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Paper Title: Multiple layers of interactivity in self-study of practice research: An empirically-based exploration of methodological issues

Multiple layers of interactivity in self-study of practice research: An empirically-based exploration of methodological issues

Context
To enhance the legitimacy, authenticity, and trustworthiness of self-study of teacher education practice (S-STEP) research, researchers are required to articulate how "quality" was conceptualized and adhered to in their research design. For example, LaBoskey's (2004) characteristics of S-STEP inquiries are commonly used: self-initiated and-oriented; improvement-aimed; interactive; employ multiple forms of (mostly) qualitative data, and; view validation as a process based on trustworthiness. While other guidelines for quality offer nuanced perspectives of quality in S-STEP research design with similarities and differences to LaBoskey's criteria (see Bullough & Pinnegar, 2001; Pinnegar & Hamilton, 2009; Samaras, 2011; Vanassche & Kelchtermans, 2015), all identify interactivity as a necessary component.

Interactivity can be defined as the gathering of multiple perspectives, be they from colleagues, students, or texts (LaBoskey, 2004). Interactivity is crucial because incorporating multiple perspectives on our practice "helps to challenge our assumptions and biases, reveal our inconsistencies, expand our potential interpretations, and triangulate our findings" (LaBoskey, 2004, p. 849). Interactivity also helps counter the shortcomings of overly solipsistic or idiosyncratic interpretation, one of the primary criticisms of S-STEP (Kelchtermans & Hamilton, 2004; Vanassche & Kelchtermans, 2015). As Loughran and Northfield (1998) suggest, interactions with others allow S-STEP researchers to gain an outsider's perspective on the practice/s being examined, which may increase the likelihood of a change in an individual's interpretation or frame of reference. In the reframing process, it is important that a variety of viewpoints are sought, including those of colleagues and students (Loughran, 2002). Interactivity is therefore an important feature of S-STEP research for the value it holds for participants involved in the research (through enabling alternative interpretations) and for legitimizing S-STEP to others in the educational research community (Freeman, deMarrais, Preissle, Roulston, & St. Pierre, 2007; Hamilton, Smith, & Worthington, 2008).

In many S-STEP designs, interactivity is operationalized as a two-way process. That is, the interaction typically involves the voices of a teacher educator whose practice is the focus of inquiry and one type of "other" voice. For example, it is common for interactivity to be represented through critical friendship where two or more teacher educators collaborate to explore a problem of practice. Fletcher and Bullock (2012) used critical friendship to examine their experiences as beginning teacher educators embedding content-related literacy practices in their respective pedagogies of teacher education. Data were generated through shared journal reflections and blog entries, as well as recorded Skype conversations. Similarly, Kitchen, Ciuffetelli Parker, and Gallagher (2008) studied a group of teacher educators who used S-STEP to guide their meetings and professional learning. Data included notes and reflections generated by group members, and transcripts of the group discussion. These are only two examples of S-STEP research using critical friendship and collaboration with other teacher educators as the source of interactivity, but their design represents a broader trend in some S-STEP research. While these types of studies have added to the knowledge base of teacher education and represent, we believe, the most common type of S-STEP research design, their scope may arguably be limited because the problem of teacher education practice is framed and answered through the lens of teacher educators only.

We suggest that certain types of S-STEP research questions, particularly those related to the enactment of pedagogical practices, may be more comprehensively answered by including student data alongside teacher educator data. In this regard we support Loughran's (2007) assertion that it is not enough to be satisfied with the teacher educator's perspective on the challenges of teacher education practice; there should be concerted efforts "to better understand the perspectives of students of teaching" (p. 1). The richness that student perspectives can add to our understandings of teacher education practices may assist us in becoming co-inquirers of practice with our students. Some S-STEP researchers have tried to do this by incorporating data generated by a teacher educator and his/her students. The inquiry focus is maintained on the practice and identities of the teacher educator, yet alternative interpretations are sought from the students. For example, Dinkelman (2003) drew from student interview data to interrogate his practice, while Freese (2006) used a student teacher's work and reflections in conjunction with her own reflective journal to improve her practice. We wonder what further insights could have been developed if the student teacher data were gathered and analyzed along with collaborative teacher educator data. If, as Zeichner (1999) says, teacher educators are uniquely positioned to understand the challenges of teacher education practice, then the alternative interpretations other teacher educators offer along with those of the student teachers may enhance the depth of the insights and understandings.

