Susan M. Cox, THE UNIVERSITY OF BRITISH COLUMBIA, susan.cox@ubc.ca
Kate Jongbloed, THE UNIVERSITY OF BRITISH COLUMBIA, katejongbloed@gmail.com
Charlyn Black, THE UNIVERSITY OF BRITISH COLUMBIA, charlyn.black@ubc.ca

Metacognition in Teaching: Using A "Rapid Responses to Learning" Process to Reflect on and Improve Pedagogy

ABSTRACT

In this paper, we critically evaluate the use of a weekly "rapid responses (RR) to learning" process in the context of teaching a graduate course on research methods over a three-year period. The RR process involved use of a short set of open-ended questions about key moments in learning that students complete, in writing, during the last five minutes of each class. The questions asked students to identify salient take-away messages, note when they felt the most and least engaged, name actions taken by anyone that were affirming or confusing, and consider specific "aha" moments. Our specific aim was to assess the following questions: What was the pedagogic value of the RR process? How did it inform our teaching and to what extent were there direct benefits of the process for students as well as for us as teachers? We found that the systematic feedback we obtained in this way supported weekly monitoring of student learning, facilitated response to trouble spots, and assisted in assessment of student engagement and classroom climate. It also provided insight into the efficacy of pedagogic strategies, such as student engagement in metacognitive learning, and models a process of instructors receiving feedback and being flexible to change. For instructors, the process enhanced motivation and professional development; plus, we found benefits in documenting instructor leadership and development. Finally, it facilitated deeper appreciation of the need to better integrate student self-assessment and the development of metacognitive skills as core components of the course.

KEY WORDS

metacognition and teaching, formative feedback, classroom assessment technique, pedagogy, teacher self-assessment

INTRODUCTION

Reflexive teaching involves both a continual practice of turning one's attention to the process of teaching and learning and an ongoing interrogation of one's values and approaches (Kuit, Reay, and Freeman 2001). It is a metacognitive activity that requires instructors to be willing to engage in "thinking about how they think about their teaching" (Tanner 2012). To support development of reflexivity in learners, it is important to create a safe environment, lay clear ground rules, and take a reflexive posture oneself (Fook 2007). Embedding reflexivity into the learning environment requires recognition that we are all both teachers and learners and as such, instructors must model reflexive practice as both researchers and teachers (University of Waterloo Centre for Teaching Excellence n.d.).

This paper focuses on how we, as an instructional team, employed a weekly "rapid responses (RR) to learning" process to generate formative student feedback that enabled us to reflect on our teaching and adjust our pedagogic approaches to foster effective student learning. This weekly RR

process was implemented in the pilot year of a new graduate-level research methods course (Approaches to Enquiry) in 2014 and studied over three subsequent years (2015–2017). The RR process asks students to provide feedback on specific instances in class that had significance for learning (Flanagan 1954; Fook 2007). Other classroom assessment techniques employ similar phrasing or items for engaging students in writing reflections on course readings prior to class (Wirth n.d.) or doing a "Minute Paper" at the end of class to see whether there is congruence between the professor's main idea and what the students perceived as the main idea (Angelo and Cross 1993).

Figure 1: Rapid response form

Please take a few minutes to respond to the questions below about today's seminar. We will share the responses with the group in an anonymized format. Thanks for doing this.

1. At what moment in today's seminar did you feel MOST engaged?
2. At what moment in today's seminar did you feel LEAST engaged?
3. What action that anyone (instructor or participant) took during the seminar today did you find most affirming and helpful?
4. What action that anyone (instructor or participant) took during the seminar today did you find most puzzling or confusing?
5. Was there anything about the seminar today that surprised you? (This could be in relation to your responses to activities, a new insight or anything else.)
6. What was/were the key learnings for you from today's seminar?
7. Is there anything else you would like to comment on?

To complete the weekly RR process, students responded in writing to seven open-ended questions during the last five minutes of each class to identify salient take-away messages, points where they felt most and least engaged, actions taken by anyone that were affirming or confusing, and specific "aha" moments.

We adapted our RR form (Figure 1) from an earlier iteration of the critical incident questionnaire (CIQ) used by one of the authors [Cox] in the context of teaching a graduate course on qualitative methods. However, as "critical incident" has connotations that suggest a serious or unusual event of concern, we chose to rename the tool as "rapid responses to learning" to avoid the erroneous perception that something was wrong. This better reflects our appreciative lens and intent to focus not only what was problematic in that week's class, but also on what worked well. Key features of the RR process are: 1) inclusion of questions that invite both positive and more critical responses; 2) a protected opportunity to respond immediately at the end of class rather than after a delay or period of deep thinking; and 3) a focus on identifying concrete instances of things that occurred during the class, rather than just a description of feelings. RR forms that included student names were handed in at the end of each class or submitted digitally and reviewed by the instructional team during the subsequent weekly planning meeting.

