EXPLORING HOW VIDEO-INFORMED FEEDBACK SUPPORTS EMBEDDED EDUCATOR PROFESSIONAL LEARNING BETWEEN MIDDLE LEADER FACILITATORS AND TEACHERS

by

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Abstract

The purpose of this study was to explore how video-informed feedback supported embedded educator professional learning (EPL) between middle leader (ML) facilitators and teachers, addressing gaps in EPL literature pertaining to the role of feedback and video in embedded, ML-facilitated EPL. Two research questions guided my study: How does a video-informed feedback model support embedded EPL between ML facilitators and teachers? and How do video-informed feedback dialogues between ML facilitators and teachers evolve to support EPL over time?

An embedded multiple case study design was used to study video-informed feedback between ML facilitators and teachers over one academic year in the context of a regional, math-based EPL initiative. A total of seven educators participated in this study: two ML facilitators and five teachers from two rural district school boards. Each facilitator represented a case; embedded units consisted of facilitator-teacher pairs. Primary data sources included semi-structured individual and dyadic interviews with participants and audio recordings of ML facilitator-teacher pairs’ feedback dialogues.

Data were analyzed using inductive descriptive and deductive provisional coding techniques to develop within case themes. Within case themes were further analyzed to develop four cross-case assertions in response to how video-informed feedback supported embedded EPL between ML facilitators and teachers. Cross-case assertions pertained to interrelated learning goals, video-informed feedback dialogues, responsive collaboration, and video-informed praise.

Key contributions of this research include my conceptual feedback model of embedded, ML-facilitated EPL as well as the importance of: (a) more knowledgeable-other support of both ML facilitators’ and teachers’ learning and practices—especially their data literacy; (b) setting
and working toward interrelated goals for teachers and students to enhance EPL outcomes; (c) explicitly leveraging multi-source feedback models that incorporate diverse classroom data, including video, to help ML facilitators and teachers co-construct practice-based evidence to inform EPL; and (d) video-informed praise from ML facilitators to teachers which enables ML facilitators’ subsequent coaching feedback and teachers’ self-regulation. More broadly, this study highlights the importance of trusting professional relationships coupled with a focus on diverse sources of practice-based evidence to enable meaningful, constructive dialogues in the context of embedded, ML-facilitated EPL and to support desired outcomes for educators and students.
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Chapter 1

Introduction

In the past decade, increasing resources, including billions of dollars, have been allocated toward educator professional learning (EPL) in an effort to enhance instructional practices and improve desired student outcomes (Desimone & Garet, 2015; Fullan, 2009; Hattie, 2013; Kennedy, 2016). For example, in the province of Ontario, Canada alone—the setting of this study—nearly 140 million dollars were dedicated to EPL across schools and districts during the 2016-2017 academic year (Campbell, Osmond-Johnson, Faubert, Zeichner, & Hobbs-Johnson, 2017). However, despite substantial investments in EPL and new accountability frameworks in K-12 education (Hattie, 2013), desired outcomes among educators and students remain inconsistent and limited, with EPL initiatives coming under growing scrutiny by funders and the public at large (Campbell et al., 2017; Desimone & Garet, 2015; Guskey, 2014).

According to Kennedy (2016), EPL research and practice to date has focused too heavily on the characteristics of EPL models and initiatives and not enough on how educators learn within EPL opportunities, limiting a robust understanding of how to maximize desired EPL outcomes among educators and students. A central aspect of learning is feedback—any information about one’s current level of understanding or performance in relation to a learning goal (Hattie & Timperley, 2007). Although feedback is considered one of the most powerful influences on learning (Hattie, 2013; Molloy & Boud, 2013; Nicol, 2010), Campbell et al. (2017) asserted that the role of feedback in EPL has not been sufficiently explored in research or practice. Feedback has been extensively investigated as a means to support students’ learning in classroom contexts (Black & Wiliam, 2009; Hattie & Timperley, 2007; Shepard, 2000) and in professional learning contexts outside of education (e.g., health sciences and business) (Eva &
Regehr, 2011; Stone & Heen, 2014); however, the role of feedback in EPL is often implicit within contemporary research and practice. While there is a focused priority on the use of feedback for supporting students in K-12 education, there is much less desire to extend this use of feedback to support professional learning among educators. This study makes an important contribution to empirical EPL literature by explicitly exploring how a feedback model supports EPL in order to develop a deeper understanding of how feedback supports educators’ learning, with the ultimate goal of contributing empirical evidence that can be used to enhance EPL outcomes for educators and students.

**Background**

EPL in Canada—as well as other areas such as the United States, the United Kingdom, Australia, and New Zealand—is rooted in the assumption that quality instructional practices underpin effective educational systems and overall student achievement (Campbell et al., 2017; Darling-Hammond, 2010; Fullan, 2009; Guskey, 2014; Timperley, 2011). Researchers and practitioners have increasingly acknowledged the complexity associated with contemporary EPL initiatives—characterizing these efforts as simultaneous activities of individual teachers, schools, and collectives engaged in learning within and across levels of educational systems (Opfer & Pedder, 2011). As a result, conceptions of EPL have moved away from a linear ‘cause and effect’ orientation toward recognizing that contemporary EPL must simultaneously address micro (individual educator), meso (school), and macro (district or region) needs and priorities among educators (Bore & Wright, 2009; Campbell et al., 2017; Davis & Sumara, 2006).

The focus of current EPL initiatives is typically guided by broad system goals (e.g., district, provincial/state, or national), but rooted in local needs and priorities identified by school-based educators (Hargreaves & Ainscow, 2015; Opfer & Pedder, 2011). Contemporary EPL
models prioritize ongoing, school- and classroom-embedded opportunities that enable recursive cycles of collaborative learning among groups of educators across roles (e.g., classroom teachers, school support teachers, school administrators, and/or system educators) repeated at regular intervals—often monthly throughout one academic year (Darling-Hammond & Richardson, 2009; Donohoo, 2013). Each EPL cycle typically entails three core phases: planning for educator and student learning, implementing strategies to support educator and student learning in classrooms, and dialogic reflection among educators regarding the impacts of implementation to inform subsequent EPL cycles (DeLuca, Shulha, Luhanga, Shulha, Klinger, & Christou, 2015; Nelson & Slavit, 2007). While feedback is inherent in all phases of EPL—particularly through ongoing collaboration among educators—it is rarely explicitly articulated in research or practice, limiting what is known about how various forms of feedback supports educators’ learning within EPL.

Increasingly, EPL models and initiatives are supported by ML facilitators—school district level educators who promote change in educational systems by supporting embedded collaborative learning among educators in schools and classrooms (Fullan, 2015). ML facilitators are often former classroom teachers operating in intermediary system support roles to foster educator learning across multiple levels of educational systems (Fullan, 2015; Timperley, 2011). ML facilitators are recognized or relative experts in particular EPL domains who support educators’ knowledge-building and implementation of new strategies within EPL (Campbell et al., 2017; Fullan, 2015; LaPointe-McEwan, DeLuca, & Klinger, 2017). In their roles, ML facilitators support the learning of individual teachers in classrooms (micro) and groups of educators in schools (meso) in order to achieve system goals and priorities (macro) (Killion, 2012). Accordingly, ML facilitators assume a great deal of responsibility for supporting and
demonstrating desired EPL impacts on both educators and students (Avalos, 2011; Fullan & Knight, 2011). Despite the central role of ML facilitators in EPL, research has not sufficiently focused on how ML facilitators support EPL (LaPointe-McEwan et al., 2017).

With growing emphasis on using practice-based evidence to understand and enhance EPL impacts on both educators and students (Bryk, 2015), a central responsibility of ML facilitators is to help educators—primarily classroom teachers—leverage evidence from both research and practice to inform their EPL efforts (LaPointe-McEwan et al., 2017). Through recurring EPL cycles, ML facilitators and educators are expected to co-construct practice-based evidence through the collaborative analysis of various sources of classroom data including student products, classroom observations, and conversations among students and/or educators (LaPointe-McEwan et al., 2017; Ryerson, 2017). In recent years, due to technological advancements, classroom video has emerged as a valued source of classroom data that captures the richness and complexity of teaching and learning activities (Gaudin & Chalies, 2015; Major & Watson, 2017; Sherin & van Es, 2009; Tripp & Rich, 2012). The analysis of classroom video among educators engaged in EPL is intended to provide critical opportunities for educators to (a) examine classroom practice and students’ learning, (b) examine interactions between instructional practices and students’ learning, and (c) plan for future teaching and learning in classrooms (Beisiegel, Mitchell, & Hill, 2018; van Es, Tunney, Goldsmith, & Seago, 2014). Additional research is needed to understand how ML facilitators and educators leverage collaborative analysis of classroom video within EPL (Major & Watson, 2017).

**Purpose and Research Questions**

This study begins to bridge gaps in existing EPL research by exploring how feedback supported embedded, ML-facilitated EPL through a combined focus on (a) the role of ML
facilitators in supporting embedded EPL with educators; (b) the role of feedback in embedded, ML-facilitated EPL; and (c) how ML facilitators and educators leverage various sources of classroom data, including video, to construct and use practice-based evidence as feedback to inform ongoing EPL efforts. Although in their roles ML facilitators simultaneously support learning goals of individual teachers in classrooms (micro) and groups of educators in schools (meso) in order to achieve system goals and priorities (macro), this research is primarily focused on how ML facilitators support individual teachers’ learning in classrooms (micro), acknowledging the work may have implications at both the meso and macro levels. The focus on teachers’ learning reflects the importance of teachers’ instructional practices in supporting desired student learning outcomes in schools and systems (e.g., Campbell et al., 2017; Darling-Hammond, 2010) and promotes a deeper understanding of how teachers learn within embedded, ML-facilitated EPL. The specific purpose of my research was to explore how video-informed feedback supported embedded EPL between ML facilitators and teachers. Two research questions guided my study:

1. How does a video-informed feedback model support embedded EPL between ML facilitators and teachers?
2. How do video-informed feedback dialogues between ML facilitators and teachers evolve to support EPL over time?

Context

This research was situated in the context of K-12 education in Ontario, Canada. Since 2003, the Ontario Ministry of Education (OMoE) has promoted provincial priorities to enhance students’ literacy, numeracy, and high school graduation rates (Campbell et al., 2017; Fullan, 2007, 2009; OMoE, n.d.a). In order to attain large-scale reform, the OMoE has provided ongoing
strategic government leadership coupled with targeted EPL funding, informed by student
achievement data from schools, district school boards (DSBs), and regions across the province.
Within current provincial EPL initiatives, emphasis has moved away from a focus on improving
students’ achievement test scores through prescriptive instructional practices toward professional
collaborative inquiries that enable deep explorations of how instructional practices support
students’ learning (Campbell et al., 2017; Donohoo, 2013; Hargreaves & Skelton, 2012).

In order to address provincial educational priorities, the OMoE has established two
branches—the Literacy and Numeracy Secretariat (LNS) and Student Success/Learning to 18.
The LNS branch consists of OMoE leaders working with over 80 experienced educators—often
former ML facilitators and system administrators—seconded from their respective DSBs to work
as Student Achievement Officers (SAOs) in schools and districts across the province. SAOs
work with educators to increase student achievement in reading, writing, and mathematics (math)
by providing expertise, leadership, and embedded support to educators in classrooms, schools,
and districts (OMoE, n.d.a). Working parallel to the LNS, the Student Success/Learning to 18
branch is focused on (a) enhancing literacy and numeracy K-12, (b) supporting students’
transition from elementary to secondary school, and (c) increasing high school graduation rates
in Ontario to 85 percent (OMoE, n.d.b).

In 2013, the Student Success/Learning to 18 branch funded an EPL initiative in math
within an established regional collaborative professional learning network—the Eastern Ontario
Staff Development Network (EOSDN). Since 1989, the EOSDN has facilitated ongoing EPL
opportunities and fostered collaborative sharing and learning among the nine DSBs in the
Eastern Ontario region. This regional math initiative, or project, was originally grounded in the

_Paying Attention to Proportional Reasoning, K-12_ document published by the Student
Success/Learning to 18 branch (OMoE, 2012). Proportional reasoning refers to an individual’s ability to compare quantities multiplicatively (i.e., in relative versus absolute terms) and is considered foundational to students’ abilities to understand and apply math. Proportional reasoning is a big idea across Ontario’s K-12 math curriculum, also extending into other subject areas (e.g., science, geography, visual art, music) (OMoE, 2012). The regional focus on proportional reasoning was collectively deemed important by the nine DSBs participating in the project. The regional math project received continued funding from the Student Success/Learning to 18 branch for five academic years (2013-2018). In the fourth year of the project (2016-2017), the focus expanded to encompass new OMoE priorities associated with the Renewed Math Strategy—a K-12 approach to supporting effective math learning, teaching, and assessment in schools through new embedded supports for all schools and differentiated supports for schools based on higher needs in math achievement (OMoE, n.d.c)

Within this regional math project, ML math facilitators from the nine DSBs in the network worked together and with educators in their DSBs to develop and implement a system-wide effort to enhance math teaching and learning. Within this broader initiative, each DSB operationalized the EPL project differently based on school- and DSB-specific priorities. With financial support from the project, math and research experts responded to DSB requests for support to help ML math facilitators implement and monitor the professional learning occurring in their respective DSB’s schools and classrooms. At the end of each year of the project, ML math facilitators worked with research experts associated with the project to analyze classroom and school data and develop informational posters to demonstrate evidence of the EPL’s impacts on instructional practices and students’ learning in math within their respective DSBs.
**Researcher Positionality**

I bring to this research over twenty years of experience as a classroom teacher (K-Adult), as a director of a private learning institution (K-12), and as an education consultant. Supporting teachers’ professional learning and practice, both informally and formally, has been a central priority throughout my professional career. My professional experiences in privately-funded educational organizations have made me keenly aware of the importance of investing in effective professional learning opportunities for educators that are likely to yield desired impacts on instructional practices and students’ learning. Consequently, my research interests have focused on enhancing professional learning opportunities for teachers and supporting teachers’ transfer of professional learning to their instructional practice in order to achieve desired outcomes in classrooms, schools, and DSBs.

These interests led to my involvement in three embedded, collaborative inquiry-based EPL initiatives in Ontario at district, regional, and provincial levels. Most significantly, for the past five years, I have served as the lead research partner for a multi-year regional EPL math project funded by the OMoE, supporting data literacy (i.e., the ability to collect, analyze, and use data in meaningful ways) among ML math facilitators from the nine DSBs involved. In the first year of my work in this EPL project, I became particularly aware of two central challenges that ML facilitators faced in supporting the professional learning and practice of educators engaged in collaborative inquiry-based EPL. First, ML facilitators struggled to support the collection and analysis of multiple sources of classroom data, especially qualitative data sources, to inform professional learning and practice of educators in schools and classrooms. This limited their ability to provide precise formative feedback to teachers regarding progress and next steps in professional learning. Second, facilitators struggled to construct evidence to demonstrate the
impact of the project on math teaching and learning in their DSB’s schools and classrooms for system-level funders (i.e., DSB administrators and the OMoE), including changes in teachers’ instructional practices and students’ learning.

Recognition of these challenges, coupled with the trusting professional relationships I developed with ML facilitators involved in this project, strengthened and informed my interests in enhancing the effectiveness of EPL by supporting ML facilitators in their complex and multifaceted roles. At the end of the first year of the regional project, I developed a video-informed feedback EPL model in an effort to help ML facilitators use multiple sources of data and various forms of feedback to support their work with teachers in classrooms and schools.

A central component of this model was classroom video analysis (CVA). CVA is a data collection technique that involves recording and analyzing video of one’s own instructional practice, often in collaboration with other educators. Research indicates that CVA provides a rich source of authentic classroom practice data to support feedback dialogues between ML facilitators and teachers (Borko, Jacobs, Eiteljorg, & Pittman, 2008; Zhang, Lundeberg, Koehler, & Eberhardt, 2011); however, only a limited number of ML facilitators involved in the project had experimented with the technique. The pilot study (Phase 1) and current research (Phase 2) described in subsequent chapters explores ML facilitators’ and teachers’ experiences with video-informed feedback. The pilot study (Phase 1) emphasized ML facilitators’ and teachers’ experiences with CVA. Building on findings from the pilot study, the current study (Phase 2) incorporated CVA along with other sources of classroom data (e.g., classroom observations and student products) and adapted the research design to better meet the needs of participants.

**Definition of Key Terms**

Eight key terms are used in this study—professional learning, middle leader facilitator,
educator, more knowledgeable-other, feedback, feedback dialogue, and classroom video analysis. To provide clarity, the following definitions will be used:

*Professional learning* (PL) refers to enhancing professional capacity (i.e., knowledge, skills, and habits of mind) and practice (Darling-Hammond, 2010; Knapp, 2003). While professional learning can occur in daily practice, outside of practice, in formal activities, and in informal settings (Killion, 2012; Mayer & Lloyd, 2011), this research focuses on professional learning undertaken using formal, facilitated activates.

*Middle leader facilitator* (ML facilitator) refers to a system-level educator, often a former classroom teacher, operating in an intermediary system support role to foster professional learning among educators in classrooms and schools in order to achieve system goals and priorities (Killion, 2012; Timperley, 2011).

*Educator* refers to any person working in support of students’ learning. This includes but is not limited to ML facilitators, classroom teachers, school support teachers, and school administrators.

*More knowledgeable-other* (MKO) refers to the concept developed by Vygotsky (1962, 1978) of a recognized or relative expert in a particular professional learning domain (see also, Nicol & McFarlane-Dick, 2006). In this study, ML facilitators are sometimes referred to as MKOs or MKO facilitators.

*Feedback* refers to any information about one’s current level of understanding or performance in relation to a learning goal (e.g., Hattie & Timperley, 2007; Molloy & Boud, 2013).

*Feedback dialogue* refers to interactive processes that enable the learner to interpret, reflect on, and integrate internal and external feedback sources in order to co-construct new
understandings with peers and/or MKOs (Boud & Molloy, 2013; Carless, Salter, Yang, & Lam, 2011).

Classroom video analysis (CVA) refers to a data collection technique that involves recording and analyzing video of teachers’ instructional practices. This technique provides a rich source of practice-based evidence to support feedback dialogues between professional learning facilitators and teachers (Borko, et al., 2008; Zhang, et al., 2011).

Delimitation

This study occurred within an Ontario Ministry of Education funded, regional math-based professional learning project involving educators from nine DSBs across Eastern Ontario, Canada. The immediate transferability of study findings may or may not be limited to comparable math-based EPL projects and/or educators working in similar DSBs or geographical regions.

Outline of Dissertation Chapters

This dissertation is organized into five chapters. This first chapter presented the study background, purpose and research questions, context, researcher positionality, definitions of key terms, and delimitations. The second chapter comprises a review of relevant empirical, conceptual, and theoretical literature concluding with the construction of my conceptual feedback EPL model that guided this research. The third chapter describes social constructivism (the methodological stance for this research), summarizes the pilot study, and outlines the current study setting, research design, data sources, and data analysis procedures. The fourth chapter presents the findings from each of two cases in the current study followed by cross-case assertions. The final chapter presents a summary of the study and a discussion of findings in
relation to the literature reviewed in Chapter 2, concluding with implications for practice and future research.
Chapter 2 Literature Review

Critical to my research has been an exploration of the practices and foundations for professional learning within the context of K-12 education. This chapter begins with a description of conceptions, characteristics, and models of contemporary educator professional learning (EPL) as identified in the literature, with a particular focus on collaborative inquiry (CI) and coaching models supported by middle leader (ML) facilitators. Next, social-constructivist learning theory—a broad learning theory that provides a lens to understand educator learning within contemporary EPL models—is discussed. Specifically, the role of feedback in social-constructivist learning is explored and used to build an analytical feedback framework. This analytical feedback framework is then used to elucidate the role of feedback in embedded, ML-facilitated EPL based on recent empirical studies. The chapter concludes with my empirically-based conceptual feedback model for embedded, ML-facilitated EPL.

Conceptions, Characteristics, and Models of Contemporary EPL

In order to enhance instructional practices and improve student outcomes in educational systems, various conceptions and models of EPL have emerged in practice. This section describes contemporary conceptions of EPL and highlights empirically supported characteristics of effective EPL models. In addition, two dominant models of contemporary EPL—CI and coaching—are explored, with particular attention to how these models are supported by ML facilitators and informed by practice-based evidence.

Conceptions of Contemporary EPL

It is widely accepted that the goal of EPL is to enhance educators’ capacities (i.e., knowledge, skills, and habits of mind) and instructional practices in order to positively impact students’ learning and achievement (Darling-Hammond, 2010; Hattie, 2013). Over the past 20
years, there has been a paradigm shift in EPL in response to new accountability frameworks in K-12 education (Hattie, 2013; Leithwood, Aitken, & Jantzi, 2006), coupled with the recognition that previous EPL models were detached from practice, superficial, and generally failed to achieve desired outcomes among educators and students (Borko, 2004; Darling-Hammond & Richardson, 2009; Guskey, 2014). Consequently, contemporary EPL models are currently focused on shifting educators’ current knowledge, beliefs, and practices in relation to their previous knowledge and experiences in order to better support students’ learning (Cordingley & Buckler, 2012). According to this modern conception of EPL, professional learning is not restricted to formal initiatives and can also occur in daily practice, outside of practice, and in informal settings (Killion, 2012; Mayer & Lloyd, 2011). Within formal EPL initiatives, activities have moved away from isolated workshops toward ongoing, school- and classroom-embedded opportunities that enable collaborative learning among educators (Darling-Hammond & Richardson, 2009; Timperley, 2011). In recent years, extensive resources have been allocated toward formal collaborative EPL initiatives. However, despite significant investments, these collaborative, embedded EPL models have similarly failed to systematically achieve desired impacts on educators and students (Desimone & Garet, 2015; Opfer & Pedder, 2011).

Formal collaborative EPL models are typically comprised of four central components: (a) the professional learning program—the learning focus; (b) the educators—the learners, including teachers, school administrators, and other school or system personnel; (c) the facilitator—the learning guide; and (d) the context—where the professional learning occurs (Borko, 2004). In her review of EPL literature, Avalos (2011) identified two different approaches to facilitation within formal EPL. First, the EPL facilitator may be a recognized external expert (e.g., university researcher or professional learning coach) who supports the learning of educators within their
context of practice. Second, the EPL facilitator may be a former classroom teacher with relative content or pedagogical expertise operating in a system role (i.e., ML facilitator) to guide formal EPL among groups of educators (e.g., lesson study, CI, or coaching). The latter model of facilitation (i.e., embedded, ML-facilitated EPL) is more common in K-12 educational contexts due to various factors including costs and access to external experts (Killion, 2012; Nelson, Deuel, Slavit, & Kennedy, 2010).

**Characteristics of Effective EPL**

Across EPL literature—both conceptual and empirical—there is relative agreement that effective EPL supports educators’ learning through instructive, active, collaborative, reflective, and substantive learning opportunities (Borko, 2004; Broad & Evans, 2006; Darling-Hammond, 2010; Desimone & Garet, 2015; Donohoo, 2013; Elmore, 2004; Guskey & Yoon, 2009; Nelson & Slavit, 2007; Quatroche, Bauserman, & Nellis, 2014). These characteristics guide the design and implementation of contemporary EPL models and initiatives in practice.

**Instructive.** Effective EPL models help educators build new content and pedagogical knowledge and acquire associated instructional strategies that support desired student outcomes. EPL goals are articulated with precision, grounded in theory and empirical evidence, aligned with curriculum standards, and applied in the context of practice. Furthermore, EPL goals must align with system priorities, meet individual and collective educator learning needs, prioritize links between educator practice and student outcomes, and address potential barriers to learning (e.g., educators’ and/or students’ background knowledge, previous experiences, mindset, and motivation) (e.g., Desimone & Garet, 2015; Elmore, 2004; Guskey & Yoon, 2009).

**Active.** Educators engaged in EPL identify and actively pursue goals that are personally relevant, meaningful in their context of practice, and grounded in evidence from research and
practice. Moreover, within EPL, there is growing emphasis on developing educators’ confidence and capacity to apply new content and pedagogical knowledge in practice. Consequently, EPL initiatives need to provide regular opportunities for educators to apply and adapt new knowledge in their respective contexts of practice (e.g., Broad & Evans, 2006; Darling-Hammond, 2010; Donohoo, 2013).

**Collaborative.** Educators engaged in EPL work together, within and across classrooms, schools, and districts, to explore practices, challenge beliefs, and analyze relevant data from classrooms or schools. This allows educators across systems to collaboratively support valued student outcomes and provides opportunities for rich dialogue among educators, both of which are critical to moving educator learning and practice forward across systems. Leveraging expert learning partners (e.g., external experts or ML facilitators) to inform and drive collaborative EPL efforts further enriches the learning and discourse (e.g., Broad & Evans, 2006; Nelson & Slavit, 2007; Quatroche et al., 2014).

**Reflective.** Recurring opportunities for deep and critical reflection among educators are central to effective EPL. Regular reflection provides educators with essential opportunities to learn from past and current experiences, contributing to the construction of new knowledge that informs enhanced instructional practices in support of valued student outcomes. Moreover, collaborative reflection helps educators stay accountable to and engaged in learning toward individual and collective EPL goals (e.g., Borko, 2004; Donohoo, 2013; Nelson & Slavit, 2007).

**Substantive.** High-quality, long-term EPL is necessary to support educators’ successful implementation of new and higher standards of instructional practice. Allocating sufficient time for EPL endeavours promotes depth of learning and sustained shifts in practice that lead to desired changes in student outcomes across educational systems. Through ongoing, professional
collaboration, educators develop communities of practice that support the multi-stage nature of instructional change (e.g., Desimone & Garet, 2015; Guskey & Yoon, 2009; Quatroche et al., 2014).

While contemporary EPL models and initiatives generally incorporate all of these characteristics to some degree, it is evident that the characteristics themselves do not provide a checklist that guarantees desired EPL outcomes. Researchers have offered various explanations for inconsistent and limited EPL impacts, despite the inclusion of these characteristics of effective EPL. First, educators respond differently to the same EPL opportunities due to the experiences, beliefs, knowledge, and interests they bring to EPL, contributing to variations in EPL outcomes among educators (Desimone & Garet, 2015). Second, EPL impacts are influenced by multiple factors including ongoing changes in educational systems (Opfer & Pedder, 2011), intermediaries—or ML facilitators—who support EPL (Timperley, 2011), school culture, and student background (DeLuca, Shulha, et al., 2015). Third, given the complexity associated with educational systems and an aim to simultaneously address micro (individual educator), meso (school), and macro (district or region) needs and priorities among educators (Bore & Wright, 2009; Campbell et al., 2017; Davis & Sumara, 2006), achieving desired impacts on educators and students takes substantial time—often multiple years—and sustained educator commitment (Guskey, 2014; Kennedy, 2016).

Collaborative Inquiry and Coaching Models of EPL

In order to enact the characteristics of effective EPL and address classroom, school, and systemic priorities, various EPL models, or frameworks, have emerged, including: professional learning communities, action research, lesson study, video clubs, CI, coaching, and instructional rounds. While all models share characteristics of effective EPL, each model advocates unique
features and benefits. Most recently, CI and coaching models have gained widespread momentum in the context of K-12 education. The following sections explore the nature of CI and coaching, comparing similarities and differences between these dominant EPL models with particular attention to how ML facilitators support evidence-informed EPL within each model.

**Collaborative inquiry.** The primary goal of CI is to develop educator pedagogy and practice around systemic or local EPL priorities in order to positively impact instructional practice and valued student learning outcomes (Nelson & Slavit, 2007; Cochran-Smith & Lytle, 2009). Specifically, CI involves focused investigation (i.e., inquiry) of targeted aspects of professional practice through the exploration of students’ responses to instruction, in order to develop new understandings and responsive practices (DeLuca, Shulha, et al., 2015). Although CI is often referred to as an EPL model or in association with an EPL initiative, some consider CI to be a mindset or “professional way of being” (Timperely, Kaser, & Halbert, 2014).

CI entails recursive cycles of learning that engage groups of educators (i.e., teachers, school administrators, ML facilitators, system educators, and/or external experts) in explorations around the complexities of teaching and learning. In a recent review of CI literature, three core phases associated with CI models were identified: dialogical sharing, taking action, and reflecting (DeLuca, Shulha, et al., 2015). Dialogical sharing involves leveraging the knowledge and beliefs of individual educators in the group to co-construct deeper understandings and shared knowledge (Nelson et al., 2010). Taking action involves the practical application of new knowledge through classroom implementation with students and the collection and analysis of classroom data in order to construct practice-based evidence to inform and monitor the impact of EPL on instructional practice and student outcomes (DeLuca, Shulha, et al., 2015). Reflection occurs at both individual and group levels and consists of considering the impact of the EPL on
valued instructional practices and student learning (Nelson, Slavit, Perkins, & Hathorn, 2008; Timperley, 2011).

Within CI, the ML facilitator plays a central and multifaceted role. First and foremost, the ML facilitator fulfills leadership responsibilities (e.g., planning meetings, developing protocols, guiding group dialogue and reflection, finding resources for group members, supporting classroom implementation, and identifying sources of classroom data) (David, 2009; Nelson & Slavit, 2007), while simultaneously engaging in CI as a co-learner in order to model inquiry skills and dispositions and foster group participation (Nelson et al., 2008). In addition, ML facilitators must effectively use questioning to shift group discussion away from collegial conversation and sharing toward deep dialogue and critical reflection (Nelson et al., 2010). Moreover, ML facilitators must help educators challenge their individual and group assumptions and beliefs in order to move toward the attainment of CI goals (Cochran-Smith & Lytle, 2009).

While, empirical evidence indicates that CI supports changes in participating educators’ content and pedagogical knowledge, instructional practices, and school culture, limited evidence has been collected to demonstrate widespread impact of CI on instructional practices and student outcomes (Nelson et al., 2010).

When examining the effectiveness of CI in relation to the three core phases (i.e., dialogical sharing, taking action, and reflecting), it has been suggested that the process of reflection within CI, especially at the individual educator level, remains an ambiguous process with unclear links to changes in subsequent professional inquiry and instructional practice (DeLuca, Shulha, et al., 2015). This may be due to CI’s unsupported assumption that educators are literate with data collection and analysis processes that underpin effective reflection for individuals and groups engaged in CI. Consequently, developing educators’ data literacy (i.e.,
ability to collect, analyze, and use data in meaningful ways) is foundational to effective CI (Kennedy, Deuel, Nelson, & Slavit, 2011; Timperley, 2011). Emerging evidence, however, indicates that it can take multiple years and targeted support from external experts for educators engaged in CI to develop such data literacy (LaPointe-McEwan et al., 2017; Nelson, Slavit, & Deuel, 2012). Moreover, in CIs facilitated by former classroom teachers fulfilling system-level support roles, these ML facilitators must concurrently develop their own data literacy while also facilitating and modelling data literacy with other educators in their CI group.

**Coaching.** Concurrent with the emergence of CI models, coaching models have gained popularity in K-12 educational contexts over the past decade (Killion, 2012; Knight, 2009). Coaching is an EPL model that falls under the umbrella of mentoring. While mentoring is a long-term, comprehensive process of supporting educators’ overall career development and induction into the profession (Fletcher, 2012; van Nieuwerburgh, 2012), coaching is a performance-oriented EPL model that targets aspects of professional performance in order to help educators develop job-specific skills or capabilities (Killion, 2012), and, in some cases, transform their associated beliefs (Fullan & Knight, 2011; West, 2009). Although there are various approaches to coaching, the coaching process generally entails recursive face-to-face dialogues between coaches and educators, grounded in evidence from practice, in order to develop educators’ pedagogical knowledge and instructional practices (Killion, 2012).

In K-12 education, common approaches to coaching include instructional coaching and content coaching. Instructional coaches are teaching experts who use modelling, resources, direct instruction, and practice-based evidence to support changes in educators’ knowledge and practice (Knight, 2012). Content coaches are experts in the content of a discipline who support lesson planning, classroom implementation, and analysis of classroom data in order to support changes
in educators’ content-specific knowledge and practice (West, 2009). Regardless of the specified approach, coaching in K-12 education is generally focused on achieving system priorities in relation to individual educators’ needs and goals (Killion, 2012; Knight, 2009; van Nieuwerburgh, 2012), thus balancing educators’ ownership of their learning with accountability to system priorities (Hargreaves & Skelton, 2012).

Coaching can occur in groups (i.e., the coach working with multiple educators), but most commonly occurs one-on-one (i.e., the coach working with one educator, typically a classroom teacher). Coaches use practice-based evidence to inform dialogues and reflection with educators regarding relevant pedagogical knowledge and instructional practices and help educators set goals to enhance subsequent practice (Killion, 2012; van Nieuwerburgh, 2012). Practice-based evidence is typically constructed through the analysis of classroom data, often observational notes or classroom video collected by the coach (Killion, 2012; Knight, 2009). Coaches use questioning techniques to help educators analyze classroom data and develop deeper understandings of their instructional practice in order to support their attainment of EPL goals for themselves and their students (Killion, 2012; van Nieuwerburgh, 2012).

While coaching relationships may be established with peer educators (i.e., peer coaching), it is more common—and generally more effective—if coaching occurs in a formal arrangement with a recognized external expert or more knowledgeable-other (MKO) educator operating in a coaching role (Cordingley & Buckler, 2012). In the context of K-12 EPL, it is increasingly common for ML facilitators to fulfill coaching roles (Killion, 2012). Within these EPL coaching models, ML facilitators provide a mixture of ‘pressure and support’ to help educators reach personal goals within system goals and accountability frameworks (Hargreaves & Skelton, 2012). ML facilitators not only model targeted instructional practices for
educators, but also provide direct feedback during coaching dialogues with educators to enhance their pedagogical knowledge and instructional practice (Killion, 2012). In order to be effective in their roles, ML facilitators must have both specialist content and pedagogical knowledge, as well as coaching skills. Specifically, ML facilitators must be fluent in collecting and analyzing classroom data in order to construct practice-based evidence. Within coaching models, middle leaders leverage practice-based evidence to inform professional dialogues and support educator reflection, with the ultimate goal of changing educators’ understandings, practices, and—in some cases—beliefs (Leat, Lofthouse, & Tower, 2012). In addition, coaches must establish trusting relationships with educators so their feedback is perceived as formative and not evaluative (Knight, 2009; Leat, et al., 2012; van Nieuwerburgh, 2012).

