ImpactingEducation
JOURNAL ON TRANSFORMING PROFESSIONAL PRACTICE

Project-Based Learning and Doctoral Student Research Skill Development: A Case Study

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ABSTRACT

The purpose of this study was to understand the ways doctoral students in an online Ed.D. program developed their skills as practitioner researchers through a project-based learning (PBL) experience. In order to describe and analyze the nature of the students' PBL experiences, case study methodology was used. Interviews, a video-recording of a two-hour synchronous class session, and student generated artifacts were iteratively analyzed by a team of researchers. Results reveal underlying tensions within three case themes: individual versus collective learning, simulated versus real research experience, and public class activity versus private group conversations. These findings demonstrate that Ed.D. program area faculty must balance the competing tensions raised by these case themes in order to facilitate research skill development and foster the ability of their students to grow as practitioner scholars.

KEYWORDS

project-based learning, action research, practitioner research, doctoral education

The education doctorate has been much discussed in scholarly literature over recent years (Guthrie, 2009; Firestone et al., 2019; Neumann, 2005). A good deal of this conversation has argued for distinguishing between the preparation of educational researchers in a PhD program and scholarly practitioners in an EdD or Professional Practice Doctoral Program (Shulman, et al., 2006). As such, led by the Carnegie Project on the Education Doctorate (CPED) (Perry & Imig, 2008), the last decade has seen numerous EdD programs being launched throughout the nation with a distinct focus on developing scholarly practitioners.

Scholarly practitioners use "practical research and applied theory as tools of change" (Perry, 2013, p.3) as they "direct their research to the improvement of practice, based in the needs of the organizations that they seek to help and blend research methods with problems of practice" (Barnett & Muth, 2008, p.12). Distinct from the needs of PhD students, the development of practitioner scholars involves educating EdD students to undertake "empirical inquiry that is more closely tied to practice settings than to theoretical questions" (McClintock, 2004, p.4). Hence, action research has been adopted as a signature pedagogy in many EdD programs (Buss, 2018). While adopted as a signature pedagogy, many EdD programs continue to struggle with how best to teach the skills of practitioner research (Adams et al., 2014).[1] One potential route toward fostering authentic

[1] Throughout this text, we use action research and practitioner research relatively interchangeably to refer to systematic, intentional study of one's own professional practice (Dana & Yendol-Hoppey, 2020).

practitioner research experiences is to facilitate students' inquiry through extensive, in-depth projects.

Project-based learning (PBL) is an instructional strategy in which learners cooperate with their peers to solve a problem. The defining features of PBL include the posing of challenging questions, student-led inquiry, extended periods of relative autonomy, the creation of realistic products or presentations, and careful assessment of student learning by instructors (Hung et al., 2012; Thomas, 2000). PBL promises to facilitate authentic learning and motivate students (David, 2008), and it has the potential to be a powerful pedagogical tool for teaching the skills of practitioner research. The purpose of this study was to understand the ways doctoral students in an EdD program developed their skills as practitioner researchers through a project-based learning experience.

As the teaching of research skills to doctoral students is the focus of this study, we begin with an overview of the literature on this topic. Next, we explain the overall program and specific coursework within which this study took place, as well as providing a detailed description of the assignment which scaffolded the EdD students' research skill development. After a discussion of research methods, we report three case themes, and draw implications for the promise PBL holds to develop the research skills of scholarly practitioners.

LITERATURE REVIEW: DOCTORAL STUDENT RESEARCH SKILL DEVELOPMENT

Despite the clear need to develop research skills during doctoral study, there is a dearth of empirical literature regarding how doctoral students learn research skills in their programs (Kerrigan et al., 2008). Additionally, an impediment to cross-program research that explores these skills is the diversity of doctoral and specialist degrees among educational programs (Leech & Huag, 2015). Finally, the purpose and function of the EdD is still a matter of debate (Firestone et al., 2019). This state of affairs amplifies the need for better understanding the process doctoral students, especially in the EdD space, undertake in order to become proficient at research.

While there is a lack of research on pedagogical aspects related to the development of doctoral research skills, scholars have investigated the transition from student to researcher as well as students' sense of research self-efficacy. Lovitts (2005) theorized a model to understand the "critical transition" (p. 139) from a dependent to independent researcher—that is, from "learning what others know and how they know it" to "conducting original research and creating knowledge" (p. 140). Lambie et al. (2014) found that doctoral students' sense of research self-efficacy increased with additional research methodology coursework. However, Leech (2012) emphasized the lack of research into the particular courses and curriculum that best helps doctoral students learn research skills. Indeed, more recent searches of the literature show a lack of studies on the appropriate balance of research coursework and the particular content of those courses. Hence, in the research literature regarding skill development of doctoral students, there is a need (1) to focus on coursework experiences and (2) to distinguish between courses designed to develop PhD students as "professional researchers" and courses designed to develop EdD students as "researching professionals" (Kumar & Dawson, 2018, p. 4). Kerrigan and Hayes (2016) noted this point in their assertion that "a program that is geared to developing practitioner-researchers must be more attentive to cultivating research interest among practitioners" (p. 158). To accomplish this, as previously mentioned, many EdD programs across the nation focus their research preparation coursework on action research and associated practitioner research methodologies (Buss, 2018; Dana & Yendol-Hoppey, 2020).