Use of this type of rapid feedback has evolved considerably over time. As noted above, our use of this form of classroom assessment has its origins in "critical incident reporting" (Flanagan 1954). This technique involves repeated use of a structured protocol designed to capture first-hand information relevant to a specific situation or event (Flanagan 1954). It has been used to determine effective/ineffective ways of doing something, to identify factors that are essential to an activity or event, and collect concrete descriptions of situations or problems (Butterfield et al. 2005; Flanagan 1954).

Early use of the technique involved asking US Army Air Force pilots to recall an occasion when they had felt disorientation or vertigo and then systematically describe what they "saw, heard, or felt" (Flanagan 1954). Thousands of critical incident reports were analyzed, and the results contributed to changes in plane design and flight training to reduce these episodes. A hallmark of the approach is that it is inherently flexible and can be modified or adapted for use in a variety of situations (Butterfield et al. 2005; Flanagan 1954). Since its development, the critical incident technique has been used as a structured opportunity for an individual to practice critical reflection, such as that related to professional development (Lister and Crisp 2007) and in a variety of research and educational settings related to health including hospital safety (Gigerenzer 2015), nursing (Narayanasamy and Owens 2001), mental health (McCormick 1997), and medical and dental education (Cottrell et al. 2002; Victoroff and Hogan 2006). The approach has also been adapted and popularized as the CIQ for use in higher education (Brookfield 2017; Keefer 2009) and is a technique that helps instructors assess student engagement with content and the learning environment, as well as capture insights related to student learning and educational experiences (Hickson 2011; Kuit, Reay, and Freeman 2001; Lister and Crisp 2007; Victoroff and Hogan 2006).

Context

Our study was conducted within the context of a graduate-level research methods course at The University of British Columbia. The course, "Approaches to Enquiry in Population and Public Health," is offered as a foundational course to ensure that thesis-based graduate students in the School of Population and Public Health (SPPH) are introduced to an evolving set of quantitative, qualitative, and mixed methods approaches. It is intended to provide students with an understanding of the scope and nature of research in population and public health, together with an appreciation of the challenges of conducting rigorous research across its span. It is designed to encourage development of curiosity as the driving force behind the conduct of research, support students in situating their individual research interests within this terrain, and encourage them to take responsibility for advancing their own learning, in partnership with their graduate supervisors. Additionally, the course is intended to support students in making decisions about the approaches they wish to pursue and refining a research question that is aligned with those choices. Students take the course in their first semester, meeting for a 3-hour class once per week over 13 weeks. It was first offered in fall 2014 and became a required course for all new doctoral students and an elective course for masters' students in fall 2015.

To promote interdisciplinary learning and emphasize diverse perspectives, the course was collaboratively taught by three instructors (Cox and Black are faculty with extensive teaching experience and Jongbloed was a teaching assistant new to teaching) who are the authors of this paper. All three were present at all sessions. Each of the instructors brings different disciplinary expertise and represents a different research paradigm (post-positivist, constructivist, and transformative). This diversity is important because the course employs a broad set of collaborative and learner-centered pedagogical tools to support graduate students in developing appreciation for a range of relevant research paradigms, learning to construct researchable questions, and fostering a reflective and self-reflexive stance. These tools include assigned readings, journaling, interactive lectures, laboratory activities, small group discussion, and student-led discussion, together with more active application of new learning through hands-on and written exercises, and peer review of others' work. Over the semester, students submit assignments that draw on course learnings to develop the pre-empirical stages of their graduate research.

The process involves structured feedback from peers and instructors emphasizing reflexivity and the evolving nature of their research questions. Explicit attention is focused on how one's research paradigm shapes these questions. There is a strong emphasis on critical thinking and reflexivity as well as researcher positionality. This can be a challenging area of learning for students and we found, as instructors, that the formative feedback from the weekly RR process was helpful in recognizing that student views about the reflective process differed from our own and that many students lacked the language to adequately describe what they were experiencing (Arend et al. 2021).

