

**Teachers' Professional Learning in the Context of
Implementing Project Based Learning in a Secondary School**
**APPRENTISSAGE PROFESSIONNEL DES ENSEIGNANTS DANS LE
CADRE DE LA MISE EN OEUVRE DE L'APPRENTISSAGE PAR
PROJET AU SECONDAIRE**

Awneet Sivia and Vandy Britton

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Article abstract

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TEACHERS' PROFESSIONAL LEARNING IN THE CONTEXT OF IMPLEMENTING PROJECT BASED LEARNING IN A SECONDARY SCHOOL

AWNREET SIVIA & VANDY BRITTON *University of the Fraser Valley*

ABSTRACT. This study explores teachers' professional learning (TPL) in the context of a school-wide implementation of Project Based Learning (PBL). Using phenomenology, we studied the narratives of two teachers engaged in the implementation. The questions driving this research are: How do teachers conceptualize their learning as professionals involved in a curricular innovation (in this case, PBL)?; What shifts in practice and identity occur?; What concepts are central to teachers' professional learning?; and, What does this reveal about a stance of inquiry in professional learning? The analysis clarifies the nature of professional learning, which we articulate as a set of proposed concepts of TPL. Further connections are made between these findings about TPL and the theory of inquiry-as-stance.

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RÉSUMÉ. Cette étude explore l'apprentissage professionnel des enseignants (TPL) dans le contexte d'une mise en œuvre à l'échelle de l'école de l'apprentissage par projet (APP). À l'aide de la phénoménologie, nous avons étudié les récits de deux enseignants engagés dans la mise en œuvre de ce projet. Les questions guidant cette recherche sont : comment les enseignants conceptualisent-ils leur apprentissage en tant que professionnels impliqués dans une innovation curriculaire (dans ce cas, APP)? Quels changements de pratique et d'identité surviennent? Quels concepts sont au cœur de l'apprentissage professionnel des enseignants et qu'est-ce que cela révèle au sujet d'une position d'enquête dans l'apprentissage professionnel? L'analyse clarifie la nature de l'apprentissage professionnel que nous articulons comme un ensemble de concepts proposés de TPL. D'autres liens sont établis entre ces découvertes sur la TPL et la théorie de l'enquête – en tant que – position.

Teachers' professional learning is seen as the core element in contributing to successful implementation of educational reform (Darling-Hammond & Richardson, 2009; Le Fevre, Timperley, & Ell, 2015; Schnellert, Kozak, & Moore, 2015; Campbell, 2017). We acknowledge that, like professional development

(PD), teachers' professional learning (TPL) involves learning about current practices, the development of teacher knowledge, engagement in professional interaction, and collaborative inquiry with colleagues (Hargreaves & O'Connor, 2018; Lieberman & Miller, 2009; Van Veen, Zwart, & Meirink, 2012; Katz, Dack, & Malloy, 2017). However, TPL is unique in that it is considered to be context-dependent and shaped by the conditions experienced by the teacher in a particular situation and setting (Day & Gu, 2007; Koffeman & Snoek, 2019; Goodnough, 2018; Attard Tonna & Shanks, 2017). For example, a culturally diverse classroom provides teachers with the opportunity to strengthen their knowledge about diversity education (Timperley & Alton-Lee, 2008). Teachers could engage in PD in relation to this topic. However, it is not until they apply the general principles learned to their specific context that professional learning actually occurs; thus, TPL is predicated on the ability to reflect on the conditions within a particular context and transform generalized PD into meaningful practice (Schön, 1983; Killion & Todnem, 1991; Warin, Maddock, Pell, & Hargreaves, 2007; Zeichner & Liston, 1996). Intrinsic motivation is another factor that prompts professional growth in teachers (Gusky, 2002; Katz, Dack & Malloy, 2017; Katz & Dack, 2012). Van Eekelen, Vermunt, and Boshuizen (2006) suggest that TPL occurs when there is an intense willingness to learn. While these descriptions of TPL are helpful in distinguishing it from PD, the challenge is that they do not adequately capture the essence of TPL from the *perspectives of teachers* undergoing this learning. As such, we seek to focus on teachers' own words in describing their learning in an attempt to understand the nature of TPL.

CONTEXT

This study is situated within a secondary school that had previously struggled with declining enrolment and negative community perceptions. In an effort to rebrand the school, the school administration secured government funding to implement Project Based Learning (PBL) as a school-wide innovation beginning with grade 9 students, with the intention to continue implementing PBL in subsequent years. While the innovation itself was interesting and became the focus of other studies (MacMath, Britton, & Sivia, 2017; Sivia, Novakowski, MacMath, & Britton, 2018), our intention in this study was to understand how teachers perceived their learning as they developed their practices over the course of implementing the PBL innovation.

