Emergent Tensions in Video-data Editing to Support Teacher Reflection:

A Reflective Look at a Research-Practice Partnership

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Abstract

To cut or not to cut? This dilemma points to an important aspect of collaborative research (Coburn & Penuel, 2016) that relies upon video captures from classroom activities to provide the impetus for teacher reflection on practice. Our research team partnered with consultants and teachers in youth sector mathematics to form a community of practice (CoP) (Wenger, 1998). This self-study reflects on one of many instrument producing activities. Specifically, the process of turning raw footage into edited clips. It describes the tensions that arise between researchers and teachers by adopting the framework of cultural-historical activity theory (Engeström, 1987). The data sources consist of videos from classrooms and meetings, transcripts, and field notes. Outcomes shed light on the tripartite of the three communities, projecting their object on different aspects of the video, "best practices" or "improvable practices". This reflective paper contributes to opening up a methodological discussion about video research in educational settings.

Keywords: Video research, video-based collective reflection, video pedagogy

Résumé

Couper ou ne pas couper? Ce dilemme soulève une question pertinente pour la recherche collaborative (Coburn et Penuel, 2016) utilisant la captation vidéo d'activités en classe comme appui à la réflexion sur les pratiques. Notre équipe effectue une recherche en partenariat avec des praticiens anglophones de mathématique du primaire et du secondaire formant une communauté d'apprentissage professionnelle (Wenger, 1998). Pour cette auto-étude ("self-study"), je pose un regard précis sur la captation vidéo, en particulier en ce qui concerne le choix des données à extraire. J'adopte la théorie de l'activité (Engeström, 1987) comme cadre pour analyser les tensions qui émergent entre chercheurs et praticiens dans le travail de sélection et de découpage des vidéos. J'effectue une analyse réflexive sur notre pratique de chercheurs afin de documenter le processus par lequel les captations vidéo sont découpées en extraits à diverses fins. La majorité des sources de données sont des transcriptions d'enregistrements vidéo ainsi que des notes de terrain. Les résultats soulignent la tripartite des communautés de la recherche, conseiller pédagogique, et les enseignants, qui tendent à mettre l'accent sur différents aspects des vidéos, entre pratiques «exemplaires» et pratiques «perfectibles». Ce regard réflexif ouvre la porte sur une discussion méthodologique sur la vidéo en recherche collaborative en milieu scolaire.

Mots clés: Recherche avec vidéo, réflexion par l'entremise vidéo

Acknowledgments

Emergent Tensions in Video-data Editing to Support Teacher Reflection:

A Reflective Look at a Research-Practice Partnership

This self-study is a reflective segment of a larger iterative research-practice partnership (RPP) (Coburn & Penuel, 2016) that relies on video records to facilitate teacher development in a professional learning community (Dayan, Breuleux, Heo, & Nong, 2015). Drawing on reflexive undertones inspired by Rabinow (2007), this case study analyzes two cases from the Creating, Collaborating, and Computing in Math (CCCM) project which will be described in "Methods". Specifically, this report focuses on the liminal road between raw video-captures of authentic classrooms and final edited clips in a youth sector group of mathematics teachers. The primary object of the videos was to promote teacher reflection on practice, and the primary goal here is to reflect on this mediating tool. This thesis describes a few situated tensions that arose in the process of editing raw footage into clips. These tensions triggered an awareness of many gaps in our processes, namely that the video does not give "unmediated access to facts" (Erickson, 2006, cited in Jacobs, Hollingsworth, & Givvin, 2007, p. 286). By reflecting on the instrument-producing activity of editing video captures, as part of the material resource of professional learning communities (Little, 2002) I see that videos cannot just be *used,* they need to be *produced* too. The outcomes reveal that, video captures, an often taken-for-granted research method, can be a valuable mediating tool for teacher learning. However, for RPPs to capitalize on the richness of video data, this study suggests that systematic modes of co-watching and co-editing videos be planned prior to reflection meetings.