METHODS

Participants

Students enrolled in the "Approaches to Enquiry in Population and Public Health" course were typically beginning their first term in the PhD program in the School of Population and Public Health. We therefore do not know the extent to which prior coursework may have emphasized reflection and metacognitive development. RR forms were collected from enrolled students during three separate offerings of the 13-week graduate course, in 2015, 2016, and 2017. Annual enrollment ranged from 12–18 students over the three fall terms and included a mix of international and domestic students, some of whom had completed a previous degree in population and public health. All but one student provided informed consent to participate in review of the data for research purposes, for a total sample of 41 participants over the three course offerings.

Design and procedures

We adopted a prospective approach to investigation of our pedagogic approaches, treating each of the three years the course was offered as a case. Although many aspects of the course remained constant in each offering, there were some significant changes over the years, including structure and sequence of weekly topics and related assignments and a change in required textbook. Moreover, each year had somewhat different student composition and dynamics. We therefore relied upon in-class observations, weekly debriefing meetings, our own interpretive notes and reflective journaling as additional data to record and contextualize students' weekly responses to the RR process. Our reflective process was both metacognitive and affective in that it actively engaged us in considering what occurred in each class as well as how we thought about and interpreted what happened. Our regular discussions and resultant insights into how to alter our approach in the next class led to the integration of our emergent understanding with our overall experiences of teaching the course.

Analysis

During three years of offering the course, our emerging analysis took place in an iterative fashion. Each week, after we received the completed RR forms, we discussed students' responses to the RR process in at least two ways. First, we noted aspects that were important to our planning for future classes or our interactions with specific students. This served a range of pedagogic functions that we discuss below. Second, we considered, at a more personal level, how we were using the RR process in our teaching, what it meant in terms of our ability to reflect on what was working or not, and how we interpreted this. Over time, we also recognized that the RR process had implications we had not foreseen, for example, how we approached the preparation of teaching dossiers and the documentation

of educational leadership. It is these benefits and their related implications that we focus on below in presenting what we have learned from using the RR process.

To assist us in making effective use of all student responses to the RR process over the three-year study period, we pasted them into an excel spreadsheet that omitted identifying student information but was searchable by item number, year, and/or weekly topic. We did not do a thematic analysis of these responses. Instead, our aim was to include them as part of our emergent insights into the pedagogic value of the RR process and, through the techniques of constant comparative analysis, identify if and how the process informed our teaching and whether there were any direct benefits of the process for students. Specific examples of student responses drawn from the spreadsheet helped us to clarify our uses of the RR process and to cluster them according to the specific benefits we derived in assessing the effectiveness of our teaching. The spreadsheet also helped us to ensure that the examples we selected represented many different students from each of the three cohorts represented.

Ethics

Ethics approval for the study was obtained from the university's Behavioural Research Ethics Board. Students provided written consent to use of their materials but were not required to complete any form of data collection that was not already part of course delivery. Informed consent was facilitated through a colleague so the instructors did not know who consented to participate until after final grades for the course were submitted. All responses were anonymized when entered into the data spreadsheet.

STUDY FINDINGS

Despite the lack of anonymity on the submitted RR forms (students submitted forms with their names), there was a high level of participation. Results that follow are based on 385 weekly RR forms collected from consenting students over the three-year research period, representing 98% of a possible total of 391 RR forms. Direct quotations are referenced according to the year of the course offering and the topic addressed during the class.

In presenting our key learnings about the benefits of implementing the RR process, we focus first on how the RR process enabled us to monitor individual learning experiences, identify trouble spots, and assess student abilities to engage in reflexivity and self-assessment. Based on these insights, we then consider the benefits of the RR process for assessing the effectiveness of our pedagogic approaches and for stimulating our professional development as teachers.

Supports weekly monitoring of successful student learning as well as trouble spots

One of the most important impacts of the RR process was that student submissions provided immediate as well as an ongoing understanding for instructors about how classroom activities had been perceived by, and "landed with" students. The instructional team reviewed student submissions both independently and as a team, in order to consider how well expectations for knowledge and comprehension, the two lowest levels of Bloom's taxonomy were met (Anderson et al. 2001; Bloom 1956). For example, in the session about research paradigms, a challenging topic, there were some very positive and encouraging contributions: "Yes! The framing of a research paradigm driving a question that is answered by a method seems blindingly obvious now" (09-2015/Paradigms/Q6), and "That I need to think more deeply over the next few months about what my positions as a researcher are. That your positions as a researcher evolve over time" (05-2015/Paradigms/Q6). Comments such as these

provided positive encouragement that we had met our goals in delivering complex material; they also showed how students were integrating new concepts into their repertoire.