PD workshops on PBL were offered a few months prior to the implementation in September 2015. Following three consecutive days of learning, teachers were asked to develop PBL units within their own courses or with teachers from other subject areas to create interdisciplinary units of study. We focused our study on the experiences of two of the four teachers who were involved in the initial implementation of PBL¹. Through pre-and post-PBL instruction interviews with these two teachers, our research sought to investigate their lived experiences and to clarify the nature of their learning. We were curious how TPL was described

by teachers who were experiencing such a substantive change in their teaching. Because the structure of PBL² requires redesigning curriculum around a driving question posed to address a real-world problem, these teachers approached curriculum in entirely new and different ways. Our curiosity as researchers was piqued because of the extent of the changes in curriculum and pedagogy at this school, and in particular, in these two teachers' classrooms. We also considered the implications this study would have for teacher educators as they support in-service and pre-service teachers who may be embarking on innovations in their own professional contexts.

BACKGROUND

This study focuses on year two of a longitudinal study examining the impact of implementing Project Based Learning (PBL) at a secondary school across all grade 9 classes. One of the salient, yet unreported outcomes from the first year of the study was the impact that the PBL implementation had upon the teachers' professional learning and growth. At the outset, we anticipated that teachers would experience significant professional growth and change in practice. What became apparent was that the learning engaged in by the teachers was integral to the implementation of this curricular innovation. Not only was there a change in teaching practice evident to us through our observations during the initial year of the study, there were also noticeable shifts in the teachers' identities, including changes in their roles within the school and a seeming reconceptualization of what teacher learning entailed for them. Thus, our study continues with two of the original four teachers involved in the initial PBL implementation. We focus on the impact of PBL implementation on TPL and how the teachers articulate and conceptualize their professional learning.

We employed phenomenology as the methodology for understanding the meanings of human experiences (Creswell, 1998, 2003). Phenomenology allows researchers to reveal the "universal essence" and provide insights into social phenomenon (Creswell, 2008, p. 54). We delved into and sought to illuminate participants' experiences by focusing on the following questions: How do teachers conceptualize their learning as professionals involved in a curricular innovation (in this case, PBL)? What shifts in practice and identity occur? What concepts are central to teachers' professional learning? Finally, what does this reveal about the importance of a stance of inquiry in professional learning? With these questions in mind, phenomenology provided us with a powerful method to elucidate the participants' responses to the questions and the descriptions of their experiences, including illuminating what they learned, and how they characterized this learning through their own words.

LITERATURE REVIEW

According to Bakkenes, Vermunt, and Wubbels (2010), TPL is the active process by which teachers participate in learning activities that lead to cognition and behaviour modification. These changes are further supported by teachers' autonomous motivation to engage in learning, as well as favourable workplace conditions such as in-service training and/or dedicated time to intentionally practice teaching in new ways (Campbell, 2017; Timperley, 2011). TPL, in this conception, emphasizes the importance of motivation, suggesting that achievement (external structures) and self-determination (internal structures) are both required for teachers to engage in effective professional growth and, ultimately, change their practice. In reviewing empirical research, Bakkenes, Vermunt, and Wubbels (2010) note that teachers learn by experimenting and trying out new teaching methods; from interacting with students and colleagues; by sharing materials in project groups; from external sources such as books, magazines, and seminars; and by "consciously thinking about one's own teaching practices (reflection)" (2010, p. 535). In contrast, numerous studies cite the ineffectiveness of organized PD activities where teachers have not been included in the decision-making (external structures only) because they treat teachers as recipients of learning rather than the determiners of it (Ball & Cohen, 1999; Van Veen, Zwart, & Meirink, 2012; Wilson & Berne, 1999). Further limitations of PD activities on teachers' learning are that the design of such activities rarely acknowledge the individual experiences, expertise and / or prior knowledge of the teachers involved in the PD (Anderson & Olsen, 2006; Berliner, 2004; Day, Sammons, Stobart, Kington, & Gu, 2007). While these descriptions imply that TPL is promoted by the presence of PD and/or innovations in education, both of which were factors in the context of this study, the ways in which teachers perceive that professional learning are still unclear.

Campbell's (2017) pan-Canadian study found effective teacher learning included: evidence-informed practice, subject-specific pedagogical content knowledge, a focus on student learning outcomes, a balance of teacher voice and system coherence, collaborative learning experiences, and engaged and supportive leadership. While these aspects contribute to a more comprehensive definition of TPL, they lack specific mention of how teachers themselves perceive and describe their learning as professionals, instead emphasizing *researchers'* conceptions. While research exists on teachers' understanding and use of PBL (e.g., Hovey & Ferguson, 2014), these (and related) studies focus on teachers' practices, curricular designs, and perceptions of student learning, viz., post-secondary applications of PBL and student learning (Dahlgren, Castensson, & Dahlgren, 1998; Li & Du, 2015), design principles of PBL (Bo & Li, 2015), and student engagement and teacher perceptions of PBL (MacMath, Britton, & Sivia, 2017; Sivia, Novakowski, MacMath, & Britton, 2018).

