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Fostering the Mobilization of Knowledge from Professional Development to the Classroom

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Abstract

This study examined the extent to which professional knowledge, acquired from professional development programs in education, was mobilized in elementary school classrooms. The author investigated the alignment of participants' perceptions and actions with the aims of professional development providers, studied teachers' in-depth experiences of that professional development, and noted the key aspects of professional development that related to knowledge mobilization. The project acquired data from four elementary school teachers employing semi-structured interviews, multiple classroom observations and teacher-generated and published documents. Participants' perceptions of professional development were influenced by the following factors: impact on income, personal/professional growth and professional collaboration. Additionally, their experiences revealed that these factors compete with each other in complex ways to influence the mobilization of professional knowledge.

Keywords

Knowledge mobilization, knowledge translation, knowledge transfer, professional development, continued professional development, teacher learning, professional growth, collaboration, elementary school teachers, teaching

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Chapter 1

1.0. Introduction

This research project examined the mobilization of teachers' professional knowledge from professional development programs to their elementary school classrooms. It employed a Habermasian (1972, 1986) conceptual framework and classified types of professional development programs using Kennedy's (2005) spectrum of professional development models and professional knowledge using Mishra and Kohler's (2006) Technological Pedagogical Content Knowledge (TPCK) framework, which provided an understanding of the mobilization process. Furthermore, this study employed a qualitative approach including semi-structured interviews, classroom observations and the analysis of teacher-generated documents.

1.1. Problem Definition

Prior to this research project, my anecdotal observations of teachers revealed a positive disposition regarding the utility and quality of their professional development experiences. However, in their classrooms, their actions did not appear to consistently align with their views about professional development. In some cases, seemingly unbeknownst to these teachers, their actions belied their description of their programs. Furthermore, a recent budget for the Ontario public education system allocated over $100 million (Ministry of Education, 2016a) toward education programs which include professional development. This raised two practical concerns 1) the potential waste of public resources, and 2) the potential waste of teachers' time.

From an administrative standpoint, considerable resources are needed to design and facilitate professional development programs. At such a high cost, it is imperative these funds are going to worthwhile programs. Nevertheless, the continued interest in professional development by the Ministry of Education, facilitators such as the Elementary Teachers' Federation of Ontario (ETFO), and the participating teachers' showed there was an assumption that these programs are having a positive effect on students. Teachers may deviate from a professional development program's content to fit the specific needs of their classes. However, my interactions with teachers revealed a lack of awareness regarding the misalignment between their perceptions about efficacy and their actions deriving from these programs. Despite these teachers' largely positive reflections about professional development programs, their actions would sometimes contradict their program experiences.

1.2. Definition of Terms

It is important to clarify the terminology that this study employed. First, professional development refers to specific programs that act to introduce and/or enrich teachers' skills and knowledge for classroom application (Kennedy, 2005). Although this clarifies professional development as tangible programs, it is still necessary to distinguish between the definition of skills and knowledge. Despite the intertwined linkage, the definition of skill refers to a practical or technical ability whereas the definition of knowledge refers to a theoretical understanding. These terms are not mutually exclusive and often need to be developed in concert for successful acquisition and application. As a result, professional knowledge was used to define a combination of skills and knowledge acquired and applied from professional development.

Eraut (1994) focused on three contexts in which professional knowledge is acquired, understood and applied. These contexts were academic, institutional discussion of policy and practice, and practice itself. When compared with the defining characteristics of professional knowledge, the academic context and institutional discussion are more aptly connected with the definition of knowledge. The academic context deals with the acquisition and understanding of pedagogical research. It is therefore important to determine which aspects align with the institutional goals of policy and practice. Finally, the practical context refers to application of that knowledge in the classroom environment, which is more closely related to the definition of skill. Thus, both the combination of knowledge and skill and the combination of contexts are integral to the development of professional knowledge.

Professional knowledge is also intrinsically related to professional development and the classroom environment. Yet, this term alone cannot suitably convey the transition of such knowledge from one environment to another. Three terms have typically been employed to explain the movement of knowledge from one environment to another: knowledge translation, knowledge transfer and knowledge management. The key descriptors in each of these terms; translation, transfer and management, offer ways to understand the movement of knowledge. In the historical development of these terms, knowledge translation comes from public health (Canadian Institutes of Health Research, 2016), knowledge transfer from organizational behaviour (Argote & Ingram, 2000; Osterloh & Frey, 2000) and knowledge management from business administration (Alavi & Leidner, 2001; Gold, Malhotra & Segars, 2001).

Knowledge transfer and knowledge management are closely related and revolve around the movement of information within an organization rather than the dissemination of information to an external audience. Knowledge translation refers to the synthesis, dissemination and exchange of knowledge to strengthen the health system as a whole (Canadian Institutes of Health Research, 2016). Together these definitions represent a strong but, incomplete characterization of the movement of professional knowledge.

A more comprehensive definition has been developed by the Social Sciences and Humanities Research Council (SSHRC) as an extension of knowledge transfer, knowledge management and knowledge translation. The term knowledge mobilization refers to "the flow of knowledge among multiple agents leading to intellectual, social and/or economic impact" (SSHRC, 2007). Since knowledge mobilization represents a more inclusive understanding of the movement of knowledge and has been developed in the educational literature (see Cooper, Levin & Campbell, 2009; Fenwick & Farrell, 2011), it is well suited as the operant term for this study.

1.3. Personal Context

Before describing the structure of this study and why this problem is important to me, it is important to reflect on my own experiences so my interpretations and biases can be better understood. The occupation of teaching has always piqued my interest and I decided the best way for me to develop an understanding of the profession was to immerse myself in the classroom environment. Thus, for the better part of a decade, I have spent a considerable amount of time volunteering in elementary school classrooms which included a great deal of observation and inquiry. My motivation for volunteering also came from the personal satisfaction I feel from helping students.

The teachers with whom I volunteered were extremely generous with their time. After many classes we had discussions about being a teacher and they would answer my questions on a wide range of topics. These conversations would often involve the topic of professional development. They sometimes made direct reference to courses they had taken, how something learned in a course was used or why something was omitted from the classroom environment. The reasons varied but, these teachers were always forthcoming and I felt confident that their explanations were genuine.

My personal experience with professional development has been related to my employment with a major beverage corporation outside the education system. It has largely been comprised of mandatory workshops revolving around training and standards. Usually these programs were designed to be facilitated without interaction from participants and simply required a signature at the conclusion for accreditation. Rarely were participants required to demonstrate the knowledge and skills they had learned. Although these programs conveyed some useful practical information, the accreditation appeared more valuable than participant interest. As a result, my personal experience with professional development outside the education system ranged from indifferent to negative.

These two experiences could not be more different. My personal experience with professional development, outside the education system, would generously be described as tepid. Yet, the teachers with whom I discussed professional development appeared to have a favourable disposition toward professional development. I am not so naïve to think all teachers enjoy professional development to the same extent. However, these teachers' experiences were described with conviction and enthusiasm, something I would struggle

to convey about my own experience. My personal experience has led me to an unfavourable disposition toward professional development in general, while my opinions of professional development within education are positive.

Once this contradiction became apparent, I became interested in researching the phenomena of professional development. I wanted to know what motivates teachers to engage in professional development, why their experiences are predominately positive and most importantly, I want to determine where and how the perceptions of professional development differ from their actions. To me, an argument can be made that the misalignment of perception and actions negatively affects the mobilization of knowledge from professional development programs to the classroom.

1.4. Research Question

My study work toward the elucidation of the factors affecting the mobilization of professional knowledge between professional development programs and elementary school classrooms.

In Ontario professional development programs are supported by individual schools, school boards, education systems and teachers' unions. Many professional development programs aim to improve teaching, teachers, and the education system in some way. Despite the considerable resources involved in professional development, many programs focus on disseminating practical skills or theoretical knowledge rather than on the mobilization of professional knowledge (ETFO, 2015). Therefore, this study asked the question: In what ways does professional knowledge acquired in professional

development programs mobilize to elementary school classrooms? To answer this question, several sub-questions were also investigated including:

How do participants' perceptions of the various organization who facilitate professional development affect mobilization?

How do personal opinions regarding professional development affect mobilization?

How does the duration of a professional development program affect mobilization?

How does the professional development model used affect the efficacy of mobilization?

How do participants' enjoyment of a professional development program affect mobilization?

Chapter 2

2.0. Literature Review

The review begins with an examination of the literature pertaining to acquisition of professional knowledge. This inquiry is followed by the literature surrounding professional development. Since professional development is such a broad topic, two groups of literature are investigated. The literature surrounding the efficacy of various models of professional development is explored first. Then the literature pertaining specifically to professional development that incorporates pedagogical content knowledge and technological pedagogical content knowledge is examined. Finally, the literature related to knowledge mobilization is investigated.

2.1. Search Criteria

I employed a pearl harvesting search strategy (Sandieson, 2006) to determine the most appropriate pieces of literature. Pearl harvesting is a systematic approach to information retrieval, in which, search filters are found and validated to improve the likelihood of finding unique and relevant articles. I created a list of synonyms for professional development that emphasized teaching and teachers. In total, I selected ten search terms for their ability to generate unique and relevant articles. I employed the same strategy for knowledge mobilization resulting in a list of four terms. I applied these two synonym rings to ProQuest, JSTOR, Education Resources Information Center (ERIC) and Google Scholar. I entered the synonym rings into the databases separately and then in concert to develop a comprehensive list of articles. Once a list of sources had be created, I investigated the literature reviews and references of the articles to determine if there were any other relevant articles.

2.2. Professional Knowledge Acquisition

The synthesis of practical skills and theoretical knowledge culminates in the development of professional knowledge. However, the acquisition of professional knowledge is a process that is not based solely on content. It also includes relatable and accurate depiction of how professional knowledge can be applied to a personal context. Accordingly, the scope of professional development makes it difficult to include the comprehensive content and relatable experience required for the acquisition of professional knowledge. Instead, many professional development programs focus on either the acquisition of skills or knowledge. This 'either-or' approach can benefit participants who are looking to acquire or enrich a specific aspect of professional knowledge but, impedes the reciprocity upon which well-rounded professional knowledge is based. Moreover, there are credible concerns about the validity of these 'either-or' techniques (Clandinin & Connelly 1995; Dall'Alba & Sandberg, 2006; Sturko & Holyoake, 2009).

Dreyfus and Dreyfus (1986) proposed a stepwise model of skill acquisition in which a student will pass through five distinct stages of increasing skill levels. However, Dall'Alba and Sandberg (2006) investigated the underlying assumption of stepwise skill acquisition in their synthesis of professional development literature. They challenged stepwise models of skill acquisition by asserting that articulation of rules does not take place at advanced skill levels. Ultimately, Dall'Alba and Sandberg (2006) concluded that any stepwise model, including that of Dreyfus and Dreyfus (1986), overlooks the process of practice. As a result, they recommended an alternative model of skill development that intertwines skill progression, experience and the understanding of practice. This

recommendation suggests there is more to skill acquisition than the cliché ‘practice makes perfect’. More importantly, the recommendation values the combination of content, knowledge, practice and experience when acquiring a skill which lends to the definition of professional knowledge.

The ‘either-or’ approach to professional knowledge is also challenged by Sturko and Holyoke (2009), who investigated the strategies of knowledge integration of teachers who participated in the same professional development program. Rather than skill acquisition, the goal was to enrich the level of academic knowledge in technical classrooms through the acquisition of new integration strategies. The results suggested teachers were occasionally employing integration strategies, despite the belief that integration strategies would benefit student achievement. From this, Sturko and Holyoke (2009) asserted that teachers’ perceptions about knowledge integration are disconnected from their actions regarding integration strategies. Even though teachers understand the knowledge being acquired, they were unable to integrate it with any consistency. The disconnection observed by Sturko and Holyoke (2009) is the relevant practice integral to skill acquisition.

In the results of both Dall’Alba and Sandberg (2006) and Sturko and Holyoke (2009), professional development was the vehicle for teachers to acquire professional knowledge. Additionally, these studies highlighted the inability of participants to reach their full potential as designed by the program. However, the design itself was the limiting factor, since these professional development programs focused on independent aspects of professional knowledge rather than their development in concert. Yet, the development of professional knowledge is not as simple as including both skill and knowledge acquisition

in professional development. Clandinin and Connelly (1995) explored professional knowledge through a series of case studies. These studies demonstrated a complex intertwining of knowing and knowledge, and skills and knowledge across teachers' personal and professional life which provide a myriad of dilemmas throughout their development. As a result, they offered the professional knowledge landscape as an abstract characterization for these competing notions (Clandinin & Connelly, 1995).

2.3. Professional Development

A driving force behind many research studies on professional development is the pursuit of effective themes. Grierson and Gallagher's (2009) case study explored the experiences of elementary school teachers engaged in a professional development program that explicitly demonstrated effective applications. The primary theme associated with effective change was the representativeness of the vicarious experiences to a local context. Additional themes that foster effective change included the mentoring ability of the demonstration teacher and on-going support. The results suggested there is merit behind the contention that professional development has the potential to change teacher's ability and pedagogy. Consequently, they argued organizations must choose to foster programs that accurately depict the local context. This sentiment is furthered by Linn, Gill, Sherman, Vaughn and Mixon (2010) who asserted that implementation of a large scale system for professional development programs can belie the intended outcomes. They contended that professional development must be tailored to the needs of individual schools and ultimately to individual students.

In other studies, a community of practice was the model of professional development employed. Lave and Wenger (1991) defined a community of practice as an established

group in which, new participants work toward an understanding of knowledge and skills by moving from peripheral participation to full participation as they increasingly engage in the sociocultural practice of a community. Hartas, Lindsay, Arweck and Cullen (2009) suggested that professional development models must incorporate good professional practice and foster a community of learning to sustain teachers' motivation for application in their professional context. Similarly, Keay and Lloyd (2009) suggested the key to continuing professional development is to allow professional development programs to develop through iterations of self-initiated and collaborative adaptations based on participant reflection. Additionally, they noted leadership must be willing to allow these changes to occur democratically (Keay & Lloyd, 2009). In turn, such programs will develop a community of practice, facilitate the alignment of professional opportunities and provide long term improvement (Lave & Wenger, 1991). However, they recommended further research to sufficiently address the practical complexities that occur in the planning of professional development programs.

In another study, Frost, Akmal and Kingrey (2010) suggested that restrictive timeframes impede long-term development but the practical complexities of inter-organizational program development can be met through a sense of community. However, they advised participants should focus on community development from the outset of the process or "the risk of conflict, member disengagement and collaborative inertia is increased" (p. 593). Hargreaves et al. (2013) also investigated the effects of a community of practice in continuing professional development. In contrast to Frost et al. (2010), Hargreaves et al. (2013) claimed that planning communities of practice is not sufficient to benefit teachers.

The autonomy of teacher participation is the key to developing successful communities of practice (Lave & Wenger, 1991).

In a comparable study, Smith (2014) focused on the influence of long-term professional development programs. Much like Keay and Lloyd (2014), he noted that ongoing and collaborative programing is integral to developing a community of practice. The results suggested a sustained, collaborative professional development program is beneficial to the confidence of teachers and provides the foundation for enduring changes in pedagogy (Smith, 2014).

A characteristic that these studies all have in common is their focus on long-term or continued professional development (Frost et al. 2010; Hargreaves et al. 2013; Keay & Lloyd, 2014; Smith, 2014). However, there are also studies (Lyndon & King, 2009; Lauer, Christopher, Firpo-Tripplett & Buchting, 2014) that suggest short-term professional development programs can effectively produce long-term results. Lyndon and King (2009) investigated the effects on teachers who participated in a 90 minute workshops on specialized content for an upcoming unit. Although the results showed professional development activities were incorporated into their teaching programs on a long-term basis, they hesitated to generalize their results beyond the pedagogy of the specialized content. A comprehensive review of short-term professional development programs revealed ten design features that positively impact effectiveness (Lauer et al., 2014). The influential design features included experimental, quasi-experimental and descriptive research designs and professional development programs less than 30 hours in duration. The results suggested clear communication of learning objectives, addressing

participant needs, demonstrations and opportunity to practice are important design features but, follow-up support is the strongest indicator of long term positive impact.

2.4. Technological Pedagogical Content Knowledge

The PCK framework (Shulman, 1987) conceptualized pedagogical knowledge and content knowledge as separate but related factors that can enrich professional knowledge. Only when both types of knowledge are considered can truly effective teaching occur. An exemplary study by Goodnough and Hung (2009) offered the PCK framework to evaluate elementary teachers' professional knowledge of a problem-based learning approach in a science-oriented professional development program. The results showed the interconnectedness of PCK can be effectively addressed by professional development through problem-based learning.

Contemporary literature is heavily focused on professional development programs that include a technological element. The rapidity with which technology advances has resulted in debate over whether program design and resources should be focused on content specific software (Dalgarno & Colgan, 2007) or generalized information and communication technologies (ICT) (Chai, Koh, Tsai & Tan, 2011; Kabakci, Odabasi & Kilcer, 2010). Kabakci et al. (2010) examined the theoretical potential of one-to-one mentoring for professional development in generalized ICT. In this theoretical investigation, the broadness of ICT was countered with the suggestion of direct, personally tailored mentoring. In a practical study of pre-service teachers, Chai et al. (2011) investigated professional development of generalized ICT in large classrooms. The results of both pre-study and post-study showed promise but, they found the results

were eventually tempered over time suggesting continued professional development was needed.

In contrast, Dalgarno and Colgan (2007) explored the effects of a specific technology concentrated on an online mathematics community. This community provided an environment where formal professional development was supplemented by ideas and activities resulting in an informal professional development. The fusion of formal and informal professional development within a specific online environment allowed mathematics teachers to address their self-reported needs while advancing their PCK (Dalgarno & Colgan, 2007). Similarly, Laferrière, Lamon and Chan (2006) explored prominent e-learning trends in teacher education and professional development. They identified four broad categories for these trends: the renewal of online hubs and courses, the increase in web supported classrooms, the increase in online communities, and knowledge creation in these online communities. Essentially, e-learning is any type of learning that involves electronic media. Under this umbrella term, an online hub is the connection point between multiple points in a network. This hub can be a source of a specific courses for students to participate or a community in which multiple participants connect to communicate about a specific topic. Within the scope of professional development, the creation of online hubs acts as a foundation for the rest of these trends to develop. The online hubs can serve as the platform for professional development courses and these communities provide a supportive environment where the professional knowledge can be created. Accordingly, it shows how technology can be a valuable tool to compliment the PCK model. A central theme that all of these studies (Kabakci et al., 2010; Chai et al., 2011; Dalgarno & Colgan, 2007; Laferrière et al., 2006) shared was the

recognition that technology has a major influence in the personal, social, and educational context.

Although some studies (Kabakci et al., 2010; Chai et al., 2011; Dalgarno & Colgan, 2007; Laferrière et al., 2006) use technology in professional development to augment the PCK model, the aim of Polly (2011) was to ingrain technology into student learning through mathematics professional development. Rather than offering technology as a medium for professional development, this study investigated the development of technology as a medium for student learning. This change shifted the focus from the PCK framework (Shulman, 1987) to the TPCK framework (Mishra & Kohler, 2006). Polly's (2011) study showed promise in its application of technological knowledge within the scope of the TPCK framework. However, he noted the integration of technology can overshadow other pedagogies during development and thus, technology-rich activities require further support during this period.

Despite increasing support for TPCK as a theoretical framework and analytical tool, studies such as Archambault and Bennett (2010) and Graham (2011) challenged its efficacy. Archambault and Bennett (2010) examined the transfer of TPCK from theory to practice through a factor analysis of survey responses. Their results showed the boundaries between domains is not clear and measuring the effectiveness of the domains in the classroom proves equally complicated. Rather than discrediting the TPCK framework as a whole, they suggested the framework has organizational value but, needs further development to tease apart the boundary domains for classroom application.

This sentiment was echoed by Graham (2011) who examined the TPCK framework from a theoretical perspective. He noted there are disputes over the definition of constructs which mirrored Archambault and Bennett's (2010) concern regarding boundary definition. This boundary dispute is especially prevalent when integrating technology and thus, the interaction between domains remains a major concern (Graham, 2011). However, like Archambault and Bennett (2010), Graham (2011) concluded there was potential to overcome these challenges if TPCK was to remain a useful theoretical framework for education.

2.5. Knowledge Mobilization

Even when the search criteria is narrowed for relevance, the literature regarding professional development is comprehensive. In contrast, the literature surrounding knowledge mobilization is relatively scarce. The conceptualization of knowledge mobilization within academic circles is largely credited to the Social Science and Humanities Research Council of Canada (SSHRC) which broadly defines knowledge mobilization as the movement of knowledge into active service (SSHRC, 2008). However, the SSHRC's *Knowledge Mobilization Strategy* points out the term knowledge mobilization goes back more than a decade and that formal conceptualizations were developed from well-established, multi-disciplinary concepts like knowledge extension, knowledge transfer and knowledge translation (SSHRC, 2007).

Much of the early research on knowledge mobilization placed emphasis on the individual and how to mobilize personal background knowledge for the purposes of effective pedagogy (Bischoff & Golden, 2003). As research developed, the focus on knowledge mobilization recognized the crucial role of technology (Buzza et al., 2006; Cooper et al.,

2009; Robertson & Thomson, 2011). Buzza et al. (2006) developed online learning modules for multi-disciplinary professional development. The online learning modules are independent components of an online community which contain materials related to a specific discipline. These online learning modules were designed to facilitate communication, and deliver professional development to the targeted practitioners. The primary targets for these modules were optometry professionals, human resources professionals, and elementary school teachers. Although the content of these modules differed based on their target audience, the role of technology is central to the development of a community of collaboration. They suggested these modules showed merit as a generalizable and flexible model of professional development with further practical application requiring administrative support. Similarly, Cooper et al. (2009) investigated the importance of evidence-based policy in provincial, national and international efforts to mobilize knowledge. In order to optimize knowledge mobilization, the study suggested educational and research organizations need to consolidate research, strengthen research tools and increase resource capacity. Most importantly, the research knowledge that is developed and consolidated must be actively mobilized by these research and educational organizations.

Although research recognizes technology as a key factor in knowledge mobilization, the types of organizations facilitating knowledge mobilization vary by study. Many research studies focus on a specific type of organization as the primary intermediary for mobilizing knowledge. This includes post-secondary institutions (Hynie, Jensen, Johnny, Wedlock & Phipps, 2011; Sá, Li & Faubert, 2010), school leadership (Bain & Swan, 2011; Muth, Bellamy, Fulmer & Murphy, 2006) and government organizations

(Robertson & Thomson, 2011). At the post-secondary level, Sá, Li and Faubert's (2010) exploratory study showed there was recognition by academic leaders for the value of knowledge mobilization in domestic and international post-secondary institutions. However, they noted that systematic constraints such as budgets, timing and implementation strategies represented the main barriers. Similarly, Hynie et al. (2011) discussed the post-secondary effort toward mobilizing knowledge for community institutions from the perspective of graduate students acting as intermediaries. The graduate students felt their roles as intermediaries for community partners gave them a deeper understanding of the theoretical knowledge they were mobilizing. Additionally, the graduate students noted there was some difficulty in establishing community partnerships. However, once the relationship with a community partner had been established, they were able to foster and maintain their relationship. Much like Sá, Li and Faubert, (2010) the graduate students attribute these difficulties to systematic constraints pertaining to budgeting, amount of time and implementation strategies (Hynie et al., 2011).