The use of action research and associated practitioner research methodologies for doctoral coursework is more robustly documented (e.g., Arslan-Ari et al., 2018; Pilkington, 2009; Wetzel & Ewbank, 2013), and action research and practitioner inquiry show promise as methodological framings for the educational doctorate. Zambo (2011), following Shulman (2005), points to action research as a "signature pedagogy" that fundamentally organizes the preparation of future practitioners. Zambo found that action research contributed to students' desire to be change agents within their professional context and provided a framework for personally and professionally meaningful research. Buss and Avery (2017) found that utilizing action research at their CPED program contributed to students' beliefs they had attained new research skills, developed new reflective and critical abilities, and gained new confidence in their research acumen. However, when considering the particularities of learning data analysis skills, Vaughn et al. (2019) pointed to the struggle their students had with data analysis, and students identified "coding issues [as] a constant undertone" (p. 5) in their work.

While it is well-documented that EdD students develop confidence in their research abilities through coursework, an understanding of students' acquisition of data analysis skills remains underdeveloped. To better understand one potential avenue to scaffold EdD students through this struggle, this study documents an effort to teach the skill of data analysis through a PBL experience embedded within an EdD research methodology coursework. We turn now to a description of the program, the courses, and the project-based-learning assignment.

PROGRAM, COURSEWORK, AND PBL ASSIGNMENT DESCRIPTION

The current research project took place within our CPED member institution EdD online program. This program reflects the perspectives outlined by the CPED organization in that we built our program around "questions of equity, ethics, and social justice to bring about solutions to complex problems of practice" (CPED Guiding Program Design Principle #1). Through inquiry-based recursive learning experiences (CPED Guiding Program Design Principle #5), our primary program outcome is to prepare students to identify, examine, and redress inequity in diverse educational settings through their work as practitioner scholars, which we define as follows:

> Professionals who bring theoretical, pedagogical, and research expertise to bear on identifying, framing, and studying problems of practice and leading informed change in their schools and districts to continually improve life and learning conditions for students and adults who work within their local contexts. (Adams et al., 2014; Dana et al., 2011; Dana & Yendol-Hoppey, 2020)

Hence, of particular relevance to this study is the CPED design concept of scholarly practitioners, defined as professionals who "blend practical wisdom with professional skills and knowledge to name, frame, and solve problems of practice" (CPED, 2019, para. 9). To cultivate the specific skills and knowledge for naming, framing,

and studying problems of practice, students in our program enroll in a series of six online research classes spread throughout two years of coursework. These courses include: Foundations of Research (Semester 1), Practitioner Research 1 (Semester 2), Qualitative Research for Practitioner Scholars (Semester 3), Quantitative Research for Practitioner Scholars (Semester 4), Practitioner Research 2 (Semester 5), and Designing Research (Semester 7). This study focuses on the second Practitioner Research class taken during semester 5 of the program. This course is designed to further cultivate the skills of a practitioner scholar through advanced study of practitioner inquiry/action research, its utility within students' daily work as educators, and in preparation for the Dissertation-in-Practice. Across the course there is a particular focus on developing the skill of data analysis.

Reflecting our focus on social justice and equity, in the fifth semester students also enroll concurrently in an online critical pedagogy course. In that course, students read several texts that challenge them to think more deeply about social (in)justice as it relates to existing structures of power that privilege some groups of people in society while disadvantaging others (e.g., Sensoy & DiAngelo, 2017). In addition to reading five textbooks, twice during the class, students are asked to "Try-It" and take an idea/suggestion from their course readings and apply it within an existing social or professional setting. For example, one student chose to work with kindergarteners on the concept of able-ness, and another re-structured their department's team meetings to encourage greater contributions from female faculty of color. As part of this work, the students are asked to create a reflective post of this experience to share with their classmates.

Across both classes, students engaged in a five-week PBL experience that connected the content of the Critical Pedagogy class with learning the process of data analysis for the Practitioner Research class. To achieve these ends, the 18 students were randomly placed in one of four teams during the second half of their Practitioner Research course. These teams had 4 – 5 members. Each team was then assigned to analyze online postings related to either one of three books they read during the first half of the Critical Pedagogy class or to the "Try It" social justice application assignment explained above. The "research questions" and "data" that guided the students' work included:

(1) What is the relationship between engaging in a virtual book study of *Is Everyone Really Equal? An Introduction to Key Concepts in Social Justice Education* by Sensoy and DiAngelo (2012) and the evolution of our thinking and practice as practitioner scholars related to creating more equitable schooling experiences in our local contexts? (DATA: Posts produced Weeks 1-3 of Critical Pedagogy course)

(2) What is the relationship between engaging in a virtual book study of *Everyday White People Confront Racial and Social Injustice: 15 Stories* edited by Moore Jr. et al. (2015), and the evolution of our thinking and practice as practitioner scholars related to creating more equitable schooling experiences in our local contexts? (DATA: Posts produced Weeks 4-5 of Critical Pedagogy course)

(3) What is the relationship between engaging in a virtual book study of *Writing Beyond Race: Living Theory and Practice* by hooks (2009) and the evolution of our thinking and practice as practitioner scholars related to creating more equitable schooling experiences in our local contexts? (DATA: Posts produced Weeks 6-8 of Critical Pedagogy course), and

(4) What are the benefits and barriers we, as practitioner scholars, face when we try to enact social justice practices in our personal and professional lives? (DATA: Posts related to two "Try-It" assignments in Critical Pedagogy course).