Theoretical Framework

Teacher knowledge impacts student learning (Harnett, 2012). This type of assumption is the *raison d'être* of teacher development programs (Putnam & Borko, 1997). Multiple theoretical and conceptual frameworks uphold CCCM, in fact, this study bears witness to the intersection of: teacher reflection on practice (Schön, 1983), situated learning and legitimate peripheral participation (LPP) (Lave & Wenger, 1991), technological pedagogical content knowledge (TPCK) (Koehler & Mishra, 2009), design-based research (DBR) (Cobb, Confrey, DiSessa, Lehrer, & Schauble, 2003), change laboratory (Virkkunen & Ahonen, 2011), lesson study Lewis & Takahashi, 2013), and many others. However, for this thesis, only three particular theories will be considered. This section will outline: first, cultural historical activity theory (CHAT) (Engeström, 1999) — which also subsumes expansive learning (Engeström & Sannino, 2010) — to provide the organizational structure of this thesis. Second, I will examine collective transformation through research practice partnership (RPP) (Coburn & Penuel, 2016; Little, 2002). Third, I will review studies that relied on the richness of video as artifact to support teacher reflection (Coles, 2014; Goldman, 2007; Hall, 2000; Hawkins & Rogers, 2016).

Cultural Historical Activity Theory

As mentioned above I adopt the framework of third generation cultural historical activity theory (CHAT) to position CCCM as a multilayered network of interconnected activity systems (Engeström, 1999). As a consequence, the "Analysis" section is structured along six intertwined elements derived from CHAT: subject, roles, objects, tools, rules, and community. According to Leont'ev (1981) the subject is driven by an object that sets the motive for collective activity and "goal-directed actions" (Engeström, 1999, p. 23).

For the purpose of this thesis the main subject is me as research assistant involved in CCCM activities, the roles pertain to the division of the tasks, the object sets the tone of the activity and it rallies partners, the artifacts are the material objects that have been modified by humans to regulate interactions (Cole, 1999), and the rules guide the direction of the activities. In this study, video is the object of study, but also part and parcel of the artifacts that mediate CCCM activities (A. Breuleux, personal communication, May, 2018). In this light, videos are artifacts that scaffold reflection. Accordingly, CCCM is conceptualized as a site where joint work at a boundary occurs when members get together to tackle issues of transition in mathematics (Penuel, Allen, Coburn, & Farrell, 2015). CCCM may appear as one unified community, it actually housed three distinct communities of practice (Wenger, 1998), each with their own object of practice: teaching, consulting, and research.

One of the keys to the CHAT approach is examining the history of a given activity, its inherent contradictions, and cycles of expansive learning that subjects experience as they attempt to resolve the contradictions (Engeström, 1999). In other words, CHAT –in particular expansive learning– is an iterative process and contradictions are the driving force that transform the activity, which in turn make the object a moving target (Engeström, 1999). Notably, CHAT feeds off of double binds, to examine the movement of an abstract notion becoming a concrete artefact to mediate activity (Engeström, 1999). The second key is dialectical discourse, where contradictions play a crucial part in precipitating change (Engeström, 1999). Consequently, CHAT embraces a dialectical approach by putting a positive spin on contradictions so that we become attuned to them (Engeström, 1999). Lastly, tensions cannot be solved by one person, instead requiring a transition from "I" to "we" (Engeström & Sannino, 2011, p. 374).

Subsequently, expansive learning requires a collective engagement with the activity to deal with historically evolving contradictions (Engeström & Sannino, 2010). For these reasons CHAT as defined by Engeström (1999) is appropriate to uncover tensions in editing video artifacts.