Emerging empirical evidence suggests that coaching supports desired changes in instructional practice and student learning; however, coaching is not a ‘quick fix’ (Fletcher, 2012; Leat et al., 2012). Killion (2012) states that in order to maximize effectiveness of coaching models of EPL, it is important to (a) clearly define the purpose and goal of EPL in coaching models; (b) clarify roles of coaches, educators, and other stakeholders; (c) use classroom data effectively to construct practice-based evidence that informs coaching; and (d) provide coaches with ongoing support to enhance their coaching practice. Without ongoing support in key aspects of coaching, specifically fostering rich dialogue and critical reflection grounded in practice-based evidence, coaching may have a limited impact on educators’ knowledge and instructional practice.

While coaching models show promise in EPL contexts, this is a new area of study with limited rigorous empirical research to demonstrate the impact of coaching on educators’ instructional practices and related student achievement. In many cases, coaching research is
conducted by the coaches themselves, limiting the trustworthiness of findings (Killion, 2012; van Nieuwerburgh, 2012). Coaching research is also confounded by the various definitions and approaches to coaching and tenuous links to theory (Fletcher, 2012; van Nieuwerburgh, 2012). Additional research is needed to determine the nature and impact of coaching in EPL contexts—particularly exploring the role of key processes inherent in coaching models (i.e., goal-setting, modelling, data collection and analysis, feedback, dialogue, and reflection) and structures that support these processes.

**The role of the ML facilitator in CI and coaching models.** CI and coaching models share many similarities, but also several key differences (Table 1). These differences influence the role of the ML facilitator within each model in four important ways. First, in both CI and coaching models, the ML facilitator is typically a former classroom teacher fulfilling a system-level support role as a MKO who requires knowledge of EPL content, facilitation skills, and data literacy. However, in CI, the ML facilitator fulfills a dual role as a MKO who guides the EPL and as a co-learner who models inquiry processes for participating educators to support changes in knowledge, practice, and beliefs. In contrast, the ML facilitator in coaching models is regarded primarily as a MKO who contributes professional knowledge, provides ‘pressure and support’, models targeted instructional practices, and gives explicit feedback to educators regarding their instructional practices to support changes in knowledge and practice, and, to a lesser extent, beliefs. Second, both CI and coaching entail ongoing cycles of planning, implementation and dialogic reflection; however, CI entails ML facilitation of group learning whereas coaching typically occurs one-on-one (i.e., ML facilitator and educator). Third, in both CI and coaching, the ML facilitator supports educators’ local and/or personal learning goals nested within systemic priorities; however, the focus of CI emerges from evidence of students’ learning (i.e.,
more inductive), while coaching targets educators’ learning needs and goals based on predetermined ‘effective practices’ (i.e., more deductive). Finally, in both CI and coaching models, ML facilitators must be fluent in using evidence from research and practice to inform EPL efforts. With respect to evidence from practice, ML facilitators and educators typically co-analyze classroom data to construct practice-based evidence together, while in coaching models, ML facilitators generally lead educators’ data collection and analysis processes.

Table 1

Comparing Collaborative Inquiry and Coaching EPL Models

<table>
<thead>
<tr>
<th></th>
<th>Collaborative Inquiry</th>
<th>Coaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPL Purpose</td>
<td>Change knowledge, practice, and beliefs</td>
<td>Change knowledge and practice, and sometimes beliefs</td>
</tr>
<tr>
<td>EPL Structure</td>
<td>Ongoing cycles of planning, implementation, and dialogic reflection, in groups</td>
<td>Ongoing cycles of planning, implementation, dialogic reflection, typically one-on-one</td>
</tr>
<tr>
<td>EPL Goals</td>
<td>Individual and group inquiry goals nested within system priorities</td>
<td>Individual learning goals nested within system priorities</td>
</tr>
<tr>
<td>EPL Focus</td>
<td>Emergent</td>
<td>Predetermined</td>
</tr>
<tr>
<td></td>
<td>Students’ learning, grounded in evidence from research and practice</td>
<td>Educators’ instructional practices, grounded in evidence from research and practice</td>
</tr>
<tr>
<td>Role of ML Facilitator</td>
<td>ML facilitator is both MKO and co-learner</td>
<td>ML facilitator is primarily MKO</td>
</tr>
<tr>
<td></td>
<td>Supports and guides EPL group learning, models inquiry processes for participating educators</td>
<td>Contributes professional knowledge, provides ‘pressure and support’, models instructional practices, provides feedback regarding instructional practices</td>
</tr>
</tbody>
</table>

Note. ML = middle leader; MKO = more knowledgeable-other.

Social-Constructivist Learning Theory

Elucidating how the characteristics of effective EPL are enacted in CI and coaching approaches allows us to distinguish the nature and key features of these prevalent EPL models. However, it is necessary to move beyond distinguishing models—which emphasizes EPL design
and implementation—in order to develop a deeper understanding of how educators learn within EPL models. Social constructivism is reflected in contemporary embedded, ML-facilitated EPL models such CI and coaching models (e.g., DeLuca, Shulha, et al., 2015; Killion, 2012) and provides a lens through which to explore educators’ learning within embedded, ML-facilitated EPL. In K-12 education, social constructivism initially gained prominence as an approach to thinking about and supporting students’ learning but has since been extended as an approach to thinking about and supporting educators’ learning (Richardson, 2003).

According to social-constructivism, the learning of individuals (micro level) occurs in relation to broader, socially-determined goals and priorities (meso and macro levels). However, despite the influence of the broader social context on learning, social-constructivism prioritizes learning needs and goals of individuals (Glassman, 2001; Richardson, 2003). Social-constructivism conceptualizes learning as an active, interpretive, nonlinear process in which individual learners make meaning and develop understanding through social interactions with others within their learning contexts (Palincsar, 2005; Richardson, 2003; Vygotsky, 1962, 1978). Social constructivism does not promote mastering specific skills or achieving standards of performance (i.e., tenets of behaviourist learning theory)—rather, it is concerned with deeper understanding and cognitive development (Fosnot & Perry, 1996).

**Key Tenets of Social Constructivism**

Social constructivism is founded on the perspective that learning is complex. Truth is not viewed as an objective reality but rather a socially negotiated construct determined by multiple individuals operating within a context and grounded in the socially constructed reality of the group (Palincsar, 2005; Richardson, 2003). Across various authors, four key tenets of social constructivism have consistently emerged: (1) learning is learner-centred; (2) learning is
facilitated; (3) learning is socially mediated; and (4) learning is active and situated (Fosnot & Perry, 1996; Glassman, 2001; Palincsar, 2005; Richardson, 2003; Tudge & Winterhoff, 1993; Vygotsky 1962, 1978). While the tenets of social constructivist learning theory underpin current EPL models, the links between social constructivism and EPL models are inconsistently articulated or explored in EPL research or practice. Accordingly, the four tenets of social constructivism are described below, and then presented in relation to CI and coaching models of EPL (Table 2) to demonstrate how the models enact social constructivism in order to support EPL across classroom (micro), school (meso), and district or regional (macro) contexts.

**Learning is learner-centred.** Within social constructivism, learning goals are shaped in relation to broad social priorities (Glassman, 2001) as well each learner’s previous knowledge, experiences, beliefs, and cultural perspectives (Richardson, 2003). According to social constructivism, the focus of learning is on promoting deeper understanding and cognitive development within each learner (Palincsar, 2005). This deeper understanding promotes transfer of learning to new contexts, and cognitive development enhances learners’ metacognition (i.e., self-monitoring of learning) (Shepard, 2000). Central to social constructivism is the *zone of proximal development* (ZPD; Tudge & Winterhoff, 1993; Vygotsky, 1962, 1978)—the distance between a learner’s ability to perform a task with guidance and the ability to perform the task independently. Vygotsky’s concept of the ZPD recognizes the learner’s current state of understanding or performance in relation to a learning goal (i.e., what the learner can do independently versus what the learner can do with support) (Palincsar, 2005; Tudge & Winterhoff, 1993). In order for learners to achieve learning goals, their learning must be supported within the ZPD (Glassman, 2001).
Learning is facilitated. Social constructivism identifies the importance of *more knowledgeable-others* (MKOs; Vygotsky, 1962) to facilitate learning. A MKO is a recognized or relative expert in a particular learning domain who supports the learner’s understanding and cognitive development (Vygotsky, 1962, 1978; see also Tudge & Winterhoff, 1993). MKOs do not deliver instruction in a traditional sense; instead they (a) help the learner set and move toward socially-mediated goals (Glassman, 2001), (b) structure or scaffold learning opportunities within the learner’s ZPD (Bruner, 1986; Palincsar, 2005), and (c) provide formative feedback to learners to help them refine their thinking and/or performance toward learning goals (Shepard, 2000). MKOs are encouraged to develop trusting relationships with learners so they can maintain the learner’s motivation and self-confidence while addressing errors and misconceptions within the ZPD through formative feedback. This feedback is critical to expanding the learner’s ZPD and moving learning forward (Richardson, 2003; Shepard, 2000).

Learning is socially mediated. Social constructivism asserts that learning is not only socially mediated by broader social contexts, but also through social interactions and negotiation with others within the learner’s context (Richardson, 2003). Consequently, dialogue plays a central role in learning, providing critical opportunities for individuals to make meaning and develop shared understandings through collaboration with others (e.g., MKOs and learning peers) (Tudge & Winterhoff, 1993; Vygotsky, 1962, 1978). Dialogue among MKOs and learning peers promotes deeper understanding (Fosnot & Perry, 1996; Vygotsky, 1962) and also contributes to the development of communities of practice in which a culture of giving and receiving feedback to promote learning is valued and accepted among the group (Lave & Wenger, 1991; Shepard, 2000).
Learning is active and situated. In social constructivism, learning is a dynamic process that occurs in a dialogue-rich environment through activity, reflection, and conversation (Fosnot & Perry, 1996). The process of learning entails ongoing cycles involving self-assessment, peer feedback, and MKO feedback to promote understanding and metacognitive awareness (Shepard, 2000). Because learning occurs in the learner’s context of practice, it is more relevant and meaningful to them, providing learning opportunities that are authentic and connected to real-world experiences (Shepard, 2000). Moreover, within their context of learning, the learner can challenge, change, or add to existing beliefs and knowledge through engagement in facilitated tasks. Ultimately, through socially-mediated reflection, learners organize, generalize, and make meaning from experiences, ultimately progressing toward the construction of big ideas—meaning constructed through ongoing organization and generalization across multiple experiences (Palincsar, 2005; Tudge & Winterhoff, 1993).

The Role of Feedback in Social Constructivist Learning Theory

Central to social constructivist learning theory, feedback is a powerful force that drives learning (Shepard, 2000). Feedback is commonly defined as information about one’s current level of understanding or performance in relation to a learning goal (Hattie & Timperley, 2007), and plays a central role in closing gaps between an individual’s current and desired states, while simultaneously helping the individual become a more effective learner (Clarke, 2012; Molloy & Boud, 2013; Nicol & McFarlane-Dick, 2006; Shute, 2008). Social constructivist learning theory asserts that MKOs play a critical role in scaffolding learning opportunities within the learner’s ZPD (Bruner, 1986; Palincsar, 2005) and providing formative feedback to guide learners’ thinking and/or performance toward learning goals (Shepard, 2000). According to Hattie and Timperley (2007), feedback answers three primary questions—Where am I going? (feed-up
toward goal); *How am I going?* (feedback on progress toward goal); and *Where to next?* (feed-forward to next steps toward goal)—in order to inform a learner’s progress.

Much of what is known about how feedback supports learning comes from research focused on commonly researched in classroom learning (i.e., K-12 and higher education) and professional learning (PL) outside of education (e.g., health sciences and business). Although feedback is implicit within contemporary EPL models, it is rarely discussed or explicitly researched in this context. Therefore, in order to understand how feedback supports educators’ learning within EPL, I first reviewed feedback literature originating from classroom learning other PL contexts. I used this body of feedback literature to construct a framework to understand the role of feedback in learning according to four core dimensions of feedback: purpose, focus, source, and mode (see Table 3). In the subsequent section, I used this framework to elucidate the role of feedback in empirical research focused on embedded, facilitated EPL. Exploring educators’ learning in EPL through the lens feedback provided an opportunity to understand how feedback supports educators’ learning within contemporary EPL models.
Table 2.

**Tenets of Social Constructivism Enacted through Collaborative Inquiry and Coaching**

<table>
<thead>
<tr>
<th>Tenets of Social Constructivism</th>
<th>Social Constructivist Learning Theory</th>
<th>Collaborative Inquiry</th>
<th>Coaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning is learner-centred</td>
<td>Individual learning goals are shaped by broad social priorities but reflect each learner’s previous knowledge, experiences, beliefs, and cultural perspectives.</td>
<td>Individual (micro) and group (meso) learning goals are nested within system (macro) priorities and focus primarily on enhancing students’ learning. Goals emerge over time through explorations of evidence from research and practice.</td>
<td>Individual learning goals are nested within school (meso) and system (macro) priorities and focus primarily on changing educators’ instructional practices. Goals are predetermined based on evidence from research and practice.</td>
</tr>
<tr>
<td>Learning is facilitated</td>
<td>MKO facilitator helps the learner set and move toward socially-mediated goals, scaffold learning opportunities within the learner’s ZPD, and provide formative feedback to support the learner’s progress toward learning goals.</td>
<td>ML facilitator is both MKO and co-learner who supports learning among groups of educators and models inquiry processes for educators. Formative feedback among MKO and educators is implicit.</td>
<td>ML facilitator is MKO who contributes professional knowledge, provides ‘pressure and support,’ and models instructional practices for educators. Formative feedback between MKO and educators is explicit.</td>
</tr>
<tr>
<td>Learning is socially mediated</td>
<td>Learning is influenced by broader social contexts and dialogues with others within the learner’s context to promote deeper understanding and a culture of giving and receiving feedback.</td>
<td>Learning is influenced by system, school, and classroom contexts and occurs through dialogues among MKO facilitators and groups of educators. Dialogues are primarily focused on students’ learning.</td>
<td>Learning is influenced by system, schools, and classroom contexts and typically occurs through 1:1 dialogues between MKO facilitators and educators. Dialogues are primarily focused on educators’ instructional practices.</td>
</tr>
<tr>
<td>Learning is active and situated</td>
<td>Learning is a dynamic process that occurs in a dialogue-rich environment through cycles of activity, reflection, and conversation among the learner, peers, and MKOs.</td>
<td>Ongoing cycles of planning, implementation, and dialogic reflection among MKO facilitators and groups of educators challenge existing beliefs and practices in order to enhance students’ learning.</td>
<td>Ongoing cycles of planning, implementation, and dialogic reflection between MKO facilitators and individual educators help educators enhance instructional practices in order to support students’ learning.</td>
</tr>
</tbody>
</table>

*Note. MKO = more knowledgeable-other; ZPD = zone of proximal development; ML = middle leader*
### Feedback Framework

<table>
<thead>
<tr>
<th>Feedback Purpose</th>
<th>Feedback Focus</th>
<th>Feedback Source</th>
<th>Feedback Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praise</td>
<td>Self</td>
<td>Internal</td>
<td>Transmissive</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Task</td>
<td>Self-monitoring</td>
<td>Dialogic</td>
</tr>
<tr>
<td>Coaching/Formative</td>
<td>Process</td>
<td>Self-assessment</td>
<td>Verbal</td>
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<tr>
<td></td>
<td>Self-regulation</td>
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<td>Written</td>
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<td></td>
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<td>External</td>
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<tr>
<td></td>
<td></td>
<td>Peer</td>
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<tr>
<td></td>
<td></td>
<td>MKO</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Client/Patient/Student</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Performance data</td>
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</tr>
</tbody>
</table>

Note. MKO = more knowledgeable-other.

**Feedback purpose.** Feedback serves three primary purposes—praise, evaluation, and coaching. Praise can take the form of appreciative feedback to recognize or motivate learning efforts (Stone & Heen, 2014) or positive feedback to acknowledge a specific performance (Dweck, 2008). According to Hattie (2012), praise is an “enigma” in the feedback literature because, while learners welcome praise, praise can dilute learners’ integration of feedback for other purposes (i.e., coaching and evaluation). This may explain why praise has been shown to have the least impact on subsequent learning and performance (Black & Wiliam, 2009; Hattie & Timperley, 2007) and is therefore not a primary purpose of feedback in PL contexts (Stone & Heen, 2014). Evaluative feedback is often formal and product-oriented, providing a summative judgment of a learner’s current level of understanding or performance in relation to a professional standard (Sargeant, Bruce, & Campbell, 2013). Although common in accountability-driven or competency-based PL frameworks, evaluative feedback is not always well-assimilated by the learner and has been shown in some cases to inhibit both a learner’s use of the feedback to drive learning forward, as well as the learner’s future feedback-seeking behaviour (Black & Wiliam, 2009; Stone & Heen, 2014). Coaching, or formative, feedback is
process-oriented and diagnostic, aimed at improving knowledge, skills, or other capabilities in relation to PL goals. Formative feedback is considered most effective in supporting a learner’s attainment of PL goals, especially when formative feedback is appropriately scaffolded, timed according to the learner’s needs, and provides sufficient, clear, specific details that inform the learner’s next steps (Clarke, 2012; Shute, 2008). It should be noted that feedback is considered formative only if the learner integrates it and uses it to improve future learning and performance (Black & Wiliam, 2009).

Feedback focus. In a substantial review of feedback literature, Hattie and Timperley (2007) identified the four primary foci of feedback—self, task, process, and self-regulation. There is relative consensus in the literature that feedback focused on self (i.e., personal characteristics of the learner) or task (i.e., the learner’s performance of a specific activity) are least effective in supporting a learner’s current and future learning efforts; as such, self and task feedback are generally not prioritized in PL contexts. In contrast, feedback focused on process and self-regulation have been found to have the greatest impact on a learner’s current and subsequent learning because these foci provide information that can be generalized across learning situations (Black & Wiliam, 2009; Hattie & Timperley, 2007). Accordingly, feedback focused on process and self-regulation are more commonly prioritized in PL. Process feedback provides information regarding strategies needed to complete a particular task and can be a powerful support of a learner’s current and subsequent efforts. Feedback focused on a learner’s self-regulation pertains to how the learner directs, monitors, and regulates actions toward learning goals. Nicol (2010) suggests self-regulation feedback should be a primary focus in PL because it builds the learner’s capacity to iteratively seek, interpret, reflect on, and incorporate feedback to enhance future learning and performance.
**Feedback sources.** Feedback in PL can come from both internal and external sources. Internal feedback is generated by the learner and plays a primary role in setting and attaining identified learning goals (Boud & Molloy, 2013; Nicol & McFarlane-Dick, 2006). Common sources of internal feedback are self-monitoring (i.e., moment-by-moment awareness of progress toward a goal) and self-assessment (i.e., global judgment of one’s progress in relation to a goal) (Butler & Winnie, 1995; Molloy & Boud, 2013). While internal feedback is an important source in PL contexts, it can be inflated and lack accuracy because it depends on human memory and interpretation of previous performance (e.g., Eva & Regehr, 2011); therefore, relying solely on internal feedback to drive PL is unreliable and ill-advised (Hauer & Kogan, 2012; Sargeant, et al., 2013; Stone & Heen, 2014).

External sources of feedback are often leveraged to inform internal feedback in order to improve accuracy of self-monitoring and self-assessment (Hattie & Timperley, 2007; Silver, Campbell, Marlow, & Sargeant, 2008; Violato & Lockyer, 2006). A common source of external feedback in PL contexts is a recognized or relative expert in a particular PL domain, or MKO (Vygotsky, 1962, 1978). Regular, ongoing feedback from MKOs, especially during professional dialogue, can play an important role in helping a learner close the gap between current and desired learning and performance, enhancing the learner’s ability to set PL goals then self-monitor and self-assess progress (Bulik, 2009; Nicol & McFarlane-Dick, 2006). Feedback from peers is also prioritized in current collaborative PL models and can play a central role, especially when MKO feedback is not consistently available (Nicol, 2010). Professional dialogues with peers often provides feedback that is more easily interpreted by learners, thus increasing the likelihood that it will be incorporated and used to inform future learning and performance (Nicol & McFarlane-Dick, 2006). Multi-source feedback, or 360-degree feedback, is a recent trend in
health sciences and business PL that integrates self-, peer-, and MKO-assessments and performance data (e.g., surveys, video, client/patient/student ratings) to generate formative feedback that guides progress toward PL goals (Molloy & Boud, 2013; Taylor, 2013).

**Feedback mode.** Feedback can be delivered through various modes—transmissive or dialogic provided in written or verbal form. Transmissive, or one-way, feedback is often corrective and not as effective in supporting learning toward complex PL goals (Nicol, 2010; Nicol & McFarlane-Dick, 2006). Recently, feedback has been reconceptualized as an interactive dialogic process in which “interpretations are shared, meanings negotiated, and expectations clarified” (Carless et al., 2011, p. 397), thus reflecting a socio-constructivist conception of learning. Feedback dialogues in collaborative PL models allow the learner to interpret, reflect on, and integrate internal and external feedback sources in order to co-construct new understandings with peers and/or MKOs (Boud & Molloy, 2013; Carless et al., 2011). Effective feedback dialogues can be supported by trusting relationships among the learners, peers, and/or MKOs (Carless, 2006; Hauer & Kogan, 2012) and facilitated through the use of structured protocols and technology (Nicol, 2010; Yang & Carless, 2013). Archer (2010) asserted that robust feedback models should leverage multiple modes including (a) transmissive feedback that provides direct correction, (b) integrated feedback that offers suggestions and comments to support learning, and (c) dialogic feedback that fosters learner reflection and self-regulation.

**The Role of Feedback in Embedded, Facilitated EPL**

As stated previously, feedback is a considered one of the most powerful influences on learning and performance (Hattie, 2013) but has not been sufficiently researched in the context of EPL (Campbell et al., 2017). In fact, when reviewing recent empirical EPL studies (2005-present)—with a focus on embedded EPL facilitated by MKOs (i.e., ML facilitators, external
experts, or researchers) in Canada, the United States, the United Kingdom, Australia, and New Zealand—I very rarely encountered the term ‘feedback’ explicitly used or studied in relation to educators’ learning. As such, the feedback framework (Table 3) I developed through my review of feedback literature focused on classroom learning (i.e., K-12 and higher education) and PL outside education (e.g., health sciences and business) was an essential analytical tool that helped me to systematically elucidate the role of feedback in embedded, facilitated EPL. Through deductive coding of the empirical EPL studies reviewed (see Appendix A), I identified three key themes that illustrated how feedback supports educators’ learning in the context of embedded, facilitated EPL: (a) feedback focused on EPL goals; (b) feedback from peers versus MKOs; and (c) feedback from practice-based evidence.

Feedback Focused on EPL Goals

In embedded, facilitated EPL, feedback was focused on the broad learning goals associated with the EPL model or initiative being investigated. In most cases, the focus of the EPL reflected organizational priorities or research-driven goals, but concurrently provided participating educators with the latitude to identify related personal or collective local goals (Dierking & Fox, 2013; Slavit & McDuffie, 2013; Slavit & Nelson, 2010). Generally, EPL initiatives recognized instructional practice as complex and multifaceted, therefore few studies focused on the acquisition of a single skill set (e.g., McCollum, Hemmeter, & Hsieh, 2011). All EPL initiatives endeavored to change instructional practices, and most often EPL goals were long-term (i.e., one year or more) and grounded in a particular curricular area such as math, language, or science (e.g., Borko et al., 2008; Gröschner, Seidel, Kiemer, & Pehmer, 2014). Many initiatives also identified concurrent goals, such as changing beliefs (e.g., Bruce, Esmonde, Ross, Dookie, & Beattie, 2010), enhancing reflection (e.g., Camburn, 2010; Charteris &
Smardon, 2013), or improving educators’ self-regulatory skills (e.g., Kramarski & Revach, 2009). It was recognized that some EPL goals (e.g., changing school or organizational culture) took longer to achieve than others (e.g., DeLuca, Klinger, Pyper, & Woods, 2015; Slavit & McDuffie, 2013; Yoon & Klopfer, 2006).

Due to the complex and multifaceted nature of instructional practice, most EPL initiatives were ongoing and developmental in nature; with recursive cycles of goal-setting, strategic planning, classroom implementation, and dialogic reflection on progress toward goals (e.g., Bruce et al., 2010; Butler & Schnellert, 2012; Nelson & Slavit, 2007). In some EPL initiatives, educators were required to set individual goals (e.g., Schnellert, Butler, & Higginson, 2008) and obtained peer or MKO feedback to (a) help identify relevant, meaningful goals (e.g., Nelson & Slavit, 2007), and (b) support planning and school- or classroom-embedded implementation to support progress toward EPL goals (Harrison, 2013; Olson, White, & Sparrow, 2011; Polly, 2012). Across EPL initiatives, it was generally assumed that educators actively incorporated available feedback from multiple sources to set and work toward EPL goals; however, this was typically not the case. While educators who actively self-regulated their learning were more likely to take ownership of EPL goals, plan and enact changes in instructional practice, seek feedback, and reflect on progress toward EPL goals (Harrison, 2013), educators did not consistently initiate self-regulatory actions (Bulter & Schnellert, 2012; Schnellert et al., 2008), seek feedback to inform progress (Camburn, 2010; Polly, 2012), nor engage in critical reflection (Dierking & Fox, 2013; Dobie & Anderson, 2015; Olson et al., 2011); thus limiting the attainment of desired EPL outcomes.
Feedback from Peers versus MKOs

Feedback from both peers and MKOs played important but fundamentally different roles in EPL. Peer feedback was a central component of most EPL studies, supporting knowledge-building among educators through collaborative learning sessions (e.g., Charteris & Smardon, 2013; DeLuca, Klinger, et al., 2015; Lewis & Perry, 2014) and educators’ implementation of new instructional practices in classroom contexts (e.g., Bruce et al., 2010; Cajkler, Wood, Norton, Pedder, & Xu, 2015; Harrison, 2013). Educators particularly valued peer feedback in co-planning lessons (e.g., Camburn, 2010; Slavit & Nelson, 2010) and to encourage risk-taking in practice (e.g., Yoon & Klopfer, 2006), but were less likely to seek peer feedback regarding implementation of new instructional practices with students in classroom contexts (e.g., co-teaching or peer observation) (Butler & Schnellert, 2012; Camburn, 2010). Educators’ readiness to seek and incorporate peer feedback in EPL was a central issue that influenced the impact of peer feedback on educators’ learning. Cultivating positive collegial relationships over time (Borko et al., 2008; Bulter & Schnellert, 2012; Nelson & Slavit, 2007) and using EPL structures and protocols to guide peer feedback processes (Levine & Marcus, 2010; Thurlings, Vermeulen, Bastiaens, & Stijnen, 2012) contributed to enhanced feedback practices among peers; however, peer feedback was commonly perceived as superficial and vague (Lewis & Perry, 2014), not always viewed as credible (Butler & Schnellert, 2012), and not consistently linked to EPL goals (DeLuca, Klinger, et al., 2015), thus reducing the effectiveness of peer feedback in informing educators’ progress toward EPL goals.

Feedback from MKOs was particularly valued in EPL because it concurrently informed educators’ progress toward their goals, knowledge-building (e.g., Camburn, 2010; Dierking & Fox, 2013; Koellner, Jacobs, Borko, Schneider, Pittman, Eiteljorg, & Frykholm, 2007), and
critical reflection (e.g., Sherin & van Es, 2009). In many EPL studies, MKOs actively facilitated dialogic reflection among educators, encouraging open discussion, navigating contrasting ideas, (e.g., Dobie & Anderson, 2015), and ensuring purposeful collaboration (e.g., Gröschner et al., 2014). Effective MKOs also scaffolded learning and feedback within EPL according to educators’ readiness in order to promote deeper educator learning (e.g., Santagata, 2009). If MKO facilitation was too structured, it constrained professional dialogue among educator groups (Levine & Marcus, 2010); however, educators who did not independently self-regulate their EPL benefitted from the structured facilitation provided by MKOs (e.g., van den Bergh, Ros, & Beijaard, 2015).

While both peer and MKO feedback played valued roles in EPL contexts, in most cases, MKO feedback was considered more effective than peer feedback. Peer feedback tended to act as praise and promoted superficial reflection, while MKO feedback was more likely to be formative in nature and promote deeper critical reflection and knowledge-building required to attain EPL goals (Dierking & Fox, 2013; Olson et al., 2011; Arya, Christ, & Chiu, 2014). Notably, more self-regulated educators who actively and consistently sought both peer and MKO feedback were better able to integrate and sustain changes in instructional practice (Dierking & Fox, 2013; Olson et al., 2011; Polly, 2012; Schnellert et al., 2008), highlighting the combined benefits MKO and peer feedback. Furthermore, when MKOs were not available, more-knowledgeable peers, or “relative experts,” provided important intermediary supports for educators engaged in EPL (e.g., Arya, et al., 2014; DeLuca, Klinger, et al., 2015), demonstrating how some educators avoided exclusive reliance on MKO feedback to support their ongoing EPL efforts.
Feedback from Practice-based Evidence

Within EPL, educators analyzed various sources of classroom data (i.e., performance data) in order to construct practice-based evidence which provided feedback regarding EPL impacts on educators’ practices and students’ learning. Student work was a commonly used source of classroom data because it provided a source of proxy data that helped monitor educators’ progress toward EPL goals at classroom, school, and organizational levels (Schnellert et al., 2008). More recently, educators engaged in EPL have focused on collecting and analyzing multiple sources of classroom data to inform EPL (e.g., student work, classroom observations, and conversations with students), providing more trustworthy practice-based evidence to support their professional dialogue and reflection within collaborative EPL (e.g., Harrison, 2013; LaPointe-McEwan et al., 2017). Given advancements in technology, a growing body of EPL literature has specifically highlighted classroom video as a rich source of classroom data that, through collaborative analysis, generates practice-based evidence that provides feedback to inform EPL efforts (e.g., Gröschner et al., 2014; Tripp & Rich, 2012).

The use of classroom video in EPL has been operationalized in various ways across studies and contexts, commonly in video clubs for teachers. When teachers collaboratively analyzed video of their own practice with teacher peers and/or MKOs, the analysis process promoted deep discussion (Arya et al., 2014; Borko et al., 2008; van Es & Sherin, 2010), stimulated professional goal-setting (Gröschner et al., 2014; Slavit & McDuffie, 2013), and supported critical reflection on practice (Charteris & Smardon, 2013; Cherrington & Loveridge, 2014; Koellner et al., 2007; Sherin & van Es, 2009), all of which supported the attainment of teachers’ EPL goals. Furthermore, sharing classroom video of one’s own practice in collaborative learning sessions “deprivatized” instructional practice, allowing peers to see each
other in action (e.g., Levine & Marcus, 2010), helping peers provide each other with more effective formative feedback (e.g., Charteris & Smardon, 2013), and providing peers with opportunities to learn from each other’s classrooms without the logistical challenges of direct observation (e.g., Borko et al., 2008). Although some EPL initiatives used commercially or expert prepared classroom video to support professional dialogue and reflection (Arya et al., 2014; Santagata, 2009), it was more common and beneficial for teachers to analyze video from their own classroom practice (e.g., Borko et al., 2008; Koellner et al., 2007). Moreover, while teachers tended to focus on positives or negatives of their practice during video analysis, MKO facilitators played an important role in helping teachers focus on meaningful aspects of their practice in relation to students’ learning (Beiseigel et al., 2018; Borko et al., 2008; Koellner et al., 2007; van Es et al., 2014). When teachers analyzed video of their own practice with MKO facilitator support, it helped them to (a) focus their reflection on practice, (b) see their teaching and impact on students from a new perspective, (c) trust the feedback they received from peers and MKO facilitators, (d) feel accountable to change their instructional practice, (e) remember to implement changes in practice, and (f) see their progress toward EPL goals over time (Tripp & Rich, 2012).

**A Feedback Model for Embedded, ML-facilitated EPL**

This review of the conceptions, characteristics, and models of contemporary EPL, social constructivist learning theory, feedback literature, and the role of feedback in embedded, facilitated EPL provides the foundation for my conceptual feedback model of embedded, ML-facilitated EPL (Figure 1). This conceptual model bridges gaps in literature regarding how feedback supports embedded, ML-facilitated EPL and directly responds to concerns that EPL
research to date has not adequately focused on how educators learn within EPL (Kennedy, 2016) or how feedback supports EPL (Campbell et al., 2017).

![Figure 1](image)

**Figure 1.** A feedback model for embedded, ML-facilitated EPL.

While ML facilitators are responsible for concurrently supporting individual teachers’ learning in classrooms (micro) and groups of educators’ learning in schools (meso) in order to support system goals and priorities (macro), this model is focused on how ML facilitators support individual teachers’ learning in classrooms (micro)—acknowledging that teachers’ instructional practices are central to supporting desired EPL outcomes among students in schools and systems (e.g., Darling-Hammond, 2010). The conceptual model entails four empirically-supported phases: (a) teacher sets/refines EPL goals with ML facilitator support; (b) teacher
implements EPL goals with classroom-embedded ML facilitator support; (c) teacher seeks feedback regarding implementation of EPL goals; and (d) teacher interprets feedback via dialogue with ML facilitator. Each of these phases reflects the socio-constructivist nature of embedded, ML-facilitated EPL but marks a shift in conceptualizing and approaching EPL by explicitly incorporating feedback as a mechanism to support teachers’ learning within EPL.

Further, the four tenets of social constructivism underpin my feedback model for embedded ML-facilitated EPL, reflecting the nature of contemporary EPL models and initiatives. First, *learning is learner-centred* because a teacher, with ML facilitator support, sets and refines personal (i.e., micro) EPL goals that are shaped by broader school (i.e., meso) and system (i.e., macro) priorities. According to social constructivist learning theory, teacher’s EPL goals for the classroom should (a) reflect their previous knowledge and experiences (i.e., ZPD; Vygotsky 1962, 1978), current EPL interests and priorities, and students’ needs; and (b) align with school and system goals for educators and students (e.g., Richardson, 2003). Second, *learning is facilitated* by the ML facilitator, acting as a MKO, who helps teachers set relevant, meaningful goals that reflect teachers’ respective zones of proximal development (ZPD). That facilitation supports teachers’ implementation of their EPL goals in the classroom and provides external feedback to teachers regarding their implementation of EPL goals. The process helps teachers interpret multiple sources of feedback through feedback dialogues. Although ML facilitators are tasked with supporting EPL with individual teachers in classrooms and groups of educators across schools to support system goals, social constructivism prioritizes facilitating the learning of individual teachers in order to attain broader EPL outcomes (e.g., Glassman, 2001). Third, *learning is socially mediated* through dialogues between ML facilitators and teachers which support teachers’ learning in EPL. These dialogues might be one-on-one between a ML
facilitator and teacher, reflecting a coaching approach to EPL, or between the ML facilitator and
groups of educators, reflecting a collaborative inquiry (CI) approach. Social constructivism
suggests that dialogues within the teacher’s context of practice (e.g., classroom or school)
 promote deeper understandings and a culture of giving and receiving feedback among educators
(Palincsar, 2005; Richardson, 2003). Fourth, learning is active and situated through ongoing
cycles of goal-setting, implementation, feedback-seeking, and feedback dialogues between the
ML facilitators and teachers, embedded within the teacher’s context of practice (i.e., classroom
or school). Within social constructivism, ongoing cycles of embedded learning are more relevant
and meaningful to teachers and provide opportunities to connect learning to real-world
experiences (Fosnot & Perry, 1996; Shepard, 2000).