Each group worked throughout the final five weeks of their sixteen-week semester to develop and enact a data analysis plan related to their team's research question and data set described above, following detailed instructions found in the course shell. These instructions, summarized in Table 1, were divided into three parts: (1) First Half of the Week (completed individually by students in preparation for a group synchronous meeting), (2) Second Half of the Week (providing structure for the group meeting itself), and (3) Team Leader Responsibilities (completed by a different group member each week). The semester culminated with each group producing a 20-minute PowerPoint presentation that detailed their PBL data analysis journey, including what they came to know about themselves as practitioner scholars as well as what they learned about the process of data analysis. These presentations were shared during a synchronous class session.

Table 1. Instructions for PBL Weekly Activity

Week	Individual Preparation	Group Meeting Time	Team Leader
One	Complete readings on data analysis and 3 open-ended sentences: • *My most important learning about the data analysis process from completing the readings this week was …* • *One skill/talent I bring to the group that will help us excel in this project-based learning data analysis experience is …* • *Something I need from the group to do my best work is …*	• Test meeting technology • Discuss readings on data analysis • Develop "ground rules" for group work	• Prepares group's data for analysis • Summarizes and posts group's ground rules for instructor feedback

Week	Individual Preparation	• Group Meeting Time	• Team Leader
Two	Complete initial read of data set and 3 open-ended sentences: • *A word or phrase that describes something interesting I noticed in the data …* • *A word or phrase that describes something that stood out to me in the data …* • *A word or phrase that describes a pattern I think might be emerging from the data …*	• Discuss what was noticed in data individually • Develop plan for how to code data together	• Writes and posts group data analysis memo summarizing synchronous meeting and group's data analysis plan for instructor feedback
Three	Complete individual coding of data as per group coding plan and complete open-ended sentence: • *A word or phrase that describes how I felt coding our data …* • *Why I chose this word/phrase …*	• Discuss individual coding experience and data itself, including how codes are defined, connected to one another, and what they mean in relationship to group's research question • Develop 2-3 claims about the data for presentation and assign group members to develop	• Writes and posts group data analysis memo summarizing claims group developed during meeting and how they were derived and group's plan for preparing presentation for instructor feedback
Four	Complete individual parts of group presentation	• Share individual work on presentation, discuss, and finalize plan for finishing and practicing presentation	• Writes and posts group data analysis memo summarizing presentation progress and final presentation "To Dos" for instructor feedback
Five	Group Presentations via Synchronous Zoom Meeting		

METHODOLOGY

This study was guided by the research question: "What happens when doctoral students engage in problem-based learning to develop their skills as practitioner researchers?" To describe and analyze the nature of the PBL experience, a case study design was chosen to frame this research. According to Creswell and Poth (2018), in case study design, researchers focus on "a bounded system (a case)" and use "detailed, in-depth data collection involving multiple sources of information... and report a case description and case themes" (pp. 96-97). The bounded system of this case was the students' experiences working within a small group to develop data analysis skills during the project-based learning assignments described above.

Our primary source of data were individual interviews conducted with the students after the two courses had ended (n=16). Interviews were approximately one-hour in length, were structured using a protocol that guided the students through each individual week of the project-based learning experience, and asked students to recall and describe how their team meetings unfolded and the ways in which their thinking and learning about practitioner research evolved as a result. Interviews were audio-recorded and transcribed verbatim, generating over 300 pages of transcripts for analysis.

Data analysis was a multi-phase, multi-faceted process that included each researcher, on a team of four, independently reading and re-reading the entire data set to prepare for coding, creating categories, and facilitating patterns of meaning within the data set (Saldana, 2015). Throughout the readings, re-readings and coding process, the research team members met frequently, creating opportunities for multiple analysts to share, discuss and debate patterns emerging in the review of the interview and synchronous meeting transcripts (Marshall & Rossman, 2010). Hence, analyst triangulation enhanced the trustworthiness and credibility of this study (Patton, 2014). Over several meetings, the research team generated three case themes that exemplified the doctoral students' experiences as they learned the skills of practitioner research through a cross-class PBL experience. These themes, reported in the next section of this paper, were member-checked with the study participants (Patton, 2014), further enhancing study trustworthiness and credibility. Our reporting of each case theme is framed from the perspective of the students. This is followed with a discussion of the implications of the students' PBL experience for EdD program faculty who endeavor to teach the research skills of practitioner scholarship.

CASE THEMES

Case Theme One: Individual Learning versus Collective Learning

This case theme is defined as the tension that occurred when *individual* students' own ways of working and thinking collided with the *collective* compromise necessitated by their participation in the project-based learning experience.