Theoretical Framework

This study is inspired by Cochran-Smith and Lytle's (2009) seminal research into teacher learning and draws on the principles of their theory of *inquiry-as-stance*³, which "is neither a top-down nor a bottom-up theory of action, but an organic and democratic one that positions practitioners' knowledge, practitioners, and their interactions with students and other stakeholders at the center of educational transformation" (pp. 123–124). PBL was the educational transformation that was introduced into the school as a district initiative. The limits of this top-down approach were mitigated by teachers taking ownership of the initiative and applying the strategies and approaches in their classrooms, thus turning it into teacher-led PBL. Application involved ongoing assessment of practice both individually and with colleagues, seeking feedback from students, reflecting individually on lessons, and analyzing experiences with colleagues in collaborative meetings. As well, administrators created a school-wide culture of 'failing forward' to encourage risk-taking. At the heart of this dynamic and complex process of learning to teach PBL were the individual experiences of the teachers who were actively inquiring into their own practice.

Inquiry-as-stance is conceptualized as a "theory of action grounded in the dialectic of knowing and acting, inquiry and practice, analysing and doing" (Cochran-Smith & Lytle, 2009, p. 119). We utilized this theoretical framework as a lens into the experiences of our participants as it reflected what we had informally observed to be the dynamic interplay of action (practice) and thought (reflection). The conception of inquiry-as-stance as "perspectival and conceptual – a worldview, a critical habit of mind, a dynamic and fluid way of knowing and being in the world of educational practice" (Cochran-Smith & Lytle, 2009, p. 120) allowed us to understand the nuances of the participants' experiences through the phases and processes involved in teaching PBL. We resisted imposing our own worldviews or applying our own perspectives or concepts onto teachers' experiences, honouring the tenets of phenomenology by focusing on participants' experiences as explicated in their own words and from their worldviews, beliefs, and habits of mind. Thus, the theoretical framework of inquiry-as-stance provided not only a theoretical undergirding for the focus of the study of exploring TPL, but also supported our methodological choice of phenomenology.

METHODOLOGY

A phenomenological investigation aims to "describe and interpret the experience of participants in order to describe the 'essence' of the experience *as perceived by the participants* (italics in original)" (McMillan, 2008, p. 291) with the hopes of grasping "the very nature of the thing" (van Manen, 1990, p. 177). Phenomenologists begin with a full description of the participants' experience and employ three levels of interpretation: a textual description of what happened; a structural description

of how the phenomena occurred; and, an overall description of the experience and/or essence of the phenomena (Creswell, 1998). To capture full descriptions, we engaged in extended interviews with participants. Individual interviews were conducted in two phases, once before PBL implementation and once directly after they finished teaching the PBL units. By suspending judgment, referred to as bracketing (Husserl, 1970), we based our findings on the experiences of participants implementing this curricular innovation (Creswell & Poth, 2017).

While the phenomenon under investigation was the implementation of PBL in terms of TPL, we utilized a psychological approach as we sought to “determine what an experience means for the persons who have had the experience and are able to provide a comprehensive description of it. [From there,] general or universal meaning(s) are derived, in other words, the essences of structures of the experience” (Moustakas, 1994, p. 13). Participants were “carefully chosen” (Creswell, 1998, p. 55), as they were involved in implementing PBL. We also wrote fieldnotes and “jottings” (Emerson, Fretz, & Shaw, 1995, p. 40) while observing collaboration meetings and subsequently compared these notes with what participants described in their interviews. Creswell (2008) states that the process for analyzing qualitative data, in this case, interview transcripts and fieldnotes, consists of developing a “general sense of the data and then coding description and themes about the central phenomenon” (Creswell, 2008, p. 244). In analyzing our data, we engaged in an inductive process of coding in order to narrow our interview data into themes: we read interview transcripts and our own fieldnotes; we formed initial codes; we grouped statements from the data into these codes as ‘meaning units’; and, we prepared an overall description of TPL (Creswell, 1998, 2003; Moustakas, 1994). We were mindful of prioritizing our participants’ voices and experiences throughout these descriptions by capturing themes that were founded on their language and their ideas.

Educational Transformation

The cross-curricular PBL unit of study under examination had “Where does our food come from?” as its driving question. Utilizing this question, grade 9 students, in groups of five, undertook a teacher-directed inquiry into food production, culminating in the design and development of an incubator in which they attempted to hatch an egg. The English teacher, Scott, engaged the students in the ethics of food production, utilizing the strands of the English Language Arts curriculum; meanwhile, the Digital Literacy teacher, Terry, supported the students through production aspects of the projects as they used technology to ‘vlog’ (video log) their learning and then create and develop a final visual presentation.

Participants

At the outset, our participants were selected based on three specific criteria: (1) they experienced the implementation of inter-disciplinary PBL units in

their classes over a period of two years, with this being their fourth semester of implementation; (2) they had demonstrated an affinity for relating their perceptions to their learning as teachers during the first year of the PBL research; and, (3) they were the two teachers from the original four who continued in this capacity. While ideally all four teachers who were part of the original PBL implementation study would have been included, two were no longer available. It was through informal conversations with the remaining teachers that we realized there was a richness to their stories and to the quality of their experiences, thus piquing our curiosity about the phenomena of TPL.