In addition to being rooted in the tenets of social constructivism, my conceptual model
explicitly incorporates empirically-supported feedback practices. Notably, the model supports
teachers’ feedback-seeking—an important aspect of self-regulation that teachers do not
consistently initiate in EPL without support (Butler & Schnellert, 2012; Camburn, 2010;
Harrison, 2013; van den Bergh et al., 2015). In this model, the feedback teachers seek can come
from multiple sources, both external and internal. External sources may include feedback from
(a) the ML facilitator as a MKO—a particularly valued source of feedback in EPL because it
promotes teachers’ knowledge-building and critical reflection (Dierking & Fox, 2013; Koellner
et al., 2007; Santagata, 2009); (b) performance data from the classroom (e.g., student products,
classroom observations, classroom video) that is collaboratively analyzed to co-construct
practice-based evidence that provides feedback to inform EPL efforts (Bryk, 2015; LaPointe-
McEwan et al., 2017; Ryerson, 2017); or (c) peers—an encouraging but inconsistent source of
feedback in EPL because peer feedback is rarely formative (Arya et al., 2014; Direking & Fox,
Internal feedback comes from teachers themselves through self-monitoring and self-assessing progress toward EPL goals (Molloy & Boud, 2013). Ideally, both external and internal feedback sources are integrated to enhance the trustworthiness of internal feedback (e.g., Eva & Regehr, 2011; Stone & Heen, 2014).

Feedback from external and internal sources might be focused on a task (e.g., the task a teacher implemented with students), process (e.g., instructional strategies a teacher implemented during a lesson), and/or self-regulation (e.g., the teacher’s next steps in practice). Moreover, feedback might serve the purpose of (a) praise to encourage and acknowledge teachers’ EPL efforts or (b) coaching to provide information regarding teachers’ progress toward EPL goals. Although feedback literature suggests that coaching feedback focused on processes or self-regulation is most important to learning (Hattie & Timperley, 2007; Nicol, 2010), the model also encompasses task feedback and feedback for the purpose of praise because these can also encourage and inform teachers’ EPL efforts, especially in the early stages of learning (Dweck, 2008; Hattie, 2012; Hattie & Timperely, 2007). Within the model, feedback is interpreted via dialogues between the ML facilitator and teacher, allowing teachers to reflect on and integrate internal and external feedback sources with ML facilitator support in order to co-construct new understandings that help teachers move toward EPL goals (Boud & Molloy, 2013; Carless et al., 2011).

My research builds upon the literature reviewed in order to examine how the conceptual feedback model presented above supports embedded, ML-facilitated EPL. My aim is to operationalize and build empirical evidence for this conceptual model and fill existing gaps in the research regarding (a) the role of ML facilitators in supporting embedded EPL with teachers, (b) how feedback supports embedded, ML-facilitated EPL, and (c) how ML facilitators and
teachers leverage diverse classroom data, including video, to construct and use practice-based evidence as feedback to inform ongoing EPL efforts.
Chapter 3
Methodology

This two-phase qualitative study operationalized my conceptual feedback model in order to explore how video-informed feedback supports embedded educator professional learning (EPL) between middle leader (ML) facilitators and teachers. This chapter begins with a brief discussion of social constructivism as the methodological lens that guided my choice of research methods. The section on social constructivism is followed by a description of the study setting, the pilot study (Phase 1) methods and a brief summary of pilot study findings. The chapter concludes with the current study (Phase 2) research design, data collection methods, and data analysis procedures, followed by a study timeline for both phases.

Social Constructivism

While social constructivism provided a theoretical lens to understand educator learning within contemporary EPL and a foundation for my conceptual EPL model (Figure 1), it also provided a methodological stance for this research. According to Creswell (2013), research rooted in social constructivism seeks to develop a deeper understanding of the world in which participants live and work. Research questions are broad and often focus on processes of interaction among individuals within their respective contexts. To address research questions, new knowledge is typically constructed through interactions with participants and observations of these participants operating in their real-life contexts. Social constructivist research recognizes complexity and seeks to incorporate multiple perspectives from multiple participants’ experiences. Researchers position themselves within the research and acknowledge how their own previous experiences influence their interpretation of participants’ experiences. Through
interpretation, researchers inductively develop patterns of meaning; typically, these patterns are socially negotiated through interaction between researchers and participants (Creswell, 2013).

**Study Setting**

This study was set within the regional EPL math project funded by the Ontario Ministry of Education, engaging nine district school boards (DSBs) in the Eastern Ontario region. The project involved approximately 1100 educators (classroom teachers, school support teachers, school administrators, ML math facilitators, system administrators, and Student Achievement Officers) across the region in a multi-year collaborative inquiry (CI)-based EPL initiative focused on the common goal of improving K-12 math teaching and learning. The pilot study (Phase 1) was conducted during the second year of the regional project, and the current study (Phase 2) was conducted during the third year of the regional project. (Note—To date, the regional project has continued for a total of five academic years; Fall 2013 through Spring 2018.)

Each DSB involved in the regional project operationalized their participation differently based on DSB- and school-specific priorities. Educators from two of the nine DSBs engaged in the regional project participated in this research—two ML facilitators and eight teachers. The two school boards will be referred to as DSB 1 and DSB 2.

DSB 1 is comprised of 19 English elementary schools and 2 English secondary schools in 16 communities, the majority of which are rural. DSB 1 covers a large geographical area with a low population density, providing education for approximately 4700 students. Within DSB 1, two ML facilitators led the learning associated with the regional EPL math project. In the first year of the initiative, 20 teachers (Grades 3-6) from 11 elementary schools were involved in CI, with a focus on teaching and learning math around the big idea of proportional reasoning. In Years 2 and 3 of the project, the two ML facilitators adopted a model that blended CI and
coaching approaches to EPL, with a more intentional focus on using data to inform and monitor impacts of EPL efforts. Year 2 engaged 25 teachers from seven elementary schools and two high schools (Grades 4-10; some continuing from Year 1, some new to the project) and focused on using questioning, consolidation, and manipulatives to support students’ proportional reasoning and representation of their thinking. The third year of the project continued to engage the same schools and 25 teachers (Grades 3-10; some continuing from Year 2, some new to the project) as well as school support teachers and school administrators, in an effort to explicitly foster collaborative leadership of math teaching and learning in schools.

DSB 2 is comprised of 38 English elementary schools and 8 English secondary schools, the majority in rural communities. DSB 2 covers a large, geographical area, providing education for approximately 15,000 students. Within DSB 2, two ML facilitators led the learning associated with the regional math project, working in conjunction with Learning Partners (i.e., ML facilitators placed in specific schools) to support classroom- and school-based professional learning and implementation. In the first year of the project, 55 teachers (Grades 1-6) from 14 elementary schools participated in EPL focused on building teacher efficacy and fluency around the big idea of proportional reasoning and cultivating professional collaboration. Year 2 engaged 30 teachers from nine elementary schools (Grades 1-8; some continuing from Year 1, some new to the project) with a related but more precise goal—to build educator fluency in proportional reasoning through a focus on consolidation, questioning, and planning for differentiated instruction. In the third year of the project, all Grades 7 and 8 teachers from the 38 elementary schools in DSB 2 were involved (some continuing from Year 2; some new to the project) with a focus on supporting intentionality around the assessment cycle to help teachers refine what they listen for, observe, and assess with respect to students’ proportional reasoning in math.
Phase 1: Pilot Study

The pilot study (Phase 1) was conducted during the 2014-2015 school year to explore (a) the feasibility of an operational video-informed feedback model and research techniques and (b) middle leader (ML) facilitators’ and teachers’ experiences with the video-informed feedback model. (Note—ML facilitators will be referred to as ‘facilitators’ for the remainder of Chapter 3.)

To enact the pilot study, I constructed a preliminary video-informed feedback model to operationalize my conceptual EPL model for embedded EPL between ML facilitators and teachers (Figure 1). Pilot study methods and findings are presented in this chapter to illustrate how the pilot study informed my research design for the current study (Phase 2). Four initial questions guided the pilot study:

1. Do educators value the video-informed feedback model as a support of their professional learning and practice?
2. What resources and supports are necessary to effectively implement the video-informed feedback model?
3. How does the video-informed feedback model impact instructional practices?
4. How do educators’ experiences with the video-informed feedback model change over time?

The operational model used in the pilot study leveraged cycles of classroom video analysis (CVA) to support video-informed feedback in embedded EPL between facilitator-teacher pairs (see Figure 2). Within the model, each CVA cycle began with a facilitator-teacher pair creating an assessment matrix that included the teacher’s instructional practice goals grounded in her recent professional learning associated with the regional math project (e.g.,
Butler & Schnellert, 2012). The facilitator then recorded three to five brief video clips of the teacher’s classroom instructional practice with students, with clips focused on the teacher’s implementation of practice goals identified in the matrix (e.g., Borko et al., 2011). Next, the teacher independently reviewed the video clips and used the matrix to complete a self-assessment of her instructional practice. The facilitator then independently viewed the same video clips and used the matrix to complete a more knowledgeable-other (MKO) assessment of the teacher’s instructional practice (e.g., Zhang et al., 2011). Finally, the facilitator-teacher pair met to engage in a feedback dialogue grounded in the self- and MKO assessments of the classroom video clips (e.g., Gröschner et al., 2014). During this feedback dialogue, the facilitator-teacher pair discussed the teacher’s progress toward her identified practice goals in order to refine the teacher’s practice goals and create a new matrix to guide the next CVA cycle.

**Figure 2.** Pilot study operational video-informed feedback model for EPL.

**Pilot study participants.** Toward the end of the first year (2013-2014) of my work as a research partner in the regional EPL math project, I recruited DSB math facilitators to participate
in the pilot study. Two facilitators from small, rural DSBs agreed to participate. Both facilitators had previously expressed interest in exploring the use of classroom video to support their facilitation of teachers’ learning and practice in schools and classrooms and served in non-evaluative, support roles within their DSBs. In addition, I had developed trusting relationships with each of these two facilitators through ongoing collaboration and support as a research partner at monthly regional meetings. At the start of the second year of the regional math project, each facilitator recruited teacher participants in elementary schools they supported. Facilitator 1 recruited two teachers (Grades 3 and 6) from school A. Facilitator 2 recruited four teachers (Grades 2/3, 3, 5/6, 6); two from school B and two from school C.

**Pilot study research design.** A longitudinal qualitative design was implemented for the pilot study. In December 2014, I met with each facilitator-teacher pair at the teacher’s home school to introduce the study, obtain signed consent from facilitators and teachers, and explain data collection protocols. During this first meeting, each facilitator and teacher participant completed a pre-questionnaire and received a data collection binder containing eight blank assessment matrices and eight reflection logs. Each facilitator-teacher pair committed to completing up to eight CVA cycle iterations throughout the remainder of the school year; approximately one per month. In May 2015, I met with each facilitator-teacher pair to complete individual post-questionnaires and a 30-minute audio-recorded dyadic interview (Sohier, 1995) regarding their experiences with the video-informed feedback model.

Data collected in the pilot study included pre-and post-questionnaires, documents (i.e., assessment matrices and reflection logs), audio-recorded dyadic interviews, and field notes. (See Appendix B for university ethics approval, Appendix C for participant Letters of Information/Consent Forms, and Appendix D for pilot study data collection protocols.) The
audio-recorded dyadic interviews with facilitator-teacher pairs comprised the primary data source. I listened to and documented significant statements from the audio-recorded dyadic interviews in researcher memos. These memos were then analyzed through standard thematic coding processes (Stake, 2010). Content analysis processes (Neuendorf, 2016) were used to analyze assessment matrices, reflection logs, and pre- and post-questionnaires. Questionnaires, and field notes were used to support and enrich conclusions drawn from thematic analyses of dyadic interviews. Data collection and analyses informed revisions to the video-informed feedback model and research design proposed in Phase 2.

**Pilot study findings.** Key findings from the pilot study are briefly summarized in relation to the four research questions.

*Question 1: Do educators value the video-informed feedback model as a support of their professional learning and practice?*

The facilitators and teachers involved in the pilot study generally valued the video-informed feedback model as a support of their professional learning and practice. In particular, facilitators appreciated the opportunity to leverage classroom video as a rich, real-time source of classroom data on which to base EPL dialogues with teachers. Because facilitators recorded the classroom video themselves during teachers’ classroom implementation with students, facilitators were able to capture critical moments during instruction, relevant to teachers’ identified practice goals, to later analyze and reflect on with teachers. Facilitators stated that classroom video allowed them to provide precise feedback, both praise and coaching, to teachers regarding their progress toward articulated practice goals. Moreover, teachers reported that classroom video provided them with the opportunity to reflect on their practice from a new perspective, without having to rely on faulty or incomplete memories of classroom events.
Teachers noted the importance of facilitators as MKOs to help them analyze video in order to determine next steps in their practice because facilitators contributed valued expertise with respect to math teaching and learning. Consequently, teachers preferred to collaboratively analyze classroom video with facilitators, instead of analyzing the video independently then engaging in a feedback dialogue with the facilitator to discuss progress and determine next steps.

*Question 2: What resources and supports are necessary to effectively implement the video-informed feedback model?*

Trusting relationships between facilitators and teachers underpinned their engagement in the video-informed feedback model. These foundations of trust were further enhanced by a supportive school culture, with school administrators providing ongoing encouragement of teachers’ engagement in the video-informed feedback model and sometimes providing release time for facilitators and teachers to engage in feedback dialogues. In addition, prioritizing adequate time for facilitators and teachers to collect and analyze classroom video was also critically important, as teachers rarely collected classroom video without the direct support of the facilitator and were reluctant to analyze their classroom video without facilitator support. Finally, adequate equipment to facilitate the collection of video data (e.g., iPads with sufficient storage, digital cameras) as well as software that enabled efficient sharing and analysis of video data were necessary to engage in classroom video analysis (CVA).

*Question 3: How does the video-informed feedback model impact instructional practices?*

The video-informed feedback model helped teachers gain confidence and persevere in their implementation of new instructional practices with students. When facilitators were in the classroom video recording teachers’ implementation, facilitators also provided teachers with guidance and encouragement to explore new approaches. This guidance and encouragement
allowed teachers to try new things in practice that they may not have tried on their own. Moreover, through facilitator-teacher pairs’ collaborative analysis of classroom video, teachers began to see the impact of these instructional practices on their students and make adjustments in their practice moving forward. Students were also impacted by the use of video in the classroom. When teachers explained to students that the purpose of CVA was to support their professional learning and practice, some students also became engaged in the analysis of classroom video, asking to review classroom video of themselves in order to analyze their own engagement in learning and set goals for improvement. Facilitators, teachers, and school administrators encouraged and supported students’ use of classroom video among students in participating classrooms.

*Question 4: How do educators’ experiences with the video-informed feedback model change over time?*

Both facilitators and teachers were initially anxious about engaging in CVA; however, over time, all participants became more comfortable and fluent with CVA processes and the video-informed feedback model itself. At the start of the pilot study, facilitators were apprehensive that teachers may not agree to participate in the study due to concerns about having their instructional practice video-recorded and collaboratively analyzed; therefore, facilitators purposefully selected teachers who had previously demonstrated readiness to take risks in their professional learning and practice. Facilitators noted that teachers began the study with different degrees of readiness to engage in CVA and developed comfort with CVA throughout the year at different rates. This required facilitators to be responsive to individual teacher’s needs and differentiate their support accordingly. At the outset of the study, teachers were primarily concerned about seeing and hearing themselves on video, but were reassured that the video
would only be viewed by themselves and their respective facilitator. Over time, teachers became increasingly comfortable viewing and analyzing classroom video of their own practice and began to more actively contribute to the analysis of classroom video, with less reliance on facilitator guidance. Specifically, teachers became more able to identify how their practice impacted students’ learning and to suggest possible next steps for themselves or their students.

**Pilot study conclusions and next steps.** Three key themes emerged from the pilot study that informed the current study. First, facilitators and teachers reported that the video-informed feedback model focused too heavily on classroom video and should include multiple classroom data sources, including student work, to inform feedback dialogues between facilitator-teacher pairs. Second, facilitator-teacher pairs who participated in the pilot study reported that the data collection binder provided in the initial study required too much paperwork within each CVA cycle (i.e., assessment matrices and reflection logs), and suggested that audio-recorded facilitator-teacher dialogues would be more feasible and provide richer data. Third, although facilitators and teachers reported that the video-informed feedback model was valuable and supported their professional learning and practice, they felt challenged to complete one CVA cycle per month due to institutional scheduling constraints and competing professional priorities.

**Phase 2: Current Study**

The current study (Phase 2) took place during the 2015-2016 school year to explore how video-informed feedback dialogues support embedded EPL between facilitators and teachers. The research design and data collection procedures for the current study were informed by the pilot study findings. University ethical clearance can be found in Appendix B.

**Refined video-informed feedback model.** The video-informed feedback model used in the current study was similar to the pilot study model in that it entailed recursive cycles of goal-
setting, implementation, interpretation of classroom data, and facilitator-teacher dialogues. However, the refined model had three key differences from the original model (see Figure 3). First, the classroom data sources in the refined model extended beyond video to incorporate multiple sources of classroom data (e.g., facilitator observational notes and student work) that can be collaboratively analyzed to co-construct practice-based evidence to inform EPL efforts. Second, classroom data were collaboratively analyzed within pairs during the facilitated feedback dialogue in each EPL cycle, instead of independently by facilitators and teachers prior to the feedback dialogue as in the pilot study model because this was more feasible and meaningful for pairs. Finally, the refined model explicitly recognized that the teachers must integrate and internalize the multiple sources of feedback to inform subsequent EPL cycles.

**Figure 3.** Refined video-informed feedback model for EPL.

**Participants.** Two facilitators—both from the pilot study (Phase 1)—and five teachers participated in Phase 2 of this study. As previously articulated, these facilitators represented participants in the previously described multi-year, regional EPL math project in Eastern Ontario and served in non-evaluative, professional learning support roles within their DSBs. Each
facilitator recruited teachers from the schools they supported to participate in Phase 2 of the study. Facilitator 1 recruited three elementary teachers from school A; one of whom had also participated in the pilot study and two of whom were new to the study. Facilitator 2 recruited two elementary teachers, both from school B and both of whom had participated in the pilot study. (Note: A third teacher from school B was recruited to participate in the study but was unable to fulfill the full-year commitment.) (See Appendix E for Letters of Information/Consent Forms.)

**Research design.** An exploratory multiple case study design was implemented for Phase 2 of the study. This research design was selected because it contributes to an in-depth understanding of a complex, dynamic phenomenon within real-world contexts (Creswell, 2013; Stake, 2006). Specifically, an embedded multiple case design was used (Yin, 2014) over the course of one school year. According to Yin, a case can be an individual, organization, process, program, institution, or event. In this study, each facilitator who supported EPL within schools in their respective DSBs represented a case (see Figure 4). The embedded units of analysis within each case corresponded to each facilitator-teacher pair. The embedded multiple case approach was selected to provide more robust empirical support for my findings within and across educational contexts and strengthen the validity of analytic conclusions drawn from this research (Eisenhardt, 1989; Stake, 2006; Yin, 2014).

**Data sources.** Within the embedded multiple case study design, I collected multiple sources of data from educator participants. Primary data sources included semi-structured interviews with educators and audio recordings of facilitator-teacher pairs’ feedback dialogues. Additional data sources included questionnaires, documents, direct observation data, and researcher field notes. Table 4 represents the mapping of data sources to research questions for the current study (Phase 2). Triangulation of these multiple data sources strengthened the validity
of the findings of this research. All data collection protocols for the current study can be found in Appendix F.

**Figure 4.** Embedded multiple case research design.

*Semi-structured interviews.* Semi-structured interviews were conducted with all educator participants in Spring 2016 at the end of Phase 2. Semi-structured interviews contributed an in-depth understanding of participants’ perspectives and experiences while allowing me the flexibility to probe for additional information and details as appropriate (Creswell, 2013; Stake, 2006). First, I conducted semi-structured dyadic interviews with each facilitator-teacher pair at the teacher’s home school. Dyadic interviewing is a technique that recognizes the interdependent relationship between individuals and leverages this relationship as a rich source of information (Sohier, 1995). Each dyadic interview lasted approximately 20 minutes. Sample dyadic interview questions included: What supports were in place that allowed a [feedback] dialogue to be effective?; What were some of the challenges you faced engaging in this EPL model?; and What were some of the unexpected benefits of engaging in this EPL model? Next, immediately following each dyadic interview, I conducted an individual interview with each teacher to obtain her individual experiences with video-informed feedback model. Teacher interviews were
approximately 20 minutes and asked questions such as: Which aspects of the model most supported your professional learning and practice as a teacher?; Describe the challenges of using classroom video as a source of data in EPL.; and Moving forward, what advice or guidance would you give other teachers considering using this EPL model? Finally, in June 2016, I conducted individual interviews with each facilitator to gain her perspectives on implementing video-informed feedback model with teachers. Facilitator interviews were conducted at my university library and lasted approximately 60 minutes each. Sample facilitator interview questions included: Which aspects of the model most supported your professional learning and practice as a facilitator?; Describe the challenges of using classroom video as a source of data in EPL.; and Moving forward, what advice or guidance would you give other facilitators considering using this EPL model?
Table 4

*Mapping Data Sources to Research Questions*

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Data source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does a video-informed feedback model support embedded EPL between ML facilitators and teachers?</td>
<td>Semi-structured interviews (dyadic and individual)* Questionnaires Documents Direct observations Field notes</td>
</tr>
<tr>
<td>How do video-informed feedback dialogues between ML facilitators and teachers evolve to support EPL over time?</td>
<td>Audio recordings* Questionnaires Documents Direct observations Field notes</td>
</tr>
</tbody>
</table>

*Note.* * denotes the primary data source(s) for the associated research question.
**Audio recordings.** Facilitators audio-recorded all feedback dialogues with teachers, for a total of four dialogues per pair, with the exception of one Case 2 pair that only completed three dialogues. Each feedback dialogue was guided by the Facilitated Feedback Dialogue Protocol and ranged in length from approximately seven to 23 minutes. Audio recordings provided real-time documentation of dialogues within each facilitator-teacher pair.

**Questionnaires.** Each facilitator and teacher completed a pre-questionnaire at the start of Phase 2. Pre-questionnaires contained five open-response items designed to elicit each participant’s initial thoughts about the video-informed feedback model and her demographic information.

**Documents.** During each facilitated feedback dialogue, the facilitator completed a Facilitated Feedback Dialogue Protocol, for a total of four protocols per pair, with the exception of the Case 2 pair that only completed three dialogues. The protocol included: the teacher’s current professional learning goal, lesson date and focus, sources of classroom data collected, and new professional learning goal. The protocol also provided three prompts to guide the facilitated feedback dialogue session: Indicate the sources of classroom data you have collected to support your reflection and goal-setting.; Please reflect on and discuss these sources of classroom data in relation to your current professional learning goal.; and After the discussion, please record your new professional learning goal.

**Direct observations.** I directly observed one video-informed feedback dialogue with each facilitator-teacher pair, the final dialogue for four out of five pairs and the second of three dialogues for the other pair. During my observations of each dialogue, I recorded written notes regarding what I saw and heard during the dialogue. Following each dialogue, I expanded my
observational notes to include my reflective thoughts about participants’ body language, facial expressions, and contextual details in order to enrich subsequent data analyses.

**Field notes.** Throughout both phases of this study, I documented field notes and reflections to record relevant thoughts, observations, and anecdotes. This documentation was used to enrich data analyses and allowed me to monitor the progress of the study and refine or adapt research questions, data collection methods, or data collection protocols as appropriate (Eisenhardt, 1989).

**Data analysis procedures.** The purpose of this embedded multiple case study was to explore how video-informed feedback supported embedded EPL between ML facilitators and teachers. Specifically, this study endeavoured to elucidate (a) how a video-informed feedback model supported embedded EPL between ML facilitators and teachers and (b) how video-informed feedback dialogues between ML facilitators and teachers evolved to support EPL over time.

To answer my research questions, I followed Creswell’s (2013) process for coding a multiple case study which entailed: (a) within-case contexts and descriptions, (b) within-case analyses, and (c) cross-case analyses and assertions. All data sources collected were included in these analyses. While it is widely acknowledged that multiple case study analyses are complex and with few supporting protocols (Creswell, 2013; Stake, 2006; Yin, 2014), every effort was made to implement a systematic approach to data analysis in order to enhance the trustworthiness of findings.

**Individual case descriptions.** Each case was described in detail including (a) a description of the school in which facilitator-teacher pairs worked and (b) the facilitator’s and teachers’ professional backgrounds and experiences working together in the regional math
project and in this study. These descriptions informed subsequent data analyses processes and enhanced the transferability of study findings (Creswell, 2013). Throughout the data analyses, I also used my tacit knowledge of the research context and participants to enrich interpretation processes (Nolen & Talber, 2011; Stake, 2006).

Within-case analyses. Within-case analyses began by organizing the data according to each case (i.e., facilitator) and embedded units of analysis (i.e., facilitator-teacher pairs) associated with the case. Within each case and embedded unit of analysis, data were then organized according to time collected (i.e., pre-study, EPL Cycle 1, EPL Cycle 2, EPL Cycle 3, EPL Cycle 4, and post-study). Once data were organized, I read all interview transcripts, Facilitated Feedback Dialogue Protocols, and field notes and listened to audio recordings of each facilitator-teacher feedback dialogue. During these reading and listening activities, I memoed key phrases, ideas, and concepts, searching for insights and patterns in relation to my research questions (Creswell, 2013). I used matrices, flowcharts, and frequency tables as appropriate to guide this process. This allowed me to get a sense of the complexity of the data before simplifying these data into codes, categories, and themes (Stake, 2006).

In response to my first research question—How does a video-informed feedback model support embedded, ML-facilitated EPL?—I coded all interview data. Coding is the process of breaking down, analyzing, and categorizing data into related segments or themes (Creswell, 2013; Stake, 2006). Specifically, I used open, descriptive coding to inductively code all interview transcripts in each case (i.e., dyadic interviews with facilitator-teacher pairs and individual interviews with the facilitator and teachers) (Saldana, 2013). My unit of analysis was an educator’s response to an interview question, with a focus on aspects of the response that specifically informed RQ1 (i.e., how the video-informed feedback model supported EPL).
Auxiliary aspects of a response that did not respond to RQ1 were not coded. Code names described the topic of each response and were informed by terms used in social-constructivist learning theory, feedback literature, and EPL research as well as my tacit knowledge of the EPL context for this study. Multiple codes were assigned to each response as appropriate (Saldana, 2013). Secondary data sources (i.e., questionnaires, documents, direct observations, and field notes) were used to enrich the analysis of interview transcripts.

After all interview transcripts were coded across both cases, I obtained an initial list of 63 codes. Related codes were combined, reducing the list to 43 codes. I then enlisted a fellow graduate student to code ten percent of interview transcripts using the refined code list in order to calculate inter-rater reliability. All discrepancies in coding were discussed, resulting in an ultimate inter-rater reliability of 92 percent. After coding, I developed categories (i.e., related codes combined) and themes (i.e., related categories combined to form big ideas) (Creswell, 2013; Saldana, 2013; Stake, 2006). For example, in Case 1, I combined the codes of authentic classroom data, capturing positives with video, student comfort with video, revisiting video data, storage for video, and capturing student thinking under the category use of classroom video. I then combined the categories of use of classroom video, monitoring student learning, collaborative data analysis, and teacher practice into the theme of co-constructing practice-based evidence. The complete list of codes, categories, and themes for each case, with associated frequencies, are summarized from highest to lowest frequencies in Appendix G to provide an overview of the salience of themes within each case.

In response to my second research question—How do feedback dialogues between ML facilitators and teachers evolve to support EPL over time?—I focused on the content and patterns of interactions in each audio recording of facilitator-teacher pairs’ feedback dialogues. During
memoing. I summarized what each educator said in sequence throughout each dialogue and noted my overall impressions of the nature of each dialogue. I then implemented provisional coding (i.e., a predetermined code list) to code my memos of each dialogue within each pair using the analytical feedback framework developed in Chapter 2 (see Table 3) (Saldana, 2013). This deductive coding process elucidated the presence and salience of various feedback purposes, foci, sources, and modes in each pair’s feedback dialogues across cycles (see Appendix H). I also used colour-coded sticky notes to further elucidate patterns of feedback within each pair’s dialogues (i.e., blue for purpose, yellow for focus, pink for source, and green for mode) and compared these patterns within and across pairs in each case over time. I triangulated the results of my deductive coding of feedback dialogue memos with the Facilitated Feedback Dialogue Protocol documents associated with each dialogue to further understand trends in feedback within and across pairs and generate themes within each case regarding how feedback dialogues evolved over time. Additional secondary data sources (i.e., questionnaires, direct observations, and field notes) informed my analyses, enabling a description of how video-informed feedback dialogues between ML facilitators and teachers evolved to support EPL within each case over time.

**Cross-case analyses and assertions.** Once my two research questions were addressed within each case, I compared findings across cases in relation to the overarching purpose of my study—to explore how video-informed feedback supported embedded EPL between ML facilitators and teachers. Specifically, I developed a word table to compare similarities and differences in findings across cases through iterative analyses of within case categories and themes in order to develop cross-case assertions (Stake, 2006; Yin, 2014). Assertions refer to evidence-based claims that recognize the situational nature of findings in qualitative research.
and, instead of providing conclusions, are intended to stimulate further conversation and research (Nolen & Talbert, 2011).

In accordance with social constructivism, my goal was to develop cross-case assertions that (a) represented the construction of new knowledge in relation to the research questions of this study, (b) incorporated multiple perspectives from multiple educators’ experiences with the video-informed feedback model, and (c) were informed by my firsthand knowledge of and engagement in the EPL context of this research. In total, I generated four cross-case assertions and then member-checked these assertions with ML facilitator participants to enhance validity (Saldana, 2013). These cross-case assertions represent socially constructed knowledge that resulted from my ongoing interactions with participants in their respective contexts of practice over the course of the five-year regional math project.

**Ensuring Trustworthiness**

Trustworthiness of a qualitative study entails the credibility, transferability, dependability, and confirmability of findings (Lincoln & Guba, 1985). Credibility was enhanced through multiple methods. First, I conducted member-checking of within-case findings and cross-case assertions with the facilitators who participated in the study (Stake, 2006). Second, my prolonged engagement in the EPL context of this study contributed to trusting relationships with participants, especially facilitators, and helped me develop understanding from the data I collected. Third, my field notes provided ongoing observations and reflections throughout the study, contributing depth to my interpretations and findings (Lincoln & Guba, 1985). Fourth, I triangulated all data collected from multiple sources and through multiple methods (i.e., participant interviews, audio recordings of feedback dialogues, questionnaires, documents, and field notes) to increase confidence in my findings. Finally, throughout the analysis process, I
regularly considered rival explanations for my interpretations and findings (Creswell, 2013; Yin, 2014).

As previously mentioned, transferability was increased through detailed descriptions of each case and its context (Stake, 2006). The systematic data collection and analysis plan outlined in the previous sections enhanced the dependability of the study (Yin, 2014). Confirmability was addressed through triangulation of multiple data sources, the statement of my positionality in relation to this research, ongoing reflection about potential biases in my field notes, and an audit trail of data collection and analysis processes (Eisenhardt, 1989; Stake, 2006; Yin, 2014).

**Study Timeline**

Table 5 summarizes the timeline for Phases 1 and 2 of this study. Data collection for the pilot study (Phase 1) was completed between December 2014 and May 2015 and included pre- and post-questionnaires, documents, direct observations, field notes, and interviews. From June through August 2015, I analyzed and reflected on preliminary data and revised my video-informed feedback model and research design in preparation for the current study (Phase 2). Phase 2 began in Fall 2015 with participant recruitment, ethics revisions and renewal, and collection of participant pre-questionnaires. The majority of data collection in Phase 2 occurred from December 2015 to April 2016 including audio recordings of facilitated feedback dialogues, Facilitated Feedback Dialogue Protocol documents, and direct observations of facilitated feedback dialogues. Dyadic interviews with facilitator-teacher pairs and individual interviews with facilitators and teachers were conducted in April and May 2016. Field notes were recorded throughout the current study (September 2015-May 2016). Phase 2 data analysis and write-up were conducted June 2016 to July 2018.
Table 5

Data Collection and Analysis Timeline

<table>
<thead>
<tr>
<th>Study Phase</th>
<th>Timeline</th>
<th>Procedures</th>
</tr>
</thead>
</table>
| Prior to December 2014 | Development of model and research design  
Ethics application  
Recruitment of participants |
| Phase 1 (Pilot study) | December 2014 | Pre-questionnaires |
| December 2014-April 2015 | Documents and direct observations, and field notes  
April-May 2015 | Semi-structured interviews (dyadic) and post-questionnaires  
June-August 2015 | Preliminary data analysis  
Researcher reflection  
Revisions of model and research design |
| Phase 2 (Current study) | September 2015 | Recruitment of participants |
| September 2015-May 2016 | Field notes  
October 2015 | Revise and renew ethics application  
November 2015 | Questionnaires  
December 2015-April 2016 | Audio recordings and documents  
April-May 2016 | Direct observations and semi-structured interviews (dyadic and individual)  
June 2016-July 2018 | Data analysis and write-up |
Chapter 4

Research Findings

The purpose of this multiple case study was to explore how video-informed feedback supported embedded educator professional learning (EPL) between middle leaders (ML) facilitators and teachers. The findings from this study respond to two research questions: How does a video-informed feedback model support embedded EPL between ML facilitators and teachers? (RQ1); and How do feedback dialogues between ML facilitators and teachers evolve to support EPL over time? (RQ2).