Interview data indicated that students began the experience with generally positive feelings about the PBL assignment. As one student shared: "I was really excited. I thought this was a really excellent opportunity to interact with my cohort members." Another student indicated she was happy to have others to work with on the project to reduce the overwhelmed feeling she had about trying to do an extensive data analysis for the first time on her own. A third student talked about the comforting nature of the collaborative work, saying, "I was able to hear some of my group members' fears about analyzing data but also their hopes, and that helped decrease my fears but also raised my hopes as well."

In addition to being thankful for the support of their classmates on this assignment, at the outset of the project students also expressed appreciation for having the opportunity to learn from each other as they collaborated to analyze a large data set. When asked to think about what she hoped to get from participating in the project, one student said, "I always feel like I learn better when I hear other ideas from other people, so I was hopeful that we would be able to work well together." Another student indicated she liked "being exposed to different ways people would code," and a different student said, "it always helps to have a colleague or somebody look over your data and make sure they're pulling the same things out." Students valued learning from and alongside their cohort members. This underscores the potential for collaboration to serve as an

important piece in teaching practitioner scholars about the process of data analysis.

However, some of the very reasons students were excited about working collaboratively on the PBL project also became a source of tension as the students had to navigate various styles of working and differing ways of thinking among group members. Students clearly articulated that there were times when conflicting ways of working created stress. One student expressed concern about these dynamics after their first group meeting, saying, "the particular person who was a little bit off track tends to sometimes not see other people's points of view and so I thought this might be tricky." Another student shared:

> To be totally honest I was a little bit nervous because we didn't pick our own groups and looking at who was in my group… certain people work better than other people, people work at different paces. We all know that some of us are more assertive type A people and trying to figure out that balance. I was a little bit nervous about how the dynamics of our group were going to work.

In addition to different work styles, students also had to navigate different ways of thinking during the process of analyzing their group's data set. With regard to coding and developing themes, students overwhelmingly spoke of trying to come to terms with group members' differing ideas after individually reading the group's data set during week 3 of the PBL experience (see Table 1). One student said, "we started talking about what we were seeing in the data… [my group members] were seeing some things completely differently." Another said, "it was difficult to find the themes and decide on them because there were so many different competing minds." A third student said, "we were all looking at codes a little bit differently." These types of comments were common and reflected the students' struggles to achieve consensus from individual thinking and analysis.

Navigating the ideas various group members had for how to approach data analysis created conflict for individuals in each PBL group. To resolve conflict and mitigate apprehension about group work, students talked of conceding their individual ways of work for the greater good by negotiating a "middle ground" with their group. It is important to note that students did not view the negotiation of a middle ground in these conflicts as negative. In most cases, students spoke in a positive manner about compromise being a natural part of the process of the work their group did. For example, one student said, "it was kind of nice to have multiple points of view; we usually ended up somewhere in the middle, somewhere that's probably more true to what is real anyway."

Beyond general positive comments about individual compromise for the larger collective, students spoke of specific ways that they or others in their group worked to come to a middle ground as a result of the differences in their ways of thinking as individuals. For example, when talking about her group, one students said:

> We had two people in our group who tended to be a little bit more shy and three people who talk a lot, so we really worked on the three of us who talk a lot kind of holding back, and the people who don't talk as much, for them to try to talk more. And also, for us to stop and check and say, "Oh, what do you think about this?"

In another example, in regard to a common data analysis document that a particular group was creating, one student indicated, "I would go through and I coded what I felt was right from my point of view." She added that as others contributed their codes, she could see how they compared to what she had done. She demonstrated a level of compromise when concluding, "if something didn't match, I thought, let me go back and re-read that; either I disagree with it…or now I see their perspective, and I might change that thinking a bit." Similarly, in another group, one student discussed the ways group work slowed down the coding process in a positive way:

> Instead of [me] saying, "I see this" immediately, [my group members] were like, "I feel like maybe you're creating a code that's not there." I was like, "Okay, I'm willing to step back and reconsider my thinking."

While overall, compromising one's individual thinking to resolve conflict was seen as a positive learning experience, one student expressed some frustration with the process:

> The biggest thing that I had to face was my fear of groups, even though it was a small group. Once again it's finding my voice… there's a lot that goes on in my head; it never shuts off – it's getting it out…. There were times I kind of stepped back a little bit when I should have pushed my way in.

For this particular student, it appeared that in the process of compromising she struggled to articulate her thinking, which ended up mitigating her voice in the group's data analysis activities.

The dynamic interplay between individual perspectives and group compromise were revealed in all four PBL groups and underscore important considerations for structuring the data analysis learning experiences of practitioner scholars in a collaborative PBL context. These considerations will be elaborated in the discussion section of this paper.