Collective Transformation Through Research-Practice Partnerships

Coherent with CHAT perspectives, Judith Little (2002), a prominent teacher educator, has traced the root of teacher network programs as dependent upon the assumption that cooperation among schools driven by a shared object produces multiple-level improvements, which promotes system-wide changes (Little, 2005). Indeed it is the collective that opens the door to partnership for collective transformation of practice (A. Breuleux, personal communication, May, 2018). However, she pointed out, there is a lack of studies that specifically examined how professional communities supplied intellectual, social and material resources for professional development (PD) (Little, 2002). To that effect, according to Little and Curry (2009), partnerships that use artifacts of teaching and learning nurture richer teacher conversations than those that simply use aggregated student test scores. This claim is based on the assumption that teacher learning benefits from examining student work (Little, Gearhart, Curry, & Kafka, 2003). Actually, over the last decade, many teacher groups have structured collective examination of student work at the heart of their gatherings (Little et al., 2003).

Moreover, according to Coburn and Penuel (2016), a research practice partnership may create the space to allow actors to work on joint objects. This was the goal of CCCM as a RPP; it planned to indirectly increase student success across levels in mathematics (Dayan et al., 2015) through bringing together teachers, researchers, and consultants to engage in iterative cycles of codesign, enactment, and reflection using videos (Heo & Breuleux, 2015). This object (i.e.

student success) needs social infrastructures in place to orchestrate reflections on teaching

mathematics (A. Breuleux, personal communication, May, 2017). Therein lies the appeal of a

RPP approach (Severance, Penuel, Sumner, & Leary, 2016), as it resolves the tensions that arise

when RPP members ascend from the abstract notion of top-down to participative PD

(Lompscher, 1999).

Furthermore, boundary-crossing was a defining characteristic of CCCM videos

(Breuleux, 2017; Breuleux, Heo, & Dayan, 2017). This is similar to boundary spanners

(Hackmann & Malin, 2018), where RPP members inhabit a space between teachers, consultants,

and researchers. Indeed CCCM fostered a space for members to cross beyond their assigned

role. To do so, the video crossed the boundaries between the codesign of a lesson and the

enactment of a lesson, in order to culminate in reflection (solo or collective). Lastly, the framer

is framed (Trinh Minh-Ha, 1992) unless engaged in stakeholder perspective taking (Goldman,

2007). Put differently, the framer is the video editor that needs to think about the three

communities and their intersections. Without which the video clip loses richness.

Richness of Video-Based Reflection

This section will cover the related concepts of rich video and reflection. To begin with,

this study is informed by initiatives that utilize videos for reflection *à la* Judith Little (2002)

within the broader context of rich representations of practice (Breuleux, 2017). CCCM

researchers refer to video data as "mirror data" (Virkkunen & Newnham, 2013, p. 18) or a

"powerful microscope" (Goldman, Erickson, Lemke, & Derry, 2007, p. 15). These metaphors

conjure the video's *mirroring* abilities (Endacott, 2016). As such it falls into the category of rich

artifacts (A. Breuleux, personal communication, May, 2018). According to Sherin and Sherin

(2007), the literature exhibits the assumption that videos "can be a valuable resource for teacher

learning" (p. 47), whether we use discovery-oriented or top-down approaches (Goldman et al.,

2007). Yet at what point does the video become rich? For Mead (1976), richness resides in

"long sequences" (p. 35); similarly, for Ash (2007), the longer the video, the richer and more

complex it becomes. Indeed, White (2009) has argued that the use of digital technology offers a

complex reality. Therefore, it is frequent practice to reduce complexity by limiting duration and

context (Ash, 2007). This will be further discussed in the "Selection" section.