On the other hand, some comments provided perspective on areas that were not well understood by students in a given class, and in some cases, it was clear that certain misconceptions had arisen more broadly: "Discussion about methodology versus methods was a bit confusing" (06-2015/Paradigms/Q4); and, "I'm still unclear about the difference between theory and paradigm. How can critical theory be fitted into the description of a paradigm?" (04-2015/Theory/Q4).

The RR supported us in identifying substantive issues or topics that were confusing in our pedagogical approach that would benefit from additional clarification. As an instructional team, we initially responded to any comments by reviewing areas of confusion in a subsequent class. However, we learned through the RR tool that this was tiresome for students, which may have reflected that the confusion was not widespread, or alternatively, that students worked independently to gain clarity on difficult concepts before returning to class again. As a result, we switched to including a single slide at the start of the lecture that identified some of the problem areas identified from the previous week's RR and asked the class if they wanted to revisit any. However, where comments were widespread, we addressed them as a major point of confusion and attempted to provide clarification.

In other cases, where an individual student identified points of confusion, the comments provided an opportunity to work more directly with that student. We gave a more personalized response, either through email or in-person, depending on the nature of the concern. In several cases we were able to detect pleas for help, either in terms of course materials or student wellbeing: "I'm a bit concerned that I am missing the mark on "good" mixed methods research questions … I am still having a hard time translating this into practice in my own work" (32-2017/Integrated KT/Q4).

Prompts students to engage in reflexivity about their own learning

Evidence of a growing appreciation for the importance of reflexivity in research was one of the things we looked for in students' written journal syntheses and weekly RR. Indeed, our repertoire of pedagogic strategies in the course consistently emphasized the value of engaging in deep and sustained self-reflection about the questions one asks and the ways one proposes to answer them through research. We required students to delve into their emerging research identities locating themselves with respect to various research paradigms and traditions. We asked them to share this journey with their peers in small group discussions and to hone the ability to locate and discuss the way that our life experiences and background assumptions shape the research we do. It was an essential component of the course; so it was no surprise that the comments emerging from the RR process also began to reflect a growing awareness and application of reflexivity as applied to how students understood both their own individual and the group's collective learning processes.

In the following examples, students comment on how specific kinds of activities helped them to both understand their own learning process and identify what facilitates or hinders their learning: "Discussion around points of confusion are really engaging because it gives me an opportunity to challenge my thinking. For example, our discussion on theory testing and theory building pushed me to question my understanding of the terms" (26-2017/Qualitative/Q1); "It's brain draining to listen to presentations and give meaningful feedback at the same time" (01-2015/Presentations/Q7). Another aspect of the reflexivity we observed in the RR had to do with linking particular approaches or activities with learning outcomes (such as skill acquisition or ethical insight) that students valued: "I especially

enjoyed the coding exercise because it felt like I was learning an actual skill that I can immediately apply to my research/reflexivity work" (32-2017/Validity & rigour/ Q1); "I had new insights about ethics in my research. Particularly about 'ethical moments' that I encountered in the past. This was surprising and sometimes disturbing as I think I may not have acted properly" (06-2015/Ethics/Q5).

Insights on reflexivity were not restricted to the individual level. Some students commented on the group learning process and how it occurs, indicating that students were also linking their own learning with opportunity to interact in extended ways with their colleagues. Links between individual and group learning extended to expressions of concern for other students' learning processes, what might impede them and, in some cases, even offered advice on how this might be remedied.

> While it is useful to see the process of clarifying the [concept] map as demonstrated by Kate [author], the exercise was not very bidirectional in the beginning. Perhaps address (and make more eye contact with) the students more often as you demonstrate the process. (04-2015/Theories/Q2).

During our weekly planning meetings, we discussed what it might mean for students to be more actively engaged in reflecting upon and learning about their own learning. It has been noted with chagrin in the scholarship of teaching and learning literature that most students never hear about the results of SoTL research (McKinney 2012). This is deeply ironic in that one purpose of such research is surely to enhance learners' understandings of how they learn. Attempting to address this situation, we experimented with providing a summary of the key points raised in the previous week's RR process at the beginning of each class. We also encouraged students to refer to their weekly RR to better understand their own learning process. Neither strategy met with discernible interest on the part of students. This is a point we return to below in the context of discussing the need to teach metacognitive skills.