Case Theme Two: Simulated Research Experience versus Real Research Experience

This case theme is defined as the tension that occurred when the benefits and value of participating in a research *simulation* collided with the limitations of participating in a research experience that wasn't *real.*

Similar to case theme one, interview data indicated that students expressed generally positive sentiments about conducting simulated research in their PBL groups, appreciating the opportunity to imitate the data analysis process they would eventually use when writing their own dissertations-in-practice. For example, one student said, "we [were] learning about how to be a better researcher of data. It was great. I learned really how to analyze data and get through it all. I think it was very awesome." Another student articulated the ways the PBL experience prepared her for conducting her own research in the future:

> It gave us firsthand experience in everything so it was wonderful. [The assignment structure] did make it really easy for you by setting things up: These are the questions to ask; This is what it looks like; This is [how] other people have [approached data analysis] in the past.... Every opportunity that we have to practice data analysis is great. It was really good scaffolding; I feel much more prepared with every time I am able to practice [data analysis].

Testimonies like these showed the value of PBL projects designed to foster data analysis skills. Many students suggested that they now

know how data analysis works because they had hands-on experience.

Learning how data analysis works was not the only benefit expressed by students, as several also noted the value inherent in connecting two different classes through the PBL data analysis simulation. For example, some students suggested that using discussion posts from the Critical Pedagogy class as a data set provided them an opportunity to dig deeper into what they learned in that class:

> I really enjoyed having a chance to go back and look at everything and have that time to process and reflect. Because we were analyzing [the discussion posts], I was able to get more meaning out of the [books we studied] in critical pedagogy and I learned more about critical pedagogy [in this process].

Another student echoed the quote above, saying that she thought the experience was "worthwhile" and that "it was really nice how the classes were brought together" because "it made the workload more reasonable and more relevant." Statements like these revealed that students appreciated the intentionally designed PBL research simulation. Engaging in the simulation afforded students the opportunity to both practice data analysis with a common set of data as well as to dig more deeply into the content of their critical pedagogy class, deepening their thinking as critical practitioner scholars.

While the value of conducting simulated research was affirmed, interview data also indicated that some students felt frustrated when engaging in data analysis with research questions that were pre-developed by the course instructor and data they did not collect on their own. For example, one student shared that when she embarked on the PBL project, "my trepidation was that this felt very impersonal in that it wasn't my wondering. Analyzing the data was going to be tedious." According to this student, although she enjoyed the learning process as a whole, she did not look forward to her PBL experience because the research question and data set were given *to* her, rather than developed *by* her. Similarly, another student described her feelings when exploring a research question and analyzing data assigned to her group:

> It felt a little superficial to me… inauthentic. I think it might have been more meaningful if we had done an inquiry project based on something that we were doing… I think we could have developed an inquiry question that could have been more meaningful.

This student further commented on the importance of developing one's own question in having an impact on her specific context and practice, a defining feature of the practitioner scholar definition that undergirded the entire EdD program in which the course was situated, as outlined previously. Practicing data analysis with others' posts seemed forced and, while a productive way of learning the data analysis process, unproductive in furthering the impact she could be having on her own local context.

Echoing this sentiment, a few students referred to their previous Practitioner Research class where they were introduced to practitioner inquiry for the first time and completed a modest project in their own contexts as a part of that class:

> [In the first Practitioner Research class], I had a problem of practice that I got to research and that really transformed my practice, that personal problem of practice versus [in this class], "Here's your question and do this"…. I missed the personal side of research.

Both the value and limitations of engaging in a research simulation to learn the skills of data analysis were revealed in all four PBL groups and underscore important considerations for scaffolding practitioner scholars' research skill development in a collaborative project-based learning experience. These considerations will be elaborated in the discussion section of this paper.

Case Theme Three: Public Class Activity versus Private Group Conversation

This case theme is defined as the tension that occurred when *public class activity* collided with *private student conversation* during the culmination of the project-based learning experience.

Interview data indicated that, like the initial positivity in themes 1 and 2 above, students began the experience satisfied with their well-established relationships as well as customary ways of communicating with cohort members:

> I felt really excited [when we started the PBL project] because I knew who I was working with…It's interesting because I've been working with this cohort for so long; we all know each other so well and we do a lot of backchanneling outside of the course shells; we're always talking on Facebook or some kind of messenger service. … Probably about 80% of our conversations happen through back-channeling.

Methods to engage in private group conversation, referred to as "backchanneling" in the quote above, were used to work on the PBL assignment as groups met every week (see Table 1). These methods were developed and refined through trial and error with various technology mediums:

> It took us a long time to figure out the technology side of it. …We did a lot of texting and we ended up getting phone numbers and calling each other. At one point I had someone on my phone via Facetime and I was Skyping everybody else and it was kind of a mess, but we did end up getting it figured out and then we had good discussions.

Experimentation with different technology mediums ultimately led to well-developed "backchanneling" communication skills. These were capitalized on during the culmination of the project-based learning experience when each group presented their research study to the entire class via a Zoom meeting. For example, while watching the other groups present, participants in one group continued to revise and improve their upcoming presentation:

> I'm pretty sure other groups did this, too. We were talking about the other [presentations] while they were happening in a Facebook chat. We were so scared because everybody's presentations were a lot more in-depth than ours, and they had way more slides than we had. Everybody's seemed to be structured very differently.… We actually changed a few of the things that we were going to say and added stuff in while we were watching other people's presentations.

Another member of that group expressed similar feelings:

> I remember this part like it was yesterday. I remember watching all the other groups and we had a chat going at the same time, and we were just like, "Ours just doesn't

> have enough information; look at all the other groups!" In the moment while other people were presenting, we were still making adjustments to ours.