Additionally, reflection is understood "as culturally mediated action" as articulated by

Virkkunen & Ahonen (2011), where "[individual] reflection is not, however, enough when a

societal practice or a form of collaborative activity needs to be developed. [...] Secondary

artifacts [...] make the reflection on the use of primary artifacts possible" (p. 229). To this effect,

the video is the material object that is modified to regulate the teacher's reflective interaction

(Cole, 1999). However, Gelfuso (2016) has remarked that there is considerable disagreement

about what reflection is and how to support teacher reflection. In fact, Derry et al. (2007) have

argued that video-based reflection is more effective than simply keeping a written diary and they

advocate for collective reflection using video. This collective reflection on practice using video

is referred to as "video-based shared reflection" (Tochon, 2007, p. 60). On the other hand, others

have suggested that individualized teacher reflection is preferable (Goldman et al., 2007). A

synthesis of the above positions would be the combination of a written diary with solo and

collective video-based reflection to support teacher reflection on practice. It is important to note

that both written and video methods are based on the assumption that reflection in and of itself is

good for practice. Accordingly, CCCM adopted a pro-reflection stance, and videos were its mediating artifact.

Literature Related to Video-Editing

The goal of this section is to identify which theoretical frameworks contribute to an understanding of the process of editing videos in support of teacher reflection. Tochon (2008) has defined video-editing as a research process which involves searching for authentic data, selecting data, and generating an interpretation of the data into a scenario. Several academics occupy the discourse on video in education research, such as Ricki Goldman, Frederick Erickson, Jay Lemke, and Sharon Derry. This review will synthesize educational knowledge on what video selection and montage are.

Selection. As mentioned earlier, to balance complexity, editors are advised to cut the duration of the footage. This brings us to selection as an umbrella construct in which video is used as the main, albeit not standalone, information source (Goldman et al., 2007). In particular, Tobin & Hsueh (2007) have argued that videos are not data unless they are a) selected and b) assigned a code. The former carries potential tensions as it requires RPP members to negotiate, while the latter is pertinent mainly to the research team. For this study, selection is defined as a process of focusing on particular information in accordance with theories, research questions, and instruments (Goldman et al., 2007). Ontologically, selection is an entity that is created when certain events are removed from larger complex events (Goldman et al., 2007). Selection determines which events will be "brought in for analysis" (Goldman et al., p.16). An event is limited by a particular group of people, time, and space (White, 2009). This suggests meaning-making activities are dependent on the context in which the video corpus was collected

in and then selected from (Goldman et al., 2007). Hence, the onus is on the researcher to explain

selection criteria (Ash, 2007). That is, video selection plays a major supplier role and we need to

elaborate on the processes behind its creation (Blomberg et al., 2014). To this end, Goldman et

al. (2007) have provided a temporal explanation of selection. The first selection occurs *before*

video collection begins, during research design. The second selection occurs *during* filming,

such as decisions not to record pauses into the sequence (Goldman et al., 2007). The third

selection occurs right *after* video collection with analysis in relation to research questions.

Video editing can be understood in two major ways: integral and reductive. I

encountered the former in Winter 2016, when my supervisor loaned me a seminal book, *Points of

Viewing Children's Thinking* by the digital video-ethnographer Goldman-Segall (1998). For

Goldman-Segall (1998) all parts of the raw footage are considered important, thus no real editing

is required. Given that Goldman-Segall (1998) adopted an integralist standpoint, her reports do

not expand on the video editing aspect of her research. In fact only 4 out of 247 pages were

dedicated to editing. Whereas, on the reductive side, it is recognized that watching closely all

video data is very time consuming (Roschelle, 2000), and it is not a one-time viewing affair. In

teacher education, very few participants are willing to sit down and watch numerous, lengthy

videos. For Ash (2007), time gives rise to the "countervailing problem of data reduction" (p.

209). Alternatively, for Roschelle (2000) the process of data reduction "[becomes] an oppressive

problem" (p. 709), particularly since we therefore lose context. Referring to the problem of

determining how to organize data in a defensible manner, Ash (2007) has claimed that the

challenge is to isolate a detailed, representative event and yet give a general overview, too. To

this end, according to Erickson's (2007) phenomenological approach, minimally-edited video is

a great data source to scaffold deep noticing because it takes into account the viewers' life

experiences and pedagogical commitments. However, given the multiplicity of viewers'

perceptions and time constraints, some form of montage becomes inescapable, although riskier.