At the secondary school level, Muth et al. (2006) outlined the steps for school leadership to conduct a case study on their school, which can provide valuable feedback for stakeholders. Additionally, they suggested this comprehensive style of case study can be used to support professional development and research when integrated into a knowledge management system. However, complications can arise if school leadership is unable to complete the case study in the prescribed time frame. Furthermore, they suggested this could be done for all schools within a district or larger education system. However, they did not offer a clear route to an integrated knowledge management system that would

accomplish this goal. Bain and Swan (2011) offered a solution to this concern with a three stage mechanism that connects solution mapping, component building and design integration by incorporating professional knowledge in an online set of tools to develop targeted feedback. This knowledge management system differed from the Muth et al. (2006) approach by limiting the scope of school reform to a single school. If this reform proved successful, the online set of tools could be expanded to other schools. The potential effect could be a large scale reform that is independently implemented.

For research placing government organization as the primary intermediaries, Robertson and Thomson (2011) critiqued the lack of a federal health education initiative. Although they recognized individual provinces have jurisdiction over the curriculum, they suggested the jurisdictional barriers can be addressed and mitigated using digital technology as a medium for knowledge mobilization.

The challenges that inevitably arose pointed to multiple organizations working toward the same goal without clear communication with one another. That goal was to determine the most constructive way to move knowledge into active service for the broadest possible common good (SSHRC, 2008). To that end, Cooper (2013) investigated the connection of research brokering organizations across multiple disciplines. She delved into educational research brokering organizations by cataloguing and typifying the Canadian context. In doing so, Cooper (2013) identified the lack of conceptual consensus within the minimal volume of contemporary empirical research. However, the work of Tuters, Read, Carr-Harris, Anwar and Levin, (2012) showed there are credible efforts in progress to combat these challenges. Tuters et al. (2012) are developing knowledge mobilization in Ontario education stakeholders through an online hub of education research summaries. Several

entities are involved in the development of this program including the Knowledge Network of Applied Education Research, the Ontario Education Research Exchange, the Ontario Institute of Studies in Education and additional funding from the Ministry of Education. Despite the current progress several challenges have already been identified, most notably the technical challenges that plagued the original launch (Tuters et al., 2012). Nevertheless, this work serves as the foundation for a provincial network of knowledge mobilization.

The literature regarding knowledge mobilization predominantly falls into one of three areas: definition, creation or addition. As the definition of knowledge mobilization has become more consistent, the focus has shifted toward creating or altering the vehicles of mobilization. Moreover, the capacity of technology to increase the reach of knowledge mobilization has pointed research toward online hubs of information. The popularity of using online hubs as the vehicle for knowledge mobilization has pushed similar research using professional development programs to the periphery. Even when professional development is the goal of the online hub, the online hub is seen as the vehicle of knowledge mobilization. As a result, this research study will specifically focus on professional development programs as the vehicle for knowledge mobilization.

Chapter 3

3.0. Research Framework

I employed a Habermasian (1972, 1984) conceptual frame based on communicative action and knowledge-constitutive interests. Additionally, my analytic frame was based on Kennedy's (2005) spectrum of professional development in conjunction with Mishra and Koehler's (2006) notion of technical pedagogical content knowledge. These lenses provided theoretical soundness and analytical coherence. The following sections explore my reasoning for selecting these frameworks as well as a description of how they informed my research.

3.1. Theoretical Framework

I employed a descriptive lens for this study resting on the theory of communicative action and knowledge-constitutive interests (Habermas, 1972, 1984). The educational context and more specifically professional development are inherently social activities that have significance to the participants. Communicative action can be understood as the interaction of multiple subjects working together through verbal or non-verbal means to reach a collective understanding of a situation. This understanding is developed through reasoned argument, negotiation, cooperation and compromise in order to result in a consensus (Habermas, 1984). The notion of professional development and knowledge mobilization captured communicative action in that, multiple actors work together through various media and models toward the mobilization of knowledge. Investigation of this interaction also requires an understanding of how the interests and actions of the subjects are related. Accordingly, Habermas' (1972) categorization of knowledge-constitutive interests and the associated research processes provide this understanding by

unpacking the various elements of knowledge and their relationship to human interests and actions. Habermas (1972) proposed three knowledge-constitutive interests 1) Technical, 2) Practical, and 3) Emancipatory. Furthermore, he connected each these knowledge-constitutive interests to various domains of research that are most apt for that interest.

The technical domain of knowledge is concerned with prediction and control through an emphasis on empirical measurement and rules. This domain is similar to a positivist approach to research which contends that observation and measurement are the key to knowledge and research. If we look to the field of behavioural psychology, proponents such as B.F. Skinner (1965) and John Watson (1913) fit comfortably within the realm of positivism. Positivism and the technical domain both favour quantitative methodologies relying on hypothesis testing, experimentation and evaluation (Cohen, Manion & Morrison, 2011). However, my research questions are rooted in describing the relationship between professional development and knowledge mobilization not empirically testing or evaluating professional development or participants' teaching. Accordingly, I did not employ the technical domain because it was not well suited as the theoretical foundation.

The practical domain moves further away from positivism and is characterized by understanding and interpretation. Similar to hermeneutics, which focuses on the perspective of participants to explain situations, the practical domain considers the personal and social context. As a result, the practical domain lends itself to naturalistic, phenomenological and other qualitative approaches. My research questions are framed around the description, interpretation and understanding of the relationship between

professional development and knowledge mobilization from the perspective of participants. Additionally, I was interested in the connection between the participants' opinions and actions rather than shifting their behaviour. As a result, I chose the practical domain as the most useful knowledge-constitutive interest.

Lastly, the emancipatory domain is action based and is focused on critically oriented sciences (Habermas, 1972) with the goal being to uncover and critique unjust power structures while promoting social freedom. As a research process, it values the freedom of subjects which lends itself to methodologies such as ideology critiques (Cohen, Manion & Morrison, 2011). My research questions are framed to describe the relationship between professional development and knowledge mobilization, not as a critique of professional development or teaching ability. As a result, the emancipatory domain does not provide the most useful foundation for the theoretical framework.

Although there is some overlap between these domains, when employing a research framework, it is important for clarity to consider these domains as mutually exclusive. My research questions are grounded in the description and understanding of the relationship between professional development and knowledge mobilization. Given the focus on evaluation within the technical domain and the critical lens of the emancipatory domain, neither presented a good fit for the theoretical framework. However, the practical domain focused on understanding and interpretation while also considering the important role of the personal and social context. Accordingly, based on the similarity between the practical domain and my research questions, I chose to frame my study within the practical domain.

3.2. Analytical Framework

Despite the importance of situating my study within the practical domain, it was also imperative that I employ an analytical framework to connect knowledge mobilization to professional development. As a result, I analyzed both professional development and knowledge to provide an understanding of knowledge mobilization. The foundation for analysis was to accurately categorize the data that was collected. Due to the amount and variety of data, I developed a rigorous framework that could account for the assortment of data collected. Accordingly, I selected two separate classification models for their ability to accomplish this goal. However, since professional development and knowledge are intrinsically related, the classification models needed to be compatible with one another to provide one all-encompassing framework.

3.2.1. Classification of Professional Development Models

One of the foundations for the analytic framework was the classification of professional development programs experienced by the participants. Many studies (Guskey, 1999; Shaha, Lewis, O'Donnell & Brown., 2004; Mitchem, Wells & Wells, 2003) have developed comprehensive models of professional development. These models were designed to evaluate the effectiveness of professional development programs and therefore, are better suited for quantitative studies. Although they provide a strong framework for evaluating professional development, responding to the research questions in my study required a strong descriptive framework.

Another common theme in professional development studies is determining the most effective characteristics of professional development programs (Abdall-Haqq, 1995; Birman, Desimone, Porter & Garet, 2000; Putnam & Borko, 1997; Wilson & Berne,

1999). These studies developed helpful lists of characteristics which are effective in professional development. However, these lists of effective characteristics often only have minor overlap and are generally developed from a multitude of professional development models. Although these lists are useful, their simplification of professional development downplays the value and reality of variety.

In contrast to the models offered, Kennedy (2005) provided a classification model for professional development that included a spectrum of models of professional development. The classification model lists the key characteristics associated with each individual model on the spectrum to distinguish them from one another. In relation to this study, classifying professional development programs was necessary given the potential variance in program structure. Additionally, Kennedy (2005) noted that the professional development spectrum is descriptive rather than evaluative. Therefore, the utility of a professional development program is not tied to specific characteristic or its location on the spectrum. This distinction is important since the focus of this study is description and understanding rather than evaluation. As a result, Kennedy's (2005) professional development spectrum is better suited for a study framed on understanding and interpretation.

In this study I employed Kennedy's (2005) spectrum of professional development models as my classification model for the professional development programs in which my participants had engaged. The spectrum consists of nine professional development models sectioned into three clusters: transmission, transitional, and transformative (Figure 1). These clusters are categorized based on their purpose, capacity, and level of professional autonomy.

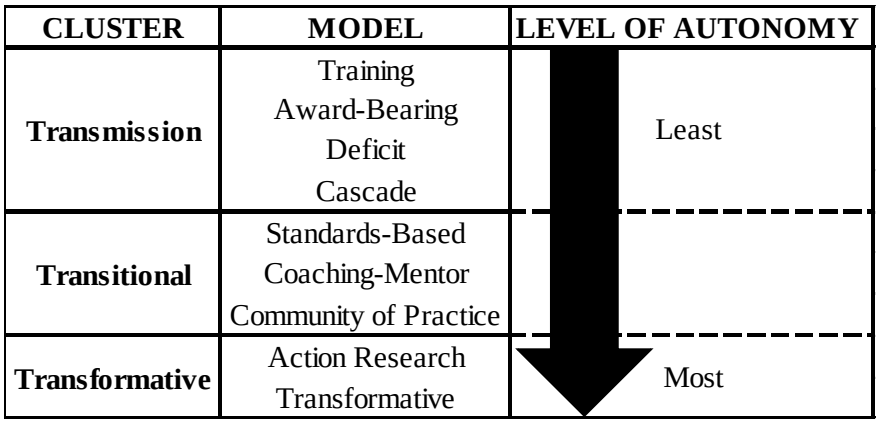

Figure 1. Classification spectrum of professional development models. Adapted from Kennedy (2005)

The function of the transmission cluster of professional development programs is to prepare or reform teacher practice (Kennedy, 2005). The types of programs within this cluster include the training model, award-bearing model, deficit model and cascade model. In this cluster of models, the information is presented to teachers with the expectation it will be mobilized to the classroom. The training model is the basic format of the transmission cluster with the award-bearing model offering additional incentive for teachers to participate. The deficit model is used to address a real or perceived weakness in the pedagogy being employed, whereas, the cascade model is similar to the training model with the added expectation that teachers will subsequently pass the information on to colleagues.

The transitional cluster offers the standards-based model, the coaching/mentoring model and the community of practice model. The models within this cluster can be offered to develop pedagogy similar to the transmission cluster. However, the models can also be applied to shift policy and practice similar to the transformative cluster. The standards-based model relies on evidence-based standards to obtain demonstrable change in practice. Although the capacity to provide a common language for wider implementation is the intention, attempts at standardization on a massive scale, like the programs offered by *No Child Left Behind* (NCLB, 2002) and the *Education Quality and Accountability Office* (EQAO, 2016), have faced criticism because test results affect teacher and school performance appraisals. The intention to provide a common language on a large scale when tied to performance appraisal limits the pedagogical narrative, resulting in a system that values teaching to the test. The coaching/mentoring model of professional development can offer a wide range of content to those involved but, the one-on-one relationship is the integral feature. In the community of practice model the key characteristics include the constantly changing forms of mutual engagement and accountability among participants resulting in the development of pedagogy. Based on the fluidity of implementation and content, the transitional cluster is in the middle of the professional development spectrum.

The transformative cluster of models include the action research model and the transformative model (Kennedy, 2005). The purpose of the models within this cluster is rooted in supporting, contributing to, or shifting policy and practice. Action research gives the participants the opportunity to become researchers and tailor their investigation to their specific needs and context. As the name suggests, the transformative model

focuses on the practices involved in transforming pedagogical practice. However, the transformative model involves a combination of practices and conditions and therefore can only be tenuously defined (Kennedy, 2005).

Beyond the clustering of related models, the spectrum offers an alternative categorization of professional development models. Moving through the clusters of professional development models from transmission, to transitional and finally transformative, the capacity for professional autonomy increases. As a result, the participants in a transformative model will have greater control over the boundaries of their professional development program and subsequently the level of knowledge mobilization.

Given the potential variance in program structure, the importance of a strong and flexible classification model is palpable. However, characterizing the model type, purpose and level of autonomy is merely the initial step since, knowledge mobilization is also key to this study. Therefore, a framework for classifying the type of knowledge being mobilized must also be developed.

3.2.2. Classification of Knowledge

With my selection of Kennedy's (2005) classification model, a strong choice for classifying teachers' practical knowledge was Shulman's (1987) pedagogical content knowledge (PCK) model. His model connected content knowledge (CK) and pedagogical knowledge (PK) for deeper understanding and the ability to transfer knowledge to a local context. Content knowledge is simply the subject matter, whereas, pedagogical knowledge is related to the methods of teaching, learning and the overarching education value. Shulman (1987) asserted that when these fundamental types of knowledge (PK, CK) are individually emphasized, the potential for knowledge mobilization is decreased.

The intertwining of these fundamental types of knowledge results in pedagogical content knowledge (PCK). PCK refers to the application of the most suitable pedagogical knowledge to the specific content knowledge that is being taught.

Although PCK was an extremely useful model for classifying knowledge, the ingress of technology within the education system over the past three decades made it imperative to find a model that reflected this change. Mishra and Koehler's (2006) Technological Pedagogical Content Knowledge (TPCK) model expanded upon Shulman's (1987) PCK by including technological knowledge within their framework. This provides additional flexibility which allows the categorization of more types of knowledge while maintaining a deep understanding of knowledge being mobilized.

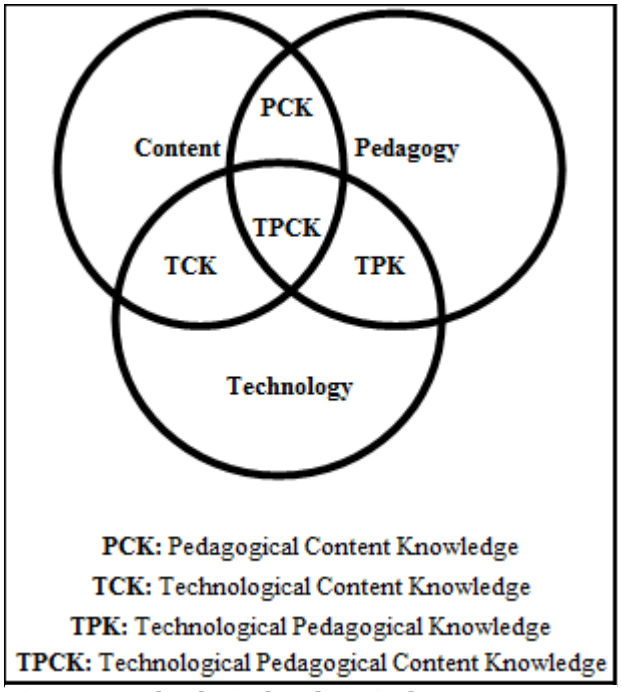

Figure 2. Technological Pedagogical Content Knowledge Framework. Adapted from Mishra & Koehler (2006)

Moreover, the inclusion of PCK within the TPCK model allowed Mishra and Koehler's (2006) model to be utilized when technology is peripheral, mobilized after the fact or not included at all. They added technological knowledge (TK) which addressed the influence that technology plays in the educational context. This knowledge represents the skills required to operate standard technologies (pens, books, white-boards) or advanced technologies (overhead projector, SMART boards, internet search engines). The defining feature of technological knowledge is a rudimentary understanding of how the technology can be used. Together PK, CK, and TK make up the technological pedagogical content knowledge model (Mishra & Koehler, 2006). Furthermore, technological pedagogical content knowledge (TPCK) pairs the fundamental factors into technological content knowledge, technological pedagogical knowledge, and pedagogical content knowledge.

Technological content knowledge (TCK) offers a bilateral relationship between technology and content. Commonly, software products offer different ways of representing content for additional and deeper mobilization. Technological pedagogical knowledge (TPK) relates to the awareness, capability and pedagogical applicability of various technologies. In many post-secondary institutions interest in TPK has resulted in an increase in online lectures, assignments, discussion boards and grading (Mishra & Koehler, 2006). The last pairing in the TPCK model maintains Shulman's (1987) definition of PCK. A conceptualization of the TPCK model as a three circle Venn diagram reveals the three tiers of inter-connections that characterize teacher knowledge. This culminates with TPCK, which goes beyond the fundamental factors and mid-tiered pairings to form an emergent form of knowledge that requires ongoing development of these subtle and complex relationships. As a result, I chose to use Mishra and Koehler's

(2006) TPCK model to characterize the type of knowledge being mobilized from the professional development experience.

When Mishra and Koehler's (2006) TPCK model is offered in conjunction with Kennedy's (2005) classification model, they provide a strong, yet flexible framework for analysing the professional development program and knowledge therein to give a clear picture of the phenomena of knowledge mobilization.

3.3. Summary

In sum, the theoretical framework combines the practical domain of the theory of communicative action and knowledge-constitutive interests (Habermas, 1972, 1984) which together underpin the descriptive lens that this study follows. Thus, I established a qualitative methodology that provided insight into the phenomenon of knowledge mobilization from the professional development program to the elementary school classroom. From this goal came the analytic framework which facilitated the collection and organization of data. Participants' professional development experience was classified by model, purpose, and level of autonomy using Kennedy's (2005) spectrum of models. The goal of professional development programs is to disseminate professional knowledge to be used in the classroom. As a result, the TPCK framework (Mishra & Koehler, 2006) was used to characterize the type of knowledge that was being mobilized. In the following chapter I will discuss the collection of data based on the research framework that has just been described.

Chapter 4

4.0. Methodology

An important component in making sense of any research project is to understand the methodology and methods that underpin the results and analysis. In this chapter, I will describe how data were collected and why the methods were selected. I will also describe how the methods must work in concert to provide the best opportunity to answer the research questions I have posed.

Based on my research questions and research framework I chose a qualitative methodology and collected data from multiple participants and in multiple forms. In qualitative studies, collecting an adequate amount of data is challenging. There needs to be a sufficient amount of data to derive patterns of understanding. At the same time, the richness and depth of the data is also necessary to make sense of the understanding.

I selected three steps of data collection to provide triangulation. Triangulation is the combination of multiple data sources to provide stronger evidence for connections and conclusions (Denzin, 1970). In the first step, I conducted semi-structured interviews in which participants described their professional development experience. I followed the interviews with classroom observations which compared the participants' perceptions and opinions of professional development to their actions. To acclimate the participant and students to my presence in the classroom, I decided to conduct at least two 'faux' observations in which I took notes but, they had no analytic consequence. These were followed by four classroom observations in which I recorded notes for analysis. Finally, I

collected teacher-generated documents and performed a documentary analysis to triangulate the alignment of perceptions, opinions and actions.

4.1. Participants

I included four participants who were full time permanent-contract elementary school teachers that provided the opportunity to collect data from different perspectives. Since gender was not a differentiating factor for the results of my study, I gave each participant a gender-neutral pseudonym including: Alex, Pat, Taylor and Jesse. My decision to limit the study to four participants was a practical one based on balancing the quantity and quality of data collected. Moreover, the four participants produced a substantial amount of data without compromising my ability to derive meaningful patterns.

Table 1. Participants Demographics and Memorable Professional Development Experience

Participant	School	Grade	Experience	Memorable Professional Development
Alex	A	5	6 years	Collaborative Inquiry and Learning in Mathematics (CIL-M)
Pat	B	1	13 years	Collaborative Inquiry and Learning in Mathematics (CIL-M)
Taylor	A	6	9 years	ETFO Book Club
Jesse	A	Kindergarten	3 years	Kindergarten Additional Qualification Courses

Note: Names of schools have been replaced with an A or B to protect confidentiality of participants.

Three of the participants taught different grade levels at the same elementary school and the remaining participant taught at a different elementary school in the same urban school board. The school board caters to a wide range of incomes, ethnicities and cultural backgrounds. Additionally, the school board places a great deal of emphasis on professional development. In fact, the school board allocated 11 percent more of their budget to professional development than a neighbouring school board with similar

demographics. The participants taught Kindergarten, Grade 1, Grade 5 and Grade 6. The length of full-time teaching experience ranged from three to thirteen years. Additionally, the participants had different amounts and types of professional development experience, from school-level initiatives and school board initiatives to Elementary Teachers' Federation of Ontario (ETFO) sanctioned Additional Qualification courses. As a result, each participant brought a different perspective based on their personal experience which helped inform their opinions about professional development.

4.2. Inclusion Criteria

There were two critical pieces of inclusion criteria for participation 1) current employment, and 2) professional development experience. First, participants had to currently be employed as teachers in an Ontario elementary school. A component of data collection included multiple classroom observations which would not have been possible if a participant was not currently employed as an elementary school teacher. Second, the participants must have been eligible to take, and have taken an ETFO certified professional development program. Although I considered two other education organizations, 1) The Ontario Secondary School Teachers Federation (OSSTF) and 2) Ontario English Catholic Teachers Association (OECTA) when I developed the inclusion criteria, only ETFO courses were designed purely for elementary school teachers. The other organizations also offer professional development programs for their members but, the OSSTF cater to secondary school teachers and OECTA combine their programming for elementary and secondary school teachers. In the context of my project, professional development from these organizations would not necessarily provide relevant experiences since, the purpose of my study was to investigate the mobilization of knowledge from

professional development programs to the elementary school classroom. Accordingly, ETFO certification served as a baseline for inclusion and allowed for a comparison of professional development experiences between participants during analysis.

I chose these two pieces of inclusion criteria because they connected the recruitment of participants to the purpose of my study. The participants' professional development experience related to the professional development environment from which professional knowledge could be mobilized and their current employment related to the environment to which the professional knowledge was intended to be mobilized. Together, they provided the opportunity to recruit more suitable participants to investigate the mobilization of professional knowledge from professional development to the elementary school classroom.

4.3. Semi-Structured Interview

I conducted one semi-structured interview for each of the four participants to determine their opinions of and experiences with professional development. Each interview consisted of a short list of open-ended questions (Appendix 1) designed to establish participants' general opinions regarding professional development as well as to uncover specific experiences that participants found particularly memorable. The questions encouraged participants to reflect on the relevance, effectiveness and enjoyment of their experiences. However, each open-ended question had a supplemental set of focused questions (Appendix 1) that I asked if the participant omitted a specific area of interest. As Moser and Kalton (1977) pointed out, when an interview deals with complex or vague content, the interviewer should probe beyond the initial set of questions for clarity. For example, one participant addressed the objectives of a professional development program

they attended but, their response overlooked how the objectives transferred into the classroom. As a result, I asked the participant to clarify how the objectives transferred into their classroom.