Assists in assessment of student engagement and classroom climate

Questions about when students felt most and least engaged provided particularly useful feedback about student engagement and how students were learning, some of which was relevant for pedagogy: "During some of the longer descriptions of paradigms that were read from the power point slides—there was a lot of information to digest in a short amount of time" (26-2017/Paradigms/Q2); "Definitions of KT—seemed vague and abstract" (25-2017/Integrated KT/Q2). Comments such as these provided perspective on how to better engage the class. Over the three years, we worked hard to introduce more specific examples that students could relate to, in order to provide more context for the abstract concepts we introduced.

The question about when students felt the least engaged shed light on physical and other constraints that influenced the ability of students to concentrate or stay engaged, many of which we were unable to address (e.g., student was hungry or tired, or there was too much ambient sound at back of room). Nonetheless, it was useful to understand some of the factors that were influencing student engagement: "At around 4:50 when I started to wonder when my parking would expire!" (9-2016/Paradigms/Q2); "I think I was distracted today given the election results from last night" (19-2016/Validity & rigour/Q2).

One of the strengths of the RR process was the perspective it provided on classroom climate and, more specifically, how individual components of the pedagogical process contributed to this dynamic. Comments provided feedback that some learning activities provided particularly rich learning opportunities: "Focus group activity was really insightful. I have a far better appreciation for what's involved" (19-2016/ Validity & rigour /Q1). Another student shared:

> I really enjoyed the group coding activity. It made me appreciate how important it is to always keep digging deeper in data collections as well as data analysis and interpretation. As we went around in the circle, there seemed to be "deeper" findings as the group was forced to find new, "less obvious" findings from the transcript. (26-2017/Validity & rigour/Q1)

Finally, the RR provided perspective about classroom climate, respect for student peers, and the level of learning attributed to peer interaction, as evidenced by comments such as the following: "It was affirming to be able to contribute to our mini-group discussion and help peers get new insight into the theories they were bringing forth in their papers" (26-2017/Theory/Q3). An additional perspective includes:

> Our mini group … was helpful in identifying further gaps; I found it very helpful to both provide and receive critical feedback and be able to have more in depth discussions than we could in our online comments. I have reframed my research question as a result of our discussion. (26-2017/Quantitative/Q3)

In summary, the RR process provided useful perspective on the shifting energy and engagement of individual students and of the class as a whole. Some comments provided impetus for us to refine our pedagogical approaches, while others provided affirmation that certain aspects of the course were working well to engage and motivate the entire class.

Provides insight into effective and ineffective pedagogic strategies

The RR process was initially adapted for use in our course with the intention of gaining new insight into how effective (or not) various pedagogic strategies were to engage students in the learning process. Early on, however, we realized that students responding to the questions about when they felt most or least engaged, were defining "engagement" in distinctly different ways. Some clearly identified being engaged with actively contributing to discussion by asking questions or commenting as opposed to remaining silent, while others were more focused on their own cognitive engagement with ideas that were interesting or questions that challenged their prior conceptions. Recognizing the variability of student understandings of what it means to be engaged thus led us to affirm that an important cornerstone of our pedagogic approach was valuing the contributions of those who actively listen as well as those who speak up.

Given that we made a practice of including a range of experiential or hands-on learning activities in each session, we were also interested in assessing the usefulness of specific kinds of exercises and if they afforded students the opportunity to apply their learning in practical ways. The following examples illustrate a range of typical positive and more critical responses, the

first to the more didactic approach taken during the lecture portion of class and the latter identifying a specific activity that the students found particularly engaging: "I really liked the examples in the start of class (the sheep were very comical). This metaphor really worked (even though they don't usually work for me!)" (29-2017/Theory/ Q1); "I enjoyed our lab activity. It was neat to operationalize the concepts in different ways" (05-2015/Quantitative/Q1).

Regular weekly feedback also affirmed students' collective emphasis on the pedagogic value of learning from and with their peers, both in large and small group discussions. Students repeatedly recognized that it was helpful to have time for in-depth discussion in small groups and to learn from other students with expertise in particular topics: "Some experiences shared by students that made me realize that I am not the only one!!" (12-2015/Major Traditions/Q5); "As usual, I liked the mini-groups because it involves the most peer interaction, plus I enjoyed giving feedback for developing research questions" (32-2017/Qualitative/Q1). These insights into the importance of students' taking an active role in other students' learning enabled us to tweak our pedagogic practices so that we actively encouraged students to become colleagues to one another. Some students noted their appreciation for the way that we, as an instructional team, demonstrated our respect for students' expertise by asking students to contribute their knowledge of a particular topic to the discussion or by inviting their opinion on a controversial issue. For instance, one student commented on how they appreciated our intervention in small group dynamics to demonstrate respectful engagement between peers: "When Susan [author] and Charlyn [author] pushed the way we were talking to each other—[it] essentially showed us the kind of conversation we should be having" (29-2017/3 Major Traditions/Q1). These endorsements were an affirmation of the shift we were trying to initiate and support in encouraging individual student learners to see themselves as a community of colleagues with a shared responsibility for their own collective learning. This is especially important for graduate students as they move into greater independence as emerging scholars.