Therefore, video-editing encompasses some form of montage. To this end, this study concerned

itself with the under-examined process that occurs between the selection of video events and the

stitching of selected video events.

Montage. Montage, a process rooted in cinematography (Monaco, 1981), refers here to

a) editing sets of strips together (Erickson, 2007) and b) superimposing several different images

on one another (Cook, 1981). For Erickson (2007), minimal edit means no cinematic techniques

(e.g., montage or cutaways) are used, though this does not mean long streams, as they could

"overwhelm" viewers (Goldman, 2007, p. 14).

In the 1980s, the work of Cook on montage became notable as he explained how

qualitative fieldworkers use bricolage, quilt making, and montage to give audiences a narrative

(Cook, 1981). According to Cook (1981), qualitative researchers use montage akin to how a

quilter stitches, edits, and puts slices of reality together. In other words, quilting, like editing, is

a process that brings psychological and emotional unity to an interpretive experience (Denzin &

Lincoln, 2013). Layering of events is a juxtaposition, that requires montage. The underlying

assumption of montage is that viewers perceive and interpret the shots in a "montage sequence

not sequentially, but rather *simultaneously*" (Cook, 1981, p. 172, italics in original). This relies

on the assumption that the audience will be active during the viewing. However, this is not

tenable in real life and becomes possible only if the facilitator of collective reflections provides

deliberate prompts (Kobiela et al., 2017).

In summary teachers' improved practice is dependent upon many factors: prompts used, type of selection, and the smoothness of montage. In other words, a smooth video enables audiences to view a seamless, coherent, non-jarring sequencing of video-images.

Affordances and Limitations of Videos-Based Reflection

The purpose of video editing is to support teacher reflection. Therefore, this section addresses two questions: why incorporate video-based reflection into curriculum for teacher learning? and, what challenges do professional development designers face in harnessing the potential of video records of practice into a tool for teacher learning? (LeFevre, 2004). Ever since the fields of digital ethnography, anthropology (Geertz, 1973), and education (Brown, Collins, & Duguid, 1996) have shifted their focus onto situated local knowledge instead of "grand narratives" (Goldman, 2007, p. 4), video has come to be known as a tool that strengthens grounded theory (Charmaz, 2006; Strauss 1987), since it mirrors thick descriptions that may lead to "thick interpretations" (Geertz, 1973, cited in Goldman, 2007, p. 6).

One of the most salient strengths of using video-based reflection is that it provides viewers access to seeing things "that participants either miss or cannot do" (Hall, 2000, p. 11), and facilitates modeling of instructions (Schunk, 2001). This strength is echoed by Blomberg, Sherin, Renkl, Glogger, and Seidel (2014) when they utilized video to model instructional strategies. Video also enables teacher learning because we can play and replay events (Engle & Conant, 2010). In fact, the ability to rewind helps to conduct multiple analyses of the same video (Erickson, 2007).

Another strength, according to Yung, Yip, Lai and Lo (2010), is that videos of authentic classroom events lead to the development of professional skills at different levels: emotional,

social, cognitive and "psychomotor learning" (p. 4). Similarly, van Es and Sherin (2008) have demonstrated that programs where teachers engage in video clubs progressively learn to notice and to move from focusing on the teacher's actions towards a target centered on student learning processes (Meyer, Lampron, & Gazé, 2014). Nevertheless, video-based reflection depends on the teacher's personal comfort in dissecting the events mirrored in the video (Little, 2005).

Traditionally, video researchers tend to focus on three areas when they sample a "stream-of-practice" (Little, 2002, p. 919): (1) who watches what? (Miller & Zhou, 2007), (2) what kind of reflective discourse is revealed by the video to analyze the range of pedagogical strategies in the landscape of teaching and learning? (Breuleux & Heo, 2017), and, most prevalent, (3) using video to foster conversations amongst practitioners (McKenney, Boschman, Pieters, & Voogt, 2016). In brief, these studies posit that practice is improved through reflection on practice. To this effect, video clips mediate the lesson study process for RPP members.