Members of this group felt these revisions contributed to the impact of their presentation:

> I think we were on Facebook Messenger; we had that going on in the back and I was like, "[group member], we need a title; put a title on there now!" She's like, "What should the title be?" I typed something out and it ended up being the title and then [the course instructor] said, "I loved your title; it just fit so perfectly!"

For two of the four PBL groups, using backchanneling to make instant collaborative revisions increased their confidence in their presentations and was therefore seen as beneficial to their project-based learning experience. In addition, other students stated that backchannel discussion with specific group members clarified concepts found unclear during reading and small group meetings throughout the entirety of the PBL experience. One student, for example, felt that backchannel communications facilitated what she called "intelligent conversations":

> This actually took place in our backchanneling, too. I think just the ability to have vocabulary that described concepts that we had thought about but didn't really realize that they had names.

Yet, while some of the students appreciated the affordances offered by backchanneling, interview data also indicated that some students felt sidetracked by this activity:

> I will admit that I was really distracted because my group members kept texting each other back and forth about whether or not something was working in our presentation. I kept getting texts about "oh no, this isn't working; let's fix this or that." I was really, really distracted and [felt like] I didn't even see the other presentations.

Another member of the preceeding particpant's group shared that backchanneling eroded, rather than enhanced her confidence before the group presentation:

> I didn't really go through and rehearse it that well; I'm thinking about it and just the build-up of it as I'm listening to the first two groups. I was texting [another group member], "Is that what we did?" I started second guessing myself; I shouldn't have done that.

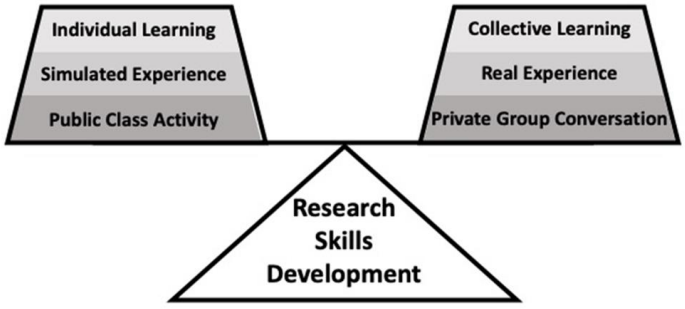
The back-and-forth engagements with public whole class activity and private group conversation were revealed in two of the four PBL groups and underscore important considerations for scaffolding practitioner scholars' research skill development in a collaborative project-based learning experience. These considerations will be elaborated upon in the next section of this paper.

DISCUSSION

In sum, the three case themes reported above each reveal a tension between two competing aspects of the problem-based learning experience designed to develop EdD students' data analysis skills: individual versus collective learning; simulated versus real research experience; and public class activity versus private group conversation. As indicated in Figure 1, the key to creating a productive learning experience through project-based learning is to help students find the sweet spot that balances competing themes for social learning, research experience, and group communication respectively. Hence, when EdD program faculty think about how to scaffold the research skills development of practitioner scholars, careful consideration should be given to the tensions that were revealed in the three case themes in this study.

Regarding case theme one, *individual versus collective learning*, our data reveal that there are certainly positive elements of having students work in groups to practice data analysis. The ways in which they help each other throughout the process can elevate the learning beyond an individual endeavor. However, our data also suggest that navigating various work styles, ways of thinking, and pressure to compromise for the sake of the group are also important to consider. Therefore, in contrast to the random group assignment that was implemented in this study, EdD program area faculty who endeavor to use project-based learning as a pedagogical strategy to develop their students' research skills should create project groups with intention, taking into account their individual students' work styles. Intentional grouping has the potential to accentuate the benefits of group work while minimizing stress caused by the need to negotiate work-style preferences, leading to better balance between individual and collective learning. In addition, EdD faculty who employ project-based learning might name and elaborate this tension for their students when introducing the PBL experience, acknowledging the likelihood that conflict will emerge within groups as individual and collective learning styles are negotiated. Further, faculty can discuss strategies groups might employ to reach productive consensus at the outset of the project as well as the important role of conflict negotiation in a student's own learning.

Figure 1. Balancing Tensions in Research Skills Problem-Based Learning.



Regarding case theme two, *simulated versus real research experience*, our data reveal that a simulated research experience can be valuable for deepening content knowledge as well as cultivating data-analysis skills. However, our data also suggest that working with pre-determined research questions and data sets might detract from the impact of a more personalized research experience rooted in students' own practice contexts—a signature feature of the professional practice doctorate. Even so, if EdD students only engage in individual, personalized research endeavors throughout their programs, they miss the opportunities afforded by a collaborative research simulation, such as sharing and practicing analysis procedures with a common set of data, as was the case in this study. While the simulation experience in this study worked well to provide a common data set for students to analyze (online posts produced by the students themselves in their Critical Pedagogy class), it failed to emulate a focus on studying problems of practice, the defining feature of the dissertation-in-practice experience. Therefore, EdD program area faculty who endeavor to use project-based learning as a pedagogical strategy to develop their students' research skills should consider creating simulation experiences that more closely approximate the types of research EdD students conduct in their local contexts. These more realistic simulations would incorporate the kinds of research questions practitioner scholars ask and the kinds of data they are likely to collect. This can occur, for example, by obtaining appropriate permissions to collect and use data sets of EdD program graduates who have completed practitioner research in coursework or for their dissertations-in-practice. EdD faculty can use elements of these data and associated research questions to design simulations that enable their current students to share a common research experience, yet one that more closely resembles authentic research conducted in practitioner scholars' typical contexts, thereby better balancing simulated and real research experience. Organizations such as CPED can play a leading role by creating a repository of raw data sets that can be accessed and used by CPED member institutions to improve the research skills development of EdD students world-wide.

