underline the potential of blogging as an enabling tool for reflective learning development.

There is a substantial body of literature in the specific context of undergraduate research (e.g., Wilson, Howitt & Higgins 2016) that shows how scaffolded reflective tasks lead to students displaying both creative and independent thinking, qualities that they say supervisors desire. Moreover, the value of reflection and the explicit role of the supervisor in reflection and doctoral identity formation has been described in the doctoral learning context (e.g. Picard et al. 2011). Reflection, therefore, appears to be central to practitioner research; for example, Fakude (2014) ascertained the effectiveness of a reflective blog in a study of master's nursing students, and Borg (2001) outlined the value of keeping a reflective learning journal (Moon 2006) to give nascent researchers insights into research processes. Another element of reflection in research, particularly

for practitioner-researchers, is described as “reflexivity”, which relates to ethics. Usher (2005, p. 32) notes that all practitioner research should acknowledge “the ‘world making’ constructive quality of research”. Reflexivity permeates every part of the research process, and researchers should “bend the research back on itself” (Usher 2005, p. 32) and situate ethics as a core element of research practices. However, to date, no study has examined inter-disciplinary master’s (by coursework) students participating in an interdisciplinary research-design course that structures reflections as an overarching paradigm in which students complete a series of scaffolded reflective tasks over time. Thus, this study hoped to capture the impact of such reflective tasks on inter-disciplinary students’ reflective processes and ability to conduct research autonomously.

Methodology

This research study aimed to answer the research question highlighted in the title:

What do master’s students’ structured reflections say about the learning processes involved in commencing a research project?

To fully answer the research question, the study needed to capture the real-time reflections (Herrington, Parker & Boase-Jelinek 2014) that the master’s students completed as part of the authentic main task: developing their research skills. This was undertaken during a postgraduate course, Research Design, that focused on the design of a master’s dissertation, which forms part of a master’s by coursework degree. In Research Design, students undertook several assessed tasks, including the design of their (proposed) research, an oral presentation based on this research supported by an academic poster, and weekly reflective blogs pertinent to the topics covered in their classes. Reflections were explored and developed during the process of doing research, rather than as a task tacked on to the end of the program.

The prompts to encourage reflection took a number of forms. Conceptually, what reflection involves and its value to learning processes was introduced as a hard scaffold (Brush & Saye 2002) in class in Week 1, through a variety of media and activities. Students were involved in scaffolded small-group discussions and whole-group feedback about what they understood by the term “research” and how they thought reflection fed into best-practice research. This was supported by the soft scaffold (Brush & Saye 2002) of optional online links to reflection and reflective learning and the nature of research, via the university learning-management system. Each week’s reflective blog related to the weekly topic itself, supported by in-class hard scaffolds (such as videos and case studies) and reinforced by a related “prompt question for their reflection” (Howitt & Wilson 2018, p. 577) and optional post-class online soft scaffolds. The only people who read the blogs and feedback were the students, tutors and course coordinator. This model allowed students time to reflect and (crucially) reflect upon their reflections using blog entries and tutor feedback; this cyclical process was informed by the scaffolded reflective learning model. This mirrored the model used in a Japanese-language curriculum (Enomoto & Warner 2013) and is reminiscent of the video annotation study by Mirriahi et al. (2018), as blogs accompanied each stage of student participation in the research process.

We explored two groups of respondents: 24 students in Group 1 and 11 students in Group 2, each over the space of a 13-week semester. Each student completed between three and seven blog entries using a range of structured prompts for reflection on the research process. The students were encouraged to complete as many blogs as they wanted, but were graded out of 4 marks for three blog posts, with the highest three scores selected if they completed more than the required

number. The students were given 14 blog-entry topics, eight relating strongly to Leedy and Ormond's (2010, pp. 1-2) dimensions:

- 1) Research originates with a question or problem: **Blog 1:** Research focus.
- 2) Research requires clear articulation of a goal: **Blog 2:** Literature review.
- 3) Research requires a specific plan for proceeding: **Blog 5:** Methodology.
- 4) Research usually divides the principal problem into more-manageable sub-problems: **Blog 11:** Process.
- 5) Research is guided by the specific research problem, question or hypothesis: **Blog 4:** Introduction.
- 6) Research accepts certain critical assumptions: **Blog 6:** Causation; **Blog 13:** Validity.
- 7) Research requires the collection and interpretation of data in an attempt to resolve the problem that initiated the research: **Blog 5:** Methodology.
- 8) Research is, by its nature, cyclical; or, more exactly, helical: **Blog 14:** Overview.