We propose that S-STEP inquiries can benefit from operationalizing interactivity in a multi-dimensional sense, moving away from designs that involve *either* critical friends *or* students to involving *both* critical friends *and* students *and* other sources of interactivity. When interactivity is two-dimensional the teacher educator-researcher may miss opportunities to thoroughly explore deep and varied interpretations of teacher education practice from multiple lenses. To be clear, we are not seeking to challenge the legitimacy of S-STEP research that operationalizes two-dimensional interactivity. Nor are we claiming we are the first or only S-STEP researchers to take this position. Indeed, LaBoskey (2004) suggests we should not only listen to multiple voices, we must also question and critique those voices.

In this paper we illustrate how viewing interactivity in a multi-dimensional sense added value to our S-STEP research design. Through sharing an empirical example from our research we explore methodological issues related to LaBoskey's (2004) characteristics using data from two-years of a longitudinal S-STEP study focused on developing and refining teacher education pedagogies for meaningful physical education experiences. We call this approach *Learning About Meaningful Physical Education,* or LAMPE (see Ní Chróinín, et al., 2015). Interactivity was positioned as a core feature in the project design. Interactivity was central because of the importance of interacting with others as a part of "strong" S-STEP research (Pinnegar & Hamilton, 2009), and also because of the composition of our research team and the role of our students in the LAMPE project.

There were three teacher educators involved in the project who worked as critical friends. We framed the role of critical friend as someone who would support and question the teacher educator whose practice was the focus of inquiry (Schuck & Russell, 2005). Tim teaches in an undergraduate physical education program in Canada and Déirdre teaches in an elementary teacher education program at Mary Immaculate College in Ireland. Both were directly involved in planning and teaching core modules in our programs using LAMPE. Mary is Professor in physical education at University of Limerick in Ireland and did not directly use LAMPE; however, her previous experiences developing innovations meant she was able to act as an

"external" expert who could critique and support Tim's and Déirdre's teacher education practices and understandings of LAMPE over the course of the project.

Aims/Objectives

The aims of this paper are to demonstrate through empirically-based examples how multiple layers of interactivity in S-STEP can lead to richer insights and deeper understandings about teacher education practice. Our objectives were to address the following questions:

1. How can embedding multiple layers of interactivity provide alternative insights into teacher education practice, and thus enhance the understandings gained?
2. What tensions were evident when embedding multiple layers of interactivity from different data sources? How were the different interactive "voices" reconciled and privileged?

Method(s)

Data were generated from Sept. 2013-Apr. 2015. From Sept.-Dec. 2013, the focus of inquiry was Déirdre's enactment of meaning-oriented physical education pedagogies in her teacher education classes (i.e. LAMPE). The following data sources were generated and in Table 1 we identify how each offered a different layer of interactivity:

Table 1: Data sources and layers of interactivity

Data source	Interactivity occurring between…	Layer
Déirdre shared weekly written reflections via email with Tim who acted as critical friend. Tim would respond with questions, comments, and interpretations of Déirdre's data. Déirdre would then address any of Tim's questions in a final reply.	Déirdre and Tim	1
Déirdre and Tim recorded two one-hour Skype conversations guided by the written reflections.		
Déirdre and Tim analyzed the above three data sources, using "turning points" (Bullock & Ritter, 2011) as a guide: turning points are moments we came to understand teacher education practice differently as a result of S-STEP.		
Turning points were shared with Mary, who acted as an external (or "meta-") critical friend.	Déirdre, Tim, and Mary	2
A graduate research assistant conducted two focus group interviews – one at the mid-point and one at the end of the course – each with two groups of four students (*n* = 8).	Students and teacher educator's practice	3

From Jan.-Apr. 2014, Déirdre and Tim switched roles, and the process was repeated. The only difference was that Tim's graduate assistant conducted one focus group with five students as well as seven individual interviews. In the 2014-2015 academic year we followed the same processes. The only difference was the number of students involved in focus group and individual interviews.