4.3.1. Interview Guidelines and Limitations

In my view, it was important to place some practical guidelines on the interview process. The data I collected from the interview directly impacted the quality of the data I obtained from the observation because I developed observation matrices (Appendix 2, Appendix 3) for each participant based on their interview responses. Additionally, I wanted the participants to be comfortable opening up about their experiences and having these guidelines in place avoided many of the caveats that may have occurred.

In order to accomplish these aims, I did not permit the interviews to take place during regular school hours to avoid any interference with school activities. Also, the interviews took place prior to the classroom observation. I chose to conduct the interviews prior to the classroom observation to gain a baseline understanding of each participant's perception of their professional development experience. Moreover, the participants' descriptions of their memorable professional development experiences directly informed my creation of their individual observation matrix.

I was concerned that ordering the interviews prior to classroom observations may have resulted in participants' adjusting their pedagogical strategies based on their perception of my research interests. To address this concern, I fully explained the purpose and objectives of the study in the letter of consent but, I avoided explaining directly how I would analyze the collected data. Additionally, I stressed to participants the importance of

maintaining their natural routines throughout the observations. As an added precaution, I chose to schedule the observations a minimum of one month after any interviews.

Additionally, I decided to conduct each interview independently from the others. I thought the participants were more likely to open up about their experiences, good or bad, if I interviewed them in a one-on-one environment. Moreover, I expected the independent interviews would provide more individualized data than would have been possible had the interviews been conducted in a group setting. I provided each participant several options for the location of the interview while remaining flexible to their suggestions. This choice gave participants the ability to select an environment in which they felt most comfortable. Thus, I reduced potential anxiety to allow for more fruitful conversations. Most participants were comfortable being interviewed in their classroom after school had concluded but, it should be noted that one participant selected an external environment for the interview which reinforced my decision to give participants a number of options for the location of their interview.

4.3.2. Transcription of Interviews

Although all the participants had consented to being recorded using a digital audio recorder when they signed the letter of consent, I reminded them at the outset of the interview that they were able to withdraw from the study if they felt uncomfortable. None of the participants chose to withdraw and upon each participant's voluntary confirmation, I conducted the interview using a Sony ICD-BX140 digital recorder.

After each interview was complete, I transcribed the interview using Microsoft Word and I encrypted the document using Cryptainer LE 11 software. I included both my questions and the participant's responses on the transcribed document.

I gave each participant a copy of their transcribed interview for member-checking. By giving participants a chance to member-check their interview, I allowed them to review what they said and make sure their responses were what they intended to convey. It also offered participants the opportunity to add any pertinent information that they may have omitted during the initial interview. However, the member-checks only resulted in a few minor changes and clarifications related to participants' opinions but no major errors. The lack of major changes indicated the initial interviews had fairly characterized the participants' opinions and experiences. I was then able to code the member-checked documents.

4.3.3. Coding Member-Checked Documents

The member-checked documents were coded using a combination of Strauss and Corbin's (1990) open-coding process and Glaser's (1965) constant comparative method. I developed a coding dictionary (Appendix 4) through an iterative process of addition, reflection and consolidation.

For clarity, I referred to the member checked documents as MCD 1, MCD 2, MCD 3 and MCD 4. First, I coded MCD 1 into categories and sub-categories based on content. Then, I reviewed the document to condense the categories based on similarities. This process was repeated several times until the categories could not be condensed any further. For MCD 2 I repeated the coding process, however, during my review to condense categories, I included MCD 1. This inclusion meant the coding for both MCD 1 and MCD 2 would be aligned and resulted in a succinct coding dictionary. Accordingly, the coding of MCD 3 included MCD 1 and MCD 2 and the coding of MCD 4 included all of the member-checked documents.

The resulting coding dictionary (Appendix 4) produced five major categories 1) Personal Professional Experience, 2) Specific Professional Development Experience, 3) Characterizing Professional Development, 4) Benefits of Professional Development, and 5) Challenges of Professional Development. Each of these categories contained sub-categories that were created to accommodate each individual code.

As I was developing the coding dictionary, I was concerned with inter-rater reliability. As Denzin and Lincoln (1994) asserted, inter-rater reliability dictates whether another observer placed in the same environment with the same theoretical framework would have interpreted the phenomena the same way. Similarly, Bogdan and Biklen (1997) argued that reliability is the accuracy of the relationship between the recorded data and the reality of actions in a natural setting. In both cases, definitions take on a theoretical conceptualization which serves as a foundation but, does not offer practical guidance for a research methodology. By using the label of dependability rather than reliability, qualitative research is able to separate itself from quantitative research while striving for a similar level of rigor.

Brock-Utne (1996) offered member-checking, debriefing by peers, triangulation, prolonged engagement, persistent observations, reflexive journals, negative case analysis and independent audits as practical guidelines for maintaining dependability. I took several of these guidelines into consideration to strengthen dependability. For example, I gave the participants the opportunity to member-check the transcript of their interviews. Additionally, I collected data from three distinct sources (interview, observation, teacher-generated documents) which allowed for triangulation during the analysis. The characterization of prolonged engagement and persistent observation in the field is

somewhat flexible, however, I attempted to achieve both through 'faux' observations which acclimated the participants and their students to my presence over an extended period of time.

There were four objectives to coding the member-checked documents. First, I coded the member-checked documents to categorize the professional development experiences along Kennedy's (2005) spectrum of professional development models. Second, my coding allowed for the categorization of the content of the professional development program along Mishra and Koehler's (2006) TPCK framework. Third, coding the member-checked document garnered insight into the participant's perception of professional development. Lastly, coding the interviews provided the information to compare convergences and divergences across participants' opinions and experiences.

4.3.4. Observation Matrix

I developed rudimentary observation matrices (Appendix 2, Appendix 3) for the classroom observations. Based on each participants' interview responses, the observation matrix was tailored to reflect their specific experiences. The four columns in the matrix were created to organize the data that was collected. I labelled the first column, PD Model, which was reserved for the specific model of professional development that each participant described during their interview. I based this categorization on the participants' description along with the description of the program facilitator. Based on these descriptions and my categorization along Kennedy's (2005) spectrum of professional development, each corresponding row listed a key factor related to their respective PD Model. In the Results section I will detail how each participants professional development experience was categorized and how the key factors were

determined. I used the second column, labelled Confirmation, to record whether or not each of Kennedy's (2005) key factors were demonstrated during the classroom observations. As such, a Yes and No was placed in each corresponding row. I labelled the third column Capacity and I used this column to document how each key factor was demonstrated during the classroom observation. As a result, each row was left blank so I was able to fill in how the key factor was demonstrated.

The last column, labelled Time, was used to record when the key factors were demonstrated. Each row listed a ten minute increment which segmented the observation into six equal sections. I carried a stopwatch during the observations which was set on a 10 minutes timer. The timer was set to vibrate so the class would not be disrupted. Any time a participant demonstrated a key factor I made note in the corresponding row based on when the factor was demonstrated. Whenever the timer ended, I reset the timer for 10 minutes and made a large checkmark in the row so I knew to move to the next row. This column differed from the others because it related to the time within the observation and therefore, the rows did not correspond to the key factors in the PD Model column.

Lastly, underneath the matrix was a large box labelled Real Time Notes. I reserved this section for anything salient that occurred during the observation which did not fit comfortably within the matrix or if one of the Capacity boxes became full. This section included comments related to context, clarification and expansion. This section proved valuable as more often than not, the participants' actions would require contextual placement, clarification and/or further explanation.

I developed a similar matrix (Appendix 3) to record observations related to the areas of the TPCK framework (Mishra & Koehler, 2006) associated with participants' professional development experience. Although the professional development program which participants' described did not necessarily include technologically specific content, I included all areas of the TPCK framework for actions that went beyond the program's expectations. As a result, the rows corresponding to the first column, labelled TPCK, listed all types of knowledge from the TPCK framework. The remainder of the matrix was the same as the other observation matrix. Despite having a section for real time notes on both matrices, I brought a notepad of lined paper as an added precaution in case there were an exorbitant amount of notes taken.

4.4. Classroom Observation

Flick (1998) developed a list of five dimensions that need to be considered when a study includes observations. From that list, I characterized the classroom observations as an overt, semi-structured, non-participant observation of others in a natural setting. My designation of semi-structured was based on two driving factors, namely 1) comparison of participant actions with data categories developed from interview responses, and 2) supplementing these categories with explanations for situational clarity.

The classroom observations were designed to be as unobtrusive as possible to compare participants' actions with their interview responses. In many classrooms, especially with young students, additional adults can be a distraction. This distraction would have contradicted the purpose of my observation and been an impediment to the learning process. To mitigate this obstacle, I sat in each participants' classroom for at least two separate one-hour 'faux' observations. During these 'faux' observations I remained at the

back of the class feigning the actions of data collection without any analytical consequence. These initial observations allowed a bilateral familiarity between the students, teacher and I. Moreover, it afforded the opportunity to become accustomed to the subtleties of the participants' actions which allowed for more accurate data collection during the actual observations.

Upon the completion of the 'faux' observations, I scheduled four observations during which actual data collection took place. Only when participants asked me did I inform them that the observations would be used for my analysis. The participants were aware that observations would have analytic consequence but, were not entirely sure how many 'faux' observations were conducted. Moreover, it did not seem appropriate to add any undue pressure to the participants by voluntarily giving them that information. Additionally, making them aware of the actual observations may have influenced their behaviour. However, when asked directly, I did not think it was not fair to deceive participants after working hard to develop rapport during the interview process. Furthermore, it may have affected the quantity and quality of teacher-generated documents they provided if they felt betrayed.

During the observations I sat at the back of the classroom with the two matrices and a stopwatch. The stopwatch had a repeating ten minute timer which kept me aware of the temporal segments throughout the class. Despite my efforts to remain silent, a few students still attempted to communicate with me during the observations. Every time this happened, I would politely, and quietly ask the student to pay attention to their teacher. I kept both matrices spread out on a desk in front of me and I took notes constantly. Although I followed the same note-taking process during the 'faux' observations, I made

a large notation at the top of the matrices to differentiate the 'faux' observations from the real ones. It became apparent during the first observation that the events of one hour in the classroom would result in a large amount of notes. As a result, the accumulation of data throughout the classroom observation was substantial. Unless I was analyzing the matrices, I kept all notes from observations in a locked cabinet.

4.5. Teacher-generated Documents

It is well known that there is a lot of paperwork in elementary schools. Teachers are given paperwork they must follow, there is paperwork they adjust and there is paperwork they create. Following the interviews and observations, I asked participants to compile a collection of documents that fell into any one of three areas: 1) Documents from a professional development program that influenced them, 2) Documents received from the school or school board that they had altered for their own benefit, and 3) Documents that they created from scratch for use in their classroom. Despite my request for a compilation of documents that included all three of the aforementioned areas, not all participants were able to fulfill my expectations.

Many of the documents from professional development programs took the form of program talking points or articles which conveyed ideas about the implementation of ideas. Although I was expecting course outlines and coursework documents, the types of documents offered by participants showed that professional development programs do not require a cookie cutter model to be enjoyable or effective. In fact, only one participant chose to offer a guideline of programming for their professional development experience. More frequent were personal notes that were derived from the professional development program. Additionally, many of these professional development documents included

markings, highlights and notes which also reflects the second form of teacher-generated documents.

I asked participants for documents which they had altered for their own benefit in the classroom. These documents took the form of school board strategies, curriculum ideas, textbook questions and work from previous years. The alterations ranged from minor to major but, a common theme was that they were specifically tailored for their classroom. These augmented documents were, by far, the most generous area of teacher-generated documents provided by participants.

I was particularly interested in documents that the participants created on their own. However, this type of document was provided the least by participants. I suspected this would be the case from the outset of the research project given the school board's expectation of fidelity to the curriculum and the time consuming process of creating an original document. The participant created documents were largely word problems that were given to the class during work periods. These problems were geared directly to the content of the lesson and the interests of the students. Additionally, some documents placed the participant within the problem for added relevance. Although I asked participants for documents that fell into three specific categories, some documents the participants gave me were simply given to them by some other entity.

To ensure confidentiality, I did not collect any hard copies of the participants' documents. Instead, I placed black tape over anything that could have linked the participant to my study. This included student names, the school name, the school board crest, and in one

case the name of local junior hockey team. These blacked out documents were then photocopied on site.

I used these documents to provide triangulation (Denzin, 1970). I compared the documents to the participants' interview responses and my observations. This comparison allowed for a deeper understanding of the data and provided the foundation for strong connections and conclusions.

4.6. Ethical Considerations

The scope of my study required several ethical issues to be taken into consideration. The approval of the participants' school board was aligned with the guidelines of the Tri-Council Policy Statement 2nd edition for research involving humans. As a result, the approval of my study by Western University's Non-Medical Research Ethics Board (Appendix 5) preceded the approval of the participants' school board.

Informed consent was a necessary component that gave an explanation of the procedures, purposes, benefits and potential concerns related to the research (Cohen et al., 2011). Informed consent was also a critical feature of gaining access and acceptance into elementary schools because it afforded the opportunity to present the ethical principles within the context of the research project. Moreover, it built trust between myself and the participants. A direct approach consisting of a verbal description along with a letter of information conveyed the details of the study to recruit participants. Furthermore, confirmation of participation in the study required written consent at the time of recruitment. Participation in this study was voluntary and participants had the option to refuse to answer any questions or withdraw from the study at any time.

Another major concern for my study was maintaining the confidentiality of participants. Ensuring confidentiality prevents the disclosure of information that identifies participants or allows participants to be connected to the information they provide (Cohen et al., 2011). Several measures were employed to ensure a high level of confidentiality. First, only minimal personal information was collected from participants. I collected the full name and email address of participants upon recruitment so I could distinguish them throughout the study. I gave the personal information of each participant a numeric identifier and placed the information on an encrypted document. I used the numeric identifier for the interview, observation and analysis of data. The methodology of this study also called for teacher-generated documents from the classroom environment. As a result, I covered any identifying markers before the documents were photocopied and the hard copies returned to the participants. I kept the teacher-generated documents in a locked cabinet when not being used for analysis.

Lastly, it is worth noting that I offered to bring participants a small beverage during the interview and observations to build rapport. Three of the four participants accepted the offer for the interview but, none of the participants accepted during any of the observations. Additionally, none of the participants were directly compensated for their participation.

4.7. Summary

Throughout this chapter, I have laid out the ways in which data were collected and the reasoning behind my methodological decisions. The four participants were recruited using two pieces of inclusion criteria: 1) current employment, and 2) ETFO professional development experience. Together these criteria recruited participants that were more

likely to be able to answer my research questions. The semi-structured interviews offered participants' the ability to describe their professional development experience in detail. Additionally, I was able to use their experiences to develop matrices for my classroom observations. I used the classroom observations to record the participants' actions for comparison with their interview responses. The teacher-generated documents were collected for a documentary analysis (Bowen, 2009) which in concert with the interview and observations offered triangulation. In the following chapter, I will discuss the results of the data that were collected.

Chapter 5

5.0. Results

In previous chapters, I have explored my own experience with professional development, the current literature, the framework which guided my research and the methods which I selected to answer my research questions. In this chapter, I will unpack the data I collected from participants in three different ways: by looking at the organizations of professional development in Ontario, by analyzing participants' beliefs and actions as a result of professional development experience, and by examining the most memorable professional development programs that they experienced.

In order to do so, I will describe the levels of administration which disseminate professional development programs to establish an understanding of participants' characterizations of professional development. These levels include: 1) ETFO Additional Qualifications, 2) School Board Initiatives, and 3) School-level Initiatives. Next, I will describe what participants perceive as the most salient aspects of their professional development experiences including: 1) Collaboration, and 2) Personal/Professional Growth. Last, I will describe the specific professional development programs that participants found influential: 1) Collaborative Inquiry and Learning in Mathematics (CIL-M), 2) Kindergarten Training, and 3) Book Clubs. I will base the descriptions on the participants' interview responses, my classroom observations, and teacher-generated documents. Together, these three sections will provide the participants' opinion of, and experience with, 1) the groups who disseminate professional development, 2) important aspects of professional development, and 3) individual experiences.

5.1. Characterizing Professional Development

Professional development can be offered by various levels of administration. The three major providers of professional development for the participants I interviewed were ETFO Additional Qualification courses, school board initiatives, and school-level initiatives. In this section I will explore the participants' characterizations of each type of professional development from their interviews.

5.1.1. Additional Qualifications

Before delving into the participants' characterization of Additional Qualification (AQ) courses, I will explore the description of these courses by the Ontario College of Teachers (OCT) and ETFO. The OCT sets the guidelines for AQ courses and provides a list of approved facilitators. The AQ courses are organized around purpose and course length (Ontario College of Teachers, 2016a). For an AQ course to be approved by the OCT for elementary level teachers it must follow a list of learning expectations. These learning expectations can be summarized into five primary areas: 1) Analysis and implementation of the Ministry of Education curriculum, 2) Adaptation to individualized student needs, 3) Creation of an effective learning environment, 4) Collaboration with colleagues and/or students, and 5) Communication with colleagues and/or students. The OCT describes AQ courses as the extension of teachers' skills and knowledge in the design, delivery and assessment of a program (Ontario College of Teachers, 2016a). The OCT licenses various organizations to create their courses.

As one of the OCT's approved course creators, ETFO is a primary provider of AQ courses in the province. An advertising method ETFO uses to separate itself from other providers is by offering what it calls, the 'ETFO Edge' (ETFO, 2016a). The ETFO edge

is described as a learning experience based on four pillars, 1) practically based courses, 2) grounded in effective practice, 3) recognition of work/life balance, and 4) continual review and updating of course content. As an added incentive, ETFO AQ courses provide participants with the ability to improve their salaries. Accordingly, ETFO claims their AQ courses are professional, credible and trustworthy, making them experts in professional learning. The practically based courses align with the position of Grierson and Gallagher (2009) and the recognition of the work/life balance appears to consider factors similar to the professional knowledge landscape developed by Clandenin and Connelly (1995).

Participants discussed a wide range of topics throughout their interviews but, they appeared to elaborate the most when it came to AQ courses. Furthermore, I found that when discussing AQ courses, participants focused on three specific areas of discussion: 1) Course Costs, 2) Impact on Income, and 3) Expanding Teaching Opportunities.

The cost of AQ courses was a topic which several participants addressed. For instance, Alex lamented, "Because, really, who can afford to throw $700 down for a course. I can't. I know a lot of teachers can't" (personal communication, October 16, 2015). However, later Alex admitted, "They've [Ministry of Education] been subsidizing the math (*sic*) AQs and a few more teachers are looking into it and interested in taking it because its $300 as opposed to $700". According to ETFO, the list of subsidized AQ courses has grown to include Mathematics courses, Technology courses, and Kindergarten courses at a cost of $450 (ETFO, 2016b). Similarly, Jesse compared the cost and style of AQ courses to a university course. "You pay for those [AQ courses], they are 700 dollars a course. Like a regular university course" (personal communication, October 14, 2015).

The course fee for ETFO AQs that do not receive subsidization is $650 (ETFO, 2016d), however, other competing providers like Universities can charge more.

A major difference between AQ courses, school board, and school level initiatives is that completion of an AQ course can impact a teacher's income (ETFO, 2016d). Therefore, I asked participants to explain how the potential impact on income affected their participation in AQ courses. For Jesse, the impact on income was an appealing factor, "I don't know if you have heard of Additional Qualification courses. But, teachers take those in order to move up the seniority and pay scale. So, I have done five of those courses and for every five you kind of move a step up" (personal communication, October 14, 2015). The number of AQ courses required to move up the pay matrix varies based on individual experience (ETFO, 2016d) and there is a cap on the amount of income an elementary school teacher can make.

Alex explained that expanding their teaching opportunities as well as the impact on income factored into their decisions to take AQ courses:

> I took [the] Geography [AQ] when I finished teachers college because I wanted to be able to teach Grade 7 and 8. And I took [the] Phys. Ed. (*sic*) [AQ] because I want to be able to teach Grade 7 and 8 Phys. Ed. (*sic*). But, I would say that [taking the] Spec. Ed. (*sic*) [AQ] and Writing [AQs] were because I wanted to get to the top [of the pay matrix]. (personal communications, October 16, 2015)

Likewise, Taylor listed some AQ courses which they hope will open up future teaching opportunities, "So, I'm hoping to also complete my Reading Specialist … then in the summer time Special Ed. (*sic*) specialist" (personal communication, October 22, 2015). When I probed into the impact on income, Taylor simply added, "It's something you're aware of but, you don't take courses just to move up".

Pat initially suggested that income was a motivating factor for other teachers:

> I would say that it is not my goal or not within my circle of friends. I do have colleagues, there are colleagues out there that do that … I think a lot of people do take Additional Qualifications for that purpose. (personal communication, October 19, 2015)

However, when I asked why the impact on income did not motivate Pat personally, they replied, "It's not a matter of being able to get ahead in the pay grade. For the last two AQ courses I took. I'm already as high [on the pay matrix] as you can get (...) so it didn't do anything for me from that standpoint" they further added, " The most useful professional development [programs] aren't the Additional Qualifications and they're not going to raise your pay anyways". It appeared that the professional development programs Pat alluded to were school board initiatives and school level initiatives.

5.1.2. School Board Initiatives

Besides Additional Qualifications certified by the Ministry of Education and provided by ETFO and other institutions, there are also professional development courses that are facilitated by individual school boards. In some cases, the Ministry of Education provides a foundation of professional knowledge and the school boards are responsible for adapting and delivering the professional development courses (Ministry of Education, 2016b). School boards can also develop and deliver professional development courses on their own which can be tailored to more specific learning strategies. Incidentally, this type of consolidation of information is similar to what Cooper, Levin and Campbell (2009) suggested for educational organizations to optimize knowledge mobilization. Moreover, the adaptation to the local context reflects the work of Grierson and Gallagher (2009), and Linn Gill, Sherman, Vaughn and Mixon (2010).

Participants discussed school board initiatives in terms of 1) Costs, 2) Number of experiences, 3) Learning Environment, and 4) Challenges.

According to participants in this study, the costs related to school board initiatives were different from the costs of AQ courses. As Jesse pointed out, "Those [AQs] you take on your own and you pay for yourself. They're a lot like the professional development that the [school] board offers which I believe you're allowed to take a day or two off to attend them" (personal communication, October 14, 2015). Pat explained that school board initiatives can require more than just a couple days, "It is a huge cost for the board. Last year, I think I was out 20 days for professional development. So that's a supply teacher for each day." (personal communication, October 19, 2015). Pat quickly added, "Their [the school board] very supportive and I think they offer some really great opportunities … I think that our [school] board specifically do (*sic*) a really good job of professional development". In fact, one of my observations had to be rescheduled because Pat was taking part in an off-site professional development program.