Six of the topics did not relate to Leedy and Ormond's (2010) dimensions, but in our view were still clearly related to "resource provision and acquisition goals" associated with researcher development, and were thus likely to develop reflective skills in this context (Boekaerts & Corno 2005, p. 206). Topic 3 related to the use of bibliographic and other software for research; topics 8 and 12 referred to the writing and presentation processes respectively. Topics 7 and 9 related to ethics: the former to the concept of ethics, and the latter to students' reflections on their experience participating in an interactive simulation exercise.

The results of the reflections were de-identified through codification, with each student given a number indicating their group, and an individual alphabetic letter to distinguish them within the group. Because the focus of our study lay principally in the scaffolding of reflections, a simple open-coding system using a sentence-by-sentence/phrase-by-phrase approach (Cohen, Manion & Morrison 2011) sufficed. We had considered an analysis of further variables, such as gender, cross-disciplinary issues and the degree program taken by the students, or indeed their research focus. In relation to the first three elements, we decided that the sample size might have been too small to draw any meaningful conclusions. With regard to the research focus of the students, many of them were undecided whether the project they did in Research Design would form the basis of the research for their dissertations.

We first examined the data in relation to the choice of reflection topic, as the literature on reflection suggests that the specific prompts (Enomoto & Warner 2013) and their connection to the students' "salient goals" are a key part of the "favourable cues in the learning environment" that encourage effective reflection (Boekaerts & Corno 2005, p. 206). After the sentence-by-sentence analysis of each reflective blog to identify emergent themes, we recontextualised the data in relation to the literature (Cohen, Manion & Morrison 2011) and found a close match between our findings and the categorisations offered in Hatton and Smith's (1995) pivotal reflection framework. We adapted this framework to include the following elements: 1) Technical, 2) Descriptive, 3) Dialogic and 4) Critical.

Results and discussion

Choice of reflective task

As noted above, the students produced a series of guided reflections related to the research process over a 12- to 13-week research-design course, with the option of two reflection topics in the final week. Table 1 shows the topics and the number of students who reflected on each.

Table 1. Reflection topics and respondents

#	Reflection topic	Number of respondents
1	Research focus	16
2	Reviewing literature	19
3	Using software for research purposes	14
4	Writing introductions	12
5	Developing methods	11
6	Causation in the research project	5
7	Ethical issues	22
8	Writing up a proposal	1
9	Exercises on ethics	20
10	Writing paragraphs	0
11	The research process in general	1
12	Oral presentation of research	1
13	Validity	7
14	Overview	1

As expected, the number of respondents engaging in the reflective blogs generally declined over the 13-week period, with more students generally participating in the first five weeks and fewer in the final five weeks. However, interestingly, the largest number of respondents writing reflective blogs occurred in Weeks 7 and 9, which both related to research ethics. In Week 7, the students reflected on research ethics in general in relation to the *Australian Code for the Responsible Conduct of Research* and ethical principles discussed in class in relation to examples. In Week 9, the students participated in an interactive simulation of research-ethics issues developed by the US Department of Health and Human Services Office of Research Integrity (<https://ori.hhs.gov/thelab>). They also completed modules with case studies on research-ethics issues, such as authorship, dissemination of research and management of data (described in Picard et al. 2011). The nature of the tasks and experience of examining case studies on ethical issues and relating these to their own research projects appeared to motivate the students to reflect on the experiences. Likewise, despite the generally low participation rates in the final five weeks, there was a spike in Week 13 of seven respondents describing how they addressed validity in their research. Again, this is perhaps because applying concepts of validity directly to their own research and their reflective processes was intrinsic to the nature of the task.

Disappointingly, because we, as research educators, hoped that the students would engage actively and reflectively with the writing process, the number of respondents reflecting on writing and the writing process was, in general, very low. The only exceptions were blogs 2 (reviewing literature) and 4 (writing introductions), which actually focused more on the conceptual aspects of selecting

literature and argument for the importance of the research in the introduction, than the writing process itself. This finding reflects the problem, common even in the doctoral context, that writing is viewed as a mechanistic process divorced from the “real business” of research, and the need for scaffolded writing and reflection on writing practices is often neglected by supervisors and research students alike (Manidis & Goldsmith 2017).