Interestingly, both participants had had previous careers and made the 'identity shift' to teaching later in life which seemed to impact their articulation of the shift to teaching with PBL. Scott had previously worked in a sawmill and then moved into theatre and acting prior to teaching. At the time of this study, he had been teaching for twenty years in both English Language Arts and Special Education. Terry, meanwhile, while trained as a lawyer, worked in the information technology field as a computer programmer; he entered teaching as a humanities teacher, then moved into a district position in technology education. At the time of this study, seventeen years after his start in the profession, Terry was brought in to teach Digital Literacy to support the implementation of PBL at this school. His skillset and knowledge of integrating technology across disciplines were useful in supporting teachers with curriculum integration in their PBL units.

While education and/or teaching were not the first career choice for either participant, both realized that the mercurial nature of education and teaching appealed to them. Scott found the engagement with students and being 'on stage' as a teacher to be gratifying; this resonated with his theatre and drama background. Terry, on the other hand, found that his personal passion for technology and innovation inspired him to seek to engage learners in new ways; as the students created increasingly more sophisticated projects using technology, his excitement about teaching also increased. As relatively 'seasoned' teachers, they held differing levels of openness to considering innovations in their teaching practice. Scott was more reticent to change his practice, but was eager to explore new ways to continue to strengthen his connection with students; meanwhile, Terry presented a more contemporary view on education, often citing his desire to see students take ownership of their learning.

Data Sources

Data was collected from multiple sources: semi-structured individual interviews with the two participants both before and after the implementation of the PBL units in their courses; observations and field notes during collaboration meetings; and, researchers' reflections following each 'collab time'. Initial interviews⁴ were conducted in January 2017 to gain understanding of the participating teachers' views on TPL prior to the start of the second semester of the second year of PBL implementation. After completing the first round of individual interviews,

the interviews were transcribed. During February, March, and April 2017, we attended three collaboration meetings⁵ in which the two participants met with other members of the staff involved in PBL implementation. This ‘collab time’ was held in one of the classrooms during school hours and took place at regular intervals over the span of three months of the second semester at the school. We also obtained consent from the non-participating teachers since they were involved in the collaboration meetings but were not part of the study. Observations of ‘collab time’ included jottings and fieldnotes about body language, time listening and time talking, who initiated the conversations, and the general content and context of the collaboration meeting. It was important to attend to all the qualities and environmental, social, and temporal dimensions of the experience (Moustakas, 1994) of our participants. As researchers, we also verbally shared our reflections with each other directly following each collaboration meeting observation. These conversations included referencing our fieldnotes, often adding points to them that came out of these follow-up discussions.

The second set of individual interviews took place in June 2017 following the completion of all PBL units in the grade 9 classes. The interviews were less structured, affording participants the latitude to describe their experiences of learning and reflections on shifts in their identities in more detail.

Data Analysis

Data was analyzed to surface the “meaning of the experience” (Creswell, 1998, p. 34). We followed the protocols for phenomenological data analysis according to Moustakas (1994) which includes identifying concepts or “clusters of meaning” that are then tied together to provide textual and structural descriptions of the phenomenon. Analysis of the transcripts and the fieldnotes yielded commonalities between our participants’ experiences that we grouped thematically. We chose to focus on the similarities across the interview data and the collaboration meeting fieldnotes in order to strengthen our understanding of TPL. We grouped our results as ‘before implementation’ and ‘after implementation’ to capture any salient shifts that occurred over the span of the educational transformation. Our results were organized to show the “clusters of meaning” (Creswell, 1998) as concepts that emerged from our thematic analysis. We then deconstructed this further to reveal the textual description (what was experienced by our participants) and the structural description (how it was experienced by our participants).

RESULTS

Before Implementation: Collaboration

Both participants referenced collaboration when discussing their practice of implementing PBL. They placed value on learning to hone their teaching practice through the relationships that had developed because of the implementation of PBL. Terry spoke of “partnering with other professionals” (ITI, T1, p. 8) and,

stressed the value of “gaining a great deal from...observing how [colleagues] are being practitioners in their own classrooms, but also how they are contributing to my own understanding and learning” (ITI, T1, p. 11). Professional collaboration became a site for connection as he described not feeling alone or isolated because of “sharing understandings in a group environment” (ITI, T1, p. 10). Scott referenced the theatre, finding commonalities between the ways in which he worked as a theatre practitioner and the ways in which the teachers would work together in implementing PBL. He says, “...PBL was really natural for me. Because of the theatre background, I found it was a really awesome way to be creative” (ITI, T2, p. 6). He shared a sense of value for having a common goal and for being able to bring different curricular areas together like directors and producers do when they produce a play.