This chapter is organized into three sections. Sections 1 and 2 describe the findings from Cases 1 and 2, respectively. Each of these two sections provides a description of (a) the case—context and educators’ backgrounds and relevant professional experiences, (b) thematic findings regarding how the video-informed feedback model supported embedded EPL between ML facilitators and teachers (RQ1), and (c) how feedback dialogues between ML facilitators and teachers evolved to support EPL over time (RQ2). Section 3 presents cross-case assertions that emerged from a cross-case analysis of Cases 1 and 2 findings in response to the overarching purpose of this study—to explore how video-informed feedback supported embedded EPL between ML facilitators and teachers. This chapter concludes with an interpretation of cross-case assertions through the lens of social constructivist learning theory—the theory underpinning the video-informed feedback model.

Section 1: Case 1 Findings

Description of the Case

Case 1 included of one ML facilitator, Diane, and three junior level (i.e., Grades 4-6) teachers from one school in DSB1—Meg, Morgan, and Lyn—that comprised three embedded
units (i.e., ML-facilitator-teacher pairs). The school served approximately 340 students (Kindergarten through Grade 7) and was situated in a large town in Eastern Ontario, Canada. At the time of the study, the school consisted of 16 teachers, one vice principal, and one principal. The principal had been in his role for ten years.

Diane had 18 years of experience in education, teaching mostly Grades 7 and 8, with some experience teaching both lower and higher grade levels. Within her DSB, Diane had been facilitating EPL for six years in an instructional coaching role. She regularly engaged in EPL herself to enhance her skills as an educator and a ML facilitator of educator learning. Over the past two years, Diane had been involved in the regional EPL project aimed at enhancing math teaching and learning across nine DSBs through collaborative inquiry (CI). Diane was a participant in the pilot study for this research, which was her first experience using classroom video to support EPL among teachers.

Meg was a Grade 4 teacher with 15 years of experience in elementary education (Kindergarten through Grade 6), with most of her classroom experience at the Grade 4 level. She had taught at her school for 14 years and was regularly involved in various EPL initiatives. Over the past three years, Meg had been working toward her EPL goals with Diane’s classroom-embedded support and coaching. Throughout the past two years, Meg had been part of the regional EPL project in math. Meg participated in the pilot study for this research which, like Diane, was her first experience using classroom video.

Morgan was a Grade 5/6 teacher with 16 years teaching experience, mostly in Kindergarten through Grade 3. During the year of this study, Morgan was teaching Grade 5/6 for the first time since the start of her career. She was new to the school, new to using classroom
video, and it was her first year in the regional math EPL project as well as her first year working with Diane.

Lyn was an early career teacher with six years of experience. She had taught Grade 1 in England and was currently working as an occasional teacher within her DSB. Over the past two years, Lyn had completed several long-term occasional teaching positions, mostly in Grades 4 through 6. During the time of this study, Lyn was a long-term occasional teacher in a Grade 6/7 classroom. Like Morgan, it was her first year at the school, first time using classroom video, first year in the regional math EPL project, and first year working with Diane.

Over the course of one school year, each ML facilitator-teacher pair collected and analyzed multiple sources of classroom data to co-construct practice-based evidence of changes in the teacher’s practice and/or her student’s learning. With respect to students’ learning, each pair monitored the progress of two marker students throughout four EPL cycles (November-April). Marker students were collaboratively selected by each pair based on these students’ previously demonstrated struggles in math.

The Video-informed Feedback Model and Embedded, ML-Facilitated EPL

Through an inductive analysis of individual and dyadic interview data from Case 1 educators—Diane, Meg, Morgan, and Lyn—informed by secondary data sources (i.e., educator questionnaires, feedback dialogue protocols, direct observations of feedback dialogues, and field notes), four themes emerged. These themes illustrate how the video-informed feedback model supported embedded EPL between Diane, the ML facilitator, and the teachers she supported (RQ1). Themes are presented in order of salience: (a) co-constructing practice-based evidence; (b) collaborative learning among educators; (c) personalizing sustained learning goals; and (d) flexibility with structures. Each theme with associated descriptions, categories, frequencies, and
sources is summarized in Table 6 and described in subsequent sections with supporting quotations from Case 1 educators. Frequencies reflect the total number of times each category occurred in Case 1 educators’ individual and dyadic interview data. (See Appendix G for a complete list of interview codes and categories with sources and associated frequencies.)
Table 6

**Case 1 Themes, Descriptions, Categories, and Sources**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Category with Frequency*</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-constructing Practice-based Evidence</td>
<td>ML facilitator-teacher pairs collaboratively analyzed multiple sources of classroom data to co-construct practice-based evidence that provided feedback regarding changes in teachers’ practices and students’ learning.</td>
<td>Use of classroom video</td>
<td>38 Pairs 1, 2, 3; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitoring student learning</td>
<td>28 Pairs 1, 2, 3; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaborative data analysis</td>
<td>17 Pairs 1, 2, 3; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher practice</td>
<td>11 Pairs 1, 2, 3; Facilitator</td>
</tr>
<tr>
<td>Collaborative Learning among Educators</td>
<td>ML facilitator-teacher pairs developed trusting, supportive partnerships with each other and relevant colleagues that promoted collaborative learning.</td>
<td>Human supports</td>
<td>27 Pairs 1, 2, 3; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning together</td>
<td>23 Pairs 1, 2, 3; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trusting relationships</td>
<td>9 Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td>Personalizing Sustained Learning Goals</td>
<td>ML facilitator-teacher pairs collaboratively identified personalized learning goals for teachers and students that were sustained over time and reflected teacher readiness and students’ needs.</td>
<td>Teacher readiness</td>
<td>19 Pairs 1, 2, 3; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher learning goals</td>
<td>12 Pairs 1, 3; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Student learning goals</td>
<td>6 Pair 1; Facilitator</td>
</tr>
<tr>
<td>Flexibility with Structures</td>
<td>ML facilitator-teacher pairs used time and the EPL model flexibly to enable teachers’ participation in the model.</td>
<td>Time</td>
<td>23 Pairs 1, 2, 3; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPL model</td>
<td>10 Facilitator</td>
</tr>
</tbody>
</table>

Note. *Frequency refers to the total number of times each category occurred in Case 1 educators’ interview data (individual and dyadic). See Appendix G for a complete list of interview codes and categories with associated sources and frequencies.*
Co-constructing Practice-based Evidence

ML facilitator-teacher pairs collaboratively analyzed multiple sources of classroom data to co-construct practice-based evidence that provided feedback regarding changes in teachers’ practices and students’ learning. The theme of co-constructing practice-based evidence comprised four categories: (a) use of classroom video; (b) monitoring student learning; (c) collaborative data analysis; and (d) teacher practice.

All Case 1 educators spoke positively about the use of classroom video to support monitoring student learning and shifts in teacher practice. During the classroom implementation phase of each EPL cycle, ML facilitator-teacher pairs collected multiple data sources including classroom video, student work samples, and ML facilitator observational notes, with Diane taking the lead in data collection activities. In subsequent feedback dialogues following classroom implementation, pairs engaged in collaborative data analysis in order to co-construct practice-based evidence that provided feedback to inform next steps for teachers and students.

Diane was essential to facilitating pairs’ co-construction of practice-based evidence within EPL cycles. Diane recorded video clips during each teacher’s implementation of a math lesson, focusing video on the teacher’s implementation of her EPL goal (e.g., effective questioning techniques or use of manipulatives) and marker students’ learning in response to the teachers’ implementation of her EPL goal. Diane also documented observational notes during the lesson and ensured that student work samples were collected for subsequent analyses. Within feedback dialogues, each pair analyzed classroom video clips that Diane selected (usually two or three clips, approximately 3 minutes per clip), annotated marker student work samples, discussed students’ misconceptions, and planned next steps for teachers and students. Diane reflected on
the value of analyzing multiple sources of classroom data, versus video in isolation, during feedback dialogues with teachers:

I think last year [in the pilot study] when I was starting off with just the video analysis, there was definitely some value in that. But I think that the model this year—being more explicit in using all the other sources of data in addition to the video—was really a helpful structure [to] push work forward for me because it made me more aware of using the video as part of all of the rest of the data that was available to us when we had those conversations. I do think, though, it was a combination of all those data sources, but video I guess if I had to name something that was most useful, I guess I would say the video. Although having said that, it's the opportunity to have that process demonstrated or that process right there as we're talking and then the product [i.e., student work] to sort of go with it.

Although Diane highlighted the importance of co-constructing practice-based evidence from multiple sources of classroom data, all Case 1 educators particularly valued classroom video as an authentic source of classroom data that prompted and enhanced their memories of classroom events to inform EPL. Diane explained that video allowed the pairs to “experience in real time what was happening” in the classroom and enriched their dialogues beyond a unidimensional focus on the teacher’s identified EPL goal:

So many other things came up at the same time—like just observing a teacher questioning, student talking, lesson structure like the three-part lesson … we were able to pull so many more things into the conversation in addition to what the initial goal was about.
Meg added that analyzing video helped her see things that she could not see during classroom implementation:

For me it was phenomenal, because I felt like I reflected on my own teaching. I reflected on my own practices that I don't necessarily do regularly. It forced me to do that because it was right there in front me. It forced me to look at my questioning, to look at my scaffolding, to look at my lead time, to look at the actual question and presenting to the kids and who the kids are in my room; did I differentiate that enough, did I not differentiate it enough, or I can see over here Johnnie is having a hard time.

Teachers across the three pairs confirmed that the collaborative analysis of classroom data with Diane during feedback dialogues was a critical element of the EPL model that supported changes in their learning and practice. According to Lyn, who was new to teaching as well as the use of classroom video:

The dialogue with Diane has been immensely helpful … looking at specific lessons and specific students … to see those videos and to have her—someone who has quite a bit of experience whereas I myself don’t have as much to have her—tell me, I really like that you did this, this and this—so that I know I’m going to continue to try to do this, this and this.

Morgan added, “Sometimes I don't realize what's happening, but when we had that chat or dialogue where [Diane] could say to me ‘Watch this little clip’… and I’m like, ‘Oh my goodness, I didn’t realize that was happening or hear a student’s response.’”

While video supported all teachers’ learning, it should be noted that classroom video supported each teacher differently during feedback dialogues. These differences appeared to be related to each teacher’s prior experience in the teaching profession, with grade-level math
curriculum, working with Diane in the project, and using classroom video. Meg, who was most experienced in all of the aforementioned areas, focused primarily on her own teaching when analyzing video during feedback dialogues with Diane. Meg valued classroom video as a means to reflect on her own practice in relation to her EPL goals (i.e., how she used questioning and responded to her marker students’ needs in the classroom), stating, “It's about learning being reflective on our practices and the things that we're already doing that we don't realize that we're doing, and maybe change the things that need to be changed to support our students.” Morgan, who was experienced as a teacher but new to teaching Grade 5/6, working with Diane, and using video, prioritized analyzing student work samples over classroom video to monitor her marker students’ learning; however, she acknowledged that triangulating student work with classroom video had the power to reveal surprises about her students:

    Probably after the second lesson when Diane and I sat down … she showed me a clip of the student's response that I hadn't seen yet. And it was a student who I thought had a really good understanding, and the video showed that perhaps the understanding wasn't as in-depth as I thought … then I really saw the value in actually having someone else videotape while I was teaching.

Lyn, who was least experienced in all areas, used video in conjunction with student work to better understand her students’ thinking and, in turn, better understand how to support their learning through her instruction: “I’ve changed the way I look at student work … I don’t look as much for the right answers. I do look for the process of getting there so I can kind of see where there is a breakdown or where there is a breakthrough.”

    Taken together, these differences among teachers’ experiences with the video-informed feedback model suggest that as teachers gained experience with collaborative classroom video
analysis (CVA), they became more comfortable with the process and better able to triangulate classroom video with student work in order to identify strengths and needs in their practice as well as in their students’ learning. However, despite teachers’ increased capacity to triangulate these classroom data sources, they continued to rely on Diane’s direct guidance and support in this process. Teacher’s reliance on Diane’s support highlights the importance of (a) the ML facilitator’s role as a more knowledgeable-other (MKO) who scaffolded teachers’ experiences with the video-informed feedback model and (b) feedback dialogues between ML facilitators and teachers to enable pairs’ coconstruction of practice-based evidence to inform ongoing EPL efforts.

Collaborative Learning Among Educators

Collaborative learning among educators refers to ML facilitator-teacher pairs developing trusting, supportive partnerships with each other and with relevant professional colleagues to promote collaborative learning within the video-informed feedback model. This theme consisted of three categories: (a) human supports; (b) learning together; and (c) trusting relationships.

With respect to human supports, all Case 1 teachers emphasized the importance of Diane’s support in their classrooms (e.g., getting to know the students, observing teaching and learning, recording classroom video, focusing video on important moments in learning or instruction). The teachers elaborated that Diane’s support in recording classroom video was particularly important—not only having a second person to physically operate the recording device but also because “she knew what to tape and when.” It appeared that Diane’s combined knowledge of the relevant math curriculum and pedagogy as a MKO, teacher’s EPL goal, classroom context, and marker students’ learning progression allowed her to record targeted teaching and/or learning moments that were most relevant to the teacher’s EPL goal. This
purposeful recording allowed each pair to engage in focused, intentional analyses during their subsequent feedback dialogues and co-construct practice-based evidence to inform next steps for teachers and students.

When teachers were asked if they could effectively record classroom video without Diane during lesson implementation, they raised concerns about others taking on this role. Teachers highlighted specific concerns about colleagues (might not capture moments relevant to the teacher’s EPL goal), school administrators (might record video through an evaluative lens), students (might not be ready for the responsibility), and self-taping using a tripod (would record too much video that is not focused on key learning moments). Meg summarized that it is important to “have someone like Diane come into our room who is very knowledgeable and who is nonjudgmental and who has that comfort zone with you and with the kids, because then it's just second nature. Nobody feels like they're on stage, nobody feels like they're being judged. It's just this is how we're doing it, we're all doing it for the benefit of the kids.” Although teachers did not feel comfortable with the school administrator’s direct involvement in video recording, Meg and Diane, who had multiple years of experience in the school, noted the importance of the school administrator’s support in other ways by providing release time for pairs to engage in feedback dialogues; opportunities for all pairs to collaborate as a divisional team; resources to support their learning (e.g., books, assessment tools, and manipulatives); and feedback to praise teachers’ EPL efforts.

In addition to human supports, Case 1 educators emphasized the importance of learning together as a central feature of the model. This was primarily evident in teacher’s feedback dialogues with Diane, during which teachers viewed Diane as a MKO who contributed critical knowledge about math teaching and learning. Teachers also spoke about the value of learning
from Diane through informal discussions (e.g., during classroom implementation within each EPL cycle or via interactions with Diane in-between formal EPL cycles). Although teachers perceived Diane as the primary contributor of knowledge, Diane asserted that teachers also provided complementary knowledge regarding their students that enriched both formal and informal dialogues. For example, Diane and Meg, highlighted how their complementary knowledge enriched how educators learned together with the model:

Meg: “Diane, like I said, has the knowledge, has the background, pulls out things that I wouldn't even see with [students’] thinking—with their strengths, with their weaknesses and next steps … She can say, ‘Well, Meg, do this or this or try this or do that.’”

Diane: “And at the same time, Meg, being the classroom teacher, when we're discussing specific students and so on, she has a wealth of knowledge that I don't have about specific things about the students.”

Learning together was also evident among Diane and the three teachers in the junior division who regularly engaged in collaborative learning sessions at the school. For Morgan, being new to the school, the division, the project, and the EPL model:

It was nice to have time with my colleagues and to plan and keep things consistent from room to room … at the beginning when [Diane] asked us each to set a goal, I kind of assumed we'd all be kind of working on our own goals … I didn't realize it would be as much collaboration as there was. [Because of this collaboration,] you're not as isolated in your teaching or your assessment. You can rely on the professional opinions of others and their experiences to make your experience much better, much more rich.

Meg and Diane, in their second year with the EPL model, added the importance of learning with me, the researcher, who helped them develop their capacity to purposefully collect and analyze
classroom data to co-construct practice-based evidence of impacts of EPL on teachers and students. Meg shared, “I feel Danielle has completely impacted my teaching for the kids, because now I am looking at the data that we collected … This is where the strengths and needs are. This is where I need to go from here now to move forward.” Diane added, “The availability and comfort with [Danielle] being accessible … there have been times definitely when we were trying to pull a lot of the stuff together and I think, wow, we have all this information and I don't know what to do with it … Danielle has been my teacher.”

Underpinning all learning among educators were trusting relationships—first and foremost between Diane and each teacher she supported, and also among the three teachers in the divisional team and between Case 1 educators and me as the researcher. With the exception of Lyn, all educators in Case 1 described the importance of building trusting relationships among educators using the video-informed feedback model. For example, Diane and Meg were in their third year working together and second year using the video-informed feedback model, which provided a foundation of trust that allowed them to readily engage in video analysis for the purpose of formative feedback during their Cycle 1 dialogue. In contrast, Morgan and Lyn were new to working with Diane, new to the school, and new to the EPL model, requiring Diane to focus more on cultivating trusting relationships during Cycle 1 and 2 feedback dialogues. Diane cultivated this trust through evidence-informed praise of each teacher’s practice, in Morgan’s case using observational notes (e.g., “I like the way you summarized the lesson goal for students.”) and in Lyn’s case using classroom video (e.g., “I like the way you deconstructed the question for students.”). Diane explained, “I think the comfort with that kind of was a natural progression. It certainly was a little less comfortable in the initial sessions, especially with the two teachers who were new to it this year. So, we’re sort of establishing relationship in getting
used to the whole thing.” Diane added that Meg enabled her trust-building with Morgan and Lyn because Morgan shared her previous positive experiences working with Diane, both in the math project and with the video-informed feedback model. When asked how other ML facilitators might engage teachers in the EPL model, Diane advised, “I would say make sure that you have a positive relationship at the get-go … and have others who have been in the process share their feelings about it.” Meg and Morgan also described the importance of trusting relationships with their school-based colleagues involved in using the video-informed feedback model. All three Case 1 teachers interacted regularly, during divisional EPL sessions facilitated by Diane or as a divisional team when Diane was not physically present in the school. As such, it was important that all three teachers established trusting relationships as a divisional team so they felt comfortable discussing their math practice with each other and revealing their ongoing challenges and EPL goals.

**Personalizing Sustained Learning Goals**

Within the video-informed feedback model, ML facilitator-teacher pairs collaboratively identified personalized learning goals for teachers and students that were sustained over time and reflected teachers’ readiness and students’ needs. The theme of personalizing sustained learning goals consisted of three categories: (a) teacher readiness; (b) teacher learning goals; and (c) student learning goals.

All educators in Case 1 spoke about the importance of acknowledging teacher readiness—or zone of proximal development (ZPD; Vygotsky 1962, 1978)—when engaging in the video-informed feedback model. Readiness referred to the teachers’ previous knowledge and experience regarding both the focus of the EPL (i.e., each teacher’s EPL goal) and the use of classroom video to support EPL. Acknowledging teacher readiness was especially important for
Diane in her role as a ML facilitator because she scaffolded EPL experiences for each teacher by considering the teacher’s prior experience as a teacher, with grade-level math curriculum, working with her in the regional math project, and using classroom video to help determine teacher learning goals. With all of this in mind, at the start of Cycle 1, Diane helped each teacher identify an EPL goal that not only reflected the teacher’s readiness as a learner and EPL interests, but also reflected students’ needs and aligned with DSB and regional priorities within the math project. Meg, who had previous experience in all areas, selected a multifaceted goal—using effective questioning techniques and responding to student’ needs in math. Morgan and Lyn, both new to implementing the grade-level math curriculum, working with Diane in the regional math project, and using classroom video, selected the same goal—using manipulatives to support students’ learning in math. Meg’s selection of a multifaceted goal suggests that her previous experiences contributed to her readiness to pursue a complex EPL goal that explicitly considered interactions between her practice and students’ learning and could be generalized beyond math. In contrast, Morgan and Lyn identified a more straightforward EPL goal linked to a concrete instructional strategy to support their students’ learning in math.

In addition to considering teachers’ readiness when collaboratively determining EPL goals with teachers, Diane also responded to each teacher’s readiness to engage in video analysis throughout EPL cycles over time and differentiated the use of video to support feedback dialogues accordingly. During Cycle 1, Diane analyzed video with Meg, who had previous experience in four relevant areas—as a teacher, with grade-level math curriculum, working with Diane in the regional math project, and using classroom video. Diane also analyzed video with Lyn who lacked experience in all areas but, as a new teacher, was eager for Diane’s feedback regarding her classroom practice and open to using classroom video. Diane did not use
classroom video during her Cycle 1 dialogue with Morgan, who was an experienced teacher but lacked experience in all other areas, because Morgan did not immediately demonstrate readiness to engage in video analysis, instead preferring to focus on a familiar classroom data source—student work. This changed by Cycle 2, as a more trusting relationship developed between Diane and Morgan that enabled their collaborative analysis of classroom video during this cycle.

Through sustained focus on personalized teacher learning goals and related marker student learning goals, Case 1 pairs used classroom data to monitor both teacher and student progress toward these goals. This concurrent focus on teacher and student goals allowed each pair to systematically reflect on how changes in instructional practice impacted students’ learning and allowed pairs to collaboratively refine teacher and student goals for subsequent EPL cycles through video-informed feedback dialogues. It should be noted that teachers’ goals remained consistent throughout the school year, but goals for students evolved as students progressed toward their learning goals over time. Case 1 educators asserted that a sustained focus on consistent goals for teachers enabled desired changes in both teachers and students, manifesting differently for each pair. Meg shared that each EPL cycle provided a continuum that enabled her to maintain an ongoing, concurrent focus on learning goals for herself and her students, stating, “It's definitely impacted my teaching … Now I feel like I'm more data driven. So, it's more like, ‘Okay, this is where Johnny is and I'm going to move Johnny forward.’ It's more intentional, it’s more focused.” Morgan, who focused primarily on classroom data in the form of student work across all four cycles, was able to see how her EPL goal of using manipulatives to support students’ learning in math helped marker students solve math problems more effectively. Lyn stated that the sustained focus on her goal of using manipulatives to support students’ learning in math, with embedded support from Diane and collaborative
analysis of multiple classroom data sources, allowed her to more readily apply new learning to her practice, asserting, “As opposed to other PD or learning I’ve done, I’ve accomplished more with this myself and for my students.”

At the end of the year, all teachers in Case 1 indicated a desire to continue with their current EPL goals, indicating that it takes considerable time and effort for teachers to develop and refine new practices and reflecting the broad nature of teachers’ articulated goals. Meg elaborated on the importance of maintaining her goal of responding to student need, “When I look at student work, sometimes I can easily see what they’ve done wrong and guide them. Some other times I’m like ‘Whoa!’… I don’t know how to respond to them because I don’t have the knowledge or foundation in my own math to see outside the box and see exactly what Johnny just did. So I want to keep going with this because it’s key.” Morgan added, “I still feel like there are so many manipulatives out there that I haven’t tried. There are some that are in my comfort zone or that I’ve used often, [but others where] I’ve had to get out the instruction manual. I also see the value in the students using them … they’ve made progress in how to use them as a tool.”

**Flexibility with Structures**

The theme of *flexibility structures* elucidated how ML facilitator-teacher pairs used time and the EPL model flexibly to enable teachers’ learning within the video-informed feedback model. All Case 1 educators spoke about *time* as a challenge to engaging in this embedded, ML-facilitated EPL model (e.g., limits on Diane’s time in a teacher’s classrooms, scheduling time to record classroom video, scheduling time for feedback dialogues); however, they agreed that the flexible use of time enabled their engagement. This was most evident with respect to scheduling time for feedback dialogues. Meg and Lyn prioritized time for feedback dialogues with Diane by scheduling dialogues during their preparation time or after school. This allowed these pairs to
engage in longer and more focused dialogues without classroom distractions or student interruptions. While Morgan did not schedule dialogues with Diane during her preparation time or after school, she and Diane carved out time for feedback dialogues in her classroom immediately following the lesson implementation, while students were engaged in independent work. Although feedback dialogues conducted in the classroom were more challenging due to background noise and intermittent disruptions, these sessions best fit Morgan’s needs and schedule and enabled Morgan to participate in the EPL model and contribute to her learning. As Morgan explained, “The time that we had, although sometimes it seemed like it was very little, it was so meaningful. And I think that's why we started sort of having these conversations on the fly, because we realized when we were getting together how important they were.”

The importance of prioritizing time with Diane to collaboratively analyze classroom data, and particularly video, was highlighted across all pairs in Cycle 3. In Cycle 3, Diane recorded video of each teacher’s classroom implementation, however each pair focused their time during feedback dialogues on collaboratively analyzing student work samples. Consequently, Diane shared each teacher’s video recordings digitally after the Cycle 3 dialogue so the teacher could view and analyze her videos independently. Interestingly, teachers reported that they did not independently view the videos in full, nor did they analyze their videos in depth. This suggests the importance of Diane’s support in the collaborative analysis of classroom video and co-construction of practice-based evidence to inform next steps in teachers’ learning and practice. Teachers confirmed that Diane’s encouragement and guidance (i.e., praise and coaching feedback) as a MKO underpinned their effective analysis of classroom video by helping them see their practice in new and different ways. Meg summarized: “I don't know how reflective I would be to take the video and go home and sit down and go through it myself. But sitting with Diane
and going through it, I found you're forced to look through it. You're forced to do it and it’s very reflective.”

A further example of the importance of prioritizing time for feedback dialogues was demonstrated in Cycle 4. In Cycle 4, the school administrator provided formal release time for each pair’s feedback dialogue, primarily to enable data collection for this study (i.e., direct observation of feedback dialogues, individual and dyadic interviews) but also to support the teachers’ learning within the regional math project. This formal release time coupled with my involvement as a researcher fostered the longest feedback dialogues recorded (average Cycle 4 dialogue = 21 minutes versus averages for Cycles 1-3 dialogues = 12, 14, and 12 minutes, respectively; see Appendix H). Within Cycle 4 dialogues, Diane and each teacher also engaged in their most in-depth analyses of classroom data and the greatest degree of triangulation of classroom data sources (i.e., video, student work, and observational notes). This was especially evident when comparing Diane and Morgan’s Cycle 2 and 4 dialogues. In Cycle 2, Diane and Morgan first analyzed student work samples and then analyzed classroom video clips of activities unrelated to the students creating the work samples, with limited discussion of video clips. In Cycle 4, the pair concurrently analyzed student work samples in conjunction with video clips of students creating the work samples, using video to enrich their understanding of how students completed the work and enabling deeper understanding of students’ learning. Morgan expressed the benefit of this concurrent analysis, stating, “This is what I saw [written solution]. So I’m glad I got to see how they were originally solving the problem.” Taken together, these findings highlight the importance of designated time for feedback dialogues involving the analysis of classroom video, especially when analyzing video in conjunction with other classroom data (e.g., student work). Moreover, these findings suggest that the presence of an
external learning partner as an observer (i.e., me as researcher), coupled with formal release time from the school administrator, provided additional motivation and accountability that helped each pair delve more deeply into classroom data analyses during their feedback dialogues.

In addition to the flexible use of time, Diane also described her flexible implementation of the EPL model to best meet each teacher’s learning needs. This involved (a) allowing each teacher to determine the focus and length of the math lesson that would be observed and video recorded, (b) selectively leveraging video clips during feedback dialogues based on teachers’ demonstrated readiness or relevance of the video, and (c) engaging in feedback dialogues of varying lengths based on teacher’s availability and level of engagement. In describing the EPL model, Diane noted how this flexible implementation of the model helped her support changes in each teacher’s practice and bridge gaps between teachers’ personal goals and regional/district goals.

The beauty of this model really is that you can be precise and you can take a lot of that [professional] learning that's happening and have some help implementing it in your classroom … It's just so much – so much more effective to have a partner, to be – I think to be trying out some of these things together. You can bounce ideas off each other. I just wish it could happen more in our board.

Diane also noted that the EPL model helped hold teachers accountable to implementing learning that occurs during large group EPL sessions with experts. According to Diane, learning from these sessions often “falls away when the go back to their classrooms.” She asserted that with the ML facilitator support and emphasis on classroom data integral to this video-informed feedback model, “whether there is a desire to implement that learning or not, having a structure like this would help many people take some of those learning pieces and be able to use them.”
How Video-informed Feedback Dialogues Evolved to Support EPL over Time

Memos of feedback dialogue audio recordings for each pair across all four EPL cycles were coded using the analytical feedback framework in order to elucidate how feedback dialogues between ML facilitators and teachers evolved to support EPL over time (RQ2) (see Appendix H). This section describes how video-informed feedback dialogues supported EPL within and across Case 1 pairs over time.

How Video-informed Feedback Dialogues Evolved within Pairs over Time

Video-informed feedback dialogues evolved differently within pairs over time (see Appendix H). These differences can best be understood in relation to each teacher’s previous experience as a teacher, with current grade-level math curriculum, working with Diane, and/or using classroom video. In Pair 1, Meg was experienced as a teacher, with current grade-level math curriculum, working with Diane, and using classroom video. Building on Diane and Meg’s established trusting relationship and previous experience in the pilot study, the pair readily engaged in coaching feedback throughout all EPL cycles. This coaching focused on Meg’s teacher processes (e.g., use of questioning), students’ processes (e.g., understanding of the math), and interaction between teacher and student processes (e.g., Meg scaffolding math tasks to support her marker students’ engagement with tasks). While Meg relied on Diane’s external feedback to guide their dialogues (e.g., Diane’s questioning to promote Meg’s reflection and Diane’s suggestions for next steps), Meg actively contributed to all dialogues as well. It appeared that Meg particularly relied on external feedback from Diane when analyzing classroom video, the only classroom data used in Cycle 1, but generated more internal feedback when student work was included as a source of classroom data in Cycles 2 through 4. In addition, as time progressed, Meg’s knowledge of her students also increased and enabled her to contribute more
feedback to their dialogues regarding student processes (e.g., students’ understanding of math concepts). Consequently, feedback between Diane and Meg became increasingly dialogic with Diane contributing relative expertise about math teaching and learning and Meg contributing relative expertise about her students’ needs and classroom context.

In Pair 2, Morgan’s lack of previous experience working with Diane seemed to create a different focus for their feedback dialogues, especially in early cycles. For this pair, praise and coaching were equally balanced in Cycle 1 but coaching was more prevalent than praise from Cycle 2 onward. This coaching feedback was primarily focused on the math tasks Morgan implemented during lessons and student process (i.e., students’ understanding of math concepts) but rarely on teacher process (i.e., the instructional strategies she used to support students’ engagement with math tasks), with coaching feedback coming from both external (i.e., Diane) and internal (i.e., Morgan) sources in a dialogic mode. In Cycles 3 and 4, after the pair had established a more trusting relationship, Diane initiated coaching feedback via questions intended to foster Morgan’s self-assessment of her practice (i.e., teacher process). Despite Diane’s questioning, Morgan maintained her focus within dialogues on using classroom data to generate internal feedback about the math task or student processes and did not explicitly self-assess her own practice. This suggests that Morgan was not yet ready to self-assess her own practice and/or primarily considered the feedback dialogues as a means to improve her students’ learning. Morgan’s focus on students is further supported in that she was the only teacher who consistently sought feedback about the math task itself, routinely leveraged student work over classroom video, and used classroom video to enhance her analysis of student work but not her own practice.
Lyn, who had the least experience as a teacher, was particularly open to feedback and readily sought and integrated all external feedback from Diane across cycles. Coaching feedback dominated early EPL cycles, with coaching from Diane regarding the math task, teacher and student processes, and teacher self-regulation, with Lyn regularly asking questions to seek clarifying feedback from Diane to support her learning and self-regulation toward her EPL goals. As time progressed, Lyn stated that she was “more confident and knowledgeable”—contributing more internal feedback to dialogues, particularly via praise of her students’ learning (i.e., student process) and coaching regarding her own next steps as a teacher (i.e., teacher process). Lyn prioritized classroom video as a source of classroom data to inform feedback dialogues, allowing her to see her teaching practice and its impact on students. As time progressed, Lyn became more independent in analyzing classroom video as well as student work, but still relied on Diane’s external coaching to enrich her analyses and suggest next steps for herself and her students.

**How Video-informed Feedback Dialogues Supported EPL across Pairs over Time**

Although feedback dialogues evolved differently within each pair, three noteworthy themes emerged in how feedback dialogues evolved across pairs over time: (a) praise maintained importance but extended to students; (b) teachers generated internal feedback more independently; and (c) classroom data were increasingly triangulated.

**Praise maintained importance but extended to students.** Feedback for the purpose of praise was an important driver of EPL across all pairs over time. In Cycles 1 and 2, Diane was the sole provider of praise, beginning each dialogue by praising teacher processes specific to her EPL goal (e.g., use of questioning) or to broader regional project goals (e.g., use of 3-part math lessons). When Diane shared a classroom video clip to support her praise, the video helped teachers see their practice in a positive light and built their confidence as a math instructor (e.g.,
effectively implementing ‘minds on tasks’, using questioning to support students’ understanding, or highlighting student misconceptions to facilitate ‘consolidation’ of lessons). For teachers new to the project as well as the use of video, this praise was critical to building trusting relationships with Diane. For all teachers, praise built teachers’ confidence by acknowledging and encouraging their ongoing EPL efforts. Combined, trusting relationships and greater teacher confidence increased teachers’ readiness to internalize Diane’s subsequent coaching feedback within each cycle, the key driver of each teacher’s learning.

By Cycles 3 and 4, teachers also began to contribute praise to feedback dialogues. While Diane continued to begin each dialogue with evidence-informed praise of teacher practice, teachers began to echo Diane’s praise with evidence-informed praise of their students’ learning. Teachers also began to initiate praise regarding students’ learning during coaching elements of feedback dialogues. The overall increase in praise from teachers can best be explained by a combination of (a) teachers’ growing confidence and capacity in their assessment of students’ learning (i.e., knowing more math curriculum and pedagogy and also knowing their students better) and (b) more available evidence illustrating improvements in students’ learning over time and in relation to changes in teachers’ math practices. Although teachers became more able to use practice-based evidence to praise their students’ growth, Diane’s praise of the teachers’ practice remained important across all cycles because teachers rarely praised their own instructional practices (i.e., teacher processes). Accordingly, Diane’s praise enabled teachers’ integration of her coaching feedback, which was critical to teachers and students achieving their learning goals.