After classifying each reflection according to the topics undertaken, each reflection and each section within individual reflections were categorised broadly using Hatton and Smith’s (1995) framework. As in the studies in Hatton and Smith’s review, all the blog entries showed signs of reflection. Perhaps this is because the classwork included oral peer-to-peer activities leading into the written reflections, which, as Hatton and Smith (1995) note, are vital for developing reflective skills.

Technical reflections

As expected, since “time and opportunity for development” are required for truly “effective reflection” (Hatton & Smith 1999, p. 37), a relatively high percentage of the blog entries could be classified under the heading of “technical rationality”. This type of reflection, which is focused on “self and task”, is common for early-stage practitioners studying in programs providing entry to a profession. As the students in this study were very-early-stage neophyte researchers, as well as being early career teachers, scientists, linguists et cetera, they would be likely to have reflections that focus on “technical decision-making about immediate behaviours or skills”; although they were drawn from “a given research/theory base, they were “interpreted in light of personal worries and previous experience” (Hatton & Smith 1995, p. 45). Twenty-seven out of 50 reflections in Group 1 and 30 out of 80 in Group 2 were classified in this category.

Technical reflections dominated all topic areas, but notably, the only two reflections on the topic of writing (one under writing introductions and another under writing up the proposal) were classified as “technical reflections”, as was the one reflection on process. In the first topic, defining a research focus, there was also a relatively high percentage of “technical reflections” (5 out of 16). This is possibly because these topics focused on the student’s own project and the skills that they were learning, rather than extrapolating this further to implications for the nature of research, or the profession. At this early stage of the research process, the students were examining, albeit with the help of peers, their own use “of essential skills or generic competencies” as “applied in [a] controlled, small scale setting” (Hatton & Smith 1995, p. 45). In the Research Design course, the students were provided with detailed information about the processes of conducting research that they began to apply to their own topics of choice. However, their reflections still tended to focus on repeating what they had been taught and directly applying it to their own actions in a “technical”, sometimes mechanistic fashion. For example, respondent 1A described the process of evaluating the available literature in his field by referring to the Excellence in Research for Australia (ERA) journal list. He undertook a mechanistic search to see what journals were listed: *“I have realised searches on ERA 2010 and found 31 journals looking for ‘electrical’ under the title column”* (1A: Literature Review). The student did this rather than taking a more nuanced view towards research-journal quality, as suggested in the teaching material for the course, where the ERA journal lists were just one tool for exploring quality. Likewise, respondent 2E referred to the process of writing her proposal with the words, *“before writing up a proposal, we should make a plan first”* (2E: Writing). In this reflection and the remainder of her reflections, the student described research writing and the research process as a formulaic recipe and diligently noted her progress in completing the recipe with words like, *“I did not edit carefully enough, but improved after my friend told me my errors”* (2E: Writing).

Interestingly, however, a fairly large number of the reflections (22 out of 130) moved between “technical rationality” and the first level of “reflection on action” – “descriptive reflections” (Hatton & Smith 1995, p. 45). This movement is common across nine out of 14 of the topics, including the two on ethics, the research focus, literature review, using software, introductions, methodology, causation and validity. This is probably because, although the students are at a very early stage of their researcher development, the majority are starting to address both “task” and “impact concerns” related to research and their professions. An example of this movement between levels of reflection can be seen in 2B’s reflection on reviewing literature. She moved from a technical description of searching a library database – *“it showed several results, I clicked the one at the top”* (2B: Literature) – to a descriptive analysis of her performance in the role of researcher “giving reasons for [her] actions” (Hatton & Smith, 1995, p. 45). This “descriptive” shift can be seen in the words:

I realised that this article was from psychology and not really part of “my gang” of researchers, really the opposing team, so I looked for some more articles” (2B: Literature).