Before Implementation: Learning From Professional Development Workshops

Participants referenced the PD opportunities that they had undertaken prior to the implementation of PBL, as well as the PBL workshop provided to all grade 9 teachers at the school in September 2015. Both participants acknowledged that PD was useful, yet described the usefulness in different ways: Terry states, “I learn as someone who observes and then does” (ITI, T1, p. 5); Scott, meanwhile, qualified learning PD as “something I can use right away” (ITI, T2, p. 12), tying this idea to concrete examples of where PBL had been used elsewhere. He states, “It was a philosophy. It was tried a few different places so there was real evidence that it was working...I found watching the video and just the whole methodology seemed very interesting, very useful and doable...I was really intrigued by it. I thought, I can do this, and I can do this really well, and I could be kind of an expert at it” (ITI, T2, p. 9). Seeing PBL in action, having relevant and authentic examples, and understanding the methods used in PBL all came from this ‘firsthand’ exposure in the early stages of implementation. Terry also commented on the power of the examples to help his process of learning how to implement PBL in his classes.

Before Implementation: Learning Mindset

The participants valued challenge and instructional innovation as part of their personal philosophies, thus demonstrating a *mindset* towards learning as professionals. This learning mindset could be categorized in two ways: (1) learning that fit with their vision and identity as educators; and, (2) learning that came from student interactions. Scott states, “I thought it would be a really great adventure” (ITI, T2, p. 9); while Terry says, “I chose to come here because I felt that this type of teaching, this type of learning environment...suited my instructional ideas and practices” (ITI T1, p. 8). Interestingly, a learning mindset was reflected in the pattern of learning throughout both of our participants’ careers. For example, Terry spoke of constantly seeking new challenges and actively contributing to new directions taken at the school or classroom level,

while Scott seized the opportunity to innovate despite the negative perceptions of PBL held by some former colleagues. The second category relates to the strong emphasis on relationships with students and on using student feedback to improve one's practice. Scott states, "When I'm teaching, I'm being informed constantly of where I'm going to have to learn more things or better ways of communicating...it's constantly redefining the practice" (ITI, T2, p. 5). Terry suggests that his role is to be "someone who is going to try to spark and initiate interest in students in their learning" (ITI, T1, p. 3); it is the ways that students "respond to things that emphasizes, supports, encourages and solidifies" (ITI, T1, p. 3) his understanding of his role as teacher. He states: "One of the things I try to do ... is to take feedback from the kids, what they liked and what they didn't like... and to respond accordingly" (FTI, T1, p. 5). Thus, a strong feature of a learning mindset also involves listening and heeding student voice.

After Implementation: Shifts in Practice

Final interviews revealed the participants' genuine excitement about the ways their teaching practices shifted as they moved through the PBL units with their students. They spoke of these shifts in how student learning was designed and how they collaborated differently, commenting on how much they "enjoyed the PBL experience" (FTI, T2, p. 1). As students worked on their PBL projects – questioning, critiquing, researching, collaborating, and connecting their learning to the real world (Allen, 2015) – their teachers adapted their teaching styles to facilitate student learning in these new ways. For instance, Scott states, "I was indeed a guide on the side and not the sage on the stage...I was really getting to see the kids during the class and migrated away from 'here's the work, get to work'" (FTI, T2, p. 1). He talked about how his work in PBL impacted his planning in other classes and grades; for instance, he shifted from teaching short story analysis to having students write their own stories on themes emerging from the stories they had read. Scott also states how PBL "actually creates more contact with the students...giving onus to the students to refine the things that are interesting to them and that makes the job more interesting for me" (FTI, T2, p. 1). The shifting practice for Terry was related to his need to be flexible "in the way of working with the students and knowing what their capacity was" (FTI, T1, p. 1). This meant that he had to be more responsive to student feedback and make different decisions regarding the learning outcomes in the PBL unit to "dive a little more deeply into those elements and to remove some components that weren't as necessary" (FTI, T1, p. 1).

The second source for the shift in the participants' teaching practice was collaboration with peer teachers. Terry emphasized the importance of working with different perspectives and how important it was to "work as a team and plan as a team" (FTI, T1, p. 2). He says, "You really do have to plan better and you have to have people of the same mindset...in this environment. You have to be willing to collaborate and willing to cooperate" (FTI, T2, p. 2). He added,

"We are taught as educators a core of education and curriculum and taught as educators in methods of delivering that to students; but we are not really taught to collaborate with one another and what that honestly looks like" (FTI, T1, p. 2). For Terry, collaboration was what propelled his growth through the PBL implementation phase, and he considered this a personal success. He partially attributed this success to working with individuals who were prepared to "put aside their own egos and their own professional identities... [so] collaboration is not necessarily an action, it is an attitude" (FTI, T1, p. 8).