Enhances instructor motivation and professional development

Effective teaching demands high engagement and energy from the instructional team. We found that receiving weekly RR from students helped us to stay engaged and enthusiastic even during particularly busy times. The care and thoughtfulness of student comments contributed to the feeling that, as instructors, we were partnering with students to co-create a learning environment where course learnings were valued, and students felt safe to share their own material and learning. In particular, this type of affirmation arose when students shared their "aha" moments with obvious enthusiasm. Sentiments like these contributed to a sense that we were achieving our teaching goals, and that students were getting something out of being there in a way that was buoying and sustaining for instructors.

Students' weekly comments also prompted us to reflect and grow as individual instructors and as a cohesive instructional team. First, RR helped to identify techniques and approaches taken by specific instructors that worked, as well as areas for improvement. Continual, nearly "real-time" feedback is especially valuable for trainee instructors as it supports them to gain confidence in applying instructional strategies that have been successful. For example, in 2015, a response to the question, "What action that anyone (instructor or participant) took during the seminar today did you find most affirming and helpful?" a student wrote: "Kate [author and the TA] coming to me at the end and clarifying my concerns about how I consider what are my concepts & constructs" (11-2015/Validity & Rigour/Q3).

The comment affirmed that seeking out and touching base with students by our TA was appreciated and valued. As a result, it became possible to apply this approach more actively and systematically. Often, insights that affirmed or critiqued an instructor's action in the classroom were discussed in the following weekly planning meeting, providing a tremendous opportunity for learning, as well as an opportunity for the faculty instructors to mentor the TA.

Second, the RR process contributed to us becoming more cohesive as an instructional team. It shaped the way we divided up leadership on materials in class, including how to draw on concrete examples from our own research. Early in the process, students used RR forms to request real-world examples that would help explain challenging concepts: "There wasn't time to ask but I'm a bit confused about the 'participatory' part of participatory action research and how it would look. An example would have been helpful!" (05-2015/Qualitative/Q4); "It would be good to have examples prepared that illustrate the differences beforehand. The discussion at the beginning of class was very theoretical" (10-2015/Quantitative/Q5). We identified the requests for more specificity noted here as an important area where we could strengthen our course, and in particular, to reinforce learning related to paradigms, as each instructor contributed different but complementary examples from their own research that reflected their own paradigm (post-positivist, constructivist, or transformative). Efforts to include more real-world examples allowed us to occupy our role of representing a particular paradigm more fully and explicitly. In later iterations of the course, student comments in RR affirmed where we had succeeded in fulfilling our commitment to share examples: "Examples on the qualitative research approach that were presented by [Jongbloed] (drawn from her own research) really clarify my confusion about case studies & how it relates with other approaches" (04-2015/Qualitative/Q3); "Defining the aspects of a research paradigm and types of paradigms. The examples really helped clarify the readings. Today gave me a lot of insight on my personal values and paradigm" (26-2017/Paradigms/Q6).

Third, engaging in the RR process each week contributed to a deeper level of professional development as it facilitated reflection within the instructional team around, "what are my values around teaching?", "what kind of classroom environment do I want to create?" and, "am I succeeding in these areas?"

Documents instructor leadership and development, while advancing SoTL research

Academic career advancement requires the ability to substantiate teaching ability, for example within a teaching dossier submitted for hiring, tenure, or promotion. RR provided a structured source of student feedback that we have found very useful in documenting claims about teaching effectiveness. In contrast with course evaluations which retroactively evaluate instructor performance and course relevance, RR feedback offers insight into the learner's experience and the effectiveness of specific pedagogic practices.

A tangible example came when the faculty instructors chose to nominate the TA for a teaching award. To develop the application, the TA returned to four years of completed RR, and was able to extract and assemble all comments related to her teaching capacity. For example:

> Susan [author] was very helpful in our small group discussion—she clarified a lot of our questions about distinguishing between paradigms and made me feel more

> comfortable about thinking about the connections between values and research in different ways than what was described in the readings. (31-2017/Theory/Q3)

Another perspective includes, "It was helpful to hear and see Kate's [author] process in developing her concept map; helpful to hear that it is a work in progress and it's okay to start cluttered, and to expect an iterative process (15-2016/Theory/Q3)."