**Teachers generated internal feedback more independently.** In a related vein, teachers contributed more internal feedback to dialogues as time progressed. In early cycles, teachers
relied on external feedback to drive the analysis of classroom data in order to co-construct practice-based evidence and determine next steps for themselves and/or their students. Furthermore, internal feedback that was generated in Cycles 1 and 2 followed Diane’s questioning to guide each teacher’s self-regulation through self-assessment of classroom data. By Cycle 3, teachers initiated more internal feedback via self-assessment of student work, relying less on Diane’s guidance. While Diane was still viewed as a MKO with respect to math curriculum and pedagogy, teachers became increasingly confident in their knowledge of their students as learners as the school year progressed because they had worked with their students for longer. Therefore, later dialogues were more dialogic and balanced with each educator contributing unique knowledge that enriched the collaborative analysis of classroom data.

It should be noted that teachers were most confident in generating internal feedback regarding students’ learning through their analysis student work and continued to rely on Diane’s external feedback during dialogues in two key ways. First, Diane’s external feedback consistently helped teachers self-assess the math task or instructional strategies (i.e., teacher process) they implemented, especially when classroom video was the source of classroom data. Second, Diane’s external feedback remained important across all cycles when identifying teachers’ next steps for themselves and/or their students because teachers were not fully able to self-regulate their progress toward EPL goals. In short, although teachers’ internal feedback became more independent and prevalent in dialogues over time, Diane’s external feedback remained a critical driver of each EPL cycle, especially in praising teachers’ processes and helping teachers determine next steps for themselves and their students.

**Classroom data were increasingly triangulated.** Over time, pairs began to triangulate multiple sources of classroom data to co-construct practice-based evidence that informed
coaching feedback and next steps. In Cycle 1, pairs used fewer sources of classroom data (e.g., only classroom video) and analyzed these data in isolation (e.g., classroom video or student work samples in isolation). By Cycle 4, pairs combined video clips in conjunction with student work samples, and this enriched their feedback dialogues. These triangulated data generated practice-based evidence that provided feedback regarding processes (e.g., teachers’ instructional approaches or students’ use of manipulatives to solve problems) as well as tasks (e.g., students’ solutions to math problems). With this integration of classroom data, pairs were better able to reflect on positive shifts in teaching and learning and helped pairs identify next steps for teachers and students,

Diane initiated and led the analyses of all classroom data in Cycle 1. This changed somewhat by Cycle 4 during which Diane continued to lead the analysis of classroom video, but teachers initiated the analysis of student work. This allowed for more balanced and collaborative analysis processes, with both educators in each pair actively contributing to Cycle 4 feedback dialogues. This trend provides further evidence of teachers’ increased involvement in feedback dialogues over time and the changing nature of these dialogues to be more complex and interactive in terms of contributions. While these findings highlight teachers’ continued reliance on Diane to initiate the analyses of both teaching and learning within classroom video clips, they also illustrate teachers’ increasing confidence in their analyses of students’ learning in math. This suggests that it would be challenging for teachers to concurrently analyze video and student work without the support and guidance of a ML facilitator or MKO. Similarly, it would be equally challenging for a ML facilitator to concurrently analyze video and student work without the input of a teacher who knows her students and their needs best. As such, both educators in the pair bring essential knowledge to feedback dialogues that enriches their collaborative analyses of
triangulated classroom data sources in order to co-construct practice-based evidence to informs EPL.

Section 2: Case 2 Findings

Description of the Case

Case 2 comprised one ML facilitator, Debbie, and two junior level (i.e., Grades 4-6) teachers from one school in DSB2 (Allison and Erika). The school served approximately 375 students (Kindergarten through Grade 8) and served a village of 6000 residents and its surrounding areas in Eastern Ontario, Canada. At the time of the study, the school consisted of 19 teachers, one vice principal, and one principal. The principal had been in her role for five years. Debbie had 21 years of experience in education, teaching mostly Grades 7 and 8, with some experience teaching junior grade levels as well. Within her DSB, she had been facilitating EPL among teachers in a ‘Learning Partner’ role for six years. Within this role, Debbie supported multiple teachers and four different elementary schools. Debbie regularly participated in EPL opportunities offered in her DSB, the province, and local universities. For the past two years, Debbie had also served as the coordinator for the regional math project aimed at enhancing math teaching and learning across nine DSBs through CI. Debbie was a participant in the pilot study for this research, her only previous experience using classroom video to support EPL among teachers.

Allison was a Grade 4 teacher with 20 years of experience in elementary education (Kindergarten through Grade 6), with most of her classroom experience in the primary grades (i.e., Grades 1-3) and one year experience in a ‘Learning Partner’ role. She had taught at her current school for six years. This was Allison’s second year working with Debbie in the regional math project. She was part of the pilot study for this research, which was her first experience
using classroom video. Erika was a Grade 6 teacher with 12 years teaching experience, mostly teaching junior grades (i.e., Grades 4-6). She had also served as a ‘Learning Partner’ in her DSB for three years and was in her second year of the regional math project. Erika and Debbie had worked together in various capacities over the past five years. Erika had previous experience using classroom video in a year-long EPL experience within her DSB, as well as during the pilot study.

Over the course of one school year, each ML facilitator-teacher pair collected and analyzed multiple sources of classroom data to co-construct practice-based evidence of changes in the teacher’s practice and/or her student’s learning in relation to each teacher’s articulated EPL goals. Debbie and Allison completed three EPL cycles (November-June), while Debbie and Erika completed four EPL cycles (November-May).

**The Video-informed Feedback Model and Embedded, ML-facilitated EPL**

Inductive coding of individual and dyadic interviews responses from the Case 2 educators (i.e., Debbie, Allison, and Erika) elucidated how the video-informed feedback model supported embedded EPL between Debbie and the teachers she supported (RQ1). The analysis of individual and dyadic interviews was informed by secondary data sources (i.e., educator questionnaires, feedback dialogue protocols, direct observations of feedback dialogues, and field notes). In total, four themes emerged, reported in order of salience: (a) sustained focus on concurrent teacher and student learning goals; (b) co-constructing practice-based evidence; (c) flexibility with structures; and (d) collaborative learning within pairs. Each theme with associated descriptions, categories, frequencies, and sources is summarized in Table 7 and described in subsequent sections with supporting quotations from the Case 2 educators. Frequencies reflect the total number of times each category occurred in Case 2 educators’
interview data (individual and dyadic). (See Appendix G for a complete list of interview codes and categories with sources and associated frequencies.)

**Sustained Focus on Concurrent Teacher and Student Learning Goals**

Within the video-informed feedback model, ML facilitator-teacher pairs collaboratively identified teacher goals and related student goals that reflected teacher readiness and students’ needs. The theme of *sustained focus on concurrent teacher and student learning goals* consisted of three categories: (a) teacher learning goals; (b) student learning goals; and (c) teacher readiness. All of the Case 2 educators explained that engaging in multiple EPL cycles over the course of the school year provided a continuum of precise, interconnected learning goals for both teachers and their students. Stemming from their experiences in the pilot study throughout the previous school year, teachers began the current year with the intention of continuing to focus on their math-based teaching and learning goals (e.g., using three-part lessons, enhanced questioning); however, during their Cycle 1 dialogues in the current year, each pair analyzed classroom video and realized the need to shift from a focus on math to a focus on supporting students’ learning skills. Debbie explained, “We recognized that in order to get to deep math learning, we need to have students demonstrating effective learning skills …when we watched the [first] video we said, ‘Okay, we’ve got a bit of an issue here because the students aren’t even listening when other kids are talking.’” Within each pair’s Cycle 1 dialogue, Debbie facilitated the realization that setting isolated goals for teachers or students would not foster desired outcomes for either and that teachers needed to identify parallel, related goals for themselves and their students. Consequently, the teachers identified the EPL goal of using Talk Moves (i.e.,
### Table 7

**Case 2 Themes, Descriptions, Categories, and Sources**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Category with Frequency*</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained Focus on Concurrent Teacher and Student Learning Goals</td>
<td>ML facilitator-teacher pairs collaboratively identified related teacher and student goals that were sustained over time and reflected teacher readiness and students’ needs.</td>
<td>Teacher learning goals 35</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Student learning goals 29</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher readiness 14</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td>Co-constructing Practice-based Evidence</td>
<td>ML facilitator-teacher pairs collaboratively analyzed multiple sources of classroom data to co-construct practice-based evidence that provided feedback regarding changes in teachers’ practices and students’ learning.</td>
<td>Use of classroom video 26</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitoring student learning 12</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaborative data analysis 12</td>
<td>Pair 2; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher practice 6</td>
<td>Pair 2; Facilitator</td>
</tr>
<tr>
<td>Flexibility with Structures</td>
<td>ML facilitator-teacher pairs used time and the EPL model flexibly to enable teachers’ participation in the model.</td>
<td>Time 34</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPL model 14</td>
<td>Pair 2; Facilitator</td>
</tr>
<tr>
<td>Collaborative Learning within Pairs</td>
<td>ML facilitator-teacher pairs developed trusting, supportive partnerships with each other that promoted collaborative learning.</td>
<td>Learning together 14</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trusting relationships 13</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Human supports 9</td>
<td>Pairs 1, 2; Facilitator</td>
</tr>
</tbody>
</table>

*Note. Frequency refers to the total number of times each category occurred in Case 2 educators’ interview data (individual and dyadic). See Appendix H for a complete list of interview codes and categories with associated sources and frequencies.*
techniques to promote classroom discourse) to support active listening and speaking among students during math lessons, in conjunction with the associated student goal of engaging in active listening and speaking in math.

These teacher and student goals were maintained by each pair for the entire school year and revisited during each EPL cycle. In her facilitation role, Debbie highlighted how the EPL model helped both teachers stay accountable to their goals over the year despite up to two months between EPL cycles, with the Facilitated Feedback Dialogue Protocol (see Appendix F) providing “a reference when we’re coming back together …‘where did we leave off and where did we need to go?’ … so that accountability piece of where we want to go.” Debbie’s flexible implementation of the EPL model allowed Allison and Erika to prioritize teacher and student goals differently. For Allison, each EPL cycle was focused primarily on her students’ progress toward their goals, whereas Erika’s EPL cycles explicitly focused on her students’ progress as well as her own. It seemed that Erika was particularly open to reflecting on and analyzing both her teaching as well as her students’ learning, but Allison was more comfortable reflecting on and analyzing her students’ learning. This may be due to a combination of Erika’s (a) recent role as a ML facilitator for three years, during which time she supported other teachers’ learning as Debbie was currently supporting hers; (b) longstanding professional collaboration with Debbie (five years), and (c) underlying nature to set and strive toward personal learning goals. In contrast, although Debbie described Allison as “very open and honest,” Allison had limited, remote experience as a ML facilitator and was relatively new to working with Debbie (one year during the pilot study). During the feedback dialogues with Debbie, Allison tended to focus on her students’ needs and progress toward their goals and focused less on her own needs and progress toward her EPL goals.
At the end of the current year, these educators shared three additional insights about using the video-informed feedback model to support teacher and student learning goals. First, they recognized that simultaneously focusing on too many teacher goals was not as beneficial to teachers or their students. Erika explained, “We got more precise… When we started it last year, I had three different [goals] and then as we watched the videos, it became more evident which goal we needed to focus in on this year with the kids that are in front of me.” Second, the ML facilitator-teacher pairs realized that classroom video could support not only teacher learning but also the students’ learning as well. This was most evident in Allison’s classroom, with Allison supporting students’ self-assessment of classroom video within each EPL cycle to monitor their own progress toward active speaking and listening goals throughout the school year. Finally, Case 2 educators asserted the importance of focusing on both teacher and related student goals over an extended period of time (i.e., a full year) to begin to see desired changes. Debbie shared, “It wasn't a one off, like ‘We're going to work on collaboration guys, okay, we're done now, we're moving on.’ You came back to revisit it.” Despite these espoused benefits, Erika noted a challenge associated with working toward long-term goals, “Sustaining the learning that was happening in-between is always difficult when there’s so many things on the go that you’re trying to be really good at.” This suggests the need for pairs to engage in more frequent EPL cycles using the video-informed feedback model and/or additional supports to help teachers maintain momentum toward their goals in between formal EPL cycles with the ML facilitator.

**Co-constructing Practice-based Evidence**

ML facilitator-teacher pairs collaboratively analyzed multiple sources of classroom data to co-construct practice-based evidence that provided feedback regarding changes in teachers’ practice and students’ learning. The theme of *co-constructing practice-based evidence* comprised
four categories: (a) use of classroom video; (b) monitoring student learning; (c) collaborative data analysis; and (d) teacher practice.

Pairs reported that collaborative data analysis, and particularly the use of classroom video, helped in monitoring student learning and seeing changes in teacher practice. Classroom data were collected during each teacher’s math lessons, with Debbie recording classroom video and making observational notes while each teacher collected student work samples as appropriate. Prior to scheduled feedback dialogues, Debbie shared two or three video clips (approximately 2 minutes per clip) from the lesson with teachers so that teachers could independently analyze their videos before the pair engaged in collaborative analysis. During feedback dialogues, Debbie reiterated the teacher and student goals as using the Facilitated Feedback Dialogue Protocol (see Appendix F) as a prompt, then facilitated the pair’s collaborative analysis of the clips she had selected to assess the teacher’s and/or students’ progress toward their goals. Pairs used the video, in conjunction other relevant data sources (e.g., student exit cards, student self-assessment tasks), to determine next steps for teachers and students. This process of collaboratively analyzing classroom video was valued by both educators in the pairs because it allowed for multiple perspectives and encompassed background knowledge from each educator in the pair (e.g., Debbie’s knowledge of math content and Talk Moves; the teachers’ knowledge of their students’ strengths and needs). Debbie elaborated:

I could sit down with a video, look at it, pull some data from it and move forward, but I thrive on that whole collaboration piece … when we look at [classroom data] together because you might say something or someone else might say something and I didn’t see that, then you build on it.
The two teachers highlighted that collaborative video analysis helped them to see change over time in their students and themselves, and also allowed them to revisit lessons to see things they didn’t notice while engaged in teaching. Debbie referred to video as a “positive eye-opener” for teachers, capturing positives in their students’ learning that they did not always see and positives in their teaching that they did not regularly acknowledge. Erika further explained:

Video evidence is so powerful because [either] you’re pleasantly surprised or it’s so evident what you need to do … if you’re kind of in the middle of [teaching], there’s so much going on at that moment in time. It becomes overwhelming to figure out what your next step is. But when you can look at it from the outside, and with somebody else, you can hone in on your specific next step to move the kids along or move the teaching along.

Building on their experiences in the pilot study, the two pairs expanded their use of classroom video to support students’ self-assessment of progress toward their goals (i.e., engaging in active speaking and listening) in the current year. This was most evident in Allison’s classroom. In Cycle 1, Allison showed her students classroom video clips that Debbie had selected and asked them to self-assess their strengths and needs with respect to active listening and speaking. Following the self-assessment activity, the class collectively identified eight elements of active listening and speaking (e.g., eyes on speaker, wait to speak, speak with confidence) and each student committed to improving in two of the eight elements throughout the remainder of the school year, with visual reminders of the eight elements and students’ associated commitments posted on classroom walls. Following the second and third EPL cycles, Allison asked her students to view the classroom video that Debbie recorded and complete a written self-assessment of how effectively they engaged in active listening and speaking. This process allowed Allison’s students to reflect on and articulate their progress toward their self-
identified learning goals, and concurrently helped Allison see gains that had been made in her students over the course of the school year.

Despite the fact that Debbie, Allison, and Erika valued classroom video as a source of classroom data to inform feedback dialogues and students’ self-assessment, they articulated two key challenges associated with video. First both teachers identified that recording, selecting, and analyzing clips would not have been possible without Debbie’s support. Erika explained, “You end up with all this video and then you don’t know what to watch. So being precise about when we want to video and who and what we want to look for in the videos is good.” Second, Allison cautioned that students tended to be evaluative of their peers when analyzing classroom video and needed reminders to focus on themselves and their own strengths and needs when analyzing videos. However, Erika explained that challenges with the EPL model led to improvements, “You have to get messy with it in order to figure out what you need to do for next time.” Debbie added, “It’s enabled us to reflect on our professional practice. It enabled students to reflect on their accountability for listening or behaviour in the classroom. And it also helps us, if we’re doing it over time, to see growth or determine what our next steps are.”

**Flexibility with Structures**

Debbie, Allison, and Erika spoke to the importance of *flexibility with structures* when engaging with the video-informed feedback model, with two associated categories: (a) time and (b) the EPL model. *Time* was highlighted as a central challenge to engaging with the model, including Debbie’s time in each teacher’s classroom (e.g., to record video, observe lessons, support instruction) and, particularly, time for each pair’s feedback dialogues at the end of EPL cycles. Both teachers gave up preparation time to engage in feedback dialogues with Debbie, and all three agreed this was essential to their participation in the EPL model. Allison explained,
“I’m willing to give those [preparation times] up because I’ve chosen something that is important to me and the kids … If it’s something you want to do, you do it, right?”

Despite Allison’s motivation to engage in the EPL model, she and Debbie were only able to complete three formal EPL cycles, instead of the intended four cycles, due to scheduling constraints and Debbie’s limited availability to be in the school. Moreover, while Erika and Debbie completed four EPL cycles, there was a lag between the classroom implementation and feedback dialogue in three out of four of their cycles (e.g., lesson implementation on December 8th, feedback dialogue on January 5th). Erika explained how the classroom video allowed for meaningful feedback dialogues despite these lags, “It still worked … it was a month later and we were still able to [engage in a dialogue] because it’s a video. We go back to that moment and it’s easy to reflect.” In contrast, Allison preferred to engage in feedback dialogues immediately following classroom implementation, which she and Debbie achieved in two out of three EPL cycles, stating, “It was far easier for me. I got more out of it. If I had said I don’t want to use my prep [for dialogues immediately following lesson implementation], we wouldn’t have gotten the same results.” Debbie summarized, “You do it when you can, but I do believe it’s better right after … the formality of the process is the challenge, but it has to be there.”

In addition to flexibility with time, Debbie also highlighted the importance of flexible implementation of the EPL model itself. As a ML facilitator, she appreciated that the model allowed her to support teachers’ personal EPL goals, increasing teachers’ motivation to engage with the model and making the learning more purposeful and meaningful for them. Moreover, although there were challenges in scheduling times for formal feedback dialogues, the model kept each teacher accountable to her goals over the year and enabled informal planning and discussions between pairs whenever Debbie was in the school, elaborating:
It’s not like a collaborative inquiry team where you’re expected to be there at a certain time and expected to have so much done … It’s fluid … So, we’ve set the goal and both [teachers] are very cognizant of that goal. I’d meet them in the hall or in their classroom and they would say to me, ‘Okay, I’ve been working on this. What are your thoughts?’ … so lots of on the fly planning and discussion.

Debbie also highlighted that the model allowed pairs to respond to students’ needs and modify goals accordingly as the school year progressed or in subsequent years with different groups of students. In the current year, both teachers’ goals for students shifted away from enhanced achievement in math toward enhanced learning active listening and speaking skills. This differed from teachers’ intended goals for students in the pilot study and Cycle 1 of the current year, with both focused on math curricular outcomes for students. Moving forward, pairs also discussed how the model could support their next group of students in the upcoming school year.

For example, Allison was moving to a Grade 2 class, and she discussed with Debbie how the EPL model and her goal of using Talk Moves to support active listening and speaking could be adapted for younger students. According to Debbie, “It’s about going back to ‘How can we best support the students through the video analysis?’”

**Collaborative Learning within Pairs**

*Collaborative learning within pairs* occurred through trusting, supportive partnerships that developed between the ML facilitator and each teacher over time. This theme consisted of three categories: (a) learning together; (b) trusting relationships; and (c) human supports.

The three educators each emphasized the value of *learning together* within the video-informed feedback model. During the pilot study, both Allison and Erika considered Debbie a
MKO because their learning goals were focused on enhanced math teaching and learning. Debbie’s area of relative expertise. In the current year, because teachers’ goals shifted to focus on students’ learning skills (i.e., active listening and speaking), teachers began to view Debbie as more of a peer rather than a MKO. Debbie elaborated, “They did see me as more as the expert coming in [last year] because we were focusing on the math … this year, with the shift to learning skills, I was more of a peer.” Observations of both pairs during classroom implementation and feedback dialogues confirmed that they were learning together in a collegial manner; however, it should be noted that Debbie maintained a critical role in facilitating each teacher’s learning throughout the EPL cycles (e.g., encouraging teachers to try new strategies, video recording teachers’ implementation of strategies, using questioning to guide teacher’s analysis of classroom data, suggesting next steps for teachers and/or students).

**Trust**ing relationships also played a central role in collaborative learning within pairs. Debbie had worked with both teachers during the pilot study throughout the previous year and had also worked with Erika for four additional years in various capacities. Building on these previous relationships, Debbie’s feedback dialogues with both teachers were open and collegial across all EPL cycles in the current year. Debbie explained that the pilot study allowed each pair to develop a “comfort level” using the EPL model together. For Debbie and Allison, this comfort level stemmed from building professional trust during the pilot study (e.g., Debbie supporting Allison’s classroom implementation EPL goals with students and providing praise and coaching feedback to support Allison’s progress toward her EPL goals) as well as becoming more familiar with the EPL model, and especially the use of classroom video to inform EPL (e.g., Allison experiencing the process of recording and analyzing classroom video with Debbie). For Debbie and Erika, who had a previously established trusting relationship through five years of
professional collaboration in various capacities, the comfort level came from experience using the EPL model itself during the pilot study. As a result of the trusting relationships Debbie established with teachers, she explained, “I’m quite open in my reflections and thoughts and next steps, and they’re quite open with me. So if they agree or if they don’t agree, it’s okay.”

In addition to trusting relationships, both teachers highlighted the importance of human supports, especially Debbie’s support in preparing for and engaging in feedback dialogues. Both teachers particularly appreciated one-on-one dialogues with Debbie versus group dialogues with teaching peers. This was evident when teachers reflected on their experiences in the pilot study in contrast to the current study. During the pilot study, Debbie conducted feedback dialogues with both teachers simultaneously because they shared the same preparation time. While concurrent feedback dialogues accommodated scheduling, teachers said it detracted from their personal learning. This was particularly true for Allison, who was new to working with Debbie in the pilot study and had limited background as a ML facilitator in comparison to Erika. Allison explained that her dialogues with Debbie and Erika felt “disjointed” during the pilot study because (a) she and Erika had different EPL goals, and (b) she was not as confident as Erika in the collaborative data analysis processes. In the current year, Allison’s relationship with Debbie was more established and she was also more confident in her ability to analyze classroom video. This might have enabled more effective dialogues among Debbie and both teachers; however, Allison maintained that one-on-one dialogues with Debbie were preferred because in concurrent dialogues, “I would be stopping my thinking to talk about what [Erika’s] goal was.” Erika agreed that one-on-one dialogues were more effective, stating, “If I was working with a colleague, they might look at my video but then they’re thinking about their own class … because Debbie doesn’t have a classroom she gets to focus on my kids too.” Erika added that Debbie’s support
helped her stay focused on her EPL goals throughout the year and especially during their dialogues, indicating, “When we’re interpreting the videos she’s always helping me stay focused on ‘What’s our goal and what do we – what do we need to be looking at when we’re looking at the videos?’” In these ways, collaborative learning with Debbie helped teachers maintain focus on their EPL goals, while collaborative learning with teaching colleagues ultimately distracted teachers from their EPL goals.

**How Video-informed Feedback Dialogues Evolved to Support EPL over Time**

Memos of audio of feedback dialogues for each pair across all EPL cycles were coded using the analytical feedback framework (see Table 3) in order to describe how feedback dialogues between ML facilitators and teachers evolved to support EPL over time (RQ2). This section describes how feedback dialogues within and across Case 2 pairs supported EPL over time.

**How Feedback Dialogues Evolved within Pairs over Time**

Distinct patterns of feedback dialogues within ML facilitator-teacher pairs emerged over time (see Appendix H). These differences can best be understood with respect to each teacher’s previous experience as a teacher, in her current grade placement, working with Debbie, in a ML facilitator role, and using of classroom video.

Allison had 20 years of experience as a teacher and had used classroom video during the pilot study in the previous year, but she had limited experience teaching her current grade level, was relatively new to working with Debbie, and had remote previous experience in a ML facilitator role. Despite these limited experiences, Debbie and Allison began the current year with an open and trusting relationship that had been established during the pilot study, which allowed them to readily engage in coaching feedback from Cycle 1 onward. Yet, throughout all
of their dialogues, coaching feedback maintained a focus on student processes (e.g., active listening and speaking) or how teacher processes supported students’ learning (e.g., Allison’s use of Talk Moves to support students’ active listening and speaking), with little coaching focused directly on teacher processes (e.g., Allison’s implementation of Talk Moves). With respect to Debbie’s guidance, Allison relied on external feedback from Debbie in Cycle 1 to lead the pair’s collaborative data analysis and suggest next steps for herself and her students. This began to change over time as Allison gained experience using classroom video to support her students’ self-assessment of their active listening and speaking skills. Allison’s increasing confidence with the process of CVA with students, coupled with an increasing understanding of her students’ needs, allowed her to generate more internal feedback in the pair’s subsequent dialogues. Consequently, feedback in the pair’s later dialogues was more dialogic and balanced between Debbie and Allison, with both educators actively analyzing classroom data, typically classroom video of students triangulated with student self-assessment activities. These collaborative analyses enabled (a) praise regarding positive shifts in teacher and student processes and students’ self-regulation toward their learning goals and (b) both educators in the pair actively contributing suggested next steps for Allison and her students.

In contrast to Allison, Erika had less experience as a teacher but most of this experience was teaching within the junior grade division. She also had five years of experience collaborating with Debbie in various capacities, three years of recent experience in a ML facilitator role, and one year of experience using classroom video during the pilot study in the previous year. Building on this background, Erika began the current year with clear intentions about how the video-informed feedback model could support the learning goals she had identified for herself and her students (i.e., using Talk Moves to support students’ engagement in math lessons). As
such, Debbie and Erika were equally engaged in contributing to feedback dialogues from Cycle 1 onward, with both educators actively analyzing classroom data in order to generate external (i.e., Debbie) and internal (i.e., Erika) coaching feedback specific to teacher processes (e.g., questioning), student processes (e.g., active listening), or a combination of teacher and student processes (e.g., teacher’s use of anchor charts to support students’ engagement in active speaking during math lessons). Each member of this pair independently viewed and analyzed the classroom video clips that Debbie pre-selected independently before their feedback dialogues, then collaboratively triangulated their independent analyses with other sources of classroom data (e.g., student exit cards) to inform next steps. By Cycle 3, their collaborative analysis deepened resulting in feedback regarding nuanced aspects of student processes and the EPL model itself. For example, in Cycle 3 Erika noted that some students appeared to be listening in the video but weren’t engaged in the lesson, while others appeared to be off task were actually engaged. In response, Debbie identified the importance of triangulating classroom video with other sources of classroom data (e.g., student work or teacher observations) because “video in isolation doesn’t capture whole story,” while Erika recognized that active listening might not look the same across all students.

**How Feedback Dialogues Evolved across Pairs over Time**

Although feedback dialogues supported learning differently within each pair, three noteworthy themes emerged in how feedback dialogues supported EPL across pairs as well: (a) teachers contributed more praise and coaching feedback over time; (b) teachers generated internal feedback more independently; and (c) pairs increasingly leveraged video to inform teacher and student self-regulation.
Teachers contributed more praise and coaching feedback over time. Although both teachers had experience engaging in the video-informed feedback model with Debbie during the pilot study, they still relied on Debbie as the primary source of praise and coaching in early feedback dialogues (i.e., Cycles 1 and 2) during the current year. Debbie’s feedback in these early cycles was largely coaching focused on teacher and student processes (e.g., teachers’ questioning techniques or students’ collaboration), as well as teachers’ self-regulation toward their identified EPL goals (i.e., using Talk Moves to support active listening and speaking among students). Debbie also interjected praise to encourage teachers when they expressed concerns that students were not progressing quickly enough toward their learning goals; however, praise was not required for the purpose of relationships building because trusting relationships within pairs had been previously established (i.e., with both teachers during the pilot study and also through Debbie’s previous collaborations with Erika). As such, these initial feedback dialogues, although dialogic in nature, were largely driven by Debbie, who helped teachers see positives in their classrooms through praise and support the learning of themselves and their students through coaching. In her Cycle 2 dialogue with Allison, Debbie explained, “It’s always good to have a second set of eyes, because when you’re living and breathing it every day sometimes you don’t see those subtle improvements.”

Over time, the teachers began to contribute more praise and coaching feedback to their dialogues with Debbie; however, the focus of teachers’ feedback differed from the focus of Debbie’s feedback. Specifically, Debbie’s praise and coaching tended to focus on teacher processes (e.g., use of Talk Moves) and teachers’ self-regulation toward their EPL goals (i.e., suggested next steps for teachers). In contrast, each teacher’s praise and coaching tended to focus on their students’ processes (e.g., students’ engagement in active listening) and students’ self-
regulation toward their goals (e.g., students using an anchor chart to self-assess their active listening). In addition to student-focused feedback, Erika also contributed coaching feedback regarding her own teacher process because she was explicitly focused on enhancing her practice within dialogues (e.g., noticing in video that Talk Moves always occurred teacher to student and never student to student). Furthermore, while most of teachers’ feedback served the purpose of coaching across all cycles (e.g., “Students appear to be listening but they aren’t listening actively”), teachers began to generate more praise-oriented feedback in later cycles (e.g., “Students are engaged in active listening because they have their eyes on the speaker and are turned toward the speaker”). Most of this praise was specific to enhanced students’ processes (e.g., increased engagement in active listening or speaking) and improved self-regulation toward their goals (e.g., students using of video to self-assess their engagement in active listening or speaking). Video was a critical source of classroom data that allowed teachers to recognize these positive changes in their students.

**Teachers generated internal feedback more independently.** Both teachers began to generate internal feedback more independently over time. In early feedback dialogues, teachers generated internal feedback primarily in response to Debbie’s coaching feedback. For example, in their Cycle 1 dialogue, Debbie suggested to Erika that she augment her EPL goal of using Talk Moves to support active listening and speaking among students, then Erika responded that she could add “revoicing” because it requires active listening skills. As time progressed, Allison and Erika began to independently generate internal feedback with minimal prompting from Debbie. For example, in Cycle 4, Allison suggested that she could help students practice active listening and speaking skills in social situations, not just math class, then Debbie added that practicing in a social situation versus math lessons might help students extend the length of time
they could listen actively. These increases in teachers’ internal feedback over time contributed to progressively more balanced and collegial dialogues for both pairs, with teachers interacting with Debbie as more of a peer versus relying on her as a MKO.

It is important to recognize that although dialogues became more collegial over time, Debbie’s feedback focus was inherently different from that of teachers and served a critical and unique purpose. Specifically, teacher feedback was mainly focused on students’ learning in relation to their goals and not on the teachers’ own learning progression. This can be understood in light of two key influences. First, as time progressed, teachers developed a greater understanding of their students’ needs and felt more confident initiating feedback specific to students during dialogues, especially because student goals were related to learning skills and not math curriculum. Second, although teachers became more confident in recognizing students’ strengths, needs, and next steps, they continued to lack confidence identifying their own strengths, needs, and next steps, requiring ongoing praise and coaching from Debbie to celebrate and refine their EPL efforts. Accordingly, teachers still relied on Debbie to provide external feedback that served the purposes of (a) praise and coaching regarding teacher processes and (b) coaching regarding teachers’ self-regulation toward their EPL goals.

**Pairs increasingly leveraged video to inform teacher and student self-regulation.**

Video was a central source of classroom data across all EPL cycles, but the role of video increased and expanded as time progressed. Given pairs’ focus on teacher and student goals related to active listening and speaking in math class versus math-based curricular goals, video was an critical source of classroom data that helped both teachers and students reflect on and self-regulate their progress toward these goals. While pairs periodically collected and analyzed student work (e.g., exit cards or self-assessment tasks) in conjunction with classroom video, they
agreed that video was essential to capturing how Talk Moves supported enhanced active listening and speaking among students over time. In her Cycle 2 dialogue, Allison explained, “In the video we actually saw the growth, which I as the classroom teacher don’t feel I see every day.” Erika added in her Cycle 4 dialogue, “Before watching the video I was worried. I thought, ‘They haven’t improved!’ I don’t know what this is going to look like. But then we watched the video and they looked pretty good!”

Recognizing the benefits of engaging in CVA to inform the teachers’ progress toward their EPL goals, each pair also began to engage students in video analysis to help students self-assess their own progress toward learning goals, thus supporting students’ self-regulation. This was most evident in Allison’s classroom, with students’ video analysis beginning in Cycle 1 and continuing in all subsequent cycles. Allison asserted that student video analysis helped her students verbalize positive change in their active listening or speaking skills and identify areas for improvement. In contrast, Debbie encouraged Erika to engage her students in video analysis during Cycle 1 and 2 dialogues, with Erika implementing student video analysis by Cycles 3 and 4. While Erika reported that some of her students felt discouraged analyzing video of themselves because they were not as engaged in active listening and speaking skills as they expected, Erika noted that engaging students in video analysis for a full school year might help students see their progress over time. Based on these experiences with students’ video analysis, both teachers expressed intentions to engage their students in video analysis to self-assess their learning skills throughout the subsequent school year.

**Section 3: Cross-case Assertions**

This section presents cross-case assertions that were constructed through my cross-case analyses of Cases 1 and 2 findings in response to the overarching purpose of this study—to
explore how video-informed feedback supported embedded EPL between ML facilitators and teachers. These cross-case assertions represent socially constructed knowledge I generated through my: (a) ongoing interactions with and observations of ML facilitators and teachers in their contexts of practice (i.e., schools and classrooms) over two academic years; (b) analysis of multiple data sources—particularly participant interviews and audio recorded feedback dialogues—to understand the multiple perspectives of ML facilitators and teachers who participated in this study; and (c) tacit knowledge of the EPL context of this study—including provincial, regional, DSB, school, and classroom contexts.

In total, I generated four cross-case assertions that respond to the purpose of this study (see Table 8). Supporting evidence from each case was used to elaborate these assertions. Assertions are presented below, in order of salience in the data, then described in detail in the subsequent sections.

1. A sustained focus on interrelated, personalized learning goals enhanced precision in video-informed feedback dialogues between ML facilitators and teachers.