Data were analyzed using constant comparison, which involved several steps. First, all data generated by Déirdre and Tim were analyzed to identify key moments of insight, confusion, or uncertainty in their practices. Second, Mary's data were incorporated to understand how her involvement in the project extended and refined understandings of the LAMPE project when used in conjunction with Déirdre's and Tim's interpretations of their respective practices. Third, data from the focus group and individual interviews with students were analyzed after Tim, Déirdre, and Mary had shared their turning points. Student data were then mapped on to the existing data set. Much like the analysis of Mary's data, student interview data were mined to identify moments when students both confirmed and disconfirmed the teacher educators' interpretations of their practice. Fourth, all data sources were then compared to identify instances when the multiple sources of interactivity provided deeper insights into Déirdre's and Tim's enactment of LAMPE pedagogies. We also looked for moments when the multiple sources made it difficult for Déirdre and Tim to maintain a focus on their respective selves.

Outcomes

There were several "episodes" we identified in our analysis that help to illustrate how using multiple layers of interactivity added value to S-STEP research design. However, in this paper we have chosen to examine one episode in depth to show the ways in which the different layers added further insights to the problems of practice that were being explored.

The episode we present is related to discussions around the role and value of peer teaching in our respective PETE courses. Both Déirdre and Tim used peer teaching in their courses and had done so for some time. In the first year of the LAMPE project, Tim's response was somewhat ambivalent to a peer teaching activity used by Déirdre, saying: "*So they were learning about peer learning as they were doing this activity, as well as learning to teach using peer learning*". This specific interaction (Layer 1) inferred generally neutral attitudes to the value of peer teaching and was couched in a positive response to Déirdre's lesson. However, following encouragement by Mary to become more critical in the second year of our critical friendship (Layer 2), Tim used the opportunity to question the value of peer teaching, focusing specifically on the extent to which peer teaching represented an authentic teaching-learning experience – most notably in terms of who pre-service teachers would be working with (primary-aged learners) in schools. He wrote:

> *…students seem to be peer teaching in virtually all classes … and I am wondering about the value of it. I do see value in peer teaching and include it in my own course but I also see several issues related to it and am rethinking its inclusion…*
> *The other thing is that they are teaching in an inauthentic context – with peers who see them and interact with them very differently from how students would… I am interested in hearing [Déirdre's] perspectives on the value of peer teaching for her students.*

Déirdre's reply laid out a clear argument (Layer 1), which drew from informal conversations with her students over the years. She said:

> *My prioritisation of peer teaching (rather than me leading all teaching) is based on feedback from students in previous years on the aspect of the course they find most useful. My aim is to provide safe, supportive spaces for them to test out ideas and learn through small group interaction ... I have become more convinced of the value of devising the module around peer interactions through the experience of the last 6 weeks … While [Tim] argues that it is an inauthentic context for them*

as first time teachers of PE it is a perfectly authentic learning context. Yes, they will be faced with additional challenges in schools but at least they will have had practice at implementing [physical education]. I actually think that this approach may be the one that best supports these primary teachers to teach PE…Have I convinced you?

Tim did not respond to Déirdre's challenge of being convinced through her arguments. Our personal recollections of the interaction suggest the issue was left to "simmer" without any firmer conclusions or understandings being reached.

While it may seem that Tim was the only one whose thoughts about peer teaching had been disrupted, Déirdre also noted how her initial thoughts about peer teaching were not standing on as solid a footing as they had been. In her turning points, Déirdre wrote:

I was (and am) left slightly unsure of myself on this now. I know that both teacher educator modelling and peer-led teaching activities are valuable pedagogies in supporting learning to teach PE, this is also supported in the literature. Ovens's (2014) article that explored teacher educator and student experiences of peer teaching is a useful point of reference ... I wonder now whether I over-emphasised peer-led activities and did not emphasise activities around teacher educator modelling enough? How do I know when I have this balance right? (student data might provide some insight on this).