Reviewing the documented week-by-week student insights supported the TA to reflect on the instructional skills she gained and practiced over time, including specific pedagogic strategies referred to within the RR. Further, revisiting the RR aided in writing the letter of nomination (from faculty instructors) and letters of support (from past students) that drew on specific examples of the TA's classroom role, which were compiled as an appendix within the application.

Similar to the way RR allowed us to document teaching capacity and growth, they also offered a method for us to document our pedagogic strategies and identify best practices. In contrast to traditional end-of-semester summative evaluations, weekly RR offered a rich "micro" look at a single course session and together provided ongoing formative input. As students completed the form immediately after class, they were able to provide detailed comments and insights at a granular level. During our use of the RR tool, students provided comments about in-class activities and even specific slides that were useful or not useful to them. This provided a level of detail not available in a summative evaluation at the end of term. Bringing together RR from multiple weeks, students, and years created a rich dataset with detailed insights into course content, instructor performance, and effective pedagogic strategies. This facilitates scholarly enquiry towards development of best practices in teaching and learning in the area of population and public health research training.

DISCUSSION

Taken together, our findings suggest that incorporating a RR on learning process in a graduate class was valuable to instructors for ongoing course improvement, both in real time and over several iterations of the course. Overall, the process was quick and easy to implement. The RR form required only five minutes to complete at the end of each class and we devoted an average of about 30 minutes to the responses during our weekly instructional team meetings. We took 10 minutes of class time the following week to reflect on insights that warranted discussion with the class. Use of the RR form was also acceptable to students, and it quickly became a routine means of concluding each session. We found it to be a useful way to get feedback from students on course content, pedagogic strategies, and the learning environment, which further informed our reflective teaching approach (Kuit, Reay, and Freeman 2001; Zepke 2013). In addition, we observed that use of RR proved to be a helpful alternative to student response systems (clickers) to support student engagement that is more relevant for small graduate classes (Heaslip, Donovan, and Cullen 2014; Zepke 2013; Zepke and Leach 2010).

Using the RR process was synergistic with the course aims and reinforced deep, self-reflective study of paradigms and methodology. Specifically, this strategy supported course content in that it invited application of the reflexive stance we asked students to take in their assignments and class discussion. It presented an opportunity for students to practice self-assessment and reflective thinking, and for the instructors to model receiving feedback and being flexible to change. Week by week, students were able to see that we read and took action as a result of their responses. In addition, students began to

link their own individual learning with other students' learning and recognize it was tied to the learning climate in the class. Each of these impacts may have helped to foster a quality learning environment.

Based on requests from current doctoral students for a course that would provide exposure to quantitative, qualitative, and mixed methods, the instructional team developed a course to meet those needs. However, at the outset, the content of the course had only limited support from faculty members. Quotes from the RR process were instrumental in proving the value of the class and convincing our faculty colleagues that the course should become a core requirement for new doctoral students and an elective for masters' students.

From 2015 to 2017, the instructional team refined this complex course, and further developed approaches aimed at supporting students to adopt reflexivity in developing research questions and methods that could serve them in future development of their thesis proposals. Given the developmental nature of the course, the value of implementing a RR process was especially high. While weekly feedback served to improve our pedagogy in a given year, the longitudinal data provided a useful perspective on changes made to the course over the longer term, and in particular, whether such changes represented true improvements. For example, we changed the textbook that was used as the primary source of required readings based on the feedback in a given year. Yet after the change, the RR process provided information that suggested engagement with the readings was not as rich as it had been in the previous year. Accordingly, the following year we reverted to the original textbook. The course continues to evolve based on what is learned from the RR process although two of the authors are no longer part of the instructional team. Moreover, the RR process is a core component in our evolving individual approaches to pedagogy. It is, for example, a vital aspect of how Cox teaches her qualitative methods course and is a form of self-assessment in teaching that has become "a habit" (Andrade 2019).