2. Video-informed feedback dialogues enabled feedback regarding teachers’ and students’ teaching and learning processes, respectively, and their self-regulation.

3. Responsive professional collaboration enhanced the value of video-informed feedback and fostered educators’ accountability to their EPL goals.

4. Video-informed praise from a ML facilitator enabled coaching feedback and teachers’ self-regulation toward EPL goals.
Table 8

**Cross-Case Assertions**

<table>
<thead>
<tr>
<th>Cross-case Assertions</th>
<th>Case 1 Findings</th>
<th>Case 2 Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interrelated Learning Goals</strong></td>
<td>Personalizing Sustained Learning Goals (RQ1)</td>
<td>Sustained Focus on Concurrent Teacher and Student Learning Goals (RQ1)</td>
</tr>
<tr>
<td>A sustained focus on interrelated, personalized learning goals enhanced precision in video-informed feedback dialogues between ML facilitators and teachers.</td>
<td>-teacher readiness</td>
<td>-teacher learning goals</td>
</tr>
<tr>
<td></td>
<td>-teacher learning goals</td>
<td>-student learning goals</td>
</tr>
<tr>
<td></td>
<td>-student learning goals</td>
<td>-teacher readiness</td>
</tr>
<tr>
<td><strong>Video-informed Feedback Dialogues</strong></td>
<td>Co-constructing Practice-based Evidence (RQ1)</td>
<td>Co-constructing Practice-based Evidence (RQ1)</td>
</tr>
<tr>
<td>Video-informed feedback dialogues enabled feedback regarding teachers’ and students’ teaching and learning processes, respectively, and their self-regulation.</td>
<td>-use of classroom video</td>
<td>-use of classroom video</td>
</tr>
<tr>
<td></td>
<td>-monitoring student learning</td>
<td>-monitoring student learning</td>
</tr>
<tr>
<td></td>
<td>-collaborative data analysis</td>
<td>-collaborative data analysis</td>
</tr>
<tr>
<td></td>
<td>-teacher practice</td>
<td>-teacher practice</td>
</tr>
<tr>
<td></td>
<td>Classroom data were increasingly triangulated (RQ2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teachers generated internal feedback more independently (RQ2)</td>
<td></td>
</tr>
<tr>
<td><strong>Responsive Professional Collaboration</strong></td>
<td>Collaborative Learning among Educators (RQ1)</td>
<td>Collaborative Learning within Pairs (RQ1)</td>
</tr>
<tr>
<td>Responsive professional collaboration enhanced the value of video-informed feedback and fostered educators’ accountability to their EPL goals.</td>
<td>-human supports</td>
<td>-learning together</td>
</tr>
<tr>
<td></td>
<td>-learning together</td>
<td>-trusting relationships</td>
</tr>
<tr>
<td></td>
<td>-trusting relationships</td>
<td>-human supports</td>
</tr>
<tr>
<td></td>
<td>Flexibility with Structures (RQ1)</td>
<td>Flexibility with Structures (RQ1)</td>
</tr>
<tr>
<td></td>
<td>-time</td>
<td>-time</td>
</tr>
<tr>
<td></td>
<td>-EPL model</td>
<td>-EPL model</td>
</tr>
<tr>
<td><strong>Video-informed Praise</strong></td>
<td>Praise maintained importance but extended to students (RQ2)</td>
<td>Teachers contributed more praise and coaching feedback over time (RQ2)</td>
</tr>
<tr>
<td>Video-informed praise from a ML facilitator enabled coaching feedback and teachers’ self-regulation toward EPL goals.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Assertion 1: A sustained focus on interrelated, personalized learning goals enhanced precision in video-informed feedback dialogues between ML facilitators and teachers.

ML facilitator-teacher pairs’ sustained focus on interrelated, personalized learning goals enriched video-informed feedback dialogues across EPL cycles. This was evident in two similar themes across cases: (a) personalizing sustained learning goals (Case 1-RQ1) and (b) sustained focus on concurrent teacher and student learning goals (Case 2-RQ1).

With ML facilitator guidance, each teacher set an EPL goal for herself at the start of the school year. The ML facilitator ensured that this EPL goal was of personal interest to the teacher, reflected her previous professional experiences, addressed her students’ needs, and aligned with the broader DSB and regional project goals. This supported teachers’ ownership of and commitment to their EPL goals while concurrently ensuring that these goals were nested within broader DSB and regional priorities. Pairs also set related goals for students’ learning, creating alignment among student, teacher, DSB, and regional goals. Throughout the school year, these interrelated, personalized learning goals enriched ML facilitator-teacher pairs’ video-informed feedback dialogues in two key ways.

First, the sustained focus on teacher and student goals enabled continuity between EPL cycles which occurred at intervals up to three months, allowing ML facilitators to support each teacher’s learning more effectively. At the end of each feedback dialogue, ML facilitators documented teacher and student goals along with planned next steps on the Facilitated Feedback Dialogue Protocol. This documentation helped teachers stay focused on and accountable to their EPL goals in between EPL cycles with the ML facilitator, which was critical because ML facilitators were not in schools daily to support teachers’ progress toward their EPL goals. Moreover, the documentation helped ML facilitators reorient themselves to teachers’ personal
goals and intentions after intervals between EPL cycles, during which time the ML facilitator had supported the learning of multiple teachers across schools, all with different goals and priorities. The documentation of teachers’ and students’ learning goals also allowed the ML facilitator to make targeted observational notes and record relevant classroom video during teachers’ lesson implementation because facilitators reviewed previously documented goals prior to the start of each EPL cycle. As such, pairs entered feedback dialogues with purposefully collected data that were relevant to both teacher and student goals. Through the collaborative analysis of this purposefully collected classroom data, pairs were able to co-construct practice-based evidence that provided feedback regarding teachers’ and students’ progress toward these goals. Moreover, this practice-based evidence allowed pairs to refine current goals and next steps at the end of each cycle, contributing to enhanced precision in subsequent EPL cycles.

Second, teachers’ and students’ goals provided a framework to guide collaborative data analysis during each pair’s feedback dialogues. At the start of each feedback dialogue, ML facilitators reminded teachers of the goals and next steps they had articulated in the previous EPL cycle to ensure that analysis centred on these goals. Consequently, both ML facilitators and teachers were able to analyze precise aspects of teacher practice or students’ learning in video and other data sources that specifically informed these goals. This was particularly important when analyzing classroom video, which provided a broad range of information from the classroom that was not necessarily relevant to articulated goals. If a teacher expressed concerns about elements of classroom video that were unrelated to her previously stated goals (e.g., her voice or appearance, aspects of their practice outside the scope of the math project, or student challenges unrelated to the math project), the ML facilitator used the teacher’s goals to help refocus the pair’s analysis accordingly. This enhanced the overall effectiveness of the video-
informed feedback dialogues by preventing teachers from getting distracted from their goals or discouraged about aspects of classroom teaching or learning outside the EPL focus.

After a full year focus on personalized, interrelated goals, teachers began to observe desired changes in themselves and their students through collaborative video analysis and feedback dialogues. Interestingly, despite these positive shifts, all teachers expressed a desire to continue with their current EPL goals in the subsequent school year. This suggests that it takes considerable time and effort for teachers to develop and refine new practices. It also highlights teachers’ recognition that each group of students will respond to practices differently, therefore teachers need to continually adapt practices from year to year to address the changing dynamics within their classrooms. Moreover, at the end of the school year, ML facilitators recognized that video-informed feedback dialogues focused on interrelated, personalized learning goals supported positive shifts in teachers’ practices and students’ learning. ML facilitators expressed their intention to use video-informed feedback dialogues to support the spread of regional project goals among other teachers in their respective DSBs in the subsequent school year.

**Assertion 2:** Video-informed feedback dialogues enabled feedback regarding teachers’ and students’ teaching and learning processes, respectively, and their self-regulation.

Video-informed feedback dialogues enabled feedback focused on teachers’ and students’ processes (i.e., practice and learning, respectively) and self-regulation. This was primarily evident in two themes that emerged across both cases: (a) co-constructing practice-based evidence (RQ1) and (b) teachers generated internal feedback more independently (RQ2). This was also evident in two unique case themes: (a) classroom data were increasingly triangulated (Case 1-RQ2) and (b) pairs increasingly leveraged video to inform teacher and student self-regulation (Case 2-RQ2). Taken together, these themes highlight three key ways in which video-
informed feedback dialogues enabled feedback focused on processes (i.e., teachers’ practices or students’ learning) and teachers’ and students’ self-regulation toward learning goals.

First, ML facilitators and teachers agreed that video captured authentic, holistic evidence of teaching and learning processes within the complexity of the classroom context in ways that paper-based data sources could not. It appeared that paper-based data sources (i.e., ML facilitator observational notes and student products) were considered to provide a more static representation of teacher practice and student learning and failed to capture the dynamic teaching and learning processes associated with the creation of these paper-based data. Accordingly, video helped ML facilitators provide teachers with precise feedback regarding classroom processes pertaining to their instructional practices and students’ learning in relation to previously identified EPL goals. Although feedback from the ML facilitator had inherent credibility due to her role as a MKO, video helped teachers understand and integrate each ML facilitator’s feedback by showing teachers real time events that occurred during lesson implementation. Specifically, video allowed ML facilitators to praise effective teacher and student processes from the lesson, pinpoint teacher or student processes that could be improved upon, and suggest detailed next steps for both teachers and students. Moreover, video provided holistic classroom data that allowed ML facilitators to provide feedback about classroom events that were potentially influencing progress toward teacher or student goals, thus enriching the coaching feedback they were able to provide to teachers. In dialogues in which video was not used (e.g., Case 1-Cycle 3), ML facilitator feedback was more focused on the math task implemented during lesson and less on how the teacher implemented the task or how the students engaged in the task, thus limiting the depth and breadth of these feedback dialogues. In Case 2, where each pair’s focus was on enhanced active listening and speaking in math class versus a curricular goal, the ML facilitator used video to
support all dialogues because paper-based data sources could not sufficiently capture the dynamic teacher and student processes associated with this goal.

Second, collaboratively analyzing video within ML facilitator-teacher pairs helped teachers reflect on events from the classroom that they did not or could not observe while implementing the lesson, thus enhancing teachers’ self-regulation toward their EPL goals. With ML facilitator guidance, video helped teachers see positive aspects of their practice and their students’ learning and identify areas of practice that could be improved upon in order to better support students’ learning. In many instances, video captured positives from the lesson that teachers did not remember as such and helped teachers recognize that only minor adjustments were needed moving forward, not global changes in their practice or their students’ learning. Moreover, collaboratively analyzing video at four points over the school year helped teachers see growth in their practice and their students’ learning over time that they did not see in daily practice, thus encouraging their ongoing EPL efforts.

As teachers became more confident with the process of collaborative video analysis during feedback dialogues, they began to take more initiative in generating feedback regarding areas of need and next steps, to some extent for themselves but primarily for their students. Furthermore, when pairs triangulated video with paper-based data sources, particularly student products, they were able to construct practice-based evidence that provided a more holistic understanding of how teacher practice influenced students’ learning and how students’ learning impacted their completion of various tasks. For example, one pair’s collaborative analysis of video of a marker student solving a math problem with classmates triangulated with the paper-based student work highlighted how the marker student contributed to the group’s problem solving effort and the multiple strategies the group tried before producing the paper-based
solution. Similarly, triangulating video of a student’s engagement in active listening and speaking during math class with the student’s paper-based exit card that self-assessed his engagement in active listening and speaking illustrated disconnects between the student’s performance in class and his perception of that performance. In these ways, video augmented and enriched the analysis of paper-based data sources by capturing teacher and student processes that underpinned the creation of these paper-based data.

Third, Case 2 pairs demonstrated the potential of using video to support students’ self-regulation toward their learning skill-oriented goals. Both pairs in this case provided students with opportunities to analyze video of their own class in order to self-assess their individual progress toward the goal of enhanced active listening and speaking in math class. While video analysis was discouraging for students in one class, largely because it only occurred once, it was quite successful in the other. In the latter class, teachers and students analyzed classroom video on three occasions to help students self-assess their progress toward personal learning goals nested within the teacher’s overarching goal of supporting enhanced active listening and speaking in math class. This process allowed students to verbalize their growth and identify their next steps at multiple points throughout the school year and highlighted the potential of students’ analyzing classroom video to support their self-regulation toward learning skills goals in the classroom.

**Assertion 3: Responsive professional collaboration enhanced the value of video-informed feedback and fostered educators’ accountability to their EPL goals.**

Responsive collaboration among educators contributed to effective video-informed feedback dialogues and fostered educators’ accountability to EPL goals. This was evident in two related themes across cases: (a) collaborative learning among educators (Case 1-RQ1) and (b)
collaborative learning within pairs (Case 2-RQ1), and also in one common theme across cases, flexibility with structures (RQ1).

Responsive collaboration among educators manifested in three ways. First and foremost, ML facilitators responded to teachers’ readiness to engage in EPL. Across all EPL cycles, ML facilitators responded to teachers’ changing needs with respect to their EPL goals and comfort using video to inform progress toward these goals and differentiated their support accordingly. For example, ML facilitators prioritized video-informed praise over coaching in early dialogues with teachers new to the project to build trust with these teachers, with praise focused on either teachers’ practices or students’ learning during collaborative video analysis, depending on each teacher’s readiness. The differentiated support from ML facilitators cultivated trust with each teacher and enhanced learning relationships within pairs, allowing for more effective video-informed feedback dialogues.

Second, responsive collaboration referred to how ML facilitators and teachers complemented each other’s knowledge during feedback dialogues. While the ML facilitator served as a MKO with relative expertise regarding math teaching and learning, teachers brought essential knowledge to dialogues regarding their students’ ongoing learning progression and needs as well as the classroom context. This became increasingly apparent in later feedback dialogues which occurred after teachers had been working with students for almost a full school year. During collaborative data analysis in later cycles, teachers were able to confidently identify students’ ongoing needs and progress toward their goals, and more independently initiate suggestions for potential next steps for students. ML facilitators were then able to build on teachers’ analysis and contribute additional suggestions for both students and teachers moving forward. In Case 1 in which the focus was math-based, the ML facilitator’s contributions as a
MKO maintained importance across all cycles. However, in Case 2 in which the focus was on learning skills versus curricular goals, the ML facilitator began to view herself as more of a peer than a MKO in later dialogues, especially working with the teacher who had previously served in a ML facilitator role. In both cases, although teachers stated that ML facilitators knew their students well due to regular visits to teachers’ classrooms over the school year, ML facilitators asserted that teachers knew their students best and relied on teachers’ knowledge of students to guide and enrich feedback dialogues.

Third, responsive collaboration was also evident in how ML facilitator-teacher pairs adapted the EPL model to navigate time constraints and teacher availability. In each EPL cycle, pairs negotiated mutually convenient times for lesson implementation, with teachers determining the lesson focus and ML facilitators leading the collection of classroom data relevant to the teachers’ EPL and lesson goals. Following classroom implementation, pairs scheduled feedback dialogues at mutually convenient times, with teachers regularly giving up their preparation time or staying after school because they valued the opportunity for one-on-one learning with the ML facilitator. Due to pairs’ fluid implementation of the EPL model, variations occurred with respect to the time between classroom implementation and feedback dialogues, duration of feedback dialogues, and time between EPL cycles. These variations were important to enabling teachers’ engagement in the EPL opportunity and did not appear to diminish desired impacts on teachers and students. However, pairs did agree that dialogues immediately following classroom implementation were ideal because the lesson was fresh in their minds.

Overall, responsive collaboration among educators fostered educators’ professional accountability to their EPL goals. This accountability was constructive in nature and primarily existed within ML facilitator-teacher pairs, with teachers accountable to ML facilitators for
working toward identified EPL goals for themselves and their students over the course of the school year. In addition, professional accountability extended beyond pairs to include the ML facilitators’ accountability to supporting DSB, project, and research priorities through their work with teachers. With respect to research priorities, all pairs expressed a desire to continue with video-informed feedback dialogues in the subsequent school year due to the benefits they observed in teachers’ practices and students’ learning, and both ML facilitators spoke about the potential benefits of using the video-informed feedback model to support the learning of other teachers involved in the regional math project. However, without accountability to me and this study, neither ML facilitators nor teachers continued to systematically engage in video-informed feedback dialogues in the following year. This suggests that accountability to someone outside the school or DSB context may be critical to pairs’ ongoing engagement with the video-informed feedback model.

**Assertion 4: Video-informed praise from a ML facilitator enabled coaching feedback and teachers’ self-regulation toward EPL goals.**

Across cases, video-informed praise from the ML facilitator, as a MKO, enabled coaching feedback and teachers’ self-regulation toward EPL goals by cultivating trust within pairs and building teacher’ confidence. This was evident in two related findings across cases: (a) praise maintained importance but extended to students (Case 1-RQ2) and (b) teachers contributed more praise and coaching feedback over time (Case 2-RQ2).

Both ML facilitators consistently used video to praise teachers’ ongoing EPL efforts across all cycles. Video-informed praise helped ML facilitators build and maintain trusting relationships with teachers by illustrating effective aspects of their classroom practice and students’ learning and establishing the positive, non-evaluative nature of feedback dialogues. For
all teachers, praise from the ML facilitator acknowledged and encouraged their ongoing EPL efforts in two important ways. First, video-informed praise allowed teachers to see things that were going well in their classrooms, whether in their own teaching practice or their students’ learning. This increased teachers’ confidence regarding the impacts of EPL on their practice and their students’ learning and helped teachers maintain momentum toward their EPL goals. Second, video-informed praise from ML facilitators helped teachers begin to use video to identify and articulate positive aspects of their students’ learning and, to a lesser extent, their own practice. In this way, ML facilitators modelled for teachers how classroom video could be used to highlight positives within the classroom, and teachers began to replicate this process themselves by highlighting positives in students’ learning during collaborative video analysis in pairs.

Within feedback dialogues, praise provided a critical foundation for subsequent coaching feedback and enabled teachers’ integration of coaching feedback to inform their EPL efforts. Coaching feedback was generated by both the ML facilitator and the teacher. Building on their praise of classroom activities, ML facilitators used video and other classroom data to provide coaching regarding specific aspects of teachers’ practices and students’ learning that could be improved upon and suggest related next steps. Over time, teachers also began to use video to identify aspects of their own practices or students’ learning that could be improved upon and suggest next steps for themselves and their students. It appeared that video-informed praise from the ML facilitator, as a trusted MKO, not only enabled ML facilitators’ subsequent coaching feedback to teachers and but also (a) stimulated teachers’ engagement in generating coaching feedback regarding their practice and their students’ learning and (b) helped teachers identify
next steps for themselves and their students. In these ways, video-informed praise from the ML facilitator was a fundamental precursor to teachers’ self-regulation toward their EPL goals.

**Cross-case Assertions in Relation to Social Constructivist Learning Theory**

The four cross-case assertions that emerged from this study can be further interpreted through the lens of social constructivism—the theoretical underpinning of the video-informed feedback model—providing an opportunity to understand how social constructivism operates in the context of embedded, ML-facilitated EPL. Table 9 presents the four cross-case assertions from this study in relation to the associated tenets of social constructivist learning theory—learning is learner-centred, learning is facilitated, learning is socially mediated, and learning is active and situated.

**Learning is learner-centred.** The tenet that *learning is learner-centred* is associated with one assertion (i.e., interrelated learning goals) and refers to teachers identifying personal EPL goals for themselves as well as related learning goals their students. ML facilitators helped teachers set EPL goals that reflected teachers’ readiness or zone of proximal development (ZPD; Bruner, 1986; Vygotsky, 1962; 1978)—including their current knowledge, attitudes, and beliefs as well as previous experiences—and their students’ needs, while concurrently reflecting system goals associated with district, regional, and provincial priorities. This process not only enhanced teachers’ engagement in EPL but also helped teachers set relevant, meaningful EPL goals and associated student goals that were aligned with classroom (micro), school (meso), and systemic, regional (macro) EPL goals. Without ML facilitator support, teachers would not likely have been as strategic or purposeful in their goal-setting, especially in aligning classroom goals with system goals, of which teachers were rarely cognizant. While ML facilitators’ primary responsibility was to support teachers’ attainment of EPL goals and teachers’ primary responsibility was to
support students’ attainment of learning goals, both ML facilitators and teachers were committed to working collaboratively toward enhanced student learning outcomes. Pairs’ collaborative focus on supporting students’ learning was evident in goal-setting, classroom implementation, and feedback dialogue activities during EPL cycles.

**Learning is facilitated.** The tenet that *learning is facilitated* is associated with all four cross-case assertions, reflecting the inherent structure (i.e., ML-facilitated) of the video-informed feedback model and highlighting critical aspects of the ML facilitator’s role in EPL. According to social constructivism, *learning is facilitated* refers to more knowledgeable-others (MKOs) helping learners set and move toward learning goals by scaffolding learning opportunities within the learner’s zone of proximal development (ZPD; Bruner, 1986; Vygotsky, 1962; 1978) and providing formative feedback to inform the learner’s progress toward articulated goals (Shepard, 2000). In the context of embedded, ML-facilitated EPL, ML facilitators played a critical role as relative experts, or MKOs, who guided and supported teachers’ learning. ML facilitators also responded to teachers’ evolving learning needs over time by differentiating and scaffolding their embedded support of teachers’ EPL—collaboratively analyzing classroom data sources, incorporating video when teachers demonstrated readiness to leverage this source, during feedback dialogues with teachers to co-construct practice-based evidence that provided feedback regarding teachers’ and students’ progress toward identified goals.

Moreover, while social constructivism suggests that ML facilitators’ primary responsibility was to provide coaching, or formative feedback, to support teachers’ progress toward their EPL goals, ML facilitators’ video-informed praise of teachers’ practice or students’ learning was equally, if not more, important in the context of embedded, ML-facilitated EPL. Video-informed praise from ML facilitators provided valuable encouragement to teachers,
fostered teachers’ openness to ML facilitators’ coaching feedback, and helped teachers begin to recognize positive shifts in their instructional practices and students’ learning during collaborative video analysis with ML facilitators. Taken together, these findings related to learning is facilitated highlight a parallel between teachers’ and students’ learning. While teachers engaging in EPL are adults learning in professional contexts, they require scaffolded learning experiences, praise, and formative feedback from a MKO to progress toward their learning goals just as students require these things from teachers to progress toward learning goals.

**Learning is socially mediated.** The tenet that learning is socially mediated is associated with all four cross-case assertions, illustrating the collaborative nature of the video-informed feedback model, and also providing a deeper understanding of how feedback dialogues supports embedded, ML-facilitated EPL. Social constructivist learning states that learning is socially mediated through dialogues with others within the learner’s context of practice to promote deeper understandings and a culture of giving and receiving feedback (Palincsar, 2005; Richardson, 2003). In the context of embedded, ML-facilitated EPL, feedback dialogues between ML facilitators and teachers within the classroom and/or school context were fundamental supports of teachers’ learning. Feedback dialogues focused on teachers’ and students’ progress toward articulated goals and were informed by practice-based evidence that was co-constructed by ML facilitator-teacher pairs through the analysis of classroom video and other classroom data sources. Practice-based evidence provided a focus for feedback dialogues, allowing ML facilitators to provide evidence-informed external feedback regarding teachers’ practices or students’ learning and helping teachers to generate evidence-informed internal feedback regarding their own practices or students’ learning. During feedback dialogues, ML facilitators
and teachers contributed complementary knowledge, with ML facilitators providing relative expertise regarding instructional strategies and teachers contributing knowledge about their students’ learning needs. In this way, both ML facilitators and teachers served MKO roles within the context of embedded, ML-facilitated EPL—each socially mediating feedback dialogues and the collaborative analysis of classroom data in order to co-construct practice-based evidence regarding teachers’ and students’ progress toward EPL goals. Although peer feedback was available to teachers, they consistently prioritized ML feedback over peer feedback because teachers considered the former to be of higher quality and more directly focused on their goals for themselves and their students.

Learning is active and situated. The tenet that learning is active and situated is associated with two assertions (i.e., video-informed feedback dialogues and responsive professional collaboration) and relates to the embedded, cyclical nature of the video-informed feedback model. In social constructivism, learning is active and situated characterizes learning as a dynamic process that occurs in a dialogue-rich environment through cycles of activity, reflection, and conversation among the learner, peers, and MKOs (Fosnot & Perry, 1996; Shepard, 2000). Within the embedded, ML-facilitated EPL in this study, teachers’ learning occurred within the classroom or school context, with formal EPL activities occurring when ML facilitators were present. ML facilitators supported all aspects of the EPL cycles—especially supporting teachers’ classroom implementation of new instructional strategies with students; collecting relevant data from classroom implementation (e.g., video, observational notes, student products); collaboratively analyzing classroom data with teachers to co-construct practice-based evidence that informed feedback dialogues between ML facilitator-teacher pairs; and providing
praise and coaching feedback regarding teachers’ and students’ progress toward their identified goals.

Although teachers explored implementation of new strategies in between ML-facilitated EPL cycles, teachers did not (a) purposefully collect or collaboratively analyze multiple sources of classroom data without direct ML facilitator support or (b) systematically reflect on the impacts of their practice on students and their progress toward EPL goals. Moreover, teachers rarely sought peer support for cycles of activity, reflection, and conversation within their schools when ML facilitators were unavailable, indicating that EPL cycles were not truly *active and situated* within teachers’ daily practices but occurred as planned events when ML facilitators were available to provide embedded support. Accordingly, in order to engage in EPL cycles, it was essential that ML facilitators and teachers navigated time constraints and competing priorities to determine mutually convenient times for classroom implementation and feedback dialogues. Designating times for implementation and dialogues helped teachers stay accountable to the EPL goals they set for themselves and their students and helped ML facilitators stay accountable to system EPL goals related to the regional EPL initiative.
### Table 9

**Cross-Case Assertions Described in Relation to the Tenets of Social Constructivist Learning Theory**

<table>
<thead>
<tr>
<th>Cross-case Assertions</th>
<th>Tenets of Social Constructivist Learning Theory</th>
<th>Description of Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interrelated Learning Goals</strong>&lt;br&gt;A sustained focus on interrelated, personalized learning goals enhanced precision in video-informed feedback dialogues between ML facilitators and teachers.</td>
<td>Learning is learner-centred</td>
<td>Teachers set personal learning goals that reflected their ZPD (i.e., current knowledge, attitudes and beliefs, previous experiences), EPL interests, and students’ needs. Teachers also set related learning goals for their students that aligned with their EPL goals.</td>
</tr>
<tr>
<td>Learning is facilitated</td>
<td>ML facilitators, as MKOs, helped teachers set EPL goals for themselves and their students that reflected both teachers’ and students’ needs and also aligned with system goals (district, regional, and provincial).</td>
<td></td>
</tr>
<tr>
<td>Learning is socially mediated</td>
<td>Teacher and student learning goals provided a focus for feedback dialogues in ML facilitator-teacher pairs.</td>
<td></td>
</tr>
<tr>
<td><strong>Video-informed Feedback Dialogues</strong>&lt;br&gt;Video-informed feedback dialogues enabled feedback regarding teachers’ and students’ teaching and learning processes, respectively, and their self-regulation.</td>
<td>Learning is facilitated</td>
<td>ML facilitators used classroom video and other classroom data to co-construct practice-based evidence that provided teachers with precise feedback regarding instructional practices and students’ learning associated with articulated EPL goals.</td>
</tr>
<tr>
<td>Learning is socially mediated</td>
<td>Feedback dialogues helped ML facilitator-teacher pairs collaboratively analyze multiple classroom data sources to co-construct practice-based evidence that provided feedback to inform next steps for teachers and students.</td>
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<tr>
<td>Learning is active and situated</td>
<td>ML facilitators and teachers enacted new practices in classrooms with students and collected classroom video, as well as other classroom data sources, to co-construct practice-based evidence that informed feedback dialogues between ML facilitator-teacher pairs.</td>
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<td><strong>Responsive Professional Collaboration</strong>&lt;br&gt;Responsive professional collaboration enhanced the value of video-informed feedback and fostered educators’ accountability to their EPL goals.</td>
<td><strong>Learning is facilitated</strong>&lt;br&gt;ML facilitators responded to teachers’ evolving learning needs by scaffolding their support of teachers’ EPL goals and the use of classroom video to inform progress toward EPL goals.</td>
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<td><strong>Learning is socially mediated</strong>&lt;br&gt;ML facilitators and teachers contributed complementary knowledge to feedback dialogues regarding math teaching and learning and students’ learning needs, respectively.</td>
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<td><strong>Learning is active and situated</strong>&lt;br&gt;ML facilitators and teachers navigated time constraints and competing priorities to determine mutually convenient times for classroom implementation and feedback dialogues—keeping teachers accountable to EPL goals for themselves and their students and ML facilitators accountable to system and external research goals.</td>
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<th><strong>Video-informed Praise</strong>&lt;br&gt;Video-informed praise from ML facilitators enabled coaching feedback and teachers’ self-regulation toward their EPL goals.</th>
<th><strong>Learning is facilitated</strong>&lt;br&gt;ML facilitators used video to praise specific aspects of teachers’ instructional practices and students’ learning in relation to articulated EPL goals in order to enable subsequent coaching feedback.</th>
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<tr>
<td><strong>Learning is socially mediated</strong>&lt;br&gt;Video-informed praise from ML facilitators, as MKOs, increased teachers’ confidence in their instructional practice, helped teachers identify positive impacts of their practice on students, allowed teachers to integrated coaching feedback from ML facilitators, and helped teachers begin to self-regulate their learning.</td>
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Summary

The findings of this multiple case study illustrated that video-informed feedback supported embedded, ML-facilitated EPL in four key ways: (a) a sustained focus on interrelated goals for teachers and students; (b) video-informed feedback dialogues that enabled feedback regarding teachers’ and students’ processes (i.e., teaching and learning, respectively) and self-regulation; (c) responsive collaboration between ML facilitators and teachers that fostered educators’ accountability to their EPL goals; and (d) video-informed praise from ML facilitators and teachers that enabled ML facilitators’ coaching and teachers’ self-regulation. While the video-informed feedback supported each ML facilitator-teacher pair differently, these key findings provide insights into how video-informed feedback strategies can support teachers’ learning in embedded, ML-facilitated EPL models.
Chapter 5
Discussion

This research responded to concerns that EPL research has not sufficiently focused on how educators learn within EPL (Kennedy, 2016), the role of feedback in EPL (Campbell et al., 2017), or how ML facilitators support evidence-informed EPL (LaPointe-McEwan et al., 2017). Through a multiple case study method, my research explored how video-informed feedback supported embedded educator professional learning (EPL) between middle leader (ML) facilitators and teachers. Two questions guided this research: How does a video-informed feedback model support embedded EPL between ML facilitators and teachers? and How do video-informed feedback dialogues between ML facilitators and teachers evolve to support EPL over time?

Over the past two decades, contemporary EPL in Canada and similar countries (e.g., USA, UK, Australia, and New Zealand) has shifted away from isolated professional development-style workshops toward socio-constructivist approaches that prioritize ongoing, recursive cycles of school- and classroom-embedded collaborative learning among educators (DeLuca, Shulha, et al. 2015; Donohoo, 2013). Despite significant investments in embedded, collaborative initiatives and substantial empirical research focused on how to enhance the effectiveness of contemporary models, desired EPL outcomes on educators and students have remained inconsistent and limited (Desimone & Garet, 2015; Opfer & Pedder, 2011).

Within contemporary, socio-constructivist approaches to EPL, ML facilitators are more knowledgeable-other (MKO) system educators who support educators’ knowledge-building in relation to system priorities, implementation of prioritized instructional strategies in schools or classrooms, and use of classroom data to inform EPL efforts (Avalos, 2011; Fullan, 2015;
LaPointe-McEwan et al., 2017). Given the central role of ML facilitators in contemporary EPL models and initiatives, it is important to understand the role of ML facilitators in supporting embedded EPL with teachers—a notable gap in EPL literature. This study explored the role of empirically-supported feedback practices and classroom video analysis in embedded EPL between ML facilitators and teachers.

This chapter briefly summarizes the key findings of this study (i.e., four cross-case assertions) and discusses key findings in relation to social constructivist learning theory, feedback literature, and EPL research to respond each research question. The chapter concludes with limitations of this research, implications for practice and future research, and concluding remarks.

Summary of Key Findings

Through my cross-case analysis of Cases 1 and 2—incorporating the perspectives of two ML facilitators and five classroom teachers, informed by my observations of and interactions with participants over two years, and reflecting my tacit knowledge of the context—I constructed four cross-case assertions addressing the overarching purpose of this study (i.e., how video-informed feedback supported embedded EPL between ML facilitators and teachers). Each assertion is summarized below then discussed in relation to my research questions.

Assertion 1: A sustained focus on interrelated, personalized learning goals enhanced precision in video-informed feedback dialogues between ML facilitators and teachers. ML facilitators helped each teacher set goals for themselves and their students that reflected each teacher’s zone of proximal development or ZPD (i.e., current knowledge, attitudes and beliefs, previous experiences), EPL interests, and students’ needs. Teacher and student goals aligned with system goals (i.e., district, regional, and provincial) and provided a focus for feedback.
dialogues between ML facilitators and teachers.

**Assertion 2: Video-informed feedback dialogues enabled feedback regarding teachers’ and students’ teaching and learning processes, respectively, and their self-regulation.** ML facilitator-teacher pairs analyzed classroom video and other classroom data to co-construct practice-based evidence that provided feedback regarding instructional practices and students’ learning and helped pairs determine next steps for teachers and students. One teacher regularly mirrored this process by collaboratively analyzing classroom video with students and helping students determine next steps in their learning.

**Assertion 3: Responsive professional collaboration enhanced the value of video-informed feedback and fostered educators’ accountability to their EPL goals.**

ML facilitators responded to teachers’ readiness and changing needs with respect to their EPL goals and comfort using video and differentiated their support accordingly. While the ML facilitator served as a MKO with relative expertise regarding math teaching and learning, teachers brought essential knowledge to dialogues regarding their students’ ongoing learning progression and needs. Pairs negotiated mutually convenient times for lesson implementation and feedback dialogues, with ML facilitators and teachers bringing relative expertise to dialogues regarding math teaching and learning and students’ needs, respectively.