Several participants talked about school board initiatives in terms of the number of programs they had taken. As Alex stated, "I've done numerous professional development [programs] through the [school] board" (personal communication, October 16, 2015), and Taylor remarked "…through [school] board initiatives, a couple per year…I've done a little of everything, so maybe 10 of those smaller [professional development] courses" (personal communication, October 22, 2015). Additionally, Pat explained their motivation for taking part in numerous school board initiatives, "We [My colleagues] have all taken advantage of any PD (*sic*) opportunity that has come up and it's not a

matter of being able to get ahead in the pay Grade" (personal communication, October 19, 2015) further adding:

> There's always new research and you always have to rethink what you're doing in your practice [and] whether it's meeting the needs of the student in front of you and how you can better your practice to meet those needs.

Some participants contrasted the face-to-face learning environment of school board initiatives to the online learning environment of Additional Qualifications. Alex explained, "The AQs when you're taking them through the school [approved University], there's a lot of online assignments and that sort of stuff, where, the [school] board is more hands-on" (personal communication, October 16, 2015). Pat agreed adding, "I personally prefer in-person [professional development] because I think online courses, what they try to do with the portion where you have to respond to so many posts, it's trying to create that false conversation" (personal communication, October 19, 2015). Although AQ courses are offered in blended and on-site formats, a large number of courses are offered online (ETFO, 2016c).

Although participants touted the learning environment of school board initiatives, they also expressed some challenges. Jesse pointed out, "there needs to be enough space for teachers to take them because sometimes it is really limited" (personal communication, October 14, 2015). Additionally, Taylor discussed the impact a lack of selection can have on the potential effectiveness of school board initiatives, "If it's a [school] board initiative that you're not as comfortable with or interested in, it may not be as successful for the teacher participating in it" (personal communication, October 22, 2015). Furthering this point Taylor described, "Our school was part of a literacy initiative…[we] got this great resource but, it was 300 pages long and they just said, read these couple chapters and

come and discuss and that was [the school] board initiative". However, Taylor expressed appreciation for the collaborative component of school board initiatives:

> There are lots of resources and books out there [but] I think coming together collaboratively, especially for me, is more beneficial. So to talk to someone, have they used it? Have they tried it out? Rather than just saying from the [school] board, this is the book you're going to read, this is the book you're going to follow. (personal communication, October 22, 2015)

5.1.3. School-level Initiatives

Individual schools also provide professional development programs. Some schools, or teachers therein, may adapt school board programs on a smaller scale or develop their own initiatives based on individual needs. In either case, these initiatives can be workshops with specific goals or developed by, and for, the teachers themselves. Participants mainly discussed them in terms of 1) Technological Skills, and 2) Collaboration.

The professional development experiences that improved technological skills were different for each participant. Alex downplayed the school initiatives simply stating "I have taken, little workshops after school (...) using Google Drive, and then (...) creating websites for parents and that sort of thing. But, never an actual course" (personal communication, October, 16, 2015). Similarly, Taylor remarked "I'm learning a bit more about Google Drive and Google Glass and that Google technology with my students. I haven't taken any courses on that, but they [students] each have their accounts now" (personal communication, October 22, 2015). Additionally, Taylor explained how this technological skill had impacted their classroom, "They [students] can sign in and their work gets saved…they can send their work directly to me to show me rather than writing it down and handing it in or printing it off", further adding, "…making edits on their

work, it can be edited in a soft copy rather than a hard copy". Pat was also aware of the student benefit explaining:

> We have four iPads in every classroom and a Chromebook in every classroom and then most classrooms have a desktop. So there's times when children can be working on them at all times and then…we have two or three excellent [Learning Resource] teachers who are willing to come in at any time and teach either a small group or a full class, whether it's different apps (*sic*) or different things. (personal communication, October 19, 2015)

Indeed, I observed multiple iPads and a Chromebook in Pat's classroom (observation, January 27, 2016; February 2, 2016; February 4, 2016; February 8, 2016). Pat employed the iPads as a learning tool for struggling students as well as a reward for students who finished their work before class ended. The Chromebook was connected to a projector which allowed Pat to show students problems and videos that pertained to their lesson. When I asked whether these technology based programs are for teachers or students, Pat added, "It can be either. They [Learning Resource Teachers] could come in to do it for teachers or they can come in to do it with your class". Although, I did not see any Learning Resources teachers conducting lessons in Pat's class, I did observe them in the school moving from class to class.

These workshops appeared to develop specific skills and their design incorporated the suggestions of Kabacki, Odabasi and Kilicer (2010), and Chai, Koh, Tsai and Tan (2011), in that, they promoted one-to-one mentoring and ongoing support. Furthermore, theses workshops mirrored the work of Polly (2011) who focused on ingraining professional development technology with student learning.

Collaboration between teachers was another topic that came up when discussing school level initiatives. Jesse explained, "One thing I did really like actually … was

Collaborative Planning, which we [colleagues] started last year. That worked really well because it was a time during your instructional day … to collaborate with other teachers and bounce ideas off each other" (personal communication, October, 14, 2015). The program was initially designed for teachers from the same grade to meet and discuss ideas during their planning time. I did not directly observe the Collaborative Planning program because, due to the number of teachers interested in the program, it could not continue as initially created so, the program adapted and now "most of the time that [Collaborative Planning] would happen after school". Since the school offers after-school programs, the Collaborative Planning typically occurred in the late afternoon or early evening. Accordingly, the effectiveness and popularity for the program supports Keay and Lloyd (2009) who promoted professional development which evolves through iterations of self-initiated collaborative adaptations.

5.2. Opinions of Professional Development

The participants' experiences with professional development encouraged discussion regarding specific topics as well. In this section I will explore the participants' opinions regarding the important aspects of their professional development experience, namely 1) Collaboration, and 2) Personal/Professional Growth.

5.2.1. Collaboration

Collaboration was a popular topic of discussion across participants and this interest went beyond individual providers of professional development. I asked each participant which aspect of professional development they felt was most important. Alex responded, "Collaboration. I think collaborating with other teachers and getting their ideas is the most beneficial [aspect of professional development]" (personal communication, October

16, 2015). Similarly, Taylor noted, "I would say the collaboration between the participants and the courses [is the most important aspect]" (personal communication, October 22, 2015). In both cases, they credited the ideas and experiences of their colleagues as the catalyst for improving their own pedagogy. For example, Taylor noted that "whether it's teachers from the same board…at some sort of professional development, or if it's some teachers who are starting and some teachers who are going back to get a little bit more…training or experience. You can really learn from your colleagues…especially for me, is more beneficial." Alex furthered this point explaining, "They [colleagues] know what works and what doesn't work. That's probably where I learn the most" (personal communication, October 16, 2015). On one occasion (observation, February 29, 2016), I arrived several minutes before the scheduled observation. The students were still on lunch break as I entered the classroom and Alex was discussing which examples would be most suitable for the lesson with another colleague.

Participants also offered specific professional development experiences which benefited from collaboration. Jesse referred to the New Teacher Induction Program (NTIP) which pairs new teachers with more experienced teachers to ease their apprehension and provide individualized support (Ministry of Education, 2010b). When discussing the initial experience of teaching music Jesse remarked, "I just felt overwhelmed and didn't know what to do." (personal communication, October 14, 2015). The NTIP program provided a way to alleviate this anxiety and according to Jesse, "I was able to meet with a teacher who has been a music teacher for years, take some of her resources and bring them right into my classroom. She was the one who set me up with the recorder program that I did

with the juniors last year." A NTIP strategy form was provided by Jesse in which the professional learning goals included the development of a music program (Ministry of Education, 2010a). Also, I observed (observation, January 26, 2016; January 27, 2016; February 9, 2016) Jesse conduct music lessons in the classroom on multiple occasions using ukuleles, recorders, and music videos. Similar to the claims of Smith (2014), Jesse noted this experience helped build confidence and provided a foundation of knowledge.

For Taylor, the benefits of collaboration were described in relation to a professional development program that offered teachers the opportunity to build a lesson together. According to Taylor:

> So you go plan a lesson together, you watch that teacher implement and teach that lesson and then you break down…the lesson and some of the answers that the students [gave]…to help show the teacher where they can go next and if that [lesson] didn't work, maybe we will try something [else] next time but it's good to have all those collaborative minds together. (personal communication, October 22, 2015)

During my observations (observation, January 26, 2016; February 1, 2016; February 10, 2016; February 11, 2016), Taylor appeared to have a well thought out lesson that engaged students with open-ended problems. Pat expressed the benefits of collaboration with a similar experience, "I enjoyed everything about the [professional development] program because it really was the opportunity to talk with other people who were the same grade level as you in different schools and really problem solve around student needs" (personal communication, October 19, 2015). Pat addressed student needs by regularly incorporating multiple representations of a problem on the board (observation, January 27, 2016; February 2, 2016; February 4, 2016; February 8, 2016). Moreover, they permitted some students to use technological aids like iPads to complete their work.

The participants also explored professional development experiences in which collaboration was not completely beneficial. When discussing a school board initiative focused on literacy Taylor lamented, "We were all coming from different areas [grade levels] and so it wasn't as beneficial because it wasn't a resource people had used and were trying…so there wasn't that cohesion" (personal communication, October 22, 2015). The different grade levels of teachers was one barrier to strong collaboration and it supports Hargreaves (2013) contention that collaboration should develop naturally and not be contrived. Another barrier was the willingness of experienced teachers to participate in professional development as Jesse noted, "…when you're collaborating with other teachers who have not gone to [many] professional development [programs] it makes it really challenging because some people are stuck in the past and not willing to update" (personal communication, October 14, 2015). Although teachers gain classroom experience over the course of their careers, this criticism was largely directed at experienced teachers who choose to avoid professional development. "When you're a new teacher it's required all at once but, you would never have to do it again and that is a problem".

5.2.2. Personal/Professional Growth

Participants sought to improve themselves when deciding to take professional development courses. However, the type of improvement depended on the specificity around which participants framed their professional development experiences. Accordingly, participants expressed their opinions regarding personal growth and professional growth.

To participants, personal growth was synonymous with continued learning. As Alex remarked, "I think it's [professional development] necessary for myself because I need to learn…It's very easy to just get into your set routine of teaching and with PD (*sic*) I find it helps me adapt to new ideas and bring them into my classroom" (personal communication, October 16, 2015) further adding, "I enjoy learning and trying new things in the classroom and I don't like feeling stagnant in where I am". I observed a bookcase beside Alex's desk which had multiple binders of lesson plans for each subject dating back several years. Accordingly, if Alex were repeating lessons from previous years there would only be one binder per subject. As such, Alex altered lesson plans yearly but kept previous lesson plans accessible for review.

Taylor also supported the idea of continued learning, explaining, "I think it's important in any sort of occupation that you have to always keep up with the new trends and keep up with new research and learning that goes on. I think in teaching it's good to double check your beliefs and your own learning" (personal communication, October, 22, 2015). Taylor provided several documents from the Capacity Building series offered by the Ministry of Education which has published dozens of documents over the past decade (Ministry of Education, 2015). Moreover, Taylor had highlighted passages and added thoughts which related back to their classroom.

To most participants, professional growth was framed around the specific needs of their classroom. Alex described an experience in a professional development program surrounding Aboriginal students, "With my Aboriginal course…we developed lessons based on [what] we were teaching at the time so that we had those lessons to teach our students" (personal communication, October 16, 2015). However, Alex admitted this

program was more applicable to a previous classroom since, there were no Aboriginal students in their current classroom. Yet, they noted the importance of having the lessons available, "Because Aboriginals are often overlooked and it is actually surprising how many students are actually Aboriginal". Incidentally, I observed several displays posted around the classroom that reinforced equality. These posters had terms and phrases such as 'Respect', 'Teamwork', and 'Diversity'.

For Taylor, the needs of the classroom were based in Special Education, "I would say it [Special Education] is very valuable, because there are so many needs in the students in your school and so many variations in learning style from the students." (personal communication, October 22, 2015). Taylor also noted their intention to take a Special Education Specialist AQ course in the summer following my interview. Additionally, I observed Taylor working with a student who was struggling with a division problem (observation, February 11, 2016). When the student explained the problem solving strategy they were attempting to employ, Taylor produced a short example with smaller numbers. The student still did not understand how to apply the strategy, so Taylor encouraged the student to try a strategy that they were more comfortable with and pointed to an anchor chart on the wall. An anchor chart lists a variety of techniques for solving multiplication problems. Additionally, Taylor noted the value of variety by suggesting:

> I'm saying a course like your Special Ed. (*sic*) courses…offer some nice basic strategies and brings some more awareness to some of the different styles of learning and some of the different students you might have…I suppose you could say that, for any [AQ] Part 1 that it's a nice introduction into really digging deeper into that sort of subject area…like Math, (*sic*) Part 1 or Reading, Part 1. (personal communication, October, 22, 2015)

Accordingly, Part 1 Additional Qualifications are described as a way to "develop the skills and knowledge needed by teachers to design, deliver and assess programs within a particular discipline or division" (Ontario College of Teachers, 2016b).

For Jesse, Full Day Kindergarten was a specific classroom need that they addressed:

> The teaching style changes so quickly. Like, the new FDK [Full Day Kindergarten] program, that's a big change for teachers who have been teaching Kindergarten a long time. It's completely different then old style Kindergarten. If they didn't have PD (*sic*) for that they wouldn't be up to date. (personal communication, October 14, 2015)

Aside from a full day of learning, the Full Day Kindergarten program differs from Half Day Kindergarten by placing more emphasis on student centered, play based learning (Ministry of Education, 2014). Not only did Jesse write 'developing and implementing appropriate play based learning strategies' in the Professional Learning Goals section of their NTIP Strategy form (Ministry of Education, 2010a), I saw Jesse engage students in play based learning activities in each observation (observation, January 26, 2016; January 27, 2016; February 2, 2016; February 9, 2016).

Pat weaved the themes of continued learning and specific needs together when describing what they value most in professional development, "The most important aspect of professional development is that teachers have a choice and are able to access PD (*sic*) that will lead to continued professional growth." (personal communication, October 19, 2015). A lack of choice prevents teachers from addressing specific needs in their classroom and a lack of access prevents continued learning. Yet, this description showed how personal and professional growth are related.

5.3. Experiences with Professional Development

Each participant had different ideas and perceptions regarding professional development. Moreover, they have had different professional development experiences. Therefore, I asked each participant to describe a memorable professional development experience in detail.

For each experience, I will describe the professional development program as specified by the corresponding facilitator. Then I will explore the participants' experience including the perceived benefits and challenges.

My observations were informed by my categorization of the professional development program. Accordingly, I will explain how I categorized the professional development program along Kennedy's (2005) spectrum of professional development. I will also explain how the knowledge from the program relates to Mishra and Kohler's (2006) TPCK framework. Then, I will use my categorization to investigate my observations and relevant teacher-generated document as they pertain to the mobilization of knowledge from the participants' professional development experience to the classroom.

5.3.1. Collaborative Inquiry and Learning in Mathematics (CIL-M)

The school board in which the participants of this study teach has continuously elected to participate in a Ministry of Education initiative called Collaborative Inquiry and Learning in Mathematics (CIL-M). In fact, Alex and Pat both chose to discuss the CIL-M in detail due to the impact it had on their pedagogy. The experiences of Alex and Pat were detailed since they had each participated in the CIL-M two and three times respectively. However, since they teach different grade levels, they did not participant in the CIL-M together.

An important branch of the Ministry of Education is the Literacy and Numeracy Secretariat (LNS) which develops initiatives for schools and school boards to improve student achievement in reading, writing, and mathematics (Ministry of Education, 2016b). One of these initiatives is the CIL-M.

According to the LNS, the CIL-M is designed to build new knowledge about, and understanding of, student learning though a job-embedded professional learning framework (Ministry of Education, 2011). To achieve this goal, a group of teachers from the same school board conduct an investigation of a mathematics lesson and its associated student work in one of the classrooms of the participating teachers. An officer of the LNS facilitates sessions prior to, and after, these in-class investigations to discuss mathematics knowledge, instruction, and reflection. This process is repeated in the classrooms of the other teachers who are participating. Over time, the importance of the LNS officer's role is diminished as the participating teachers develop a deeper understanding of ways to apply new knowledge to improve student learning. The CIL-M is an ongoing initiative and school boards have an opportunity annually to participate.

Each participant described their experience beginning with a summary of the program which Alex characterized as, "…basically it's [CIL-M] bringing in the whole idea of problem solving into your math curriculum." (personal communication, October 16, 2015) This summary was followed by a detailed explanation of a day in the CIL-M:

> So, basically what would happen is…you would go into a library first…[with the LNS officer] doing a couple of hands-on activities with us and show[ing] us what it looked [like] if we were teaching…And then plan a lesson and a problem to do with the host teacher's class. So, a teacher would be a lead teacher and then another teacher would be an assistant, and they would be the only two teachers that could talk throughout that

> lesson. The other two or three teachers would observe students [and] the host teacher. (...) So we would go in [the classroom], teach the lesson, then we would come back together again in the library [and] talk about what we saw in our observations of the students. So, maybe it was developing a new strategy for that location. (Alex, personal communication, October 16, 2015)

Similarly, Pat explained:

> It's where (sic) you get together with four or five other schools and it's all math (sic) centered based on problem solving. So, you actually go into the classroom of one teacher and you [the host teacher] deliver[s] a lesson and then you have six or seven people there to take notes and they're not allowed to say anything. They just take notes on what the children are doing and saying. Then you come back and you look at it as a group and then you work out what the next steps are for that class. (personal communication, October 19, 2015)

Moreover, this process was repeated multiple times throughout the year as Alex noted, "…it was multiple sessions. I think it was four full-day sessions and I think we had three half-day sessions" (personal communication, October 16, 2015). While Alex discussed the number of sessions Pat chose to explain why multiple sessions were needed:

> So, we did it as a teacher inquiry and we had our own inquiry that we were looking into. Like, if we did this, how would it affect student learning? And that allowed us a month in between each classroom visit. (personal communication, October 19, 2015)

Beyond the descriptions of their experience, Alex and Pat explored the perceived benefits and challenges of the CIL-M. Alex began with an appreciation for the expertise that the facilitators of the program shared, when they said, "I found it very beneficial because…you have people that are knowledgeable in teaching math and they take you through step-by-step [to] show you what your math (*sic*) program should look like." (personal communication, October 16, 2015)

Additionally, Alex touted the opportunity to integrate the developed lesson immediately and the collegial support the CIL-M offered. Alex noted that "there's four schools that get together and at each of those schools we get to practice it in the classrooms, going through it with the kids [and] having your colleagues there to support you". Similarly, Pat explained, "This is a live class…So, I had a group come into my classroom while I delivered a lesson and had a co-teacher with me and then [we] went back to talk about [what] the next steps were and what we had seen" (personal communication, October 19, 2015). Pat's description also alluded to the benefits of reflection. Alex addressed the perceived benefits of reflection more directly by pointing out, "I found it very beneficial because it has helped me a lot not so much coming up with problems but how to reflect with the kids at the end and what my main focus of that problem would be. Like in [during] the reflection part." (personal communication, October, 16, 2015)

Alex and Pat both noted the repetition of content as a challenge they faced after multiple years of participation. Alex explored this challenge when I asked about further CIL-M participation in upcoming years, Alex responded, "now that I have done it twice I don't know. I'm sure I could get some things out of it but, it becomes pretty repetitive because it's the same sort of idea. That would be the only drawback that I have with it." (personal communication, October 16, 2015). Alex recognized the CIL-M offered an interesting and effective style of professional development but also, was aware of the diminishing returns.

Taylor also participated in the CIL-M multiple times but, rather than detailing the experience offered a brief summary:

> So I did it, I think, 3 years in a row and… the third year, of doing the same CIL-M …I was ready to make a change…Parts of it were valuable, going into another teacher's classroom and breaking down some of the student thinking but, it was the same ideas that were going on over and over again. If I would have done two years…maybe I wait another year and then do another one… [Perhaps] if they did like a math (*sic*) one in first term and a language one in [the] second term, that would create more interest or different interest from teachers. (personal communication, October 22, 2015)

Much like Alex and Pat, Taylor acknowledged the benefits of the CIL-M but, criticized the repetition. However, Taylor offered two novel solutions for this challenge in non-consecutive participation and alternating program content.

Based on these descriptions, I categorized the CIL-M as a Community of Practice model of professional development. Kennedy (2005) offers an explanation of the Community of Practice model but contends that Wenger (1998) provided the three integral pillars 1) evolving forms of mutual engagement, 2) understanding and tuning their enterprise, and 3) developing repertoire, styles, and discourses.

The CIL-M described the evolving forms of mutual engagement as a community of participants working together to develop a mathematics lesson. As participants developed their lesson, they experienced a greater understanding of their own pedagogy and the role of the LNS officer diminished. Participants drove the development of a mathematics lesson through multiple trials, discussions, reflections, and their own inquiry.

Since the LNS does not provide access to previously developed mathematics lessons and Alex and Pat could not, or would not, produce actual documentation of the lessons they developed in the CIL-M, I used my Community of Practice categorization and the descriptions of the CIL-M to develop the key factors to guide my observations. These

factors included, 1) Employing open-ended problem solving, 2) Encouraging student collaboration, 3) Fostering different types of student thinking, and 4) Discussing applications of a problem solving strategy. I chose these factors for their ability to demonstrate the mobilization of professional knowledge obtained from the CIL-M to the participants' classrooms. Additionally, neither participant described any sort of inclusion of technology within the CIL-M, so the knowledge that was to be mobilized fit more comfortably within Shulman's (1987) PCK framework. The content knowledge centered on mathematics lessons, but the key factors related to various types of pedagogical knowledge.

Looking at the first factor which guided my observations, both Alex (observation, February 25, 2016; February 29, 2016; March 1, 2016; March 3; 2016) and Pat (observation, January 27, 2016; February 2, 2016; February 4, 2016; February 8, 2016) employed number strings to encourage open-ended problem solving. In number strings, students are given a series of connected mathematics problems that increase in complexity. To bring awareness to the multiple strategies that can be employed, Alex asked the class to provide multiple strategies before moving on to the next problem (observation, February 25, 2016; February 29, 2016; March 1, 2016; March 3; 2016). Alex was also mindful of a student using the same strategy for different problems and on two occasions (observation, February 29, 2016; March 1, 2016) accepted the solution but asked the student to try a different strategy before moving on.

Pat also employed open-ended problem solving in ways other than number strings. I observed one example during a 'Thought Exercise' in which Pat asked students if you have 11 balloons made up of 2 different colours, how many balloons of each colour are

there? (observation, January 27, 2016). Students provided several different solutions and regardless of the response Pat replied, can you explain your thinking to the class? Another open-ended problem Pat gave to students surrounded the development of patterns (observation, February 4, 2016). Pat asked students to create a pattern of shapes that had at least three different shapes and repeated at least twice. Each student was encouraged to employ a strategy that corresponded with their abilities. Some students elected to make more complex patterns whereas, others chose to keep the pattern simple. I noticed that Pat would ask the student follow up questions such as, 'what is your pattern?' and 'what makes it a pattern?' Both of these examples reflect a document that Pat provided which explained how to create open-ended questions. Specifically, they relate to sections encouraging a deeper understanding of student reasoning, creating meaningful connections, and reflection (Anonymous, N.d.).