As we revealed in our findings, the RR process provided perspective on how effectively we functioned as an instructional team, as well as how our individual contributions were received by students. In retrospect, however, we now have a much deeper appreciation for the need to explicitly integrate the value of the RR process as a means to develop student as well as teacher self-assessment and metacognitive skills (Andrade 2019; McMillan and Hearn 2008; Tanner 2012). Extensive SoTL research demonstrates that enhanced skills in student self-assessment and metacognition relate significantly to improvements in demonstrable learning but the capacity to do either sadly develops by chance rather than by instructional design.[1]

Indeed, it is paradoxical that instructors are often alert to student-centred practices, yet students themselves are overlooked as a relevant audience for the findings arising from research in the scholarship of teaching and learning (McKinney 2012). Recognizing this same tendency in our own approach to working with the RR process, we identified the need to look at how the process might be made more useful to students in understanding their own learning processes. As it stands, the RR process was primarily helpful for us, the instructional team, rather than the student. This reflects our initial intentions but begs the question of how could or should the RR process now be tweaked? Could it be more closely integrated with other important pedagogies that we employ in teaching to ensure that its value as a form of student self-assessment and metacognition is also maximized? For example, could the RR process be modified to become a stimulus for post-class journaling? As one student noted in their end of course evaluation: "I didn't realize the RRs were meant to be a learning tool for students and so wonder if I was maybe not using them as intended?" Some ideas that have emerged for us in considering how to make the RR process more student-oriented include using the reflections as a stimulus for small group

discussion about "aha moments" in learning and their significance. It might also be possible to post the pooled reflections from the class as a whole so that students could compare their own learning process with that of others. These and other ideas support the paradigm shift being called for by Maurer et al. (2021) who argue that sharing SoTL findings with students is a form of intentional knowledge mobilization that not only improves student learning but also "means creating new dialogic spaces to discuss, frame, co-own, and contest SoTL, not merely feed back outcomes to students."

We recognize that use of the RR process also raises important ethical considerations. For instance, we carefully considered whether to have students submit their weekly RR anonymously or not. Given that our priority was to use the RR process to identify and respond to areas of confusion arising from the subject matter of the course, we thought it would be counterproductive not to be able to assist specific learners. Having anonymized responses would preclude this. On the other hand, we do acknowledge that our ability to identify specific students may have introduced some constraints on their comfort when providing more critical perspectives. Another ethical aspect that arose pointed to the value of understanding when students felt vulnerable in some way or how our in-class activities affected the learning environment. For example, we conducted an in-class focus group that was subsequently transcribed so that the class could use the data to learn about qualitative analysis and coding. Some students noted concerns about being asked to analyze only a few of the students' contributions as this might make them feel as if they were under the microscope. In response, we adopted a practice of making ourselves accountable to students through regular weekly sharing of what we learned from the RR process. This entailed reflexivity on our part and an openness to changing our approach to offering specific activities.

Limitations

It is important to acknowledge a number of study limitations. First, the research approach used here does not constitute a full-blown analysis of the RR dataset; rather, we have presented a summary of our learnings over four years of using the RR tool in our teaching practice. Second, the RR process was just one pedagogical tool we used within a larger course strategy, and we are not able to untangle it from that broader context to draw conclusions. Third, our findings represented the instructor perspective. Better understanding of student perspectives of the RR process is an important area for future study. Finally, submitted RR were not anonymous. As students knew they were identifiable to us they may not have been as critical as they would have been had the forms been submitted anonymously.

CONCLUSION

Each iteration of the course offering has allowed us to adapt and change the content and pedagogic approaches in response to what we have learned through the rapid response process. We now see that there would also be much value in adding another component to our RR process, that is, an additional set of RR questions tailored to the instructional team's experience of each class. Although we debriefed after each class by talking about specific moments when we felt students were most or least engaged, it would have been helpful for us to create a more systematic record of this, organized in parallel to the RR responses from students. Further, we also see great value in working more closely with students to identify ways and means of making the RR process more responsive to their needs and preferences, such that it becomes a more valuable aid in their ability to engage in self-assessment and to better understand and reflect on their individual and collective learning.

ACKNOWLEDGMENTS

We wish to thank our students for their generous insights and participation. We also acknowledge the valuable advice of reviewers and editors who have immeasurably improved this manuscript.

AUTHOR BIOGRAPHIES

Susan M. Cox is professor and director of the MSc and PhD Programs in the School of Population and Public Health at the University of British Columbia.

Kate Jongbloed is a Canadian Institutes of Health Research—Michael Smith Health Research BC Health Systems Impact postdoctoral fellow with the BC Office of the Provincial Health Officer and the University of Victoria.

Charlyn Black is professor in the School of Population and Public Health at the University of British Columbia.

NOTES

1. Evidence and resources to support the comprehensive integration of student learning about learning into approaches to teaching are available through "Improve with Metacognition" (http://www.improvewithmetacognition.com), an award-winning site devoted to metacognition in teaching and learning within the higher education environment.

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