**Assertion 4: Video-informed praise from ML facilitator enabled coaching feedback and teachers’ self-regulation toward their EPL goals.** ML facilitators used video to praise specific aspects of teachers’ instructional practices and students’ learning in relation to EPL goals. Praise from ML facilitators increased teachers’ confidence in their instructional practices, helped teachers identify impacts of their practice on students, and enhanced teachers’ abilities to determine next steps for themselves and their students.
How the Video-informed Feedback Model Supported Embedded, ML-facilitated EPL

The video-informed feedback model operationalized in this study was rooted in my conceptual feedback model (Figure 1) and entailed a cycle consisting of four core elements—goal-setting, classroom implementation, feedback seeking, and feedback dialogues. While each of these elements was rooted in social constructivist learning theory, feedback literature, and EPL research, findings of this study provide a deeper understanding of how the elements collectively supported embedded EPL between the ML facilitators and teachers. All four assertions generated through this study provide evidence that the video-informed feedback model supported embedded, ML-facilitated EPL by (a) supporting ML facilitation of teachers’ EPL and (b) enhancing data literacy among ML facilitators and teachers.

Supporting ML facilitation of teachers’ EPL. In contemporary EPL, ML facilitators are recognized or relative experts (i.e., MKOs) who assume a great deal of responsibility for supporting socio-constructivist approaches to EPL models—facilitating learner-centred, socially-mediated, active and situated EPL among educators. In their complex and multifaceted roles, ML facilitators are tasked with supporting classroom (micro) and school (meso) goals in order to achieve system goals and priorities (macro) (Bore & Wright, 2009; Opfer & Pedder, 2011). The findings of this study provide evidence of the critical role that ML facilitators play in supporting teachers’ EPL within the context of systemic EPL initiatives and illustrate how the video-informed feedback model provided a valuable structure to support ML facilitation of teachers’ EPL, addressing gaps in EPL literature regarding the role of ML facilitators in EPL (LaPointe-McEwan et al. 2017; Major & Watson, 2017).

Each element of the video-informed feedback model—goal-setting, classroom implementation, feedback seeking, and feedback dialogues—helped ML facilitators purposefully
engage teachers in iterative cycles of knowledge-building, classroom implementation, and dialogical reflection focused on teachers’ EPL goals (DeLuca, Shulha, et al., 2015; Killion, 2012), reflecting a socio-constructivist approach to EPL. Through their implementation of the model, ML facilitators prioritized time to help teachers set personal EPL goals and associated student goals for the classroom (micro) that (a) reflected each teacher’s zone of proximal development (ZPD), EPL interests, and students’ needs and (b) were concurrently aligned with school (meso) as well as district, regional project, and provincial (macro) goals. ML facilitators’ support of teachers’ goal-setting was critical because ML facilitators were responsible for supporting system and school goals through their support of teachers’ EPL; however, teachers were not consistently aware of these broader goals because they were primarily focused on the needs of the students in their respective classrooms (Desimone & Garet, 2015; Guskey, 2014).

In addition to enabling purposeful goal-setting between ML facilitators and teachers, the video-informed feedback model supported embedded, ML-facilitated EPL by designating times for ML facilitators to (a) support teachers’ classroom implementation of EPL goals while collecting relevant classroom data (e.g., student work, observational notes, classroom video) and (b) engage in feedback dialogues with teachers during which classroom data were analyzed to construct practice-based evidence that informed reflection and next steps in EPL. ML facilitators’ direct involvement in teachers’ classroom implementation and engagement in feedback dialogues with teachers enhanced the intentionality of ML facilitator-teacher pairs’ time together and fostered teachers’ accountability to implementing new instructional strategies with students, two persistent challenges in socio-constructivist approaches to EPL (e.g., Butler & Schnellert, 2012; Harrison, 2013). In addition, this process helped ML facilitators support and monitor teachers’ progress toward classroom (micro) goals in support of school (meso) and
system (macro) goals, an ongoing challenge in systemic EPL initiatives (e.g., Campbell et al., 2017; Desimone & Garet, 2015; Hargreaves & Ainscow, 2015; Opfer & Pedder, 2011).

Moreover, the model allowed ML facilitators to explicitly leverage feedback within EPL to support teachers’ learning, with two sources of feedback being particularly helpful in supporting teachers’ EPL—MKO feedback from the ML facilitator to the teacher and feedback from practice-based evidence constructed through the collaborative analysis of classroom data during feedback dialogues. MKO feedback has been well established as a valuable support of teachers’ learning in EPL (Arya et al., 2014; Dierking & Fox, 2013; Olson et al., 2011). However these findings suggest the potential value of multi-source feedback models (Molloy & Boud, 2013; Taylor, 2013) in the context of EPL—intentionally incorporating feedback from ML facilitators or other MKOs, internal feedback from teachers, and practice-based evidence constructed from diverse classroom data to inform EPL efforts.

ML facilitators’ explicit use of feedback within EPL was enabled by trusting relationships with teachers. While the importance of trusting relationships between ML facilitators and teachers engaged in EPL is not new (e.g., Knight, 2009; Leat, et al., 2012), my findings demonstrate how ML facilitators leveraged the video-informed feedback model to build trusting relationships with teachers by: (a) helping teachers set and focus on EPL goals that reflected their personal needs and interests; (b) observing and supporting teachers’ implementation of new strategies with students; (c) responding to teachers’ readiness to collaboratively analyze classroom video during feedback dialogues; (d) using classroom data to praise teachers’ progress toward EPL goals; (e) valuing teachers’ relative expertise regarding students’ learning trajectories; and (f) adapting the model to meet individual teacher needs and schedules as well as their own styles of facilitation.
Enhancing data literacy among ML facilitators and teachers. Within the context of contemporary EPL, both ML facilitators and teachers require data literacy to construct and use practice-based evidence to inform and demonstrate impacts of EPL (Campbell et al., 2017; LaPointe-McEwan et al., 2017). However, research consistently points to limited data literacy (i.e., the ability to collect, analyze, and use data) among educators (e.g., Campbell & Levin, 2009; Cochran-Smith & Lytle, 2009; DeLuca, Shulha, et al., 2015; LaPointe-McEwan et al., 2017). A key contribution of my research is illustrating how the video-informed feedback model provides a structure that concurrently enhances the data literacy of both ML facilitators and teachers engaged in EPL.

Developing data literacy was particularly important for ML facilitators who were responsible for guiding teachers’ learning. As in previous studies, ML facilitators brought considerable content knowledge and facilitation skills to the model but were less confident using data to support teachers’ learning (e.g., DeLuca, Klinger, et al., 2015; Kennedy et al., 2011; LaPointe-McEwan et al. 2017; Timperley, 2011). The video-informed feedback model helped ML facilitators guide pairs’ purposeful collection and collaborative analysis of relevant classroom data that informed identified EPL goals, with an emphasis on using classroom video as a data source that captured the complexities of classroom teaching and learning processes. Accordingly, pairs were able to co-construct meaningful, practice-based evidence regarding the impacts of EPL on teachers’ practices and students’ learning, a priority in contemporary EPL that is inconsistently realized (Bryk, 2015; Campbell et al., 2017). Moreover, in line with previous research, the collaborative analysis of classroom video within ML facilitator-teacher pairs helped teachers see their teaching and its impacts on students from a new perspective, trust the feedback they received from ML facilitators, feel accountable to changing their practice, and
recognize their progress toward EPL goals over time (Major & Watson, 2017; Tripp & Rich, 2012).

The findings of this study extend previous research on classroom video analysis (CVA) in EPL by highlighting the value of triangulating classroom video with student work during ML facilitator-teacher pairs’ feedback dialogues. CVA studies typically focus on the analysis of video in isolation (e.g., Charteris & Smardon, 2013; Dobie & Anderson, 2015); however, triangulating classroom video with student work enabled more equal contributions of ML facilitators and teachers during dialogues, with both offering important insights and suggestions regarding next steps for teachers and students. Moreover, triangulating classroom video with student work helped both ML facilitators and teachers understand the dynamic processes that students used to complete the work because they were able to watch video clips of students engaged in the work. This allowed pairs to determine more precise next steps for teachers and students that would not have been possible through the analysis of video or student work in isolation.

**Challenges with the Video-Informed Feedback Model**

Although the video-informed feedback model supported ML facilitation of teachers’ EPL and enhanced the data literacy of both ML facilitators and teachers, two challenges to ML facilitator-teacher pairs’ engagement in the model were also evident: (a) teachers relied on ML facilitator support and (b) ML facilitators relied on researcher support. These challenges highlight potentially important implementation issues associated with EPL models rooted in social constructivism.

**Teachers relied on ML facilitator support.** First, teachers relied on direct ML facilitator support to engage in all aspects of the video-informed feedback model. Without ML
facilitator support, teachers would not have strategically aligned their goals with broader school and system goals because teachers were most aware of and connected to classroom goals (micro) compared to school (meso) and system (macro) goals—confirming previous findings regarding teachers’ goal-setting in EPL and highlighting an underlying challenge in systemic EPL initiatives (e.g., Butler & Schnellert, 2013; DeLuca, Shulha, et al., 2015; Harrison, 2013; LaPointe-McEwan et al, 2017). Moreover, despite ML facilitators’ support of teachers’ goal-setting, teachers’ goals for themselves tended to be relatively broad in comparison to teachers’ goals for their students. This may be because teaching is considered a complex profession and therefore does not focus on developing specific competencies (e.g., Bruce et al, 2010; DeLuca, Klinger, et al., 2015; McCollum et al., 2011), making precise EPL goals for teachers more challenging to articulate and achieve. This may also reflect that teachers were more familiar with articulating student goals because student goals were connected to explicit curriculum expectations.

Teachers also relied on ML facilitators’ scaffolded and responsive support to engage in all other aspects of the video-informed feedback model—classroom implementation, feedback seeking, and feedback dialogues. While scaffolded ML facilitator support enables teachers’ engagement in EPL and is an important feature of contemporary EPL approaches (Avalos, 2011; DeLuca, Klinger, et al., 2015; van den Berg et al., 2015), these findings suggest that it may be important to provide a mechanism to gradually remove this scaffolding in order for teachers become more independent and self-regulated in their learning toward EPL goals. Moving teachers toward self-regulated learning is necessary in the current context of EPL because systems do not have the financial or human resources to provide all teachers with consistent, classroom-embedded support from ML facilitators. This points to a limitation of the video-
informed feedback model itself and suggests potential issues with similar socio-constructivist EPL models that presume teachers will self-regulate their EPL efforts when ML facilitators are not available (Dierking & Fox, 2013; Olson et al., 2011; Polly, 2012; Schnellert et al., 2008).

Although teachers did not self-regulate their learning toward EPL goals without direct ML facilitator support, they did continue to support and monitor students’ learning toward identified goals—providing further evidence of the importance of teachers’ setting interrelated goals for themselves and their students to enhance teachers’ engagement in EPL as well as EPL outcomes for both teachers and students (e.g., DeLuca, Klinger, et al., 2015). In supporting students’ learning goals, teachers indirectly continued to focus on their own EPL goals in support of students’ learning because teachers’ and students’ goals were interrelated. However, without ML facilitator support, teachers did not purposefully collect and analyze diverse classroom data to monitor and inform students’ progress toward goals—relying mostly on student products with some observations and conversations but not leveraging classroom video. Although teachers recognized the value of collaborative CVA to support their own learning as well as their students’ learning, they were unsure of how to capture critical teaching and learning moments with video while simultaneously teaching a lesson without ML facilitator support—providing a deeper understanding of the role ML facilitators play in CVA that leverages teachers’ own classroom video (Beiseigel et al., 2018; Major & Watson, 2017)

Moreover, teachers were not comfortable asking peers to support video recording and collaborative video analysis—stating both time constraints and personal readiness as barriers to engaging peers in collaborative video analyses processes. This aligns with previous findings that teachers prefer MKO support of ML facilitators over peer support because ML facilitators support scaffolded knowledge-building, classroom implementation, critical reflection, and
professional dialogue (Dierking & Fox, 2013; Dobie & Anderson, 2015; Santagata, 2009; Sherin & van Es, 2009). However, unlike a great deal of CVA research, these findings suggest that video-based EPL models (e.g., video clubs) that do not leverage ML facilitator support or engage ML facilitators and groups of teachers in CVA (e.g., Arya et al., 2015; Beiseigel et al., 2018; Borko et al., 2008; Charteris & Smardon, 2013) may not be as effective in supporting teachers’ EPL as video-based EPL models that engage ML facilitator-teacher pairs in one-on-one CVA.

Taken together, these findings highlight the critical role of ML facilitators in the video-informed feedback model as well as in the enactment of socio-constructivist EPL models in general. In particular, socio-constructivist EPL models are rooted in the belief that learning is socially mediated and active and situated—occurring through school- and classroom-embedded cycles of activity, reflection, and dialogue among educators (e.g., classroom teachers, support teachers, school administrators, ML facilitators). However, unlike previous studies, this study suggests that teachers may not engage in these cycles without direct support of a MKO (e.g., ML facilitator) and are not likely to seek feedback and support from peers (i.e., colleagues) when MKOs are not available (e.g., DeLuca, Klinger, et al., 2015; Dobie & Anderson, 2015). As such, teachers are not likely to fully engage in a socio-constructivist approach to EPL without direct, consistent MKO facilitation in their context of practice (i.e., school and classroom). These findings are important in light of the substantial investments of time and money in socio-constructivist EPL models that presume teachers will regularly seek out and benefit from opportunities to learn collaboratively and explore the implementation of new practices with colleagues in their schools.

ML facilitators relied on researcher support. In addition to teachers’ reliance on ML facilitators’ support to engage in the video-informed feedback model, ML facilitators also relied
on my support as a researcher to engage in the model. This finding contributes to an emerging body of literature focused on supporting ML facilitators’ practice in order to enhance EPL outcomes (LaPointe-McEwan et al., 2017). Both ML facilitators identified the benefits of the video-informed feedback model in supporting their own facilitation practices as well teachers’ and students’ progress toward identified goals. However, despite their intentions to continue and expand their use of the model after this study was complete, neither continued to implement the model in its entirety. When asked two years following this study to elaborate on why they did not continue with model, ML facilitators explained that the focus of the regional EPL project had shifted away from changing teachers’ practices toward supporting students’ learning in response to new provincial priorities in math education. As such, during ML facilitators’ limited time with teachers in classrooms, they were now focused on collecting and analyzing classroom data, including video, pertaining to students’ learning rather than teachers’ practices. This finding suggests that alignment between research-endorsed approaches and EPL priorities is a fundamental precursor to ML facilitators’ implementation of new facilitation practices with teachers. Furthermore, while focusing on students’ learning within EPL is not a negative, it does suggest that ML facilitators’ personal accountability to me and this study was critical to facilitators’ implementing the video-informed feedback model as a means to support changes in teachers’ practices. It may be that feedback and video, integral aspects of the model, carry potentially evaluative connotations in the context of EPL and would have been challenging for ML facilitators to leverage without external researcher support and endorsement. Or it may be that ML facilitators have limited time with teachers in schools and many competing priorities within their roles, making continued engagement in the video-informed feedback model unfeasible without my direct support moving forward.
Similarly, teachers involved in this study valued the model and planned to continue to use video analysis to support their own learning as well as their students’ learning moving forward—regardless of whether they were involved in the regional project and working with a ML facilitator. While teachers did continue to record video of students to monitor students’ learning toward goals after this study, they did not continue to use video to monitor their own progress toward EPL goals, collaboratively analyze video with ML facilitators, or engage students in the analysis of their own video to self-assess their progress toward goals.

Taken together, these findings confirm the importance of educators’ accountability to EPL goals (Donohoo, 2013; Hattie, 2013; Hargreaves & Skelton, 2015) and highlight the importance of personal accountability between learners and MKOs, whether between teachers and ML facilitators or between students and teachers, when leveraging socio-constructivist EPL models to work toward nested goals. In this study, ML facilitators and I were accountable to each other for implementing the video-informed feedback model with teachers; teachers and ML facilitators were accountable to each other for implementing the model with students; and students and teachers were accountable to each other for using the model to support students’ self-assessment. This personal accountability was enhanced by requiring ML facilitators and teachers to collect and analyze video during implementation of the model because video data itself provided evidence of changes in facilitation practices, instructional practices, and students’ learning (e.g., Major & Watson, 2017; Tripp & Rich, 2012; van Es et al., 2014). After the study was complete, ML facilitators were no longer personally accountable to me—breaking the chain of accountability between MKOs and learners to implement the video-informed feedback model.

It should be noted that, while ML facilitator-teacher pairs did not continue to implement the video-informed feedback model in its entirety beyond their personal accountability to me and
this study, the data literacy that the video-informed feedback model enabled had a lasting impact on both ML facilitators and teachers. This contributes insights into how ML and teachers can develop data literacy needed to construct practice-based evidence within EPL (Kennedy et al., 2011; LaPointe-McEwan et al., 2017). ML facilitators’ enhanced data literacy also extended to their planning with other school-based (meso) and system (macro) educators, enabling purposeful data collection and analysis to inform school and system EPL goals. And although facilitators did not continue to use video to systematically support changes in teachers’ practices, teachers continued to use video to monitor their students’ learning—with and without ML facilitator support. In these ways, the enhanced data literacy that the video-informed feedback model promoted among ML facilitators and teachers appeared to have the most enduring impact beyond this study. This is an important contribution to EPL literature because it demonstrates an EPL focus—data literacy—that is not curriculum-based but has the potential to spread and sustain among educators in schools and systems (Campbell et al., 2017; DeLuca, Klinger et al., 2015; Desimone & Garet, 2015; Hargreaves & Skelton, 2015).

**How Feedback Dialogues between ML Facilitators and Teachers Evolved over Time**

This study offered a unique opportunity to examine how feedback dialogues between ML facilitators and teachers evolved to support EPL over time. To date, empirical studies of the role of feedback in professional learning have been limited to contexts outside of education (e.g., health sciences and business), with feedback only an implicit aspect of contemporary EPL studies and models (e.g., Sargeant et al., 2013; Stone & Heen, 2014). Given the central role of feedback as a driver of learning and performance and the established importance of feedback to support students’ learning (Hattie, 2013), it is long overdue to develop an understanding of how feedback supports educators’ learning in the context of EPL (Campbell et al., 2017).
The assertions of this study illustrate three noteworthy changes in feedback dialogues between ML facilitators and teachers over time: (a) the critical and expanding role of praise; (b) teachers’ responses to feedback within dialogues; and (c) ML facilitator-teacher pairs’ use of data within feedback dialogues. These changes provide a deeper understanding of how feedback operates in the context of embedded, ML-facilitated EPL and how feedback supports teachers’ and students’ progress toward EPL goals.

**The critical and expanding role of praise.** According to the literature, formative (i.e., coaching) feedback is the most effective in supporting a learner’s attainment of goals; especially when it is appropriately scaffolded, timed according to the learner’s needs, and provides specific details that inform the learner’s next steps (Clarke, 2012; Shute, 2008). In contrast, praise is considered to have the least impact on subsequent learning and performance because it simply acknowledges or motivates learning efforts (Black & Wiliam, 2009; Hattie & Timperley, 2007). While my findings do not dispute the critical role of coaching feedback in the context of EPL, this study highlights that the critiques of praise may be overstated in EPL involving ML facilitators and teachers.

In all feedback dialogues, ML facilitators regularly praised teachers’ implementation of new instructional practices (i.e., teachers’ EPL goals), often using classroom video as evidence to support this praise. Although praise from ML facilitators did not provide information regarding teachers’ next steps and was transmissive in nature—considered an ineffective feedback mode (Nicol, 2010)—praise did enhance teachers’ motivation to implement new practices and promoted positive, trusting relationships within pairs. Teachers’ motivation coupled with trusting relationships within pairs enabled subsequent coaching feedback from ML facilitators to teachers regarding instructional practices or students’ learning and helped teachers
integrate this formative feedback. According to Black and Wiliam (2009), feedback is only formative if the learner integrates it and uses it to improve future learning and performance. My findings extend this assertion in the context of EPL by showing how video-informed praise from ML facilitators supported teachers’ openness to integrating and using coaching feedback to improve their practices over time. These findings contradict claims that praise dilutes coaching feedback and has the least impact on subsequent learning and performance (Black & Wiliam, 2009; Hattie & Timperley, 2007) and support Dweck’s (2008) assertion that praise regarding specific performances (i.e., processes) can be an effective driver of learning. In addition, these findings build on Dweck’s position by (a) showing how classroom video supported praise of both teachers’ practices and students’ learning and (b) illustrating that teachers consistently valued video-informed praise over time, not just in the early stages EPL.

Moreover, my findings revealed that teachers also began to contribute praise to feedback dialogues as time progressed. Teachers’ praise was primarily focused on students’ learning progress and followed by teachers’ coaching feedback regarding next steps for students. However, without ML facilitators’ video-informed praise regarding teachers’ practices and students’ learning across all dialogues, teachers might not have been able to praise students’ progress and determine their next steps as effectively. In these ways, video-informed praise from ML facilitators enabled (a) teachers’ integration of ML facilitators’ coaching feedback and (b) teachers’ ability to begin to self-regulate their learning toward EPL goals—both central priorities in EPL that are not consistently realized (Butler & Schnellert, 2012; Dobie & Anderson, 2015; Polly, 2012).

**Teachers’ responses to feedback within dialogues.** This study confirms findings from feedback literature that regular, ongoing feedback from MKOs within feedback dialogues helps
learners close gaps between their current and desired learning and performance (Carless et al., 2011; Nicol & McFarlane-Dick, 2006). My findings extend previous feedback literature by illustrating how teachers became more active contributors to feedback dialogues with ML facilitators over time, elucidating how feedback dialogues with ML facilitators supported teachers’ ability to monitor and self-assess their own progress toward EPL goals.

During the initial dialogues, teachers relied on external feedback from ML facilitators, as MKOs, regarding both their instructional practices and students’ learning. As in previous EPL studies, it was clear that teachers valued ML facilitators’ relative expertise regarding content and strategies endorsed by the regional EPL project and related to their personal EPL goals (e.g., Camburn, 2010; Dierking & Fox, 2013). Similar to feedback literature from outside the context of EPL, feedback dialogues between ML facilitators and teachers in this study were enhanced by trusting relationships (Hauer & Kogan, 2012) as well as by technology (i.e., video) and protocols (Yang & Carless, 2013). Furthermore, my findings illustrate that as teachers became more confident with new learning and strategies and more familiar with their students’ strengths and needs over time, they began to contribute more feedback to dialogues with facilitators. However, this internal feedback from teachers was primarily focused on students’ learning and less frequently on their own practices. As such, teachers continued to rely on ML facilitators’ external feedback, whether praise or coaching, regarding their own progress toward EPL goals.

According to the professional learning literature from other domains, internal feedback is desirable but often inflated and unreliable because it depends on human memory and the learner’s interpretation of past performances (e.g. Eva & Regehr, 2011; Stone & Heen, 2014). My findings illustrate that collaboratively analyzing classroom video with ML facilitator guidance enhanced the accuracy of the internal feedback teachers generated, helping teachers
recognize progress in themselves and their students and identify clear next steps for both (Borko et al., 2008; Gröschner et al., 2014; Tripp & Rich, 2012). Moreover, it is important to note that the internal feedback generated by teachers in this study was never inflated and often underestimated performance, especially their own. This suggests that external feedback from a MKO, supported by performance data in the form of video, may be particularly valuable in the context of EPL in which teachers might be reluctant to acknowledge their own progress toward goals.

**ML facilitator-teacher pairs’ use of data within feedback dialogues.** According to feedback literature, multi-source feedback is a recent trend in professional learning that integrates feedback from self, peer, MKOs, and performance data generated formative feedback that guides learning and progress toward identified goals (Molloy & Boud, 2013; Taylor, 2013). My findings illustrate how ML facilitator-teacher pairs increasingly leveraged multiple sources of feedback over time to enhance and inform dialogues in the context of EPL. In early dialogues, most feedback came from the facilitator, as a MKO, and isolated sources of classroom data (e.g., student work or classroom video). While these dialogues helped ML facilitator-teacher pairs develop trusting relationships and teachers build foundational knowledge, they were not as effective at driving learning forward as later dialogues that leveraged more diverse feedback sources.

In later dialogues, pairs increasingly triangulated multiple sources of feedback, including external feedback from ML facilitators, internal feedback from teachers, and various sources of performance data (e.g., classroom video with student work that was created while the video was recorded) to inform their EPL efforts. The increased triangulation of multiple feedback sources can be attributed to the development of trusting relationships within ML facilitator-teacher pairs,
teachers’ growing confidence with respect to EPL goals and their students’ needs, and the increased data literacy of both ML facilitators and teachers that developed over time through their engagement in the video-informed feedback model. Interestingly, although pairs collaboratively triangulated multiple sources of feedback during later dialogues, each member of the pair primarily generated feedback accordingly to the responsibilities of their role. Specifically, ML facilitators generated feedback focused on teachers’ practice while teachers generated feedback focused on students’ learning. In this way, pairs’ collaborative analysis of multiple feedback sources provided multiple perspectives, both with complementary expertise, which enriched feedback dialogues and informed more detailed next steps for both teachers and students.

It should be noted that classroom video was particularly informative during dialogues because, when triangulated with other feedback sources, it enabled feedback focused on teachers’ and students’ processes and self-regulation. According to feedback literature, process and self-regulation feedback have the greatest impact on current and subsequent learning because these foci provide information that can be generalized across learning situations (Black & Wiliam, 2009; Hattie & Timperley, 2007). My study confirmed these findings in the context of EPL, illustrating how video allowed pairs to (a) collaboratively reflect on processes, including teachers’ implementation of instructional strategies and students’ engagement in lessons or tasks; and (b) identify next steps for both teachers and students. Taken together, these findings suggest that an explicit focus on multi-source feedback has potential to support Bryk’s (2015) call for educators to more effectively construct and use practice-based evidence within EPL.
Implications for Practice

This research points to three implications for practice with respect to embedded, ML-facilitated EPL, in particular the needs to: (a) support both ML facilitators’ and teachers’ learning and practice; (b) prioritize data literacy and the co-construction of practice-based evidence among ML facilitators and teachers; and (c) reconceptualize video-informed feedback dialogues as evidence-informed learning dialogues.

Support both ML facilitators’ and teachers’ learning and practice. Contemporary socio-constructivist EPL models are rooted in the belief that learning occurs through ongoing, socially-mediated cycles that are active and situated in the educator’s context of practice and facilitated by ML facilitators acting as MKOs. The findings of this study suggest that teachers engaged in socio-constructivist approaches to EPL rely heavily on ML facilitation of their learning and are not likely to systematically implement new instructional practices with students, collect and analyze classroom data to inform EPL, or leverage peer feedback to support their learning when ML facilitators are not available. Therefore, if socio-constructivist EPL models are to have desired impacts on teachers’ instructional practices, it will be necessary for teachers to have ongoing, classroom-embedded learning opportunities with a ML facilitator, acting as a MKO, who can encourage and support teachers’ implementation of new practices. This support should entail: (a) collaboratively identifying and refining teachers’ personal EPL goals that reflect teachers’ needs and interests as well as broader systemic priorities; (b) setting interrelated goals for teachers and students; (c) a sustained focus on teachers’ EPL goals for at least one school year; (d) regular intervals of classroom-embedded time for ML facilitators and teachers to explore implementation of instructional strategies together; and (e) opportunities for ML facilitators and teachers to collect and analyze relevant classroom data to inform progress and
next steps in EPL. Given demands on all educators’ time, this embedded support from ML facilitators might occur two or three times per school year and should be flexible to accommodate teachers’ availability to the extent possible, fostering teachers’ personal accountability to ML facilitators for implementing new practices in their classrooms. It is important to recognize that ML facilitators require parallel supports to enhance their facilitation practices, which might be achieved through personal accountability to an external MKO (e.g., research partner or content expert) who supports ML facilitators’ learning and practice. Without sustained, embedded external MKO support of teachers’ and ML facilitators’ learning and practice, socio-constructivist EPL models are not likely to achieve desired impacts on instructional practices and students’ learning.

**Prioritize data literacy and the co-construction of practice-based evidence among ML facilitators and teachers.** In embedded, ML-facilitated EPL, ML facilitators are recognized or relative experts in the EPL focus and the facilitation of adult learning. However, this study highlights the importance of supporting the data literacy of both ML facilitators and teachers to enable the co-construction of practice-based evidence to inform EPL efforts. Embedded and scaffolded support from a research partner over a sustained period of time can help both ML facilitators and the teachers they support develop the data literacy required to purposefully collect and analyze relevant classroom data (e.g., student products, observations, conversations). Research partners can also encourage ML facilitators and teachers to systematically leverage more diverse data sources to inform EPL, including classroom video, that they may not feel confident exploring on their own. Purposefully collected classroom video captures observations and conversations of both teachers’ practices and students’ learning. When triangulated with students’ paper-pencil products, video reveals the complex processes that underpinned the
creation of these products. Research partners can play a vital role in helping ML facilitators and teachers become more confident in triangulating multiple classroom data sources, including video, during collaborative data analysis in order to inform both teachers’ and students’ progress toward their identified goals within EPL. While continued researcher support may be necessary if ML facilitators and teachers are using video to support changes in teachers’ practices, it seems that once ML facilitators and teachers have developed sufficient data literacy, they can use classroom video in conjunction with other classroom data sources to co-construct practice-based evidence of students’ learning without direct researcher support.

**Reconceptualize video-informed feedback dialogues as evidence-informed learning dialogues.** In the current context of EPL, feedback and classroom video are rarely discussed explicitly nor systematically leveraged to support changes in teachers’ practices, likely due to the potentially evaluative connotations associated with both. However, if EPL initiatives are to realize desired impacts on instructional practices and associated student outcomes, it may be necessary to reframe both feedback and video as positive, constructive supports of embedded, ML-facilitated EPL. Explicitly leveraging multiple sources of feedback, including classroom video, within dialogues enables ML facilitator-teacher pairs to co-construct practice-based evidence of changes in teachers’ practices and students’ learning. Moreover, video-informed praise from ML facilitators to teachers regarding changes in teachers’ practices or students’ learning can be an essential precursor to ML facilitators’ coaching feedback and teachers’ self-regulation toward EPL goals. However, despite the empirically-supported benefits associated with video-informed feedback dialogues in embedded, ML-facilitated EPL demonstrated through this study, it may be important to reconceptualize these dialogues as evidence-informed learning dialogues and focus these dialogues on students’ progress toward learning goals. In doing so,
more teachers may be willing to engage in these dialogues and ML facilitators may be more
comfortable promoting evidence-informed learning dialogues with teachers because this
designation does not directly reference ‘feedback’ and ‘video.’ Moreover, the conceptualization
of evidence-informed learning dialogues may better reflect the fact that ML facilitators and
teachers bring relative expertise to these dialogues and that evidence of students’ learning may
come from various data sources, not only classroom video.

Limitations and Implications for Future Research

The findings of this research emerged from a qualitative multiple case study involving
two cases of embedded, ML-facilitated EPL. Both cases were situated within a broader, regional
EPL initiative that engaged educators from nine DSBs in Eastern Ontario in math-based EPL
funded by the Ontario Ministry of Education. The two ML facilitators and five teachers who
participated in this research represented two rural DSBs involved in this regional project and
were purposefully selected based on their interest in exploring the use of classroom video to
support EPL. Moreover, I had previously established trusting relationships with the two ML
facilitators through my role as a research partner in the regional EPL project. This ongoing
collaboration in the regional project helped to create strong trust and was likely a factor in my
ability to engage these educators in the current study. The presence of a pre-existing relationship
may serve as a limitation for the transferability of my findings to other ML-facilitated, embedded
EPL initiatives in which such pre-existing collaborations are not present. In addition, all teachers
who participated in this study represented the junior division (i.e., Grades 4-6). As such, findings
may not transfer to teachers of lower or higher grade levels. Furthermore, all educator participants
were open to exploring the use of classroom video to support EPL; therefore, findings may not
transfer to educators who are reluctant to leverage classroom video in EPL.
Despite the limitations of this study, the findings suggest important directions for future EPL research. First and foremost, it is imperative that researchers continue to work toward developing a theory of how educators learn through EPL. In particular, this study suggests challenges associated with the implementation of socio-constructivist approaches to systemic EPL—especially beyond the classroom (micro) context—and implicates future research that uses grounded theory methods to develop a deeper understanding of how educators learn within and across micro, meso, and macro levels of complex educational systems. Moreover, it may be beneficial to explore EPL through different theoretical lenses (e.g., self-regulation) or empirically-supported pedagogical approaches (e.g., strategic alertness).

However, given the (a) widespread implementation of the ML facilitator strategy in contemporary EPL and (b) increasing prioritization of practice-based evidence within EPL, additional studies are also needed to further explore how video-informed feedback supports embedded, ML-facilitated EPL. In pursuing this line of research, it will be important to explore educators’ experiences with video-informed feedback models in different contexts (e.g., larger DSBs or DSBs outside Eastern Ontario), in content areas outside of math, with larger samples of ML facilitators and teachers engaged in embedded EPL, and through studies in which the research partner is not also the researcher. Furthermore, it may be useful to explore how video-informed feedback models—and other multi-source feedback models that prioritize diverse classroom data—can be leveraged to support, spread, and sustain EPL across classrooms, schools, and systems. Finally, it may be valuable to explore the notion of evidence-informed learning dialogues that leverage classroom video, in conjunction with other classroom data sources, to support teachers’ and students’ progress toward learning goals through dialogues among (a) ML facilitators and teachers, (b) groups of teachers, and (c) teachers and students.
Concluding Remarks

To enhance the outcomes of embedded, ML-facilitated EPL models and initiatives, it is critical to understand how ML facilitators support teachers’ learning within EPL—in particular, how ML facilitators and teachers leverage (a) empirically-supported feedback practices to support teachers’ and students’ learning and (b) diverse classroom data, including video, to co-construct and use practice-based evidence to inform EPL. This research explored how video-informed feedback supported embedded EPL between ML facilitators and teachers. Key contributions of this research include my conceptual feedback model of embedded, ML-facilitated EPL as well as highlighting the importance of: (a) MKO support of both ML facilitators’ and teachers’ learning and practices—especially their data literacy; (b) setting and working toward interrelated goals for teachers and students to enhance EPL outcomes; (c) explicitly leveraging multi-source feedback models that incorporate diverse classroom data, including video, to help ML facilitators and teachers co-construct practice-based evidence to inform EPL; and (d) video-informed praise from ML facilitators to teachers which enables ML facilitators’ subsequent coaching feedback and teachers’ self-regulation. This study also suggests the potential of reconceptualizing video-informed feedback dialogues as evidence-informed learning dialogues to expand and enhance educators’ engagement in this socio-constructivist approach to EPL and enhance EPL outcomes for teachers and students.