Additionally, I observed Alex employing an open-ended mathematics problem in which students received an equation with empty boxes in place of a two digit multiplicand, a single digit multiplier, and a two digit product (observation, February 25, 2016). Alex asked students to correctly fill in the boxes using only the numbers one through six. Although students appeared to be slightly confused at first, they provided a potential solution and explained there are a lot of different ways the problem could be solved. Another open-ended problem I saw involved the capacity of an Mp3 player (observation, March 3, 2016). Alex gave students a list of songs which differed in size and asked to fill the Mp3 player with as many songs as they could fit. Additionally, there was a bonus question in which the Mp3 player was a different size. Since the songs differed in size, students submitted a variety of correct solutions.

Another form of pedagogy the CIL-M conveyed was for participants to encourage student collaboration. I observed Alex begin each class with number strings and students would usually attempt to solve the problem on their own. However, after one strategy had been employed, Alex routinely asked students to work with the person near them to come up with a different strategy (observation, February 25, 2016; February 29, 2016; March 1, 2016; March 3; 2016). Since students usually opted to sit beside their friends, for subsequent problems, I noticed that Alex encouraged collaboration beyond typical social groups by asking students to work with different people.

Similarly, Pat would ask students to sit on the carpet beside their 'math buddies' for number strings (observation, January 27, 2016; February 2, 2016; February 4, 2016; February 8, 2016). On many occasions, I observed Pat ask students to talk it over with their 'math buddies' before coming up with a strategy whenever a problem was put on the board. Furthermore, Pat would ask students how they came up with the solution, talk about the strategy with the class, and ask if the strategy could be used for another problem.

In Alex's classroom, once the number strings were complete, students were given work for the remainder of the class. During my first observation Alex placed students into groups based on where they sit regularly (observation, February 25, 2016). During my second observation, students were put into groups based on the alphabetical order of their last name (observation, February 29, 2016). In another observation, they were put into groups based on who had completed the work from the previous day and who needed more time to complete the work (observation, March 3, 2016). Only once did I not observe student collaboration during the work period (observation, March 1, 2016). The

reason, as Alex explained to the class, was that their poor behaviour earlier in the day was the cause of individual work time.

I also observed Pat employ group work when they placed students into groups to create a graph about skating preferences (observation, February 8, 2016). Each group was asked to come up with a unique research question about skating, ask other students their research question, and create a graph. Some examples included: Have you skated before? Do you own skates? Do you prefer hockey skates or figure skates? The students worked together to organize group roles and devise a research question, and needed to collaborate with other groups to collect data for their graph. When two groups came up with the same research question, Pat suggested they collect data from different students or have one of the groups slightly alter their research question. In response, the two groups decided to ask different students and I noticed that one student even thought to put their results together for one large graph, but the class ended before it came to fruition.

The CIL-M also encourage participants to foster different types of student thinking. To that point, I observed Alex's reaction to a student who had completed their work near the end of class (observation, March 1, 2016). After confirming the student's work was correct, Alex asked the student how many other ways they could come up with the same answer. The inquisitive intonation appeared to resonate with the student as they promptly returned to their desk and quietly worked until the end of class.

However, I observed a more poignant example when a student correctly explained a multiplication strategy during number strings but made an error in the multiplication process (observation, February 25, 2016). When the student realized they had made an

error, they became visibly upset, went to their desk and began sobbing. Rather than scolding or ignoring the student, Alex stopped the class and made a point of explaining, to everyone, that mistakes are acceptable and should be embraced because they are the foundation of learning. Then, Alex showed the distraught student, and the rest of the class, that the strategy was indeed correct and encouraged the student to rejoin the rest of the class. The student took a few moments to calm down before returning. Later on during number strings, I witnessed Alex select that same student who promptly answered a problem correctly using the same strategy. This reaction appeared to change how the student was thinking about mathematics which exemplified pedagogy related to the CIL-M program.

I saw Pat deal with a similar situation when a student did not get to use foam shape cut outs during an individual work period and became upset exclaiming, 'I can't do it without the shapes' (observation, February 4, 2016) . Pat brought the student who was upset and the student who had the foam cut outs to another work station. Pat explained to the students that the mathematic tools are interchangeable because they are just representations and then followed up with a brief discussion about sharing and working together. Although both students still chose to use the foam shapes, they were able to do so as partners.

To discuss the applications of a problem solving strategy, I witnessed Alex employ word problems that were relatable to students. At the outset of a word problem surrounding the capacity of an Mp3 player, Alex explained that the problem solving strategy could be applied by students when filling their iPhone, iPad, laptop or desktop with music, videos and/or games (observation, March 3, 2016). As two students cleaned their desks at the

end of class, I noticed they were discussing whether they should delete one large game or two smaller games from their video game platform to provide capacity for a new game. This conversation appeared to be initiated by the content of Alex's Mp3 word problem and the students applied a similar problem solving strategy to address their own problem.

On a different occasion, Alex asked students to pay attention to a division lesson because the strategies could be applied to problems surrounding the fair distribution of food, toys or other things with friends and siblings (observation, March, 1, 2016). During the work period, I noticed that Alex gave students a word problem surrounding the number of buses needed for an upcoming field trip. Although the distribution of food and toys got the attention of students, the acquisition of buses for a field trip was another applicable use of the problem solving strategy they learned.

Pat also discussed the application of problem solving using food (observation, February 2, 2016). They gave a group problem to students in which a student ordered four slices of pizza. If the student received one slice per day starting on Monday, which day would they need to bring a lunch? Since many students order lunch from the pizza program at school, they appeared to understand the applicability of the problem. Another applicable problem I observed was the skating graph (observation, February 8, 2016) since the class was scheduled to go on a skating trip the following week and some students needed to rent either figure or hockey skates.

5.3.2. Kindergarten Training Programs

When I asked which professional development experiences were most memorable, Jesse described a pair of Kindergarten AQ courses: Kindergarten, Part 1 and Kindergarten, Part 2. ETFO creates a large number of AQ courses for teachers across a wide variety of

topics. In many cases, these AQ courses involve multiple parts which build upon one another to provide more specialized content (Ontario College of Teachers, 2016b). One such example are the AQ courses ETFO designed to enhance the professional knowledge of Kindergarten teachers.

Kindergarten, Part 1 is designed for teachers looking to enhance their professional knowledge and practices with students 3.5-6 years old by exploring the benefits of play-based learning (ETFO, 2016c). Kindergarten, Part 2 builds upon Part 1 and extends professional knowledge through design and delivery methods. The final Kindergarten AQ course is a Specialist program which goes beyond Part 1 and Part 2 to incorporate practical experience, networking, collaboration and assessment strategies.

First, Jesse explained which Kindergarten AQ courses they had completed, which they had not, and why they had not:

> I have done my Part 2, Kindergarten, which means I have taken two Kindergarten courses, a Level 1, a Level 2 and then [there is] a Specialist [course]. You can't take a Specialist [course] until you have two years in that grade. (personal communication, October 14, 2015)

At the time of the interview, Jesse had completed the first two Kindergarten AQ courses, but did not have the two years of Kindergarten teaching experience required for the Specialist course. However, Jesse was looking forward to taking the Specialist course because of the professional knowledge gained from the Kindergarten AQ experiences stating, "[They were] really beneficial because [in] my first year teaching I had to teach Kindergarten and it was the new FDK [Full Day Kindergarten] program so taking those [AQ] courses really helped. It let me know the shift from old Kindergarten, to Full Day Kindergarten and inquiry-based learning". The transition to Full Day Kindergarten

involved a full day of learning, as opposed to a half-day, and more emphasis on play based learning (Ministry of Education, 2014).

Yet, Jesse's first experience with the Kindergarten AQ courses, was taking Kindergarten, Part 1 at a University located outside the school board where employment was being pursued:

> I did not enjoy taking Part 1 through [University X] because different school boards are at different times…the [AQs] through specific universities usually cater to their school boards. [University X] was [catered] more to the status of [School Board X]. Whereas [for Part 2], [University Y] was more catered to the status of [School Board Y]. (Jesse, personal communication, October 14, 2015)

This perceived challenge was amplified during an uncomfortable moment in an interview for a within School Board Y as Jesse explained, "I thought I was doing great [until] I had an interview at [Elementary School Y]. I started talking about old-style Kindergarten and the principal stopped me and was like, no, we have switched [to Full Day Kindergarten]". However, this experience did not deter Jesse from further professional development endeavours. In fact, after being hired at a different school within School Board Y, Jesse decided to take Kindergarten, Part 2 in the summer to prepare for the classroom:

> For that program [Part 2]…they wanted you to understand…how important documentation was. In Kindergarten, documentation is…the main form of assessment. If you didn't know how to document and engage in play then you were not able to assess those kids correctly. The report card program for Kindergarten is a lot different than it is for all the other grades. There [are] no progress reports and it's like a written essay for report cards. So, it [Part 2] was kind of setting you up for that…In my first year of kindergarten, I was referring back to my course [Part 2] constantly because I found it so helpful. If I didn't take that course [Part 2] I think I would have been a little bit lost. They don't tell you much when you start teaching. Of course you have teachers' college and you have the curriculum documents but they just kind of throw you in and all of a

> sudden you're like, how do I do report cards? (Jesse, personal communication, October 14, 2015)

Jesse also noted the scheduling options the Kindergarten AQ courses offered:

> Sometimes you can take them [AQs] in the summer and go for 10 straight days and the course will be over. Sometimes you can go one Wednesday night and [they] go for 12 weeks and other times you can [do them online]. (personal communication, October 14, 2015)

Then Jesse added, "I've done all mine online". Since they exclusively chose online courses, I asked about the structure and environment of a typical online course, to which they responded:

> When you take a course online you would have to check-in…it would track your hours…you needed to comment on other people's posts…you needed to complete three assignments a week and somehow pair off with somebody else and do assignments with them. (personal communication, October 14, 2015)

Jesse acknowledged the flexibility of online courses was a major benefit, but warned that balancing the courses and regular teaching responsibilities can be taxing, "I took two [professional development courses] during the summer and that was great but, I also took two when I was working and I was truly overloaded".

After completing the Kindergarten AQ courses, Jesse perceived a positive impact on their professional reputation by noting, "I feel like I've become an expert on what Kindergarten is and I find some of the older teachers who have been teaching longer ask me questions when it comes to what the new [Full Day] Kindergarten looks like because of [my experience with] those courses".

Based on the descriptions of ETFO and Jesse, I categorized the Kindergarten AQs as a Training Model. According to Kennedy (2005), professional development programs that follow the Training Model are usually designed with five factors in mind, 1) Introducing

new knowledge, 2) Updating skills to demonstrate their competence, 3) Demonstrating skills specified in a standardized manner, 4) Focusing on coherence and quality assurance, and 5) Commonly delivered off-site. The Kindergarten AQs introduced new knowledge to Jesse about play based learning and the transition to Full Day Kindergarten. This new knowledge also included proper documentation methods, inquiry based learning, guidelines for engagement in play, and assessment techniques. Moreover, the Kindergarten AQs encouraged the use of standardized documentation methods to help teachers in older grade levels understand the strengths and weaknesses of students. The Kindergarten AQs are offered online with one instructor disseminating the course content to the class. Although there are projects where participants were required to work together, the online environment limits the amount of in-person collaboration. Yet, there appears to be an inherent assumption by ETFO that the content of this class is directly mobilized to the classroom.

I used my Training Model categorization and the descriptions of the Kindergarten AQs to develop the key factors which guided my observations. I selected five factors to guide my classroom observations based on their ability to demonstrate the mobilization of professional knowledge. The five factors included, 1) Play-based learning, 2) Documentation of student learning, 3) Responsive Pedagogy, 4) Emergent curriculum, and 5) Facilitating student transitions from home to school. Although the Kindergarten AQs were taken online, there was no technological knowledge that was included for mobilization. Therefore, the knowledge imparted by the Kindergarten AQs fit within Shulman's (1987) PCK framework. It appeared that the content knowledge surrounded play-based learning and documentation of student learning, yet these were also forms of

pedagogical knowledge. The remaining factors provided various forms of pedagogical knowledge.

I observed Jesse demonstrate play-based learning on multiple occasions (observation, January 26, 2016; January 27, 2016; February 2, 2016; February 9, 2016). The classroom had several learning stations spread around the perimeter with a large carpet in front of a white board in the center. Some examples of learning stations were building blocks, sand, and water, quiet reading, an art center and toy animals. I also observed a poster on the wall beside the door of the classroom which described each learning center along with how it contributed to student learning. That chart showed how the content knowledge of the Kindergarten AQs was intended to be mobilized. Moreover, a document provided by Jesse gave a basic outline for the flow of a full day (Anonymous, N.d.) including the regular use of learning stations as a way to engage students in play-based learning while providing the context for documentation. Additionally, I noticed that Jesse regularly moved around the learning centers to engage with students for several minutes before asking questions about what they were building/reading/creating etc. By engaging with students first, Jesse appeared to get a sense of what the students were trying to accomplish before asking pointed questions. This engagement demonstrated the mobilization of the pedagogical knowledge.

In several cases, I saw Jesse engage students in play as a first step to documenting what the student was learning. On one occasion, a student was playing with toy dinosaurs and Jesse played for several minutes before asking the student if they could organize by grouping the dinosaurs by size and height (observation, January 26, 2016). As the student explained their organization strategy, Jesse began to document the student's discourse and

action. Another time, I observed Jesse scatter approximately a dozen toys that differed in type, colour and size across the floor and asked a student if they could group the toys that were alike (observation, February 9, 2016). The student obliged and Jesse asked several questions about their sorting strategies while documenting the process. Interestingly, the documentation actually took place in the form of an iPad recording which they would re-watch later to make physical notes. This technological application was a form of technological pedagogical knowledge which went beyond the expectations of the Kindergarten AQs. Additionally, I witnessed a further example of documentation at the reading center as a student read a book about animals (observation, February 2, 2016). Jesse engaged the student by asking about the book they were reading, and asked if the student could read the book out loud so both of them could enjoy. As the student read, Jesse documented the names of the animals they read correctly and the names of the animals they read incorrectly. Furthermore, I noticed that Jesse made note of the correct use of the book including, reading the title, reading from the beginning of the book and reading the pages in order. These examples showed the various ways that pedagogical knowledge from the Kindergarten AQs was mobilized.

Another factor which the Kindergarten AQs sought to have mobilized was responsive pedagogy. Responsive pedagogy refers to the adaptation of pedagogy to students' cultural strengths. During one observation, Jesse read a story about farm animals to a group of students (observation, February 2, 2016). At the end of the story, Jesse asked students to name other animals that are found on farms. After several responses that focused on traditional North American farms, Jesse listed some farm animals that are typical from other areas around the world.

I observed a poignant example of responsive pedagogy when a new student was introduced to the class (observation, February 9, 2016). The student was new to the country and spoke almost no English. Although the school had a translator, multiple students with language barriers were being introduced in multiple classes. To bridge the language barrier when the translator was not available, Jesse used the translate feature on an iPhone to communicate with the student. Later in the class, Jesse made the iPhone available to students when they wanted to ask the new student to join them at a learning center. This novel application of technological pedagogical knowledge went beyond the expectations of the Kindergarten AQs.

During several observations, Jesse also engaged with an emergent curriculum. I observed one example when a student at the building blocks learning center had created a tall structure that was approximately one meter tall (observation, January 26, 2016). Jesse asked questions about the strength of the structure that encouraged the student to think about how it was built and how they could make it more stable. Moreover, Jesse encouraged the student to add another structure that resembled a famous Canadian tower. I also observed Jesse employ an emergent curriculum during the 100th day of the school year (observation, February 2, 2016). Jesse used the event as a counting exercise. They asked students to count aloud to one hundred. Jesse would stop them when they reached various numbers and talk about what happened on that particular day. Afterward, they asked students if they could determine which day their birthday fell on or, for those with summer birthdays, how many total days were in a full school year. In the first example, the application of emergent curriculum was spontaneous, in the second example, the

application of emergent curriculum was planned. In both cases, Jesse mobilized the pedagogical strategies surrounding emergent curriculum.

I noticed Jesse facilitate student transitions from home to school in multiple ways. First and foremost, students were expected to put on their winter clothes when going outside and put away their winter clothes when entering the classroom. If a student was particularly slow, or decided to throw their clothes on the ground, Jesse addressed the student immediately and asked whether they would behave like that at home. In one case, a student said their parents always pick up after them, to which Jesse politely asked if they could call the student's parents to confirm whether this was true. Immediately the student picked up their winter coat and apologized for lying (observation, January 27, 2016). Another example of facilitating student transition was demonstrated when Jesse began the class by discussing good school habits including bring a lunch, appropriate winter clothing, respecting adults, and saying please and thank you (observation, February 9, 2016).

5.3.3. ETFO Book Club

Taylor elected to discuss book clubs as a memorable professional development experience. More specifically, an ETFO Book Club in which the resource focused on elementary mathematics.

For teachers, book clubs can be a valuable tool which give individuals the opportunity to employ a resource in their classroom and discuss strategies with other colleagues. Although school boards and sometimes individual schools can create book clubs, one of the largest facilitators of book clubs for teachers is ETFO. However, unlike the AQ courses which ETFO develops, the Book Clubs do not impact a teacher's position within

the pay matrix and the only cost is the resource itself. Additionally, ETFO Book Clubs allow teachers the opportunity to select a resource and offers a facilitator who guides teachers through the resource over several sessions (ETFO, 2015). ETFO provides a comprehensive list of resources for teachers including but not limited to: *Engaging Primary Learners through Play*, *Social Justice Begins with Me*, *Thinking Mathematically*, *Special Education Handbook*, *Punished by Rewards* and *Classroom Management that Works*. The titles range in topic, applicability and target audience which makes the Book Club flexible to the particular needs of teachers and students. Taylor discussed the book club experience in general, but went into detail regarding an ETFO Book Club surrounding elementary mathematics.

In recent years, Taylor elected to participate in ETFO Book Clubs and noted, "I participated in sort of the same one a couple years in a row and it was a[n] [ETFO] Book Club". Following this, Taylor explained how a typical ETFO Book Club was structured:

> We got to…choose a resource to dig a little deeper into, and talk with other teachers who are reading and trying out that same resource. Then we would go try out the things [in our classrooms] and the next month we would discuss what we had done and some of the strategies from the book we had used. (Taylor, personal communication, October, 22, 2015)

Taylor went into further detail regarding a recent ETFO Book Club revolving around elementary mathematics, "We had talked about open-ended math (*sic*) questions so, moving away from worksheets and you're [the students] gonna (*sic*) solve it this way to, putting more of the emphasis on how the student learns and how they problem solve". The notion of open-ended mathematics problems was one of the main features which drew Taylor to this ETFO Book Club resource. The experience changed the perception Taylor had of how mathematics problems were presented and noted, "These general

open-ended questions have different access points where students can plug themselves in and it can be at varying levels…" (personal communication, October 22, 2015).

Taylor also noted the iterative structure allowed participants to apply what they had read, then reflect on the effectiveness with other teachers by explaining, "then…we all come together and talk[ed] about the different strategies at the end…so that was great to talk about" (personal communication, October, 22, 2015). In this particular ETFO Book Club, the collaboration was not limited to teachers using an identical resource, as Taylor pointed out, "there was another group in that Book Club and they were doing a different math (*sic*) book and so they had…strategies that they were practicing and reading and we could all talk about these strategies and how they transferred into the classroom". The format of this Book Club placed value on collaboration which aligned with the aspect of professional development which Taylor values most, as they reflected, "whether it's teachers from the same board, getting together at professional development, or if it's some teachers who are starting and some teachers who are going back to get a little bit more of that training or experience".

Even though ETFO Book Clubs allow teachers to select the resource, Taylor was aware of the challenges that option brought:

> We had the chance to pick the resource so that would be good and bad. If you picked a book that you thought you'd be interested in and then it turned out to be a little bit different, than it might not work out as well. The second one I did is all about inquiry in the natural world…so it was talking about how you can integrate learning lessons…out in nature and taking different aspects of nature and applying them to the curriculum and the classroom. It was cool and it was interesting but, it wasn't something I used as much in the classroom as I did the math (*sic*) book. (personal communication, October 22, 2015)

Nevertheless, Taylor preferred having the option to select a resource rather than being told which resource to implement in the classroom, which they explained, "our school was part of a literacy initiative and…they [the school board] just said, okay, read these couple chapters and come and discuss…we were all coming from different areas [grade levels] and so it wasn't as beneficial because it wasn't a resource people had used and were trying".

I categorized the ETFO Book Club as a Community of Practice model of professional development to guide my observations. Several aspects of the ETFO Book Club demonstrate the factors essential to Kennedy's (2005) use of the Community of Practice model (Lave & Wenger, 1991) of professional development. First, the continued collaboration with others, including the ETFO official, for the overall benefit of group showed the evolving forms of mutual engagement. The monthly meetings gave participants the opportunity to tune their enterprise, through candid discussions regarding pedagogical strategies. Additionally, the ETFO Book Club offers a resource filled with new content and pedagogical styles which can help participants develop their repertoire, style and/or discourses.

Given the descriptions of the ETFO Book Club and my Community of Practice categorization, I identified four key factors which could demonstrate the mobilization of knowledge to the classroom. These factors included, 1) Using open-ended problem solving, 2) Encouraging student collaboration, 3) Fostering different types of thinking, and 4) Discussing the applications of a problem solving strategy. Additionally, the ETFO Book Club did not include the application of any technological knowledge which meant the knowledge was categorized using Shulman's (1987) PCK framework. The content

knowledge focused on open-ended mathematics problems and the pedagogical knowledge focused on the strategies surrounding student collaboration, student thinking, and applying problem solving strategies.

I observed Taylor employ open-ended mathematics questions to give students the opportunity to try out different problem solving strategies. On one occasion, Taylor created a word problem surrounding the amount of food needed for a school wide lunch (observation, February 1, 2016). Students needed to estimate the number of people attending and then estimate the amount of food each person would eat. Since the estimations varied, there were many possible solutions. Moreover, Taylor repeatedly reminded students as they worked on the problem that as long as they showed their work, different solutions could be equally correct.

Another example I observed was during a fraction lesson (observation, February 10, 2016). Taylor gave students a square piece of paper and asked them to fold it in half four times. Once unfolded, the resulting paper had 16 equal sized squares. Then Taylor asked students to shade half the paper as a way to demonstrate lowest common denominator. Some students shaded vertically, some shaded horizontally and Taylor shaded half the squares in a checkered pattern. The class then discussed if these were all suitable responses and if $\frac{1}{2}$ was equal to $\frac{2}{4}$, and $\frac{8}{16}$ based on the shaded patterns.