Finally, regarding case theme three, *whole class activity versus private group conversation*, our data reveal that private group conversations can contribute positively to students' overall learning and performance. However, our data also suggest that private group conversation can interfere with student learning when it competes with whole class activity. Interestingly, in this study, course instructors were unaware of the private group conversations that occurred during the final presentations until participants mentioned them across their interviews. Therefore, EdD program area faculty who endeavor to use project-based learning as a pedagogical strategy to develop their students' research skills should work to heighten their awareness of both the *what* and *when* of small group conversation. This, in turn, can help faculty capitalize on the potential of small group conversations to enhance learning while minimizing drawbacks, striking a better balance between the two. While instructors cannot be aware of every private conversation that occurs among students regarding course content, it is important to recognize that backchanneling, the term introduced by a student in this study to refer to private group conversation, can serve a useful purpose and contribute to student learning. With this in mind, EdD faculty who employ project-based learning might actually suggest engagement in backchanneling as a potentially useful endeavor to further learning goals at the outset of the project, discussing strategies with students to ensure it complements, rather than competes with, whole class activities.

CONCLUSIONS

The proliferation of new EdD programs designed to develop scholarly practitioners who can conduct and lead research efforts aimed at improvements in educational practice necessitates that those of us who administer these programs thoughtfully craft a plan to teach the skills of practitioner research to our students. The current study responds to this imperative by giving voice to students transitioning into practitioner scholars. We learn from the budding practitioner scholars in this study that when a balance is struck between individual and collective learning, simulated and real experience, and public class activity and private group conversation, project-based-learning holds promise as one pedagogical strategy EdD faculty can employ to foster the development of research skills. Yet, a great deal of additional research is needed to better understand not only the possibilities inherent in a project-based-learning approach to EdD student research skills development, but also to uncover and understand additional strategies that will serve practitioner scholars as they learn to conduct systematic and intentional study of their own professional contexts to solve problems of practice and lead informed change. This study serves as a call for other CPED programs to enact, study, and report upon the ways they develop the research skills of practitioner scholars. In so doing we emulate the kind of research we ask of our students, and we take another step toward unleashing the power of professional practice doctoral programs to transform educational practice.

REFERENCES

Adams, A., Bondy, E., Ross, D., Dana, N. F., & Kennedy-Lewis, B. (2014). Implementing an online professional practice doctoral program in a PhD environment: Managing the dilemmas. *Journal of School Public Relations, 35*(3), 363-382.

Arslan-Ari, I., Ari, F., Grant, M. M., & Morris, W. S. (2018). Action research experiences for scholarly practitioners in an online education doctorate program: Design, reality, and lessons learned. *TechTrends: Linking Research & Practice to Improve Learning*, *62*(5), 441-449. https://doi.org/10.1007/s11528-018-0308-3

Barnett, B. G., & Muth, R. (2008). Using action-research strategies and cohort structures to ensure research competence for practitioner-scholar leaders. *Journal of Research on Leadership Education*, *3*(1), 1-42.

Buss, R. R. (2018). Using action research as a signature pedagogy to develop EdD students' inquiry as practice abilities. *Impacting Education: Journal on Transforming Professional Practice*, *3*(1). https://doi.org/10.5195/IE.2018.46

Buss, R. R., & Avery, A. (2017). Research becomes you: Cultivating EdD students' identities as educational leaders and researchers and a "learning by doing" meta-study. *Journal of Research on Leadership Education*, *12*(3), 273-301. https://doi.org/10.1177/1942775116674463

Carnegie Project on the Education Doctorate (CPED). (2019). *The CPED framework*. https://www.cpedinitiative.org/the-framework

Carnegie Project on the Education Doctorate (CPED). (2014). *Development of the CPED working principles.* https://www.cpedinitiative.org/page/ HistoryPrinciples

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (Fourth edition). SAGE.

Dana, N. F., Adams, A., Bondy, E. Kennedy, B., Lowery, R., Swain, C., Pringle, R., & Ross, D. (2011, April). *The development of practitioner scholars as teacher professional development: Exploring the problems and possibilities inherent in building an online professional practice doctoral program.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Dana, N. F., & Yendol-Hoppey, D. (2020). *The reflective educator's guide to classroom research: Learning to teach and teaching to learn through practitioner inquiry* (4th edition). Corwin.

David, J. L. (2008). What research says about... Project-based learning. *Educational Leadership*, *65*(5), 80-82.