Descriptive reflections

Along with blogs that move between “technical” and “descriptive” categories, there were also a high number of reflections that could be categorised as “descriptive only” (27 out of 130). One reason for the high percentage of descriptive reflections is probably because the actions reflected on are fresh in the students’ minds and deeper reflection-on-action requires longer time for reflection and the scaffolding of deeper reflective processes. The focus in these blogs is on “best practice” as a basis for an analysis of one’s own practice and processes, but the emphasis is on the individual, rather than the profession or body of researchers as a whole, as shown by the following extracts:

Currently, I am considering which paradigm is more suitable to be used in my research (IX: Methodology).

I need to work out how, using survey research, I can test relationships or factors to be causal or just correlated to entrepreneurial intent of female Australian....students (1J: Causation).

Hence I was back to square one situation where I need to find the real limited focus of my research project (IR: Literature).

Such findings align with the work of Harvey, Coulson and McMaugh (2016), who, in the promulgation of their ecology of reflection theory, argue that not all reflection need be critical; rather, a shallower form of reflection can often be determined by the task, such as a description or recall. Thus, the non-dialogic responses in both our technical and descriptive categories could fit in with their perspective. This, however, in turn demands the bigger question of whether reflection and reflective practice are only characteristic of a deeper approach to learning.

There were also a reasonable number of blog entries (15 out of 130) that included both “descriptive” and “dialogic” reflections. In these reflections, the students moved from a focus on their own voice and concerns towards exploring issues with others and/or contextualising problems and finding “alternative ways to solve [them] in a professional situation” (Hatton & Smith 1995, p. 45). An example of this can be found in respondent 2K’s response on the topic of ethics (2K: Ethics):

One of the key lessons that I will apply in my own research is a need to consider ethics at all levels of research, and that this should come early in the design of the project since it may impact of the nature of the design choice.... Also, as educational researchers we need to pay much attention to ethical considerations because of the inevitable bureaucratic delays and experiences of the human participants in the study.

This extract shows how the respondent moved from describing general principles of ethics to considering how it could affect his specific research discipline of education and professional research practice. In this case, as in a number of others, the topic of ethics encouraged a movement from the pure descriptive, explaining the ethical issue, to the dialogic where the issue is applied to their own research project. Another example can be seen in the work of respondent 1X, who described the issues arising from journal ranking, then applied the system to her own project:

I don't think that journal ranking produces an unbiased picture on the real value of the journal in the field. However, it is good to know which of them are reliable from an academic point of view.... Thus I have found a number of journals in regional economy developments that I should read...it is more convenient in terms of reference to a particular field (1X: Literature Searching).

Dialogic reflections

According to Hatton and Smith (1995, p. 45) “dialogic reflections” are more “deliberative, cognitive, and narrative”, with the student practitioner “weighing competing claims and viewpoints, and then exploring alternative solutions”. Only six classic dialogic reflections were identified. These arose from the topics of ethics (two reflections), presentations (one reflection), literature searching (one reflection) and using research paradigms/methodology (two reflections) – all topics that naturally lend themselves to an internal dialogue and deliberate weighing of choices. For example, respondent 1X deliberately analysed her research paradigm:

I consider my research deductive, because I use predefined variables.... However, in the process of data collection new outcomes may require [sic] to interpret the findings in a different way...calling for an inductive approach (1X: Paradigms/Methodology).

On the topic of ethics, respondent 1E explored not only research practices, but also the professional practices of education: “*With specific reference to education, we need to ensure academic integrity, not only for ourselves, but for our colleagues and students as well*” (1E: Ethics).

Critical reflections

“Critical reflections” as discussed in the literature were the least prevalent in our study, with only a few (four out of 130 reflections) classified in this category. According to Hatton and Smith (1995, p. 45), in critical reflections, respondents are “thinking about the effects upon others of [their] actions, taking account of social, political and/or cultural forces” and applying these to the broader profession. We suggest that perhaps the nature of the blog topics did not lend themselves to application to broader issues and tended to encourage the respondents to focus on their own specific research topics. However, the few respondents who did address broader social, political or cultural issues did so in relation to their specific research topics. For example, respondent 2F stated:

In my case, for example, my research on the relationship between gender differences and student achievement scores on CBT will not affect the students directly. However, it will give opportunity for policy makers in the educational system to think about whether additional training is needed [on gender issues] before the students sit the CBT (2F: Introductions).