I observed Taylor encourage student collaboration on multiple occasions through group work. During one observation, Taylor gave students a problem surrounding the multiplication of fractions and told them to work with the person beside them (observation, February 11, 2016). The use of these ‘elbow partners’ was prevalent during

number strings, lessons and classwork (observation, January 26, 2016; February 1, 2016; February 10, 2016; February 11, 2016). However, Taylor employed other types of student collaboration. During another observation, Taylor split the class into four large groups of students for a multi-part word problem on poster sized paper (observation, January 26, 2016). They asked students to work together to develop a solution, and directed the groups to organize themselves into sub-groups to address different parts of the word problem. Once these smaller groups had a solution for each part, the group designated one group member to write their final responses on the poster paper and tape their paper to the wall. Additionally, once each group had completed the task, students had the opportunity to go around the classroom on a 'gallery walk' to observe the other groups' work. A benefit to the 'gallery walk' was that it showed students different ways in which the groups thought about, and solved, the problem. However, this 'gallery walk' was a strategy from a school board document (School Board Y, 2012) and not indicative of the pedagogical knowledge from the ETFO Book Club.

Another factor which guided my observations of Taylor's classroom was fostering different types of student thinking. At the beginning of class during number strings, I noticed that Taylor would ask students to explain their thinking before providing a solution. Each time a student employed a problem solving strategy that had not already been used Taylor invited them to write the strategy on the board (observation, January 26, 2016; February 1, 2016; February 10, 2016; February 11, 2016). Moreover, Taylor created an anchor chart that displayed the different strategies that could be used to solve multiplication problems. The use of an anchor chart and 'gallery walk' are aligned with a document Taylor provided (School Board Y, 2012). This document explored various

ways to engage students in mathematic problem solving, namely through anchor charts and gallery walks. Additionally, Taylor had highlighted important points about the 'gallery walks' and added several notes to the document, including where the anchor charts should be located in the classroom and an extra example of a problem solving strategy.

5.4. Summary

In this chapter, I explored the participants' interview responses, my classroom observations and teacher-generated documents to determine the participants' opinion of and experience with 1) the groups who disseminate professional development, 2) important aspects of professional development, and 3) individual experiences.

There are three main groups who disseminated professional development to the participants in my study, namely 1) ETFO Additional Qualification, 2) School Board Initiatives, and 3) School Level Initiatives.

The participants had mixed opinions regarding Additional Qualifications (AQ). They were aware of, and grateful for, the positive impact on their income, the professional knowledge they received, and the expanded teaching opportunities as a result of their participation. However, the personal costs associated with AQs were a major concern. In contrast to the AQs, participants did not mention the personal costs associated with school board initiatives. Instead, participants focused on the number of professional development experiences and the learning environment in which they took place. The number of experiences were closely tied to the participants' desire to continue their own education, and the learning environment was praised as being more hands-on than the theory based

AQ courses. Although there were concerns expressed about the accessibility of the school board initiatives the participants largely had positive experiences.

The participants dissociated the school level initiatives from professional development, instead choosing to euphemize the programs as workshops. However, many of the technological skills they learned about translated directly into their classrooms. Moreover, the school level initiatives had a strong collaborative element including, in one case, the students. Despite the euphemism, the participants viewed the professional development at the school level as an overwhelmingly positive experience.

Throughout the participants' interviews, collaboration and personal/professional goals were identified as the most important aspects of professional development. Collaboration was important to participants because of the expertise and support they received in the group dynamic. The personal/professional goals wove together the general pursuit of education and the specific addressing of classroom needs.

The individual experiences that participants had with professional development were largely positive. Alex and Pat both enjoyed the CIL-M because it offered collaboration, support and reflection in an iterative process. However, the CIL-M proved repetitive after multiple years which detracted from the freshness of ideas. The Kindergarten Training was a pair of AQ courses (Kindergarten, Part 1; Kindergarten, Part 2) completed through two different ETFO providers. Together, they laid the groundwork for documentation and assessment guidelines while putting Jesse on the path to Kindergarten, Specialist designation. Moreover, they were offered online which fit better with the schedule of Jesse. The ETFO Book Club gave Taylor new ideas and resources to implement in the

classroom and offered a strong collaborative element. However, being given the opportunity to choose a resource is fraught with challenges and can derail the experience if it is not applicable in the classroom. I have explored the results of data and can now discuss the similarities, differences, connections and implications in the following chapter.

Chapter 6

6.0. Discussion

In this chapter I will discuss the implications of the data I collected from participants. For clarity I will follow the same pattern of sections as the Results: 1) Characterization of Professional Development, 2) Opinions of Professional Development, and 3) Experiences with Professional Development.

6.1. Characterization of Professional Development

Participants described three levels of professional development and I will address the themes from each level individually before summarizing the results. In doing so, I will compare the participants' perceptions, descriptions, and actions with respect to each level of professional development.

6.1.1. Additional Qualification courses

Participants agreed that the cost of AQ courses was a major barrier to their participation, with several comparing the cost to post-secondary courses. This comparison was not surprising since many universities are providers of AQ courses. However, all of the participants had taken at least four AQ courses and Pat had taken nine. Moreover, Jesse and Pat indicated they would be taking more AQ courses. The suggestion that cost was a barrier to participation was not reflective of past experience, and for two participants was not indicative of future endeavours. Perhaps this perceived barrier was a result of the high cost of AQ courses in comparison to school-board initiatives or school-level initiatives which are considerably less expensive.

Although participants had different reasons for taking AQ courses, the impact on income was a common theme. Jesse explained that the impact on income was an appealing factor. Similarly, Alex admitted that they had taken some courses for the impact on income but, listed specific outcomes to demonstrate how others had been practically motivated. In contrast, Pat and Taylor denied that income was a motivating factor for taking AQ courses but, were aware of the impact on others. Indeed, Pat was mindful that taking AQ courses strictly for the impact on income was a common occurrence within their community of colleagues. Jesse was the only participant who viewed the impact on income as an authentic motivating factor. Yet, Jesse was also the only participant who had not reached the top of the pay matrix. Alex had recently reached the top of the pay matrix and both Pat and Taylor had taken several AQs since reaching the top of the pay matrix. Therefore, it appeared that participants who had reached the top of the pay matrix were more practically motivated than those who had not.

In contrast to the participants, the providers of AQ courses, such as ETFO, place emphasis on providing content which could, in theory, positively impact teachers' pedagogy and potentially student learning. Moreover, they suggest that given the quality of the program the cost is fair and the impact on income is an incidental benefit. However, participants focused on these factors in reverse order. The course cost was considered a major barrier to participation, albeit a perceived one, and only when the impact on income was reduced or eliminated did the motivating factors shift to the impact on teaching. Thus, there appears to be a disconnect between the organizational goals of AQ providers and the personal goals of participants.

6.1.2. School Board Initiatives

Participants tended to frame their experiences with school board initiatives in comparison to their AQ experiences. They viewed school board initiatives as a good professional development alternative which had minimal personal costs. Only, Pat appeared to recognize the cost of school board initiatives to the school board. Unsurprisingly, they were the most supportive about the school board creating and developing professional development programs. The other participants appeared appreciative yet, were more interested in listing the number of school board initiatives that they had taken. I found that participants' enthusiasm for school board initiatives was rooted in their ability to access low cost professional development.

Another comparison participants made between school board initiatives and AQ courses was the learning environment. Both Alex and Pat preferred the hands-on learning offered by these initiatives rather than the online courses offered by AQ courses. Pat was particularly critical of online courses as a medium for collaboration. Yet, neither Alex nor Pat mentioned the AQ courses that offer blended or onsite formats. On the other hand, Jesse and Taylor were critical of the limitations of school board initiatives. Jesse criticized the limited size of course classrooms and Taylor felt there was a limited course selection. Although both admitted they continue to pursue school board initiatives, they felt the wider selection of AQ courses allowed for easier entry and content more related to their interests. Yet, they did not appear to consider that AQ courses are offered across the province by a large number of providers which can offer a larger amount of classrooms and variety of course content than a single school board. Interestingly, when participants compared school board initiatives to AQ courses, their positions were contradicted by an incomplete view of the other level of professional development. Alex and Pat neglected

the hands-on learning that was offered by some AQ courses, and Jesse and Taylor did not consider the effect geographical boundaries had on school board initiatives. So, the participants seemed focused on espousing their preferred level of professional development rather than engaging in a balanced comparison.

6.1.3. School-Level Initiatives

Several participants did not appear to consider school-level initiatives as professional development. Yet, they were aware that these initiatives, facilitated by Learning Resource teachers, offered professional knowledge that could have a direct benefit to their classroom. Moreover, I observed some of the ideas and skills from these school-level initiatives such as the application of iPads and Chromebooks being employed in the classroom. My observation of the skills being mobilized suggested the school-level initiatives were effective. Nevertheless, participants hesitated to label these school-level initiatives as professional development programs suggesting instead, they were just workshops. It appeared the participants distanced these programs from professional development since they focused on skills training. Perhaps they considered the notion of basic technological application as a lesser form of professional development.

To that point, when Jesse described a collaboratively developed school-level initiative there was not the same type of dissociation. Jesse was positive about the Collaborative Planning program which was created, and developed, by teachers from their school. In fact, the program drew so much interest that it had to adapt to accommodate the increasing numbers. The interest may have been derived from the effectiveness but, it also seemed that there was a social component which drove colleagues to join the program. Yet, the technologically based initiatives appeared effective without this

collaborative element or even recognition as professional development. So, the effectiveness of these school-level initiatives seemed to be driven by the applicably of content and the bottom-up facilitation of the school-level initiatives.

6.1.4. Summary

In sum, the participants' characterization of professional development revealed several implications. First, the major criticism of AQ courses was perceived and did not inform behaviour. However, there did appear to be a separation between the organizational goals of AQ providers and the personal goals of participants until the impact on income was removed. Unlike the perceived cost barrier, this separation did appear to have an effect on the behaviour of participants.

Second, school-board initiatives were consistently compared to AQ courses but, did not take a full view of what, and how, each level of professional development is offered. Aside from the minimal personal costs, the participants' comparisons seemed biased toward their preferred level of professional development and not reflective of the actual options available.

Last, the school-level initiatives were developed and facilitated by colleagues. Although participants avoided the label of professional development when the program was facilitated by one colleague, like the Learning Resource Teacher, the label was not avoided when the content was collaboratively developed. Yet, both forms of school-level initiatives appeared effective. So, the bottom-up facilitation seemed more important to effectiveness than whether participants viewed their experience as professional development. In sum, at all levels of professional development there was some misalignment between what the participants described and how the participants behaved.

6.2. Opinion of Professional Development

In this section, I will explore themes associated with participants' opinions regarding the important aspects of professional development. To do so, I will compare participants' opinions with their behaviour to determine the cogency of their claims.

6.2.1. Collaboration

Alex and Taylor described collaboration as the most important factor of professional development. More specifically they relished collaboration for the exposure to the ideas and experiences offered from colleagues. Moreover, both participants selected professional development programs in which collaboration was integral to their memorable professional development experiences. In fact, I observed Alex expand this interest beyond the context of formal professional development when discussing a relevant lesson with a colleague. Furthermore, both participants consistently incorporated collaboration in their classroom through group work to encourage student learning. Hence, Alex and Taylor appeared to foster collaboration as an effective learning strategy for students, which aligned with their own support and experience with collaboration.

While Jesse did not label collaboration as the most important factor of professional development, they did offer an explanation of the NTIP program experience which incorporated collaboration. Indeed, the one-to-one collaboration of the NTIP program presented a mentoring model of professional development which Kennedy (2005) considered a successor of the collaborative model. This program informed some forms of professional knowledge which I observed, such as the inclusion of music in classroom lessons. Although Jesse did not label collaboration as the most important factor of professional development, they made special note of an experience which incorporated

collaboration. It appeared that collaboration can be effective even when it is not considered the most important aspect of professional development.

Jesse and Taylor also expressed concerns with collaboration. Taylor expressed concerns when teachers from different grades were expected to collaborate, and Jesse expressed the challenges of collaborating with teachers who lacked interest. In both cases, the challenges centered on others within the program, but they differed in the ability for program design to address the challenges. Perhaps if a professional development program is designed for teachers of a specific grade, or specific content area, Taylor's concerns could be addressed, however, Jesse's criticism of other participants' motivation seemed beyond the scope of program design. The difference may be due to the different values each placed on the importance of collaboration as it pertains to professional development. It may also speak to the amount of consideration they had given to the benefits and challenges of collaboration.

6.2.2. Personal/Professional Growth

Participants discussed personal and professional growth separately by describing either the importance of continued learning or addressing specific needs of their students. Alex was concerned that without continued learning they may fall into a routine which neglected new ideas and information regarding pedagogy. Similarly, Taylor noted the constant development of new educational research as a reason for continued learning. After explaining why continued learning is important, Alex, Jesse, and Taylor each described experiences which addressed specific classroom needs. These experiences surrounded content such as Aboriginal learning, Special Education, and Full Day Kindergarten. I noticed that when participants described the general pursuit of continued

learning they sought personal growth, and when addressing specific student needs they sought professional growth. Although they did not make direct reference to the relationship between personal and professional growth, it seemed that participants were aware of the relationship by explaining their interest in continued learning followed by specific instances.

6.2.3. Summary

The most important aspects of professional development to the participants in this study were collaboration and personal/professional growth. Both those who did, and those who did not label collaboration as the most important aspect of professional development appeared capable of mobilizing professional knowledge obtained from programs in which collaboration was integral. However, it appeared that those who labelled collaboration as the most important aspect of professional development were better able to provide actionable criticisms such as creating professional development programs for teachers of a specific grade.

Participants also used professional development as an avenue to strive for personal and professional growth. Although they addressed each type of growth separately, there appeared to be an understanding that they were related. Therefore, participants were able to demonstrate that their opinions regarding their most valued factors of professional development were informed by their experiences.

6.3. Professional Development Experiences

In this section, I will investigate the detailed descriptions of participants' memorable professional development experiences to understand the extent to which they mobilized

the corresponding professional knowledge into their classrooms. First, I will compare the participants' descriptions of their experiences with the facilitators' description of the professional development programs to determine if the programs were conducted as intended. Then, I will compare the participants' actions during my observations to each of the main factors I developed to gauge the degree to which the goals and expectations of the professional development programs were mobilized.

6.3.1. CIL-M

The CIL-M was detailed by both Alex and Pat as their memorable professional development experience. In addition to my comparison of intended professional development program and participant experience, there were four factors which I investigated to gauge the participants ability to mobilize knowledge from the CIL-M into their classroom: 1) Employing open-ended problem solving, 2) Encouraging student collaboration, 3) Fostering different types of student thinking, and 4) Discussing applications of a problem solving strategy.

6.3.1.1. Intended Course versus Participant Experience

Based on the descriptions of the CIL-M, there was a strong indication that the program was being conducted as the LNS intended. A LNS officer facilitated the development of a lesson prior to an in-class demonstration. Additionally, both Alex and Pat described a collaborative critical reflection based on the in-class lesson. Furthermore, the process was repeated throughout the school year so other teachers could develop and demonstrate lessons based on collaboration and their own inquiry. However, there was no evidence that showed the CIL-M was addressing the participants' concerns regarding the repetition of content year over year. Yet, there was no indication that the participants expressed

these concerns to the facilitators of the CIL-M. Moreover, the structure of the CIL-M suggested that participants develop the content for their mathematics lesson, hence, they bear some of the responsibility for a lack of new ideas.

6.3.1.2. Open Ended Problem Solving

Both participants consistently employed open-ended problem solving through a variety of methods. The number strings had the dual role of reviewing previous lessons while employing open-ended problem solving strategies. Indeed, both Alex and Pat employed number strings prior to their mathematics lesson. Since students appeared to enjoy number strings, it also appeared to be an effective way to get students thinking about mathematics. In addition, the participants employed open-ended problem solving during the work period of the class, however, I observed this strategy slightly less often than number strings. Alex devoted some work periods to practicing a specific problem solving strategy and Pat sometimes extended the duration of number strings and the mathematics lesson into the work period. In both cases, participants used the work period to address a specific goal rather than allowing students to explore their own learning. However, I found that through my observations, and the teacher-generated documents, that both participants appeared to actively mobilize the open-ended problem solving central to the CIL-M expectations.

6.3.1.3. Student Collaboration

The CIL-M also provided the encouragement of student collaboration as an important factor. To that point, both Alex and Pat regularly asked students to confer with others in close proximity during number strings. In fact, Pat used this practice so often that students

seemed to instinctively sit beside partners which the class referred to as ‘math buddies’. In contrast, Alex encouraged students to collaborate with a variety of others rather than prescribing one set pairing. Neither strategy appeared more, nor less, effective than the other, but in both cases collaboration was encouraged. It is worth noting that students in Alex’s classroom appeared to have more established social circles, whereas, Pat’s students seemed more open to socialize with any other student. Thus, the participants’ encouragement of student collaboration during number strings was underpinned by their understanding of the social dynamics within their classroom.

In addition to number strings, Alex encouraged student collaboration through group work in all but one observation. However, it appeared that group work had become so ubiquitous to their pedagogy that when students misbehaved it was removed as a form of punishment. Even though students responded with good behaviour, the removal of a preferred method of pedagogy due to external forces did not appear to completely represent the intended mobilization of student collaboration as prescribed by the CIL-M.

6.3.1.4. Different Types of Student Thinking

In addition to encouraging student collaboration, the CIL-M stressed that participants foster different types of student thinking. Both Alex and Pat made an effort to foster different types of student thinking. Alex demonstrated this effort during number strings when a student exaggerated their minor error into a potentially disruptive situation. By addressing the student immediately, Alex defused a potentially disruptive situation and appeared to shift the student’s negative attitude to a positive attitude. Furthermore, Alex reinforced the positive attitude by calling on the student later in number strings. Similarly,

Pat attempted to change student thinking when a student was upset about the unavailability of their preferred 'math tool'. Pat used this opportunity to explain why the mathematic tools are interchangeable and the benefits of sharing and collaboration. Although both participants were able to provide an example of how they attempt to foster different types of student thinking, it appeared to be reactionary behaviour. Moreover, they responded to students' attitudes in specific situations which may have affected students' short-term thoughts about mathematics but may have less impact on students' long-term dispositions regarding mathematics. Therefore, the participants appeared able to mobilize the professional knowledge when necessary but, in my opinion, could have been more active in their fostering of different types of student thinking for long-term effectiveness.

6.3.1.5. Applications of Problem Solving

Finally, the CIL-M stressed that for deeper comprehension, participants should describe the applications of the problem solving strategies being employed. The participants appeared to demonstrate the applications of problem solving strategies with varying levels of effectiveness. Both Alex and Pat created word problems which related to situations that students may encounter in their daily life. Moreover, food was the most popular way they related problem solving strategies to students. In addition to problems related to food, Alex created a relatable word problem surrounding the capacity of an Mp3 player to engage students on a deeper level. In fact, I observed the problem solving strategy being applied by students after the work period to solve a personal problem. Although Pat devised a problem related to a skating field trip, the relatability appeared to go beyond the comprehension of students. Thus, Alex seemed more capable of relating

problem solving strategies to real life situations than Pat but, both were able to demonstrate the same applications of problem solving strategies.

6.3.2. Kindergarten Training Programs

Jesse detailed both Kindergarten, Part 1 and Kindergarten, Part 2 AQ courses as their memorable professional development experience. In addition to my comparison of the providers of the professional development programs and Jesse's experiences, there were five factors which I compare to Jesse's actions to gauge their ability to mobilize the professional knowledge from the Kindergarten AQ courses into their classroom: 1) Play-Based Learning, 2) Documentation of student learning, 3) Responsive Pedagogy, 4) Emergent Curriculum, and 5) Facilitating students transition from home to school.

6.3.2.1 Intended program versus Experience

The professional development experience Jesse described included two connected Kindergarten AQ courses. ETFO described the courses as a way to create, design and explore the forms of play-based learning expected in Full Day Kindergarten. Although Jesse described Kindergarten, Part 2 in a manner which aligned with ETFO specifications, Kindergarten, Part 1 appeared to be more aligned with Half Day Kindergarten, the predecessor of Full Day Kindergarten. Jesse blamed the facilitator of Kindergarten, Part 1 and suggested the school board in which the facilitator operated was not held to the same standard as the other school boards. Strangely, this suggestion was both correct and incorrect. It was true that the facilitator's school board had not rolled out the Full Day Kindergarten which may have resulted in content that was not applicable. However, it was incorrect to suggest the facilitator was held to a different standard. Based on Jesse's years of experience it appeared their participation in Kindergarten, Part 1

coincided with a five year roll out of Full Day Kindergarten across the province. Furthermore, it appeared the school board in which Jesse took Kindergarten, Part 1 had not yet transferred to Full Day Kindergarten. Had Jesse taken the course one or two years later, the roll out would have been completed and it may have prevented an awkward interview experience. Nevertheless, it was surprising the provider of the AQ course, which is expected to facilitate the implementation of the Ministry of Education's curriculum to be approved by the OCT, seemed unaware or unwilling to adapt their content to the upcoming Full Day Kindergarten. Hence, Kindergarten, Part 1 was technically conducted as intended but, given the expectations of the OCT and the related content in Kindergarten, Part 2, I felt the program was not conducted as intended despite the extenuating circumstances. However, this experience did not deter Jesse from participating in Kindergarten, Part 2, indeed, it appeared to be a catalyst for their enrollment. Moreover, Kindergarten, Part 2 seemed to be conducted as ETFO intended. Jesse noted the play-based learning and documentation as the main tenets which aligned with the goals of the Kindergarten AQs. Given the unfavourable experience and the different focus of the programs, I thought Jesse was at a disadvantage to confidently and consistently mobilize knowledge from the Kindergarten AQ courses. However, I should have focused on the enthusiasm that Jesse expressed for completing Kindergarten, Part 2 rather than their disappointment with the Kindergarten, Part 1 experience.

6.3.2.2. Play based learning

The importance of play-based learning to Full Day Kindergarten was a main feature of the Kindergarten AQs. The physical layout of Jesse's classroom and their mobilization of pedagogical knowledge reflected the importance of play-based learning. In every

observation, Jesse engaged students in play-based learning at the various learning centers around the classroom. Much like the AQs' expectation for play-based learning, Jesse engaged students in play-based activities to gain an understanding of what students attempted to accomplish and create the context for documentation. Additionally, the teacher-generated documents showed the majority of the school day was reserved for learning center activities. Therefore, Jesse competently mobilized the professional knowledge regarding how to engage students in play-based learning.

6.3.2.3. Documentation of student learning

After Jesse used play-based learning to create the context, I observed the documentation of student learning on multiple occasions. Moreover, Jesse documented different students engaging in different types of learning in different ways. In some cases, the learning situation appeared somewhat contrived to ensure the documentation was related to specific learning outcomes. However, more often Jesse engaged students in a learning activity and after several minutes of observation documented the learning outcomes from the students' responses to pointed questions. The Kindergarten AQ courses focused on correct documentation methods to provide accurate student assessment more than creating the situation in which documentation takes place. Yet, when placed alongside the focus on play-based learning it appeared that organic documentation was preferred. Perhaps, this form of documentation is ideal but, I found that a classroom of Kindergarten students can be somewhat chaotic which made any sort of documentation challenging, let alone organic documentation.