After Implementation: Liberation

Liberation surfaced as a consistent theme in the final interviews with both participants. A sense of liberation came about because of the participants' "willingness to take risks" (FTI, T1, p. 1) due to the solidity of the relationships established between colleagues. Terry says, "I have had lots of experience as an educator [and] all of those preparation components. But coming in and having an incredible team to work with right off the bat was by far the most liberating aspect of doing this particular educational approach and doing this job; that was empowering" (FTI, T1, p. 4). Terry felt empowered to "stretch" his practice which validated his personal belief that teachers have to be "lifelong learners" (FTI, T1, p. 9). For Scott, meanwhile, the sense of liberation was manifest in how much he enjoyed teaching PBL and the opportunities it afforded him to connect with students. He states, "I'm much more comfortable with how I am teaching, and I really like what I am teaching and how it's going" (FTI, T2, p. 2). He continues by saying, "I know that I am a lot more confident in the classroom... Although I was saying that I have less time to do it all, I have more time to really focus on what is important" (FTI, T2, p. 12). It became clear from the final interview with Scott that his shifting role to 'guide on the side' freed him up from feeling that he had to know all the answers and, in this newfound freedom, he discovered that he was still able to effectively support student learning.

Overall, the data showed that participants experienced the phenomenon of TPL in both affective and cognitive ways. Both participants spoke of the exhilaration and excitement of implementing something new. Terry regarded this as his genuine "love of learning" (ITI, T1, p. 2) and described how he challenged himself to integrate technology into his teaching: "I feel like when I have mastered something, then I typically look for something new to challenge myself with" (ITI, T1, p. 7). Scott connected his excitement to his theatre background by stating, "I kind of saw it as my last adventure in the field; a person with a theater and art background, it really fit into my strong suit of creativity, holistic practice, and connecting bits together" (ITI, T2, p. 6). At the same time, both spoke of the fear and uncertainty of "not being in control of it" (FTI, T2, p. 4). There was also underlying frustration around the collaboration meetings when the two 'new' teachers to the team were perceived as being less receptive to a collective vision of implementing PBL. Terry expressed his experience as, "when you are

working with interdisciplinary PBL in particular, you really do have to plan better and you have to have people who are of the same mindset” (FTI, T1, p. 2). As well, Scott expressed a sense of loneliness attached to the work of innovating curriculum: “It’s almost like they don’t even want to know about it. Instead of coming around and thinking, *that must be really exciting*, nobody really asked us during the first year when nobody else was doing it, and nobody was saying, *so how is that going for you?* It’s not really an impediment, but it would be nice if people were a bit more open to the changes that we are all engaged in” (FTI, T2, p. 4). A salient outcome of our research was the description of teacher learning as a function of student feedback. Scott referenced how much he appreciated student feedback on his lessons in order to make changes to his practice, and this was coupled with a strong commitment on his part to reflect on his teaching. This led to learning *with* students, where there was a shared excitement but also a shared uncertainty of what the next steps or directions were in the PBL unit. We described this as being a ‘learner of learners’, where TPL required Scott to be constantly aware of and responsive to student learning needs.

In addition to the themes that surfaced during the analysis of the interview data, two further insights became evident: (1) as co-researchers who were present for the participants’ articulation and meaning-making, we noticed how the interviews externalized the internal process of reflection that was occurring for both participants; and, (2) our role as co-researchers also pointed to the collaborative nature of TPL. While our participants were learning with their colleagues and each other in collaborative meetings, they were also learning by narrating their experiences to us. As co-researchers, we became co-collaborators in the process of the participants’ learning through our questions and prompts during the interviews, thus extending our understanding of TPL.

DISCUSSION

We began this study curious about the experiences of two teachers who were directly involved in the implementation of a curricular innovation — in this case, PBL. Our curiosity arose from previous research examining teachers’ and students’ perceptions of engagement in PBL classrooms. We recognized the salience of teacher learning as an integral element in creating effective learning environments. In conducting this phenomenological study, we gained a deeper understanding of the essence of these teachers’ experiences and gained clarity about the nature of TPL in the context of implementing an innovation. The results further connected to the theory of inquiry-as-stance, revealing to us the centrality of the dialectic between action and thought, and the value of a ground-up, organic process of developing practitioner knowledge. Our study not only expanded our understanding of TPL, it helped to reinforce inquiry-as-stance as a powerful theory of teacher learning that involves a *mindset* that disposes teachers to learn from their practice and become aware of shifts in their identity as teachers. Thus, the following discussion is organized into three sections: what

we learned about TPL from this study; how inquiry as a theoretical framework has been clarified through our participants' experiences; and, how we may apply what we learned to our work as teacher educators in programs designed to prepare pre-service and in-service teachers for such dynamic contexts.