Déirdre's final comment that "*student data might provide some insight on this*" is telling because it reveals how we came to rely on another layer of interactivity to help us work through problems we found troublesome. Moreover, we turned to the research literature as an additional layer of interactivity (Ovens, 2014, in this case) to help us better understand what it was we were exploring. For example, Tim's perspectives on peer teaching were altered by considering Déirdre's opinions in tandem with those of his own students (Layers 1 and 3). Two interview participants referred to peer teaching as among the most useful experiences in his PETE course. For example, Shannon (pseudonym) saw the value of peer teaching in the ways it allowed her to begin thinking like a teacher: what resources she could use, how she could modify them to suit her aims and her students' abilities, both before and during the lesson. She said:

…We did that assignment when we had to teach the class a couple of games from a game category and we had to come up with those games on our own. You couldn't have "Googled" it. I think that kind of stuff […] is really useful because it's getting a taste of what I'm actually going to do

Another interview participant, Rob (pseudonym), said:

I would say definitely the games presentations and lesson presentations that we had to do [was useful] because it was very applicable to how I see my future teaching practice being. Collaborating with others […] helped improve the ideas that we had together… Maybe it wasn't a perfect lesson but that's what it's like and I really like to reflect on what I've done and help improve it in the future.

Both Shannon's and Rob's responses to the peer teaching experience supported Déirdre's view that peer teaching may not have been authentic in terms of teaching children, but it provided a very authentic experience of learning to teach. While Tim had not discounted Déirdre's opinion, the perspectives of his students provided more support for the role of peer teaching in the course.

In this episode, multiple layers of interaction allowed the problem of peer teaching to be explored. The added value of including multiple layers of interactivity (that is, Layers 1, 2, and

3) is clear if we consider the ways in which the problem may have been left unchallenged or interrogated at a surface level. For example, in the first year of the critical friendship when Tim and Déirdre were managing their comfort with each other and confidence in sharing doubts and challenges, peer teaching went unquestioned by Tim. Including Mary in the process encouraged a more critical stance on challenging the reasons behind teaching decisions, and Tim used this encouragement to question the place of peer teaching for both himself and Déirdre. As a result, Déirdre responded to Tim with views grounded in her own beliefs and those of her students (albeit informally gathered), views that addressed Tim's questions about authenticity. However, the views of his own students *in addition* to Déirdre's offered Tim a more thoroughly supported and nuanced justification for the pedagogy from multiple perspectives. Importantly, the question of authentic experiences with school-age learners prompted previously unconsidered questions about the authentic nature of other aspects of the teaching experience: planning, modifying, and reflecting.

Multiple layers of interactivity supported deeper exploration of our practices related to the enactment of LAMPE pedagogies and added value to our S-STEP research design. This resulted in a more thorough justification for understanding potential solutions to those problems we identified (Loughran, 2007). Through the project we began to rely on the multiple layers as an additional source of understanding when we reached an impasse in our thinking. For example, following an interaction with Tim, Déirdre said: "*I had not thought about some of the issues [Tim] raised in relation to peer power relations – this might be something that we could chase in the focus groups?*"

Significance

In exploring methodological issues related to LaBoskey's (2004) five characteristics of S-STEP, we identified two main outcomes. First, the multi-dimensional nature of the interactivity we engaged in during this research enabled insights into our practice that may not have been possible had we conceptualized interactivity in a two-dimensional sense (that is, with only one layer), as in relying solely upon one-on-one critical friendship as a source of interactivity. Second, several tensions were evident in how we considered the different interactive "voices" when analyzing data. As a corollary, we struggled to reconcile some student data that were gathered and analyzed much later and which contradicted our views or actions as teacher educators. Another tension arose when student data challenged our ability to maintain a focus on our respective selves.

This third tension was apparent in our analysis. Because the data generated by Déirdre and Tim occurred in "real time" through reflecting on critical incidents immediately after they happened, those data sources were often privileged in terms of how they led to changes in our understandings and enactment of the pedagogies being explored. While conducting our analysis we were mindful of considering the "volume" the teacher educators' voices were set to (the person whose practice is being studied and critical friend/s) relative to the students' voices. We began to ask ourselves: To whom do we listen most closely? Our selves? Our critical friends? Our students? When and why should we listen to one more closely than another? In contemplating these questions we show that by attending to issues of rigour we were simultaneously confronted by issues about maintaining a focus on the personal relevance of the inquiry for our practice. We do not see these as competing aims but understanding ways they can co-exist is something we continue to grapple with. Our research thus supports the assertion of Vanassche and Kelchtermans (2015) that S-STEP researchers must continually wrestle with

tensions such as relevance-rigour and effectiveness-understanding. The significance of the paper lies in its potential to generate important debate around ways to approach data gathering, analysis, and quality in S-STEP when there are multiple layers of interactivity.

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