In addition, I observed Jesse document some students multiple times and others not at all. Although I could not discern an order for documenting student learning, I recognized that there were other times during the instructional day when students were engaged in play at learning centers. Therefore, I could not be certain that there was not a larger pattern of student documentation.

Jesse employed an iPad as a tool for documentation which was particularly interesting because it incorporated technology in a novel way and went beyond the expectations of Kindergarten, Part 2. This digital documentation allowed Jesse to create a detailed file of each student and was a practical solution to the potentially illegible process of physical documentation. Furthermore, they could watch the video as many times as needed which could increase the accuracy of documentation. In the Kindergarten AQs, accurate documentation was an important feature but was conveyed as a standard practice not through technological application. The only challenge which Jesse may need to address was the seemingly random order of student documentation. Nevertheless, Jesse demonstrated the documentation of student learning on a regular basis that surpassed the expectations of the Kindergarten Training AQ courses.

6.3.2.4. Responsive Pedagogy

The Kindergarten AQs may have been able to define responsive pedagogy and give examples but, by definition, responsive pedagogy is a reactive practice. Demonstrating responsive pedagogy was particularly challenging for Jesse during my first couple of observations because their classroom had very few cultural minorities and one occasion all three were absent from class. However, when a new student with a unique cultural

background was introduced to the class, Jesse provided a method of overcoming a significant language barrier which resulted in increased communication, learning, and socialization. By the end of class, I observed bilateral communication between the new student and other students about their interests and hobbies. Jesse was able to nurture the cultural strengths of the new student, in this case language, to provide a sense of well-being which typified the responsive pedagogy conveyed by the Kindergarten AQs.

6.3.2.5. Emergent Curriculum

Much like responsive pedagogy, emergent curriculum is largely a reactive practice. The Kindergarten AQs can offer tools and examples for implementation but, the responsibility rests with the participant to mobilize the knowledge. I observed Jesse employ an emergent curriculum while engaging students at learning centers. Typically Jesse briefly observed students before asking a series of pointed questions that would encourage the students to explain what they were doing. In some cases, it appeared that Jesse sought specific learning outcomes from the questions and would document student responses. However, in other cases, the questions were designed to foster the students' interests at the time of the interaction and resulted in no documentation. Both types of engagement fit comfortably within the Kindergarten AQs goals for emergent curriculum. On another occasion, Jesse planned a short lesson in which the 100th day of the school year was used to facilitate a counting exercise. The students appeared engaged and Jesse seized the opportunity by asking students to employ their counting abilities to other important days which related to them. Based on my observations, Jesse seemed able to understand and apply the Kindergarten AQs tools for emergent curriculum.

6.3.2.6. Facilitating Student School Transitions

In Full Day Kindergarten, many students are experiencing an extended period away from their parents for the first time. Therefore, facilitating student transitions from home to school was integral to Kindergarten AQ programs. Jesse fostered the student transition in the form of classroom rules. Among others, the rules dictated that students clean up after themselves. They enforced these rules consistently and would amicably confront students if the rules were broken to give them the opportunity to adjust their behaviour. Facilitating the student transition from home to school is a challenging and long term process so, my observations could only capture a glimpse into the process. However, the mechanisms were in place and Jesse consistently reinforced the behaviour which was sought.

6.3.3. ETFO Book Club

Taylor described an ETFO Book Club as their memorable professional development experience. Aside from my comparison of ETFO's description of book clubs to the professional development experience, I will explore the factors which I developed for my observation. Like the CIL-M experience of Alex and Pat, Taylor's experience in the ETFO Book Club had four factors which I investigated to gauge the participants ability to mobilize knowledge into their classroom: 1) Employing open-ended problem solving, 2) Encouraging student collaboration, 3) Fostering different types of student thinking, and 4) Discussing applications of a problem solving strategy.

6.3.3.1. Intended program versus Experience

Taylor described the general structure of ETFO Book Clubs and went into detail about a specific experience in which they investigated a resource on mathematics pedagogy. The ETFO Book Club resource was selected by the participants who would meet on a monthly

basis to discuss what strategies they had employed and the strengths and weaknesses of these strategies. Moreover, each meeting was facilitated by an ETFO officer who was present to guide participants through the content and explore alternative options for strategies. At that point, the Book Club had been conducted the way in which ETFO intended. However, Taylor's experience went beyond the ETFO's expectations as the Book Club was paired with another Book Club investigating a similar mathematics resource. This additional level of collaboration may have been due to a limited number of ETFO officers available or perhaps, it was a feature which ETFO omitted from their description of the Book Club. In any case, it provided additional voices and ideas which Taylor valued without diminishing the expected experience.

6.3.3.2. Open Ended Problem Solving

Taylor primarily employed open ended problem solving during the daily lesson and student work periods. Their lesson surrounding lowest common denominators included a hands-on example in which students could arrive at the solution in multiple ways. Moreover, Taylor chose an esoteric representation of the solution so students could compare and discuss their representations of lowest common denominator together before explaining how the ideas all connect. Similarly, during a work period Taylor provided a word problem which allowed students the opportunity to employ different problem solving strategies that resulted in many different, but equally correct, solutions. Both examples were indications that the open-ended problem solving developed in the ETFO Book Club could be mobilized. However, I did not observe open-ended problem solving in every lesson or work period. In fact, there were several occasions when I thought Taylor had the opportunity to employ open ended problem solving but elected to offer

students traditional question/answer problems. Nevertheless, when Taylor employed open ended problem solving, the results appeared effective.

6.3.3.3. Student Collaboration

In contrast to the open-ended problem solving strategies, Taylor encouraged student collaboration in all of my observations. Most classes began with number strings in which Taylor often asked students to discuss responses with their 'elbow partners' before accepting a solution. These 'elbow partners' were also one form of group work which they employed during work periods. The use of 'elbow partners' during number strings may have been application of an ETFO Book Club strategy but, the extended application of group work showed that student collaboration appeared to be ingrained within Taylor's mathematic pedagogy.

On one occasion, Taylor constructed three different sized groups for students to collaborate within to solve a multi-part word problem. Initially students separated into four large groups to solve the problem. Then Taylor separated the large groups into smaller groups and each addressed an individual part of the problem. Additionally, once the students had put the solution together, back in the large groups, students participated in a 'gallery walk' which allowed comparison and discussion about the strategies of other groups. However, the 'gallery walk' was derived from a document provided by the school board's Learning Services website and not the ETFO Book Club. Additionally, due to the amount of time and resources required for students to complete this problem, this style of group work did not appear to be a regular occurrence. More often, Taylor encouraged student collaboration by placing students in small groups during the work period to solve

problems based on the daily lesson. It seemed that Taylor was capable of mobilizing the techniques from the ETFO Book Club, and other sources, which would encourage student collaboration.

6.3.3.4. Different Types of Student Thinking

Taylor fostered different types of student thinking in multiple ways. Primarily, students were asked to explain their thinking whenever they asked a question or gave a solution. This strategy was especially prevalent during number strings in which every students' response required an explanation. As a reward for a well-thought out response, Taylor sometimes asked students to come to the front of the class to explain their thinking while writing their response. It seemed like the reward was a strategy being adopted from the ETFO Book Club but, I thought it should be reconsidered. It slowed down number strings which interrupted the lesson and work period and some students would reject the offer due to shyness. Although Taylor assured students their answer were correct, placing students in a potentially anxious situation could discourage participation in number strings altogether. Interestingly, Taylor successfully mobilized this application of a Book Club strategy to foster different types of thinking, yet it produced the opposite of the expected results. It is possible the Book Club was ongoing which would have explained the discrepancy, but the separation between our interview and my observations suggested, the Book Club had been completed and Taylor simply did not mobilize this particular strategy.

The use of 'gallery walks' and 'anchor charts' was another method Taylor employed to foster different types of student thinking. Both tools gave students the opportunity to

observe different strategies that others had employed. The ‘anchor charts’ offered the various strategies that could be used to solve a problem and the ‘gallery walk’ offered the strategies that had been used by other students. However, the ‘gallery walks’ and ‘anchor charts’ were both listed on the document that Taylor provided from the school boards’ Learning Services website. Put together, Taylor tried various methods from the ETFO Book Club and other sources to foster different types of student thinking. While the strategy directly employed from the Book Club did not appear to be effective, the knowledge did appear to be mobilized. Ironically, the professional knowledge was mobilized from another source other than Book Club. So, Taylor provided evidence that they can mobilize professional knowledge required to foster different types of student thinking but, that they still could improve on their selection of professional knowledge to mobilize.

6.3.3.5. Discussing Applications of Problem Solving

Despite the creation of word problems in which estimations were required for a school wide lunch, Taylor struggled to demonstrate the applications of the problem solving strategies being employed. While the Book Club may have provided examples of how to relate problem solving strategies to students, the process is largely dependent on the teacher’s ability to relate to the interests of students. Some lessons included brief examples which could be perceived as relatable but, more often than not, they offered abstract examples then placed focus on the various strategies. Accordingly, I did not observe Taylor mobilize the professional knowledge required to discuss the application of problem solving strategies.

6.3.4 Summary

The participants' experiences all had some differences from the intended professional development program. Taylors' experience in the ETFO Book Club was initially aligned with the intended program but differed from the intended structure when it went beyond the expectations when another Book Club was incorporated into the reflective collaboration. In contrast, Jesse's initial experience did not align with the expectations of Kindergarten, Part 1, but aligned with Kindergarten, Part 2. For Alex and Pat, the CIL-M aligned very closely for their experiences, but after multiple years of participation, they expected the intended design of the program to evolve, which did not occur. Interestingly, when the programs strayed from their intended designs it did not necessarily result in a negative experience. Alex and Pat both felt their experience was diminished but, not negative. On the other hand, Taylor's experience went beyond expectations resulting in an overwhelmingly positive experience. Jesse's initially negative experience was the catalyst for continuing on to Part 2 of the AQ course which resulted in an overall positive experience.

The memorable professional development experiences that participants described were: 1) CIL-M, 2) Kindergarten AQ courses, and 3) ETFO Book Club. Each participant was able to mobilize some knowledge into their classroom, despite varying degrees of effectiveness. Alex and Pat were able to mobilize all of the factors which the CIL-M offered. In my opinion, Alex appeared more effective at mobilizing open-ended problem solving and the application of problem solving strategies, whereas, Pat seemed more effective at encouraging student collaboration. Interestingly, both Alex and Pat struggled in the same way to foster different types of student thinking and perhaps, this was a result of how the strategies were offered by the CIL-M. Similar to Alex and Pat, Jesse was able

to mobilize the professional knowledge from the Kindergarten AQ courses into their classroom. However, Jesse differed from Alex and Pat by going beyond the expectations of their program. On the other hand, Taylor was the only participant who I thought was unable to demonstrate some level of mobilization of an important factor. In fact, Taylor showed minimal effort to discuss the applications of problem solving strategies, missed some opportunities to employ open-ended problem solving, and only effectively encouraged different types of student thinking from sources outside the ETFO Book Club. Yet, Taylor seemed especially capable of encouraging student collaboration, and adopting additional sources to encourage different types of student thinking, which showed the benefits of drawing from multiple sources of information.

6.4. Chapter Summary

In sum, the participants' perceptions reflected some type of difference between their actions, the facilitators' descriptions, or their own descriptions regardless of the level of professional development. Whereas the participants' opinions regarding the important aspects of professional development appeared to be reflective of their own experience. The participants' mobilization of the professional knowledge into their classrooms were predictably varied. However, all participants were able to show some evidence the professional knowledge had been mobilized, aside from one factor for one participant. More interesting, was the ability of some participants to take the professional knowledge being offered and mobilize it in a manner which went beyond the expectations of the facilitators.

Now that I have explored the themes of the participants' characterizations, opinions and experiences of professional development, in the next chapter I will consider how these implications address my research questions and the broader impact on the literature.

Chapter 7

7.0. Conclusion

In this chapter, I will briefly reiterate the flow of my project before weaving the major themes together. The first step of this project was identifying the problem. I used my personal professional development experience and my volunteer experience to develop my primary research question. Next, I investigated the contemporary literature for any gaps in the research. Specifically I focused on research pertaining to professional knowledge acquisition, professional development, TPCK, and knowledge mobilization. Based on this review of the literature, I determined that my project would differ from current research by viewing professional development as a vehicle for knowledge mobilization rather than an outcome or node along the path to mobilization.

Following the literature review, I developed my theoretical and analytical perspectives. I selected the Habermasian (1972, 1984) theories of communicative action and knowledge-constitutive interests as my theoretical framework. Additionally, I selected Kennedy's (2005) spectrum of professional development models and Mishra and Kohler's (2006) TPCK framework as my analytical framework. Using my research framework as a foundation, I employed a qualitative methodology which included semi-structured interviews, unobtrusive observations and document analysis.

Once the structure of the research project was in place, I collected data and identified the major themes. The three major themes were 1) Characterizing Professional Development, 2) Opinions of Professional Development, and 3) Professional Development Experiences.

After the major themes were identified and the data had been presented, I discussed the connections and implications.

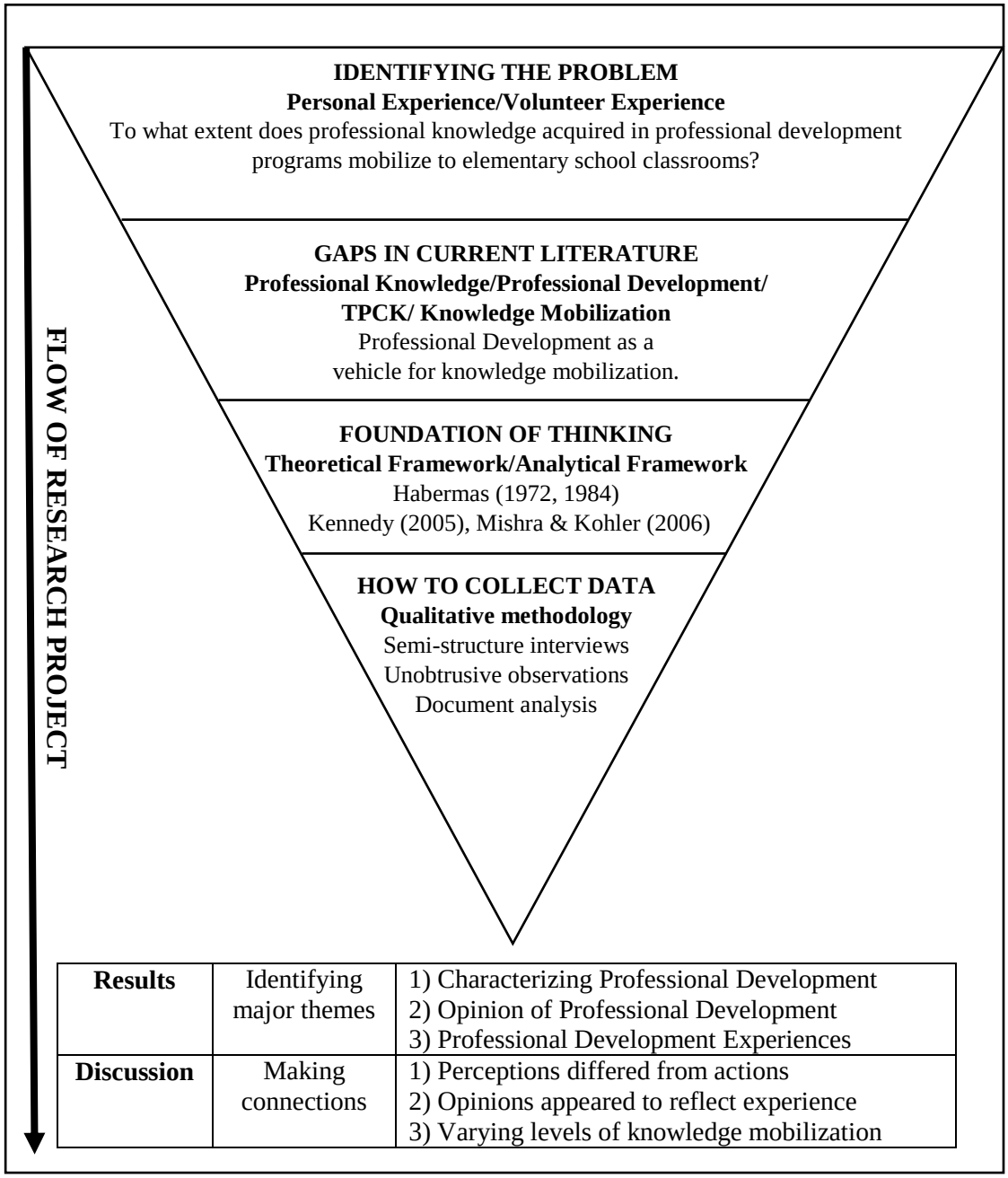

Figure 3. Conceptualizing the flow of my research project.

Now I will explore how the major themes regarding participants' perceptions, opinions, experiences and actions emerged to answer my research question. In what ways does professional knowledge become mobilized from professional development to the elementary school classroom? In order to answer that question I also asked several sub-questions including: How do participants' perceptions of the various organization who facilitate professional development affect mobilization? How do personal opinions regarding professional development affect mobilization? How does the duration of a professional development program affect mobilization? How does the professional development model used affect the efficacy of mobilization? How do participants' enjoyment of a professional development program affect mobilization?

The two major themes participants described regarding AQ courses was the perceived cost barrier and the reasons for taking AQ course. Even though all participants held the unanimous view that cost was a barrier to participation it was not reflective of their actions. Moreover, their reasons for taking AQ courses were not aligned with the AQ providers' expectations until the impact on income was reduced. However, this lack of alignment between perceptions and actions, and the differing goals of participants and providers did not appear to affect mobilization. Part of the reason it did not appear to affect mobilization was that the participants' perceptions regarding AQ courses were largely peripheral because they did not contain views about the content of the courses. However, given the disconnect between the goals of AQ providers and participants, there is a risk that professional knowledge from AQ courses may not be mobilized into classrooms as intended.

The participants' perceptions of AQ courses were also used to frame their characterization of school board initiatives. This comparison explained the enthusiasm for relatively low cost professional development, yet, prevented participants from providing a balanced perspective. I found they advocated for their preferred level of professional development by making decontextualized statements. These biased perceptions towards either school board initiatives or AQ course could have an effect mobilization on professional knowledge.

Unlike the participants' perceptions of AQ courses and school board initiatives, their characterization of school-level initiatives included specific details about the content of programs. The descriptions showed that participants who took courses surrounding, what they perceived as, basic training avoided the label of professional development. Furthermore, it revealed participants' perceptions about what constitutes professional development. Yet, those who participated in a collaboratively developed school-level initiative had no problem with the label of professional development. Regardless of how they were labelled I found that both types of school-level initiatives resulted in the professional knowledge being mobilized. Interestingly, the perception of whether an initiative was professional development did not appear to affect mobilization so long as the content was applicable.

As I looked into the participants' opinions regarding the most important aspects of professional development it became clear that they were informed by experiences which had provided a direct impact on their classroom. Participants who described collaboration as important were able to support their opinion with detailed explanations of their experiences and my observation of their actions. Furthermore, it appeared that those who

appreciated professional development that incorporated collaboration had a better understanding of how to address the associated challenges. Similarly, participants gave specific examples of how professional development impacted their professional growth. Thus, the participants' opinions about the most important aspects of professional development appeared to affect the mobilization of corresponding professional knowledge.

I used each participant's description of a memorable professional development experience as the foundation for my observations. In theory, a memorable professional development experience would be conducted as expected to provide professional knowledge that is consistently mobilized into the classroom. However, each experience had some differences from the intended program. Yet, it did not appear to have a major effect on the participants' ability to mobilize the professional knowledge. Instead, I found these differences had an impact on participants' decisions to enrol in similar programs in the future.

My comparison of the participants' descriptions of the programs to their enacted pedagogies found a variance in the extent to which professional knowledge was mobilized into their classrooms. Some types of professional knowledge were mobilized beyond what their professional development program expected, some professional knowledge was mobilized as expected and, some professional knowledge was not mobilized as expected. However, looking deeper into programs does reveal some interesting implications.

Each professional development program had what could be considered a mid-range duration. Two of the programs had multiple meetings over the course of the school year with time in between to evaluate the relevance and effectiveness of the professional knowledge being mobilized. Moreover, these programs had multiple collaborative reflections in which strategies could be adapted or new strategies employed. So, the duration of the program was several months but, it was mostly individual inquiry. The other professional development program was conducted online over several months. However, participants were expected to be engaged in the program several times per week. Although the programs were roughly the same duration, the online professional development program appeared to be more intensive. Therefore, I contend that the duration of the professional development program is less important than the extent to which participants are engaged.

I also looked at whether the model of professional development had an effect on the mobilization of professional knowledge. In this study, the professional development program which provided the most effective mobilization of professional knowledge appeared to be the Kindergarten AQ courses which were both Training models of professional development. However, based on the evidence, I thought the model of professional development had less to do with effective mobilization than the enthusiasm and tenacity of the participant. I felt the professional development programs which followed the Community of Practice model, the CIL-M and ETFO Book Club, were much better suited to foster the mobilization of professional development. Indeed, some aspects of the program were mobilized quite effectively. Yet, there are potential challenges of the Community of Practice model, such as complacency, groupthink, and

resistance to new ideas which may have limited the participants' ability to mobilize the professional knowledge.

The enjoyment of a professional development program is difficult to gauge. If a participant receives professional knowledge which positively impacts their classroom, then it could be considered enjoyable. However, if a participant gets no useful professional knowledge, but it was a good socializing experience, they may also consider it enjoyable. I hold the view that for this study the former is a more useful indicator of the effect that enjoyment had on mobilization. Looking at the specific professional development programs, the participants described experiences as mostly positive with the notable exception of Kindergarten, Part 1. Yet, there was no indication that the enjoyment of the program made it more, or less, likely for professional knowledge to be mobilized. In fact, an argument could be made that the negative experience had a more positive effect on mobilization since the negative experience with Kindergarten, Part 1 along with the awkward interview experience motivated the participant to participate in Kindergarten, Part 2 which had the most effective mobilization of professional knowledge in this study.

In sum, the difference between my project and the current literature is that I viewed professional development as the vehicle for knowledge mobilization rather than an outcome or a node along the path to mobilization. To that point, the extent to which professional knowledge mobilized into the classroom depended on several competing factors which affected different participants in different ways. In my study, some of these factors included the person's opinions regarding the important aspects of professional

development, the individual experiences with professional development, and most importantly, the personal drive to mobilize professional knowledge into the classroom.

Although my research questions have been addressed, this study has uncovered other potential avenues of research. Future studies should explore the factors which impact one type of professional development model to better unpack the mobilization of professional knowledge. More specifically, future research could investigate multiple participants from the same professional development program. Additionally, my study looked solely at elementary school teachers, and perhaps, secondary school or post-secondary teachers mobilize professional knowledge based on different factors.

Before this study, I believed that teachers viewed the utility and quality of their professional development experiences as positive, but sometimes the professional knowledge they had gained was not directly brought into their classrooms. However, in the classrooms of the participants of my study, it turned out that there was more mobilization occurring than I had thought, even though there was no simple match between professional knowledge and classroom actions. Indeed, the relationships between teachers' beliefs and views about professional development and the mobilization of its content turns out to be far more complex than we yet even understand.