Teachers' Professional Learning

Our learning about TPL was driven by the following initial questions: How do teachers conceptualize their learning as professionals involved in a curricular innovation (in this case, PBL)? What shifts in practice and identity occur? What concepts are central to teachers' professional learning? What does this reveal to us about a stance of inquiry in professional learning? Through participants' voices, this study proposes that TPL involves: a learning mindset, collaboration, learning from professional development, shifts in practice, and liberation. A learning mindset implies that TPL draws largely on intrinsic motivation, or a deep desire to learn about and from one's practice as an educator. Associated with a learning mindset is learning from external structures or motivations such as PD workshops and other teachers, as was the case in this study. Learning as a mindset means that teachers *think* differently about their professional practice: they envision practice not as an object to be learned, but as a source of their learning; and, they regard their professional work as a dynamic and ongoing array of experiences that translate into learning about their practices as educators. A learning mindset also means that teachers learn from their students — they become 'learners of learners' and attend to the ways in which students take up learning in their lessons. TPL requires reflection on one's practice, and this can lead to shifts in identity — the teachers in our study became more confident, felt empowered, and viewed themselves as leaders in this particular innovation. TPL came to include the dimensions of change over time, growth in practice, self-knowledge, and reflection. Collaboration, as another emerging concept of TPL, establishes the social nature of learning as a professional. As this study revealed, it was through collaboration between teachers implementing PBL that collegial relationships, a sense of solidarity, and continual refinement of their practice occurred. Another important dimension of TPL is liberation or a sense of professional freedom. Learning as a professional requires the ability to feel free to try new strategies and approaches, to take risks, and not be constrained by institutional policies or educational structures.

How Has Inquiry-as-Stance Been Clarified for Us?

We come to understand inquiry-as-stance as both an epistemology and axiology of TPL. While the theory of inquiry-as-stance enunciates the dialectic between action and thought evidenced in participants' narratives, this study also reveals how participants valued engaging in this dialectic through interrogating their practice, collaborating with colleagues, and reflecting on student feedback (Cochran-Smith & Lytle, 2011). The participants expressed a sense of professional empowerment

and agency as they reformed their teaching: “I am a lot more confident in the classroom...I am very present, I am in every moment, I’m not sure that was true five years ago” (FTI, T2, pp. 12–13). Inquiry-as-stance, therefore, sets in place the precursors that are necessary to reinvigorate practice: a view of learning that is organic, teacher-driven, action-oriented, and improvement-aimed. Such claims suggest that TPL regards teachers “as activists and generators of knowledge” (Cochran-Smith & Lytle, 2009, p. 135). The merits of grounding TPL in the theory of inquiry-as-stance are that teachers develop a sense of agency around their practice and recognize the potentially positive outcomes that TPL has on the quality of students’ experiences. In professional contexts such as the substantive curricular innovation engaged in by the participants, inquiry-as-stance became a powerful *architecture* for framing their learning.

Implications for In-Service and Pre-Service Teacher Education

Given what our study revealed about the conceptual nature of TPL in a context of innovation, we suggest the following considerations for teachers and teacher educators to help inform their work:

Professional development is effective insofar as the learning is taken up directly and immediately in terms of implementation. While this finding is well established in the research (Avalos, 2011; Britton & Sivia, 2019; Hardy, 2010; Teacher Development Trust, 2015), it bears repeating because it was so central to the experiences of the two participants. TPL was enhanced by the seamless transition from PBL PD workshops offered at the school to teachers implementing such units in their classes.

Teachers could benefit from opportunities to reflect on and critique their vision of education in relation to implementing a curricular innovation. The research (Korthagen & Kessels, 1999; Polizzi & Frick, 2012; Shulman & Shulman, 2004; Zeichner & Liston, 1996) supports the importance of critical reflection for professional growth.

From this study, we recognized that cultivating a disposition where teachers are ‘learners of learners’ would benefit teachers who intend to implement curricular innovations in their classrooms. This may include opportunities for students to provide feedback to their teachers about learning activities, as well as teachers assessing what practices promote student engagement and achievement.

While we know that collaboration is strongly tied to teacher learning (Adams, Momborquette, & Townsend, 2019; Hargreaves & O’Connor, 2018; Sharpe & Nishimura, 2017; Timperley, 2011), this study revealed the significance of collaboration in the face of innovation. Collaboration was perceived to lessen participants’ feelings of isolation as implementors of PBL.

While these points align with several features of effective professional learning (Campbell et al., 2017), added are the components associated with teachers’

identities, dispositions, and beliefs. Thus, our study brings forward knowledge about the nature of TPL from the voices of teachers and extends understanding about inquiry-as-stance as a “worldview, a critical habit of mind, a dynamic and fluid way of knowing and being in the world of educational practice” (Cochran-Smith & Lytle, 2009, p. 120). We assert that inquiry-as-stance is not only foundational to initiating learning, but required to sustain TPL through setting in motion: a learning mindset; shifting practice; a sense of liberation; and professional collaboration, which are all central to TPL. Thus, we can now add these components to Cochran-Smith & Lytle’s (2009) earlier conception of inquiry-as-stance in teacher learning. Furthermore, we suggest that the four components of TPL described in this study are not only conditional to enacting inquiry-as-stance, they may also be necessary in order for teachers to sustain learning through the context of curricular innovations.