Likewise, respondent 1P, who would be returning to her own developing country after completing her master's degree, explored the future significance of her learning in Australia to her own professional and research context:

The sessions provided me with lifelong learning because I am now using the literature search techniques in other courses.... At my workplace, I will also use the search techniques to improve my own and my organisations' practices. I will share the skills with colleagues...where possible due to unreliable internet services (1P: Literature Searching).

Table 2 summarises the reflection topics and reflection categories.

Table 2. Reflection topics and categories

#	Reflection topic	Reflection category
1	Research focus	Technical – 9 Technical to Descriptive – 3 Descriptive – 3 Descript to Dialogic – 1
2	Reviewing literature	Technical – 6 Technical to Descriptive – 3 Descriptive – 6 Descript to Dialogic – 2 Dialogic – 1 Critical – 1
3	Using software for research purposes	Technical – 6 Technical to Descriptive – 3 Descriptive – 3 Descript to Dialogic – 2
4	Writing introductions	Technical – 7 Technical to Descriptive – 2 Descriptive – 2 Critical – 1
5	Developing methods	Technical – 3 Technical to Descriptive – 1 Descriptive – 4 Descript to Dialogic – 1 Dialogic – 2
6	Causation in the research project	Technical – 1 Technical to Descriptive – 1 Descriptive – 2 Descript to Dialogic – 1
7	Ethical issues	Technical – 11

		Technical to Descriptive – 4 Descriptive – 2 Descript to Dialogic – 2 Dialogic – 2 Critical – 1
8	Writing up a proposal	Technical – 1
9	Exercises on ethics	Technical – 9 Technical to Descriptive – 3 Descriptive – 3 Descript to Dialogic – 4 Critical - 1
10	Writing paragraphs	- 0
11	The research process in general	Technical – 1
12	Oral presentation of research	Dialogic – 1
13	Validity	Technical – 2 Technical to Descriptive – 2 Descriptive – 2 Descript to Dialogic – 1
14	Overview	Descript to Dialogic – 1

Conclusion

This article has addressed the structured reflective blogs of master's students from an interdisciplinary cohort, with each blog being pertinent to the student's particular field of study. A number of issues have emerged from the results of the study; the fundamental issue is that the "learning ecology" (Harvey, Coulson & McMaugh 2016) of the course and the nature of the task itself affect the types of reflection that emerge. This leads to the question of whether setting structured reflective tasks could lead to more-complex levels of reflection than otherwise might have occurred without scaffolding. Yet, without such scaffolds, the reflective blogs could have suffered from a deficit of reflection. However, it should be noted that the two blogs showing a spike in numbers of reflections, ethical issues in Week 7 and exercises on ethics in Week 9, were scaffolded through interactive research issue simulations and some case studies. The relevance of such activities to the students' specific research projects would appear to be the prime determinant of their reflective engagement, a pattern which again emerged in Week 13 in relation to validity and how the students might address it in their own research. Perhaps this is also because, as Usher (2005) notes, research processes in practitioner research should be reflective, exploring ethical issues at each stage.

The clarity of the results is somewhat obscured because the subjects in the cohort were both researchers and practitioners. We drew explicitly on the research reflection, albeit at a low level in terms of tasks, yet we did not really draw on the practitioner in terms of the task. Perhaps working with this kind of cohort requires explicit scaffolding of both researcher and practitioner aspects. Ethical topics were one area where the students could practically engage with the task of reflective practice.

A related issue emerging from the data was the students' level of experience as neophyte researchers. Doing research design and projects as part of a coursework degree rather than a

research degree, may have affected their view of themselves as researchers and their perceptions of their own ability to make an impact on practice. In the few cases where critical reflections did occur, they were usually from students who were experienced practitioners (in developing countries) and able to imagine the immediate impact of their work on practice –an educational administrator from Indonesia (two critical reflections) and two teacher educators from Africa (with one critical reflection each). This reinforces the idea that reflection flourishes where it is closely linked to practice and context (Smith & Trede 2013).

Future interesting work would be to compare reflective practice in other cohorts, such as MPhil or PhD students, as compared to students completing a professional degree. This would give further insight into whether types and amounts of scaffolded reflective practice can be distinguished between the researcher/practitioner and the doctoral researcher, or whether other factors are at play, such as writing being mechanistic and divorced from the “real business” (Manidid & Goldsmith 2017) of research.

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