In conclusion, this study highlights the importance of trusting professional relationships coupled with a focus on diverse sources of practice-based evidence to enable meaningful, constructive dialogues in the context of embedded, ML-facilitated EPL and to support desired outcomes for educators and students. Practice-based evidence that includes classroom video can provide not only a focus of attention within professional dialogues but also a means through
which trusting relationships among educators can develop. Cultivating these trusting relationships through a focus on practice-based evidence within professional dialogues is critical to supporting desired outcomes among educators and students through embedded, ML-facilitated EPL opportunities.
References


## Appendix A: Review of EPL Literature

**Key:**

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<tr>
<th>Educator Professional Learning Model (EPL Model)</th>
<th>Focus of Feedback (FB Focus)</th>
<th>Source of Feedback (FB Source)</th>
<th>Mode of Feedback (FB Mode)</th>
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<tr>
<td>Collaborative Inquiry (CI)</td>
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<td>Self</td>
<td>TR = Transmissive</td>
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<td>Coaching</td>
<td>Task</td>
<td>Peer</td>
<td>D = Dialogic</td>
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<td>Process</td>
<td>More knowledgeable-other (MKO)</td>
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### Empirical EPL Studies Reviewed in Chapter 2

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<th>Research Methodology and/or Approach</th>
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<td>Dierking, R. C., &amp; Fox, R. F.</td>
<td>2013</td>
<td>“Changing the Way I Teach”: Building teacher knowledge, confidence, and autonomy.</td>
<td><em>Journal of Teacher Education</em>, 64(2), 129–144.</td>
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Appendix B: General Research Ethics Board Approval Letters

July 15, 2015

Ms. Danielle LaPointe  
Ph.D. Candidate  
Faculty of Education  
Queen's University  
Duncan McArthur Hall  
511 Union Street West  
Kingston, ON, K7M 5R7

GREB Romeo #: 6013195  
Title: "GEDUC-735-14 Supporting Formative Assessment of Teacher Practice through Classroom Video Analysis"

Dear Ms. LaPointe:

The General Research Ethics Board (GREB) has reviewed and approved your request for renewal of ethics clearance for the above-named study. This renewal is valid for one year from August 1, 2015. Prior to the next renewal date you will be sent a reminder memo and the link to ROMEO to renew for another year.

You are reminded of your obligation to advise the GREB of any adverse event(s) that occur during this one year period. An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours. Report to GREB through either ROMEO Event Report or Adverse Event Report Form at http://www.queensu.ca/orc/researchethics/GeneralREB/forms.html.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes in study procedures or implementation of new aspects into the study procedures. Your request for protocol changes will be forwarded to the appropriate GREB reviewers and/or the GREB Chair. Please report changes to GREB through either ROMEO Event Reports or the Ethics Change Form at http://www.queensu.ca/orc/researchethics/GeneralREB/forms.html.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

Joan Stevenson, Ph.D.  
Chair  
General Research Ethics Board

c.: Dr. Don Klinger, Faculty Supervisor  
Dr. Liying Cheng, Chair, Unit REB  
Ms. Erin Wickham, c/o Graduate Studies and Bureau of Research
August 09, 2016

Ms. Danielle LaPointe  
Ph.D. Candidate  
Faculty of Education  
Duncan McArthur Hall  
Queen's University  
511 Union Street West  
Kingston, ON, K7M 5R7

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Dear Ms. LaPointe:

The General Research Ethics Board (GREB) has reviewed and approved your request for renewal of ethics clearance for the above-named study. This renewal is valid for one year from August 1, 2016. Prior to the next renewal date you will be sent a reminder memo and the link to ROMEO to renew for another year. You are reminded of your obligation to submit an Annual Renewal/Closure Form prior to the annual renewal due date (access this form at [http://www.queensu.ca/traq/signon.html](http://www.queensu.ca/traq/signon.html); click on "Events"; under "Create New Event" click on "General Research Ethics Board Annual Renewal/Closure Form for Cleared Studies"). Please note that when your research project is completed, you need to submit an Annual Renewal/Completed Form in Romeo/traq indicating that the project is 'completed' so that the file can be closed. This should be submitted at the time of completion; there is no need to wait until the annual renewal due date.

You are reminded of your obligation to advise the GREB of any adverse event(s) that occur during this one year period. An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours. To submit an adverse event report, access the application at [http://www.queensu.ca/traq/signon.html](http://www.queensu.ca/traq/signon.html); click on "Events"; under "Create New Event" click on "General Research Ethics Board Adverse Event Form".

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example, you must report changes in study procedures or implementation of new aspects into the study procedures. Your request for protocol changes will be forwarded to the appropriate GREB reviewers and/or the GREB Chair. To submit an amendment form, access the application at [http://www.queensu.ca/traq/signon.html](http://www.queensu.ca/traq/signon.html); click on "Events"; under "Create New Event" click on "General Research Ethics Board Request for the Amendment of Approved Studies".

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

John D. Freeman, Ph.D.  
Chair, General Research Ethics Board

c.: Dr. Don Klinger, Supervisor  
Dr. Richard Reeve, Chair, Unit REB  
Ms. Erin Wicklam, Dept. Admin.
Appendix C: Pilot Study Letters of Information/Consent Forms

LETTER OF INFORMATION/CONSENT FORM for FOCAL TEACHERS

This research is being conducted by Dr. Don A. Klinger and Danielle LaPointe (PhD student) of the Faculty of Education at Queen’s University in Kingston, Ontario. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines and Queen’s policies and approved by the [insert name] District School Board.

What is this study about? Effective professional learning is critical to building teacher knowledge, enhancing instructional practice, and improving valued student outcomes. Classroom video analysis (CVA), the process of recording and analyzing video of one’s own teaching practice, is a powerful method that supports the transfer of professional learning to professional practice and captures the complexity of classroom teaching. Classroom video provides a rich data source on which educators can base self- and peer-assessments of instructional practice. Furthermore, collaboratively analyzing classroom video supports purposeful dialogue among educators focused on refining and expanding practice goals. When video is analyzed and discussed by a learner/mentor pair in a professional learning context (a) the learner’s transfer of learning to practice is accelerated, and (b) the mentor develops and refines strategies to effectively encourage change among learners.

Consequently, the purpose of this study is to pilot a cycle of CVA that leverages self- and peer-assessment between learner/mentor educator pairs to support the transfer of professional learning to professional practice.

What will this study require? You will be asked to engage in 8 iterations of the CVA Cycle throughout the school year (approximately one per month Oct-May) with a self-selected colleague to fulfill the role of your more knowledgeable-other peer (e.g., teacher leader, administrator, program facilitator). In each iteration of the CVA Cycle, you will: (1) create an assessment matrix with 3 to 5 instructional practice goals grounded in your recent professional learning, (2) videotape 5 to 10 minutes of your classroom practice, (3) use your matrix to self-assess your video, (4) share your video with the more knowledgeable-other peer so he/she can complete a peer-assessment of your video clip using your matrix, (5) meet with your more knowledgeable-other peer to engage in purposeful dialogue (10-15 minutes) regarding your instructional practice goals and refine your matrix for the next iteration. After each iteration of the CVA Cycle, you will complete a brief reflection log. In addition, you will complete a short questionnaire at the beginning, middle, and end of the study. At the mid- and end-points of the study, you will participate in a brief (30 minute) group interview with your more knowledgeable-other peer. With your permission, the group interview will be audio-taped. Assessment matrices, reflection logs, questionnaires, and interview recordings will be included as data. The results will be used to support our research. At no time, will these results be used in any way to monitor teacher performance. Your classroom video will not be collected as data in this study; classroom video will only be used by you and your more knowledgeable-other peer to support the completion of assessment matrices.

Is participation voluntary? Your participation is completely voluntary and choosing not to participate will not result in any adverse consequences. There are no known physical, psychological, economic, or social risks associated with this study. Further, you are free to choose, without reason or consequence, to refuse to answer any questions or withdraw from the study at any time.
What will happen to my responses? Assessment matrices, reflection logs, and questionnaires completed by you and your more knowledgeable-other peer will be transferred to electronic files. The group interview recordings will be transcribed after which the recording will be destroyed. All electronic files will be password protected. Paper and audio data will be secured in a locked cabinet. A pseudonym will replace your name on all data files to protect your identity. Comments you make may be used to inform our work but at no time will your name or personal information be used or published. Thus we will protect your confidentiality to the extent possible. The data will be used to inform our research. Only the researchers will have access to the data. We may also publish or present our findings in professional or academic journals and conferences. In accordance with the Queen’s University policy, we will maintain copies of the transcripts for a minimum of 5 years and may use the anonymous data in subsequent research.

What if I have concerns? Any questions about study participation may be directed to the principal researcher Dr. Don Klinger at (613) 533-3028 or at don.klinger@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or (613) 533-6081.

Again, thank you. Your interest in participating in this research study is greatly appreciated. Please sign the below indicating your willingness to participate in this research. Please retain the second copy of this letter for your records.

I am willing to participate in the CVA Cycle study for the purposes of the research, and have my comments recorded.

Please sign one copy of this LOI/Consent Form and return to Dr. Don A. Klinger or Danielle LaPointe. Retain the second copy for your records.

I have read the above statements and had any questions answered. I freely consent to participate in this study.

Participant’s Signature: ___________________________________________________________

Date: ___________________________________
LETTER OF INFORMATION/CONSENT FORM
for MORE KNOWLEDGEABLE-OTHERS

This research is being conducted by Dr. Don A. Klinger and Danielle LaPointe (PhD student) of the Faculty of Education at Queen’s University in Kingston, Ontario. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines and Queen’s policies and approved by the [insert name] District School Board.

What is this study about? Effective professional learning is critical to building teacher knowledge, enhancing instructional practice, and improving valued student outcomes. Classroom video analysis (CVA), the process of recording and analyzing video of one’s own teaching practice, is a powerful method that supports the transfer of professional learning to professional practice and captures the complexity of classroom teaching. Classroom video provides a rich data source on which educators can base self- and peer-assessments of instructional practice. Furthermore, collaboratively analyzing classroom video supports purposeful dialogue among educators focused on refining and expanding practice goals. When video is analyzed and discussed by a learner/mentor pair in a professional learning context (a) the learner’s transfer of learning to practice is accelerated, and (b) the mentor develops and refines strategies to effectively encourage change among learners.

Consequently, the purpose of this study is to pilot a cycle of CVA that leverages self- and peer-assessment between learner/mentor educator pairs to support the transfer of professional learning to professional practice.

What will this study require? You will be asked to engage in 8 iterations of the CVA Cycle throughout the school year with a focal teacher who has invited you to fulfill the role of his/her more knowledgeable-other peer. In each iteration of the CVA Cycle, you will: (1) view the focal teacher’s 5 to 10 minute video clip of his/her instructional practice, (2) use the focal teacher’s assessment matrix to complete a peer-assessment of his/her video clip, (3) meet with the focal teacher to engage in purposeful dialogue regarding his/her instructional practice goals and help the focal teacher refine your matrix for the next iteration. After each iteration of the CVA Cycle, you will complete a brief reflection log. In addition, you will complete a brief questionnaire at the beginning, middle, and end of the study. At the mid- and end-points of the study, you will participate in a brief (30 minute) group interview with your focal teacher partner. With your permission, the group interview will be audio-taped. Assessment matrices, reflection logs, questionnaires, and interview recordings will be included as data. The results will be used to support our research. At no time, will these results be used in any way to monitor teacher performance. The focal teacher’s classroom video will not be collected as data in this study; classroom video will only be used by you and your focal teacher partner to support the completion of assessment matrices.

Is participation voluntary? Your participation is completely voluntary and choosing not to participate will not result in any adverse consequences. There are no known physical, psychological, economic, or social risks associated with this study. Further, you are free to choose, without reason or consequence, to refuse to answer any questions or withdraw from the study at any time.

What will happen to my responses? Assessment matrices, reflection logs, and questionnaires completed by you and your focal teacher partner will be transferred to electronic files. The group
interview recordings will be transcribed after which the recording will be destroyed. All electronic files will be password protected. Paper and audio data will be secured in a locked cabinet. A pseudonym will replace your name on all data files to protect your identity. Comments you make may be used to inform our work but at no time will your name or personal information be used or published. Thus we will protect your confidentiality to the extent possible. The data will be used to inform our research. Only the researchers will have access to the data. We may also publish or present our findings in professional or academic journals and conferences. In accordance with the Queen’s University policy, we will maintain copies of the transcripts for a minimum of 5 years and may use the anonymous data in subsequent research.

**What if I have concerns?** Any questions about study participation may be directed to the principal researcher Dr. Don Klinger at (613) 533-3028 or at don.klinger@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or (613) 533-6081.

Again, thank you. Your interest in participating in this research study is greatly appreciated. Please sign the below indicating your willingness to participate in this research. Please retain the second copy of this letter for your records.

I am willing to participate in the CVA Cycle study for the purposes of the research, and have my comments recorded.

**Please sign one copy of this LOI/Consent Form and return to Dr. Don A. Klinger or Danielle LaPointe. Retain the second copy for your records.**

I have read the above statements and had any questions answered. I freely consent to participate in this study.

Participant’s Signature: _______________________________________________________

Date: __________________________
Appendix D: Pilot Study Data Collection Protocols

Pilot Study: Focal Teacher Pre-Questionnaire

1. How might classroom video analysis (CVA) support your professional learning and practice?
2. How might classroom video provide authentic data around instructional practice and classroom learning?
3. What potential challenges do you foresee with engaging in the CVA Cycle?
4. If there was one thing you would like to see happen as a result of this study, what would it be?
5. Demographic Information
   a. Current grade placement
   b. Total years teaching experience
   c. Current professional learning involvement
   d. Total experience with classroom video analysis

Pilot Study: Focal Teacher Post-Questionnaire

1. Describe how the CVA Cycle has impacted your professional learning and practice.
2. How has this impact changed over the course of the school year?
3. How has engaging in the CVA Cycle impacted your thinking about the use of video in professional learning and practice?
4. Describe the most significant challenges you have faced engaging in the CVA Cycle and, if appropriate, how you overcame them.
5. How might the CVA Cycle be changed to better support professional learning and practice?
6. What 5 words would you use to describe the CVA Cycle?
7. Would you recommend the CVA Cycle to colleagues engaged in professional learning? Why or why not?
Pilot Study: More Knowledgeable-Other Pre-Questionnaire

1. How might classroom video analysis (CVA) help you support the professional learning and practice of your teacher colleagues?
2. What potential challenges do you foresee with engaging in cycles of CVA?
3. If there was one thing you would like to see happen as a result of your participation in this study, what would it be?
4. Demographic Information
   a. Current role
   b. Total years in role
   c. Current professional learning involvement
   d. Total experience with classroom video analysis

Pilot Study: More Knowledgeable-Other Post-Questionnaire

1. Describe how eight cycles of CVA have impacted your ability to support the professional learning and practice of the focal teacher(s) you have been working with.
2. How has this impact changed over the course of the school year?
3. How has engaging in the CVA Cycle impacted your thinking about the use of video in professional learning and practice?
4. Describe the most significant challenges you have faced engaging in the CVA Cycle and, if appropriate, how you overcame them.
5. How might the CVA Cycle be changed to better support professional learning and practice?
6. What 5 words would you use to describe the CVA Cycle?
7. Would you recommend the CVA Cycle to colleagues engaged in professional learning? Why or why not?
Pilot Study: Dyadic Interview Questions

Questions for Focal Teacher and More Knowledgeable-Other at End-Point of the Pilot Study:

1. a) How has your experience with the CVA Cycle changed over time?
   b) Which aspects of the CVA Cycle were most valuable to (best supported) your learning and/or practice as the focal teacher?
   c) Which aspects of the CVA Cycle were most valuable to (best supported) you in your role as the more knowledgeable-other?

2. How have your professional relationship and feedback processes changed over time as a result of engaging in the CVA Cycle?

3. Talk to me about challenges you have faced engaging in the CVA cycle?

4. What advice would you give to educators considering engaging in the CVA Cycle?

5. Would you continue to engage in the CVA Cycle beyond this study? Why or why not?
Pilot Study: Focal Teacher Self-Assessment Matrix

<table>
<thead>
<tr>
<th>Name:</th>
<th>More Knowledgeable-Other’s Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lesson date:</th>
<th>Length of video (5-10min):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lesson focus:

Please indicate 3 to 5 instructional practice goals to guide this iteration of the CVA Cycle. Use this matrix to self-assess the 5-10 minute video clip or your instructional practice that you record.

<table>
<thead>
<tr>
<th>Practice Goal #1</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Practice Goal #2</th>
<th>Rarely</th>
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<th>Often</th>
<th>Always</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Practice Goal #3</th>
<th>Rarely</th>
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<th>Often</th>
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</table>

<table>
<thead>
<tr>
<th>Practice Goal #4</th>
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</table>

<table>
<thead>
<tr>
<th>Practice Goal #5</th>
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<th>Always</th>
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</table>

Other notes:
Pilot Study: More Knowledgeable-Other Assessment Matrix

<table>
<thead>
<tr>
<th>Name:</th>
<th>Focal Teacher’s Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson date:</td>
<td>Length of video (5-10min):</td>
</tr>
<tr>
<td>Lesson focus:</td>
<td></td>
</tr>
</tbody>
</table>

Please record the focal teacher’s 3 to 5 instructional practice goals guiding this iteration of the CVA Cycle to on this matrix. Use this matrix to provide a more knowledgeable-other assessment of the 5-10 minute video clip or the focal teacher’s instructional practice.

<table>
<thead>
<tr>
<th>Practice Goal #1</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Goal #2</td>
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<tr>
<td>Practice Goal #5</td>
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</tbody>
</table>

Other notes:
Pilot Study: Focal Teacher Reflection Log

<table>
<thead>
<tr>
<th>Name:</th>
<th>More Knowledgeable-other’s Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson date:</td>
<td>Length of video (5-10min):</td>
</tr>
</tbody>
</table>

Lesson focus:

*Please rate the extent to which of each phase of this iteration of the CVA Cycle supported you in working toward your practice goals.*

<table>
<thead>
<tr>
<th>Phase</th>
<th>Not at all</th>
<th>Very little</th>
<th>Somewhat</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating the assessment matrix</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Videotaping your lesson</td>
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<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Completing the self-assessment matrix</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Receiving the more knowledgeable-other assessment of your video</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Engaging in purposeful dialogue with your more knowledgeable-other</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Refining the assessment matrix with your more knowledgeable-other</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

*Please add additional comments regarding benefits and/or challenges associated with each phase of the CVA Cycle.*

Creating your matrix:

Videotaping your lesson:

Completing the self-assessment matrix:

Receiving the more knowledgeable-other assessment:

Engaging in purposeful dialogue with your more knowledgeable-other:

Refining the assessment matrix with your more knowledgeable-other:

*Please provide any additional insights or feedback regarding your experience with this iteration of the CVA Cycle on the reverse side.*
Pilot Study: More Knowledgeable-other Reflection Log

<table>
<thead>
<tr>
<th>Name:</th>
<th>Focal Teacher’s Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson date:</td>
<td>Length of video (5-10 min):</td>
</tr>
<tr>
<td>Lesson focus:</td>
<td></td>
</tr>
</tbody>
</table>

Please rate the extent to which each phase of this iteration of the CVA Cycle contributed to your ability to support the teacher in working toward his/her practice goals.

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Very little</th>
<th>Somewhat</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Completing the more knowledgeable-other assessment matrix</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Sharing your more knowledgeable-other assessment matrix with the focal teacher</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Engaging in purposeful dialogue with the focal teacher</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Refining the assessment matrix with the focal teacher</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Please add additional comments regarding benefits and/or challenges associated with each phase of the CVA Cycle.

Reviewing the videotaped lesson:

Completing the more knowledgeable-other assessment matrix:

Sharing your more knowledgeable-other assessment matrix with the focal teacher:

Engaging in purposeful dialogue with the focal teacher:

Refining the assessment matrix with the focal teacher:

Please provide any additional insights or feedback regarding your experience with this iteration of the CVA Cycle on the reverse side.
Appendix E: Current Study Letters of Information/Consent Forms

Exploring how Video-informed Feedback Supports Embedded Educator Professional Learning between Facilitators and Teachers

LETTER OF INFORMATION/CONSENT FORM for TEACHERS

This research is being conducted by Dr. Don A. Klinger and Danielle LaPointe (PhD student) of the Faculty of Education at Queen’s University in Kingston, Ontario. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines and Queen’s policies and approved by the [insert name] District School Board.

What is this study about? Effective professional learning is critical to building teacher knowledge, enhancing instructional practice, and improving valued student outcomes. Classroom video analysis (CVA), the process of recording and analyzing video of one’s own teaching practice, is a powerful method that supports the transfer of professional learning to professional practice and captures the complexity of classroom teaching. Classroom video provides a rich data source to inform professional learning efforts. Furthermore, collaboratively analyzing classroom video with colleagues supports purposeful dialogue focused on refining and expanding professional learning goals. When video is analyzed and discussed by a learner and more knowledgeable-other pair in a professional learning context (a) the learner’s transfer of learning to practice is accelerated, and (b) the more knowledgeable-other develops and refines strategies to effectively support change among learners.

Consequently, the purpose of this study is to explore educators’ experiences with a professional learning model that leverages classroom video, in conjunction with other sources of classroom data, as feedback to inform professional dialogue between educator pairs and support the professional learning and professional practice of both teachers and facilitators.

What will this study require? You will be asked to engage in 4 iterations of the professional learning cycle (December through April) with your school board designated facilitator. In each iteration of the cycle, you will: (1) set an instructional practice goal with your facilitator, grounded in your recent professional learning and recorded on the protocol provided, (2) implement your goal in the classroom and collect relevant data sources, including classroom video, (3) discuss and interpret the data with your facilitator (approximately 15 minutes), and (4) determine next steps in your professional learning and practice with your facilitator. With your permission, each discussion with your facilitator will be audio-recorded. In addition, you will complete a short questionnaire at the beginning and end of the study. At the end of the study, you also will participate in a brief (30 minute) group interview with your facilitator. With your permission, the group interview will be audio-recorded. Your protocols, audio-recorded discussions, questionnaires, and interview recordings will be included as data. The results will be used to support this research. At no time, will these results be used in any way to monitor teacher performance. Your classroom video will not be collected as data in this study; classroom video will only be used by you and your facilitator to support your professional learning and practice.

Is participation voluntary? Your participation is completely voluntary and choosing not to participate will not result in any adverse consequences. There are no known physical, psychological, economic, or social risks associated with this study. Further, you are free to choose,
without reason or consequence, to refuse to answer any questions or withdraw from the study at any time.

**What will happen to my responses?** Protocols and questionnaires will be transferred to electronic files. Each audio-recorded discussion with your facilitator will be listened to in order to make notes of key ideas, then destroyed. The group interview recordings will be transcribed after which the recording will be destroyed. All electronic files will be password protected. Paper and audio data will be secured in a locked cabinet. A pseudonym will replace your name on all data files to protect your identity. Comments you make may be used to inform our work but at no time will your name or personal information be used or published. Thus we will protect your confidentiality to the extent possible. The data will be used to inform our research. Only the researchers will have access to the data. We may also publish or present our findings in professional or academic journals and conferences. In accordance with the Queen’s University policy, we will maintain copies of the transcripts for a minimum of 5 years and may use the anonymous data in subsequent research.

**What if I have concerns?** Any questions about study participation may be directed to the principal researcher Dr. Don Klinger at (613) 533-3028 or at don.klinger@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or (613) 533-6081.

Again, thank you. Your interest in participating in this research study is greatly appreciated. Please sign the below indicating your willingness to participate in this research. Please retain the second copy of this letter for your records.

I am willing to participate in this study regarding feedback-driven mediated professional learning for the purposes of the research, and have my comments recorded.

**Please sign one copy of this LOI/Consent Form and return to Dr. Don A. Klinger or Danielle LaPointe. Retain the second copy for your records.**

I have read the above statements and had any questions answered. I freely consent to participate in this study.

Participant’s Signature: ____________________________________________________________

Date: __________________________
Exploring how Video-informed Feedback Supports Embedded Educator Professional Learning between Facilitators and Teachers

LETTER OF INFORMATION/CONSENT FORM for FACILITATORS

This research is being conducted by Dr. Don A. Klinger and Danielle LaPointe (PhD student) of the Faculty of Education at Queen’s University in Kingston, Ontario. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines and Queen’s policies and approved by the [insert name] District School Board.

What is this study about? Effective professional learning is critical to building teacher knowledge, enhancing instructional practice, and improving valued student outcomes. Classroom video analysis (CVA), the process of recording and analyzing video of one’s own teaching practice, is a powerful method that supports the transfer of professional learning to professional practice and captures the complexity of classroom teaching. Classroom video provides a rich data source to inform professional learning efforts. Furthermore, collaboratively analyzing classroom video with colleagues supports purposeful dialogue focused on refining and expanding professional learning goals. When video is analyzed and discussed by a learner/more knowledgeable-other pair in a professional learning context (a) the learner’s transfer of learning to practice is accelerated, and (b) the more knowledgeable-other develops and refines strategies to effectively support change among learners.

Consequently, the purpose of this study is to explore educators’ experiences with a professional learning model that leverages classroom video, in conjunction with other sources of classroom data, as feedback to inform professional dialogue between educator pairs and support the professional learning and professional practice of both teachers and facilitators.

What will this study require? You will be asked to engage in 4 iterations of the professional learning cycle throughout the school year (December through April) with three classroom teachers. With each teacher in each iteration of the cycle, you will: (1) help the teacher set an instructional practice goals, grounded in recent professional learning (recorded on the provided protocol), (2) help the teacher implement her/his goal in the classroom and collect relevant data sources, including classroom video, (3) discuss and interpret the data with the teacher (approximately 15 minutes), and (4) help the teacher determine next steps in professional learning and practice. With your permission, each discussion with teachers will be audio-recorded. In addition, you will complete a brief questionnaire at the beginning and end of the study. At the end of the study, you will participate in three brief (30 minute) group interviews, one with each teacher. You will also participate in an individual interview (60 minutes) regarding your experiences with the model. With your permission, the group and individual interviews will be audio-recorded. Protocols, audio-recorded discussions, questionnaires, and interview recordings (group and individual) will be included as data. The results will be used to support this research. At no time, will these results be used in any way to monitor teacher performance. Teachers’ classroom video will not be collected as data in this study; classroom video will only be used by you and the associated teacher to support her/his professional learning and practice.

Is participation voluntary? Your participation is completely voluntary and choosing not to participate will not result in any adverse consequences. There are no known physical, psychological, economic, or social risks associated with this study. Further, you are free to choose,
without reason or consequence, to refuse to answer any questions or withdraw from the study at any time.

**What will happen to my responses?** Protocols and questionnaires will be transferred to electronic files. Each audio-recorded discussion with individual teachers will be listened to in order to make notes of key ideas, then destroyed. The group and individual interview recordings will be transcribed after which the recording will be destroyed. All electronic files will be password protected. Paper and audio data will be secured in a locked cabinet. A pseudonym will replace your name on all data files to protect your identity. Comments you make may be used to inform our work but at no time will your name or personal information be used or published. Thus we will protect your confidentiality to the extent possible. The data will be used to inform our research. Only the researchers will have access to the data. We may also publish or present our findings in professional or academic journals and conferences. In accordance with the Queen’s University policy, we will maintain copies of the transcripts for a minimum of 5 years and may use the anonymous data in subsequent research.

**What if I have concerns?** Any questions about study participation may be directed to the principal researcher Dr. Don Klinger at (613) 533-3028 or at don.klinger@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or (613) 533-6081.

Again, thank you. Your interest in participating in this research study is greatly appreciated. Please sign the below indicating your willingness to participate in this research. Please retain the second copy of this letter for your records.

I am willing to participate in this study regarding feedback-driven mediated professional learning for the purposes of the research, and have my comments recorded.

**Please sign one copy of this LOI/Consent Form and return to Dr. Don A. Klinger or Danielle LaPointe. Retain the second copy for your records.**

I have read the above statements and had any questions answered. I freely consent to participate in this study.

Participant’s Signature: __________________________________________________________

Date: __________________________
Appendix F: Current Study Data Collection Protocols

Current Study: Teacher Pre-Questionnaire

1. How might the EPL model support your professional learning and practice?
2. How might the EPL model provide authentic data around instructional practice and classroom learning?
3. What potential challenges do you foresee with engaging in the EPL model?
4. If there was one thing you would like to see happen as a result of this study, what would it be?
5. Demographic Information
   a. Current grade placement
   b. Total years teaching experience
   c. Current professional learning involvement
   d. Total experience with classroom video analysis

Current Study: Facilitator Pre-Questionnaire

1. How might this EPL model help you support the professional learning and practice of teacher colleagues?
2. How might the EPL model provide authentic data around instructional practice and classroom learning?
3. What potential challenges do you foresee with engaging in the EPL model?
4. If there was one thing you would like to see happen as a result of this study, what would it be?
5. Demographic Information
   a. Current role
   b. Total years in this role
   c. Total years teaching experience
   d. Current professional learning involvement
   e. Total years experience with classroom video analysis
Current Study: Facilitated Feedback Dialogue Protocol

<table>
<thead>
<tr>
<th>Teacher Name:</th>
<th>Facilitator Name:</th>
</tr>
</thead>
</table>

Current professional learning goal:

Lesson date:

Lesson focus:

1. *Indicate the sources of classroom data you have collected to support your reflection and goal-setting.*

<table>
<thead>
<tr>
<th>Sources of Classroom Data</th>
<th>Yes/No</th>
<th>Describe (as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilitator observational notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (e.g., self-assessment, peer feedback)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. *Please reflect on and discuss these sources of classroom data in relation to your current professional learning goal. (audio-record discussion, 15-30 minutes)*

3. *After the discussion, please record your new professional learning goal.*

New professional learning goal:
Current Study: Facilitator-Teacher Pair Dyadic Interview Protocol

Think about a time when you had a very effective dialogue.
- Describe the dialogue.
- What was it about the dialogue that made it an effective learning opportunity?
- What supports were in place that allowed this dialogue to be effective?

What were some initial challenges you faced engaging in this EPL model (i.e., Cycle 1)?

What were some of the later challenges you faced engaging in this EPL model (i.e., Cycles 2-4)?

How did you negotiate these challenges?

What were some unexpected benefits of engaging in this EPL model?

How has this experience impacted your thinking about video-informed collaborative professional learning?

Are there any questions I haven’t asked, but should have?
Current Study: Teacher Individual Interview Protocol

Demographic/Background
What previous professional learning or experiences have contributed to your willingness to participate in this study?

Confirm demographic—years teaching, grades taught, other educational roles, previous EPL experience, previous experience with video analysis

Experience with EPL model (data-informed feedback dialogues)
Thinking about your personal/individual experience with this EPL model (show model):
- Which aspects of the model most supported your professional learning and practice as a teacher?
- What underlying supports helped you to engage with this EPL model as a teacher?
- What challenges did you face engaging with the model as a teacher?

Data-informed feedback dialogues
Thinking about the data you collected to inform your professional learning and practice:
- What supports and resources helped you to collect, interpret, and use these data?
- Which data sources were the most beneficial in supporting your professional learning and practice?
- What challenges did you face collecting, interpreting, and using these data?

Thinking about the classroom video as a source of data to inform your professional learning and practice:
- Describe the benefits of using classroom video as a source of data in EPL.
- Describe the challenges of using classroom video as a source of data in EPL.
- If you were going to use classroom video moving forward, what would you do the same? What would you do differently?
- What structures would need to be in place in order for you to continue using classroom video to support your professional learning and practice?

Change over time
How has your experience with this EPL model changed over time?

Moving forward
How might this EPL model be changed to better meet the needs of teachers? Of students?

Moving forward, what advice or guidance would you give other teachers considering using this EPL model?
- What would you keep? What would you change?

Are there any questions I haven’t asked, but should have?
Current Study: Facilitator Individual Interview Protocol

**Demographic/Background**
What previous professional learning or experiences have contributed to your willingness to participate in this study?

Confirm demographic—years teaching, grades taught, other educational roles, previous EPL experience, previous experience with video analysis

**Experience with EPL model (data-informed feedback dialogues)**
Thinking about your personal/individual experience with this EPL model (show model):
- Which aspects of the model most supported your professional learning and practice as a facilitator?
- What underlying supports helped you to engage with this EPL model as a facilitator?
- What challenges did you face engaging with the model as a facilitator?
- Which aspects of the model most supported the professional learning and practice of the teachers you worked with?
- What challenges did teachers face engaging with the model?

**Data-informed feedback dialogues**
Thinking about the data you collected to inform your professional learning and practice with teachers:
- What supports and resources helped you to collect, interpret, and use these data?
- Which data sources were the most beneficial in supporting your professional learning and practice as a facilitator?
- What challenges did you face collecting, interpreting, and using these data?

Thinking about the classroom video as a source of data to inform your professional learning and practice as a facilitator:
- Describe the benefits of using classroom video as a source of data in PL.
- Describe the challenges of using classroom video as a source of data in PL.
- If you were going to use classroom video moving forward, what would you do the same? What would you do differently?
- What structures would need to be in place in order for you to continue using classroom video to support your professional learning and practice and the professional learning and practice of teachers?

**Change over time**
How has your experience with this EPL model changed over time? (e.g., self, teachers, students)

**Moving forward**
How might this EPL model be changed to better meet the needs of facilitators? Of teachers? Of students?

Moving forward, what advice or guidance would you give other facilitators considering using this EPL mode?
- What would you keep? What would you change?

Would you use this model to support the professional learning and practice of other teachers? If so, how?

Are there any questions I haven’t asked, but should have?
Appendix G: Current Study Within-Case Themes, Categories, and Codes

How the Video-Informed Feedback Model Supported Embedded, ML-facilitated EPL

Case 1 Themes, Categories, and Codes with Associated Frequencies (RQ1)

<table>
<thead>
<tr>
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<th>Category</th>
<th>Code</th>
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<th>Category Total</th>
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<td>Authentic classroom data</td>
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### Appendix H: Current Study How Video-Informed Feedback Dialogues Evolved over Time

#### Case 1 Feedback Dialogues over Time (RQ2) (* dominant, P = praise, C = coaching, SR = self-regulation, T = teacher, S = student)

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### Case 2 Feedback Dialogues over Time (RQ2) (* dominant, P = praise, C = coaching, SR = self-regulation, T = teacher, S = student)

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