What are the implications of this knowledge? For one, we now have a way of articulating TPL and recognizing the importance of providing teachers with the opportunity to collaborate and try new practices. Learning that involves liberation as a key component means that teachers must be given the freedom to experiment in their teaching practice, and to do so without fear of repercussion or reprimand. To be truly liberated as a teacher, as evidenced in this study, one must have the capacity to ‘fail forward’ and navigate these challenges in open and sincere conversations with colleagues. Collaboration, in this sense, is vital to the process. Finally, a learning mindset means that teachers must have the opportunity to learn on their own terms – whether through PD, through their own reflective processes, through dialogue with others, through supportive communities of practice, or all of these in various combinations. TPL requires this learning mindset as a foundation for change and growth.

LIMITATIONS AND QUESTIONS

Could this theorization of TPL occur without a curricular innovation? We suggest not. Did the curricular innovation need to be PBL? Again, we suggest not. The presence of PBL as the curricular innovation in this study required significant unlearning and relearning, an important factor in understanding TPL. However, the conceptual framework of TPL developed from this study is one that we suggest encompasses learning in the context of any curricular innovation. The nature of the specific relationship between TPL and the PBL innovation is not sufficiently explored in this study and warrants further examination beyond the scope of this paper. We also suggest further study is needed on the nature of TPL when innovations are teacher-initiated versus administrator-initiated. As a phenomenological account of learning from only two participants, this study excludes others’ perspectives, such as administrators, students, or colleagues, on TPL at this school.

NOTES

1. After the first year, one of the teachers left the school, and the other switched to a leadership role. The two remaining teachers continued to implement PBL within their own courses and formed new interdisciplinary partnerships.
2. PBL (Buck Institute) involves nine steps that students must go through in order to complete a PBL unit or project.
3. For sake of ease, we have hyphenated inquiry as stance throughout the paper. While Cochran-Smith and Lytle do not use hyphens in their initial text, because we are utilizing this as the theoretical framework for the study and refer to it so often, we added the hyphens to assist readers in their understanding.
4. ITI: Initial Teacher Interview; FTI: Final Teacher Interview; T1: Digital literacy teacher; T2: English teacher.
5. The collaboration meetings involved all four teachers who were teaching the integrated (inter-disciplinary) PBL unit. They met to discuss the processes, successes, and challenges of implementing the unit, and shared resources. For the purposes of this study, we focused our observations and fieldnotes on the two participants in this study.

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AWNEET SIVIA is an Associate Professor in the Teacher Education Department at the University of the Fraser Valley. She teaches courses in social justice, science, and technology education, school reform, classroom research, and educational policy and leadership. She held teaching and leadership positions in K-12 and in post-secondary education systems. Awnet developed and taught in numerous educational programs to support the diverse needs of students, including international education, paraprofessional upgrading, foreign-credentialed teacher education, and graduate certificate and degree programs. Awnet's research interests include science teacher education, social justice education, diversity leadership, self-study in teacher education, teacher learning, and school innovations. awneet.sivia@ufv.ca

VANDY BRITTON is an Associate Professor and former Department Head in the Teacher Education Department at the University of the Fraser Valley. She began her educational career as a high school drama, dance, and English teacher, and has worked in Teacher Education for the past fifteen years. Vandy teaches courses in social justice, Indigenous education, English Language Arts instructional methods, Fine Arts instructional methods, classroom management, and reflective practice. Her research interests include teacher education, teacher learning, social justice and anti-racist education, Indigenous education, and literacy education. vandy.britton@ufv.ca

AWNEET SIVIA est professeure agrégée au département Teacher Education de l'Université de la vallée du Fraser. Elle enseigne des cours sur la justice sociale, l'enseignement des sciences et de la technologie, la réforme scolaire, la recherche de classe et la politique et le leadership en matière d'éducation. Elle a occupé des postes d'enseignante et de leadership de la maternelle à la 12^e année et dans les systèmes d'enseignement postsecondaire. Awnet a développé et enseigné dans de nombreux programmes éducatifs pour répondre aux divers besoins des étudiants, y compris l'éducation internationale, le perfectionnement paraprofessionnel, la formation des enseignants diplômés à l'étranger et les programmes de certificat et de diplôme d'études supérieures. Les intérêts de recherche d'Awnet comprennent la formation des enseignants en sciences, l'éducation à la justice sociale, le leadership en matière de diversité, l'autoapprentissage dans la formation des enseignants, l'apprentissage des enseignants et les innovations scolaires. awneet.sivia@ufv.ca

VANDY BRITTON est professeure agrégée et ancien responsable de département au département de Teacher Education de l'Université de la vallée du Fraser. Elle a commencé sa carrière d'enseignement en tant que professeure de théâtre, de danse et d'anglais au secondaire et a travaillé dans la formation des enseignants au cours des quinze dernières années. Vandy enseigne des cours sur la justice sociale, l'éducation autochtone, les méthodes d'enseignement de English Language Arts, les méthodes d'enseignement des beaux-arts, la gestion de classe et la pratique réflexive. Ses intérêts de recherche comprennent la formation des enseignants, l'apprentissage des enseignants, la justice sociale et l'éducation antiraciste, l'éducation autochtone et l'éducation en littérature. vandy.britton@ufv.ca