Firestone, W. A., Perry, J. A., Leland, A. S., & McKeon, R. T. (2019). Teaching Research and Data Use in the Education Doctorate. *Journal of Research on Leadership Education*. https://doi.org/10.1177/1942775119872231

Guthrie, J.W. (2009). The case for a modern doctor of education degree (Ed.D.): Multipurpose education doctorates no longer appropriate. *Peabody Journal of* Education, 84(1), 3-8.

Hooks, B. (2013). *Writing beyond race: Living theory and practice*. Routledge.

Hung, C.-M., Hwang, G.-J., & Huang, I. (2012). A project-based digital storytelling approach for improving students' learning motivation, problem-solving competence and learning achievement. *Educational Technology & Society*, *15*(4), 368-379.

Kerrigan, M. R., & Hayes, K. M. (2016). EdD students' self-efficacy and interest in conducting research. *International Journal of Doctoral Studies*, *11*, 147-162.

Kumar, S., & Dawson, K. (2018). *An online doctorate for researching professionals: Program design, implementation, and evaluation*. Athabasca University Press.

Lambie, G. W., Hayes, B. G., Griffith, C., Limberg, D., & Mullen, P. R. (2014). An exploratory investigation of the research self-efficacy, interest in research, and research knowledge of Ph.D. in education students. *Innovative Higher Education*, *39*(2), 139-153.

Leech, N. (2012). Educating knowledgeable and skilled researchers in doctoral programs in schools of education: A new model. *International Journal of Doctoral Studies*, *7*, 019-037. https://doi.org/10.28945/1558

Leech, N., & Haug, C. A. (2015). Investigating graduate level research and statistics courses in schools of education. *International Journal of Doctoral Studies*, *10*, 093-110. https://doi.org/10.28945/2111

Lovitts, B. E. (2005). Being a good course‐taker is not enough: A theoretical perspective on the transition to independent research. *Studies in Higher Education*, *30*(2), 137-154. https://doi.org/10.1080/03075070500043093

Marshall, C., & Rossman, G. B. (2010). *Designing qualitative research* (5th ed.). Sage Publications.

McClintock, C. (2004). The scholar-practitioner model. *Encyclopedia of distributed learning*, 393-396.

Moore, E. Jr., Penick-Paris, M.W., Michael, A. (Eds.). (2015). *Everyday white people confront racial and social injustice: 15 stories.* Stylus Publishing, LLC.

Neumann, R. (2005). Doctoral differences: Professional doctorates and PhDs compared. *Journal of Higher Education Policy and Management, 27*(2), 173-188.

Patton, M. Q. (2014). *Qualitative research and evaluation methods* (4th ed.). Sage Publications.

Pilkington, R. M. (2009). Practitioner research in education: The critical perspectives of doctoral students. *Studies in the Education of Adults*, *41*(2), 154-174. https://doi.org/10.1080/02660830.2009.11661579

Perry, J. A. (2013). Introduction: Developing stewards of practice. In Perry, J. A. & Carlson, D. L. (Eds), *In their own words: A journey to the stewardship of the practice in education* (pp. 1-14). Information Age Publishing.

Perry, J. A., & Imig, D. G. (2008). A stewardship of practice in education. *Change: The Magazine of Higher Learning, 40*(6), 42-49.

Saldana, J. (2015). *The coding manual for qualitative researchers* (3rd ed.). Sage Publications.

Sensoy, Ö., & DiAngelo, R. J. (2012). *Is everyone really equal? An introduction to key concepts in social justice education*. Teachers College Press.

Sensoy, Ö., & DiAngelo, R. J. (2017). *Is everyone really equal?: An introduction to key concepts in social justice education* (Second; J. A. Banks, Ed.). Teachers College Press.

Shulman, L. S. (2005). Signature pedagogies in the professions. *Daedalus*, *134*(3), 52-59. https://doi.org/10.1162/0011526054622015

Shulman, L., Golde, C.M., Bueschel, A.C. & Garabedian, K.J. (2006). Reclaiming education's doctorates: A critique and a proposal. *Educational Researcher, 35*(3), 25-32.

Tashakkori, A., & Creswell, J. W. (2008). Editorial: Envisioning the future stewards of the social-behavioral research enterprise. *Journal of Mixed Methods Research*, *2*(4), 291-295. https://doi.org/10.1177/ 1558689808322946

Thomas, J. W. (2000). *A review of research on project-based learning*. Autodesk Foundation.

Vaughan, M., Boerum, C., & Whitehead, L. S. (2019). Action research in doctoral coursework: Perceptions of independent research experiences. *International Journal for the Scholarship of Teaching & Learning*, *13*(1), 1-8. https://doi.org/10.20429/ijsotl.2019.130106

Wetzel, K., & Ewbank, A. (2013). Conceptualizing the innovation: Factors influencing doctoral candidates' interventions in the action research dissertation. *Educational Action Research*, *21*(3), 392-411. https://doi. org/10.1080/09650792.2013.813402

Zambo, D. (2011). Action research as signature pedagogy in an education doctorate program: The reality and hope. *Innovative Higher Education*, *36*(4), 261-271.