References

Abdal-Haqq, I. (1995). *Infusing Technology into Preservice Teacher Education*. ERIC Digest. (ERIC Document Reproduction Service No. ED 389 699)

Alavi, M., & Leidner, D. (2001). Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, *25*(1), 107-136.

Archambault, L., & Barnett, J. (2010). Revisiting technological pedagogical content knowledge: Exploring the TPACK framework. *Computers & Education, 55*(4), 1656-1662.

Argote, L., & Ingram, P. (2000). Knowledge Transfer: A Basis for Competitive Advantage in Firms. *Organizational Behavior and Human Decision Processes, 82*(1), 150-169.

Bain, A., & Swan, G. (2011). Technology enhanced feedback tools as a knowledge management mechanism for supporting professional growth and school reform. *Educational Technology Research and Development, 59*(5), 673-685.

Birman, B.F., Desimone, L., Porter, A.C., & Garet, M.S. (2000). Designing professional development that works. *Educational leadership*, *57*(8), 28-33.

Bischoff, P., & Golden, C. (2003). Exploring the Role of Individual and Socially Constructed Knowledge Mobilization Tasks in Revealing Preservice Elementary Teachers' Understandings of a Triangle Fraction Task. *School Science and Mathematics*, *103*(6), 266-273.

Bogdan, R. & Biklen, S.K. (1997). *Qualitative research for education*. Boston: Allyn & Bacon.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative research journal*, *9*(2), 27-40.

Brock-Utne, B. (1996). Reliability and validity in qualitative research within education in Africa. *International Review of Education*, *42*(6), 605-21.

Buzza, D., Bringelson, L., Eaton, C., Loucks Campbell, S., Degutis, V., & Bookan, K. (2006). Mobilizing Knowledge and Building Capacity for Technology-Enhanced Professional Development. *Canadian Journal of University Continuing Education*, *32*(2), 147-163.

Canadian Institutes of Health Research (2016). *Knowledge Translation*. Retrieved from: http://www.cihr-irsc.gc.ca/e/29418.html

Clandinin, D. J., & Connelly, F. M. (1995). *Teachers' Professional Knowledge Landscapes*. New York: Teachers College Press.

Chai, C. S., Koh, J. H. L., Tsai, C., & Tan, L. L. W. (2011). Modeling primary school pre-service teachers' technological pedagogical content knowledge (TPACK) for meaningful learning with information and communication technology (ICT). *Computers & Education*, *57*(1), 1184-1193.

Cohen, L., Manion, L. & Morrison, K. (2011). *Research Methods in Education* (7th ed.). New York: Routledge.

Cooper, A. (2013). Research Mediation in Education: A Typology of Research Brokering Organizations That Exist Across Canada. *Alberta Journal of Educational Research*, *59*(2), 181-207.

Cooper, A., Levin, B., & Campbell, C. (2009). The growing (but still limited) importance of evidence in educational policy and practice. *Journal of Educational Change*, *10*(2), 159-171.

Dalgarno, N., & Colgan, L. (2007). Supporting novice elementary mathematics teachers' induction in professional communities and providing innovative forms of pedagogical content knowledge development through information and

communication technology. *Teaching and Teacher Education: An International Journal of Research and Studies*, *23*(7), 1051-1065.

Dall'Alba, G., & Sandberg, J. (2006). Unveiling professional development: A critical review of stage models. *Review of Educational Research, 76*(3), 383-412.

Denzin, N.K. (1970). *The research act: A theoretical introduction to sociological methods.* Chicago: Aldine.

Denzin, N. K., & Lincoln, Y. S. (1994). *Handbook of qualitative research*. Sage Publications, Inc.

Dreyfus, H. L., & Dreyfus, S. E. (1986). *Mind over machine: The power of human intuition and expertise in the era of the computer.* New York: Free Press.

Education Quality and Accountability Office, (2016). EQAO Home. Retrieved from http://www.eqao.com/en

Elementary Teachers Federation of Ontario, (2015). ETFO Book Clubs. Retrieved from http://www.etfo.ca/professionaldevelopment/etfosbookclubs/pages/default.aspx.

Elementary Teachers Federation of Ontario, (2016a). AQs. Retrieved from http://etfo-aq.ca/aqs-pqps/

Elementary Teachers Federation of Ontario, (2016b). AQ Funding Available as of February 1st, 2016. Retrieved from http://etfo-aq.ca/2016/02/aq-funding-available-as-of-february-1st-2016/

Elementary Teachers Federation of Ontario, (2016c). Catalogue. Retrieved from http://etfo-aq.ca/catalogue/

Elementary Teachers Federation of Ontario, (2016d). Frequently Asked Questions. Retrieved from http://etfo-aq.ca/faqs/

Eraut, M. (1994). *Developing Professional Knowledge and Competence*. London: Falmer Press.

Fenwick, T., & Farrell, L. (2012). *Knowledge Mobilization and Educational Research: Politics, language and responsibilities*. Routledge: New York.

Flick, U. (1998). *An Introduction to Qualitative Research.* London: Sage.

Frost, J. H., Akmal, T. T., & Kingrey, J. U. (2010). Planning teacher professional development: the struggles and successes of an inter-organizational collaboration. *Professional Development in Education, 36*(4), 581-595.

Glaser, B. G. (1965). The constant comparative method of qualitative analysis. *Social problems, 12*(4), 436-445.

Gold, A. H., Malhotra, A., & Segars A. H. (2001). Knowledge Management: An organizational capabilities perspective. *Journal of Management Information Systems, 18*(1), 185-214.

Goodnough, K., & Hung, W. (2009). Enhancing pedagogical content knowledge in elementary science. *Teaching Education, 20*(3), 229-242.

Graham, C. (2011). Theoretical considerations for understanding technological pedagogical content knowledge (TPACK). *Computers & Education, 57*(3), 1953-1960.

Grierson, A. L., & Gallagher, T. L. (2009). Seeing is believing: creating a catalyst for teacher change through a demonstration classroom professional development initiative. *Professional Development in Education, 35*(4), 567-584.

Guskey, T. R. (1999). *Evaluating professional development*. Corwin Press.

Habermas, J. (1972). *Knowledge and Human Interests* (trans. J. Shapiro). London: Heinemann.

Habermas, J. (1984). *The Theory of Communicative Action. Volume One: Reason and the Rationalization of Society* (trans. T. McCarthy). Boston: Beacon Press.

Hargreaves, E., Berry, R., Lai, Y., Leung, P., Scott, D., & Stobart, G. (2013). Teachers' experiences of autonomy in Continuing Professional Development: Teacher Learning Communities in London and Hong Kong. *Teacher Development, 17*(1), 19-34.

Hartas, D., Lindsay, G., Arweck, E., & Cullen, S. (2009). The nature and outcomes of PGCE Plus as a model for teacher professional development. *Professional Development in Education, 35*(1), 101-118.

Hynie, M., Jensen, K., Johnny, M., Wedlock, J., & Phipps, D. (2011). Student internships bridge research to real world problems. *Education & Training, 53*(2), 237-248.

Kabakci, I., Odabasi, H. F., & Kilicer, K. (2010). Transformative learning-based mentoring for professional development of teacher educators in information and communication technologies: an approach for an emerging country. *Professional Development in Education, 36*(1-2), 263-273.

Keay, J., & Lloyd, C. (2009). High-quality professional development in physical education: the role of a subject association. *Professional Development in Education, 35*(4), 655-676.

Kennedy, A. (2005). Models of Continuing Professional Development: a framework for analysis. *Journal of In-service Education, 31*(2), 235-250.

Laferrière, T., Lamon, M., & Chan, C. (2006). Emerging E-Trends and Models in Teacher Education and Professional Development. *Teaching Education, 17*(1), 75-90.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Lauer, P. A., Christopher, D. E., Firpo-Tripplett, R., & Buchting, F. (2014). The impact of short-term professional development on participant outcomes: a review of the literature. *Professional Development in Education, 40*(2), 207-227.

Linn, G. B., Gill P., Sherman, R., Vaughn, V., & Mixon, J. (2010). Evaluating the long-term impact of professional development. *Professional Development in Education, 36*(4), 679-682.

Lyndon, S., & King, C. (2009). Can a single, short continuing professional development workshop cause change in the classroom? *Professional Development in Education, 35*(1), 63-82.

Ministry of Education, (2010a), Individual NTIP Strategy Form.

Ministry of Education, (December 29, 2010b). The New Teacher Induction Program (NTIP). Retrieved from http://www.edu.gov.on.ca/eng/teacher/induction.html.

Ministry of Education, (September 1, 2011). *Collaborative Inquiry*. Retrieved from http://www.edu.gov.on.ca/eng/literacynumeracy/collaborative.html.

Ministry of Education, (August 15, 2014). *Full Day Kindergarten*. Retrieved from http://www.edu.gov.on.ca/kindergarten/

Ministry of Education, (June 23, 2015). *Inspire*. Retrieved from http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/capacityBuilding.html

Ministry of Education (2016a). *Education Funding Technical Paper 2016-2017*. Retrieved from: http://www.edu.gov.on.ca/eng/policyfunding/funding.html

Ministry of Education, (2016b). Literacy and Numeracy Strategy. Retrieved from http://www.edu.gov.on.ca/eng/literacynumeracy/

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

Mitchem, K., Wells, D.L., & Wells, J.G. (2003). Effective Integration of Instructional Technologies (IT): Evaluating Professional Development and Instructional Change. *Journal of Technology and Teacher Education, 11*(3), 397-414.

Moser, C. & Kalton, G. (1977) *Survey Methods in Social Investigation* (2nd Edition). London: Heinnemann.

Muth, R., Bellamy, T., Fulmer, C., & Murphy, M. (2006). The Annual Case: Developing, Organizing, Using and Disseminating Craft Knowledge. *Educational Leadership and Administration, 18*(1), 51-84.

No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002).

Ontario College of Teachers, (2016a). Additional Qualification. Retrieved from http://www.oct.ca/members/additional-qualifications

Ontario College of Teachers, (2016b). Schedule D: Three Session Additional Qualifications. Retrieved from http://www.oct.ca/members/additional-qualifications/schedules-and- guidelines/schedule-d

Osterloh, M., & Frey, B. (2000). Motivation, Knowledge Transfer, and Organizational Forms. *Organization Science, 11*(5), 538-550.

Polly, D. (2011). Developing Teachers' Technological, Pedagogical, and Content Knowledge (TPACK) through Mathematics Professional Development. *International Journal for Technology in Mathematics Education 18*(2), 83-95.

Putnam, R. T., & Borko, H. (1997). Teacher learning: Implications of new views of cognition. In *International handbook of teachers and teaching* (1223-1296). Springer, Netherlands.

Robertson, L., & Thomson, T. (2011). Watching Bald Eagles Change Shifts: Seeking Digital Curriculum Access Across Canada. *Alberta Journal of Educational Research, 57*(3), 317- 336.

Sá, C., Li, S., & Faubert, B. (2011). Faculties of education and institutional strategies for knowledge mobilization: an exploratory study. *Higher Education, 61*(5), 501-512.

Sandieson, R. (2006). Pathfinding in the Research Forest: The Pearl Harvesting Method for Effective Information Retrieval. *Education and Training in Developmental Disabilities, 41*(1), 401-409.

Shaha, S., Lewis, V., O'Donnell, T., & Brown, D. (2004). Evaluating professional development. *Journal of Research in Professional Learning, 1,* 1-18.

Shulman, L. (1987). Knowledge and Teaching: Foundations of the New Reform. *Harvard Educational Review, 57*(1), 1-23.

Skinner, B.F. (1965). *Science and Human Behavior.* New York: Simon and Schuster.

Smith G. (2014). An innovative model of professional development to enhance the teaching and learning of primary science in Irish school. *Professional Development in Education, 40*(3), 467-487.

Social Science, Humanities Research Council. (2007). *SSHRC's Knowledge Mobilization Strategy 2009-2011.* [Ottawa]: Author.

Social Science, Humanities Research Council. (2008). *Strategic Framework for SSHRC's Knowledge Mobilization Strategy*. [Ottawa]: Author.

Strauss, A. L. & Corbin, J. (1990). *Basics of Qualitative Research.* Newbury Park, CA: Sage.

Sturko, P., & Holyoke, L. (2009). Evaluating professional development that prepares teachers to integrate academic skills into technical curricula. *Professional Development in Education, 35*(2), 211-225.

Tuters, S., Read, R., Carr Harris, S., Anwar, A., & Levin, B. (2012). Developing and Launching an Online Hub to Facilitate the Exchange of Research Knowledge in Education: The Case of the OERE. *Canadian Journal of Educational Administration and Policy, 139(1),* 1-29.

Watson, J.B. (1913). Image and affection in behavior. *Journal of Philosophy, Psychology and Scientific Methods*, *10*(16), 421-428.

Wenger, E. (1998). *Communities of Practice: learning, meaning and identity*. Cambridge: Cambridge University Press.

Wilson, S. M., & Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: An examination of research on contemporary professional development. *Review of research in education*, *24*, 173-209.

Appendices

Appendix 1. Semi-Structured Interview Questions

Approximate duration: 30-60 minutes

Participant: 1 2 3 4

1) What grade do you currently teach?

2) How long have you been an elementary school teacher?

3) What is your opinion of professional development programs?
   a) How many professional development programs have you attended throughout your teaching career?
   b) How many typically per year?
   c) Are professional development programs necessary for all teachers?
      i) Why or Why not?
   d) What is the most important aspect of professional development?

4) Can you tell me about a memorable professional development program you have attended?

   a) Was it a mandatory session or was it elective?
   b) Was it a one day session or multiple day session?
   c) What were the main objectives of this professional development program?
   d) In what ways do these objectives transfer into your classroom?
   e) To what extent do you incorporate these objectives into your classroom?
   f) In what ways did you enjoy and/or not enjoy the course?
   g) What are some aspects about the course that you found particularly enjoyable?
   h) Were there any aspects about the course that you did not find enjoyable?

5) What are some ways you have implemented knowledge obtained in a professional development program into the classroom?

   a) Can you give specific examples?

6) Is there anything else which could be of value to improve professional development?

Appendix 2. Professional Development Observation Matrix

OBSERVATION MATRIX			
PD Model	**Confirmation**	**Capacity**	**Time**
Factor 1	Yes/No	Factor 1 was shown by doing this	0-10 min Key Factor 1,5,6
Factor 2	Yes/No	Factor 2 was shown by doing this	10-20 min Key Factor 1,2,4
Factor 3	Yes/No	Factor 3 was not shown	20-30 min Key Factor 6
Factor 4	Yes/No	Factor 4 was shown by doing this	30-40 min Key Factor 1,4
Factor 5	Yes/No	Factor 5 was shown by doing this	40-50 min Key Factor 5,6
Factor 6	Yes/No	Factor 6 was shown by doing this	50-60 min Key Factor 2, 4, 5
Real Time Notes:			

Appendix 3. Professional Knowledge Observation Matrix

OBSERVATION MATRIX			
Type of Knowledge	**Confirmation**	**Capacity**	**Time**
TPCK	Yes/No	TPCK was shown by doing this	0-10 min T,P, TPK
PCK	Yes/No	TP was shown by doing this	10-20 min C, TCK
TCK	Yes/No	TC was shown by doing this	20-30 min T, P, C, TCK
TPK	Yes/No	TK was shown by doing this	30-40 min TPCK
T	Yes/No	T was shown by doing this	40-50 min P, C, PCK
P	Yes/No	P was shown by doing this	50-60 min T, C, TCK
C	Yes/No	C was shown by doing this	
Real Times Notes:			

Appendix 4. Coding Dictionary

1. Personal Professional Experience

1. Current position
- 1. School
- 2. School board
- 3. Profession
- 4. Income Matrix

2. Previous position
- 1. As a teacher
- 2. Prior to teaching

3. Future positions
- 1. Maintaining position
- 2. Lateral movement
- 3. Promotion

4. Other Teachers
- 1. School
- 2. School board
- 3. Profession
- 4. Income Matrix

5. Day-to-day routine
- 1. Students'
- 2. Teaching Content
- 3. Pedagogy
- 4. Technology
- 5. Assessment

2. Specific Professional Development Experience

1. Part 1 & Part 2, Kindergarten
- 1. Objectives/goals
  - 1. Documentation
  - 2. Engaging in play
  - 3. Assessment preparation
  - 4. Inquiry-based learning
- 2. Course assignments
  - 1. Developing methodology
  - 2. Analyze authentic documentation
- 3. Benefits
  - 1. Necessary for effective teaching
  - 2. Classroom preparation
  - 3. Standardization
- 4. Challenges
  - 1. Lack of standardization across school boards
  - 2. Lack of relevant preparation
  - 3. Workload balance
- 5. Outcomes
  - 1. Professional improvement
  - 2. Personal improvement
  - 3. Student improvement

2. Running Records
- 1. Objectives/goals
  - 1. Standardize coding method

2. Develop methodology
2. Benefits
    1. Content integral to effective teaching
    2. Changing teaching landscape
    3. Adherence to standards
    4. Assessment tool

3. New Teacher Induction Program

1. Objectives/goals
    1. Orientation
    2. Mentoring
    3. Classroom management
2. Benefits
    1. Content integral to effective teaching
    2. Sharing content with colleagues
    3. Collaboration
    4. Learning new methods of pedagogy

4. Collaborative Inquiry and Learning in Mathematics (CIL-M)

1. Objectives/goals
    1. Collaborate to develop and implement hands-on math lessons
    2. Observe class/analyze teacher/student work
    3. Give feedback to the classroom teacher
    4. Build off strengths and weaknesses for next teacher's classroom
2. Benefits
    1. Collaboration
    2. Feedback
    3. Teacher led
    4. Tailored to student needs
    5. Personal inquiry
    6. Hands-on experience
3. Challenges
    1. Repetitive
    2. Math based only
4. Outcomes
    1. Affect student learning
    2. Address student needs
    3. Problem solving

5) Book Club

1. Objectives/goals
    1. Choose and investigate a teaching resource with other participants
    2. Discuss implementation strategies with other participants
    3. Try out content and pedagogy in the classroom
    4. Discuss the effectiveness of the resource with other participants at monthly intervals
    5. Continue developing effective pedagogy based on feedback
2. Benefits
    1. Teacher-driven
    2. Collaboration
    3. Deeper understanding of content
    4. Deeper understanding of student needs
    5. Additional support from learning resource teacher
    6. Voluntary Participation

3. Challenges
    1. Trying to agree on a resource
    2. Not all resources proved effective for classroom implementation
4. Outcomes
    1. New methods of pedagogy
    2. Student engagement

6) Smartboard Course
1. Objectives/goals
    1. Learn how to use Smartboard software
    2. Learn how to apply software in classroom
2. Benefits
    1. New technological resource
3. Challenges
    1. School does not have access to Smartboard
    2. License is not purchased/renewed
    3. Superficial application of technology
    4. Rushed implementation
    5. Expensive
4. Outcomes
    1) Same pedagogy with new technology
    2) Mistakes in implementation were augmented for implementation of iPads

3. Characterizing Professional Development

1. Additional Qualification
1. Motivation
    1. Classroom Need
    2. Personal Interest
    3. Professional Advancement
    4. Financial
    5. Required
    6. Learning environment
    7. Partially subsidized
2. Learning Environment
    1. In-class
    2. Online
3. Facilitator
    1. University
    2. ETFO
4. Length
    1. One Day
    2. Multiple Days (Consecutive)
    3. Multiple Days (Non-consecutive)
5. Distinguishing Characteristics
    1. Financial Benefit

2. School Initiatives
1. Specific Title
    1. Collaborative Planning
    2. Book Studies
    3. Website Planning
2. Learning Environment
    1. In-class
3. Length

1. One Day
2. Multiple Days (Consecutive)
3. Multiple Days (Non-Consecutive)

4. Distinguishing Characteristics
    1. Address classroom needs
    2. Additional support
    3. Free programs
    4. Hands-on experience

3. School Board Initiatives

1. Specific Title
    1. Professional Book Studies
    2. Reading Workshops
    3. Aboriginal Workshops
2. Motivation
    1. Classroom Need
    2. Personal Interest
    3. Professional Advancement
    4. Required
    5. Learning environment
3. Learning Environment
    1. Classroom
    2. Workshop
4. Length
    1. One Day
    2. Multiple Days (Consecutive)
    3. Multiple Days (Non-Consecutive)
5. Distinguishing Characteristics
    1. Flexible schedule
    2. Additional support

4. Benefits of Professional Development

1. Important Aspects

1. Continued Learning
2. Changing landscape
3. Collaboration
4. Visualization
5. Student-centered
6. Teacher directed

2. Teaching methods

1. Adhering to standards
2. Content integral to effective teaching
3. Sharing with colleagues
4. New methods of pedagogy
5. New resources
6. Hands-on experience
7. Theory based

3. Personal/Professional Growth

1. Gain expertise in subject matter
2. Financial Compensation
3. Challenging themselves
4. Avoiding personal ruts
5. Personal Improvement

6. Compensation for participation/completion
7. Address student needs

5. Challenges with Professional Development

1. Costs

1. Financial
2. Time

2. Availability

1. Scheduled time
2. Amount of programs
3. Entrance criteria

3. Motivation

1. Financial
2. Not mandatory
3. Mandatory
4. Resistance to new ideas

4. Content

1. Relevance
2. Representativeness
3. Benefits
4. Workload balance
5. Inorganic
6. Diminishing Returns
7. Repetitive

Appendix 5. Ethics Approval

Western Research

Research Ethics

Western University Health Science Research Ethics Board
NMREB Delegated Initial Approval Notice

Principal Investigator: Dr. John Barnett
Department & Institution: Education\Faculty of Education,Western University

NMREB File Number: 106500
Study Title: Fostering the mobilization of knowledge from professional development to the classroom
Sponsor:

NMREB Initial Approval Date: April 20, 2015
NMREB Expiry Date: April 20, 2016

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Instruments		2015/03/09
Revised Western University Protocol	Clean copy of Western Protocol	2015/04/06
Revised Letter of Information & Consent	Clean copy of amended LOI	2015/04/06
Recruitment Items	Clean copy or recruitment materials	2015/04/06

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Ethics Officer, on behalf of Riley Hinson, NMREB Chair or delegated board member

Ethics Officer to Contact for Further Information

Erika Basile	Grace Kelly	Mina Mekhail	Vikki Tran

Curriculum Vitae

Name:	Robert Williams
Post-secondary Education and Degrees:	Western University London, Ontario, Canada 2013-2016, M.A. Education Studies Wilfrid Laurier University Waterloo, Ontario, Canada 2007-2013, B.A. Honours Psychology Conestoga College Waterloo, Ontario, Canada 2010-2011, Diploma, Hospitality and Tourism Management
Related Work Experience:	Volunteer Teacher Assistant Rockway Public School 2011-2014 Volunteer Teacher Assistant A.R. Kaufman Public School 2010-2012 Volunteer ESL Teacher Assistant Waterloo Collegiate Institute 2008-2009