Furthermore, videos bridge theory and practice in the context of learning from classroom videos (Gomez, 2008, cited in Blomberg, Sherin, Renkl, Glogger, & Seidel, 2014). This bridging is reflected in Hawkins and Rogers (2016) adaptation of the videos as tool approach to support reflection amongst preservice teachers. However, LeFevre (2004) has stated that the video alone does not induce professional development for teachers and that it's the way in which teachers interact with the video that will govern their potential for learning. For instance, Meyer, Lampron, and Gazé (2014) relied on the concept pedagogical content knowledge (PCK) (Shulman, 1986) to interpret students' behaviors and to decide how to proceed with instruction.

Pertinent to this study the research team employed two models for video as a reflective tool to help teachers avoid evaluative judgement (Coles, 2014). The first, the "open university

model" (Jaworski, 1990, p. 60) established discussion norms to support new ways of seeing and labelling: the content of teachers' contributions and the kind of a comment made. The second, the noticing approach, asks teachers, "what did you notice?" after viewing a clip to learn to notice (van Es & Sherin, 2008, cited in Coles, 2014, p. 269). This requires "seeing in depth" (Goodwin, 1995, p. 16) and "heightened listening" (Coles, 2014, p. 275).

Despite this emphasis on video-based reflection, at the turn of the millennium, Hall (2000) asserted that we did not know much about research activities where collecting, watching, and interpreting videos are a stable source of data. Nearly 18 years later, this is still a valid statement. This leads us to another weakness of videos, namely that the viewers are positioned outside of the recorded event: unaware of the circumstances behind the action (Hall, 2000).

Since videos are only snapshots, the best case scenario for "commensurability" is to ask viewers to create their own video representations (Geertz, 1973, cited in Goldman, 2007, p. 32). This leads us to two other challenges for the use of video as a tool in research (Barron, 2007). The first is determining what to capture (*before* selection: angle (close up, wide, pan), date, time, space, activity, teacher, lesson, student group) and the second is deciding how to analyze (*after* selection: frame-by-frame) (Barron, 2007). Meanwhile, selection concerns *during* filming are minimized when researchers use the fix camera approach in recording data. Therefore, it is necessary to explain the circumstances before, during, and after video recording and extraction; the more they are explicit, the more convincing claims about that event are (Erickson, 2007).

Gaps in Literature

How can an educational researcher like myself learn the skills to edit videos when the literature from experts makes no substantive mention of it? Indeed, one of the questions that arose during this study was: what should I do after the video is recorded? From the above literature, it is evident that most studies elaborated on the *use* of video as a mediator for reflection. For example, Dayan et al. (2015) have analyzed how authentic video clips promote reflection. Although some authors have written about *how* they collected footage, few have discussed the post production phase. In fact, Hall (2000) has pointed out that, frequently, research articles do not recount the process of collecting and selecting video data. There seems to be a blindspot regarding how videos need to be edited and, thus such editing requires and fosters learning on the part of the *researcher* (Breuleux et al., 2018).

In particular, most researchers have focused on the kinds of reflections novice teachers have versus expert teachers, few have addressed tensions in editing for three distinct yet interdependent communities of in-service teachers, consultants, and researchers. Even fewer have nuanced videos required for solo reflection versus collective reflection. This gap led to the present study.

Consider how Pea and Hoffert (2007) have illustrated a video workflow diagram to depict steps involved in a research project that employs videos (see Figure 1). Notice the vagueness with which the editing box, depicted in yellow in the lower right-hand corner of the diagram, is relegated to one square without details. In fact, only one page, in the chapter, mentioned an "edit decision list" (EDL) comprising time code pairs and pointers to original material (Pea & Hoffert, 2007, p. 444).

In summary, due to the lack of a conceptualized framework guiding video editing (S. Beck, personal communication, June, 2018) the process of preparing videos carved out time away from other aspects of video research.
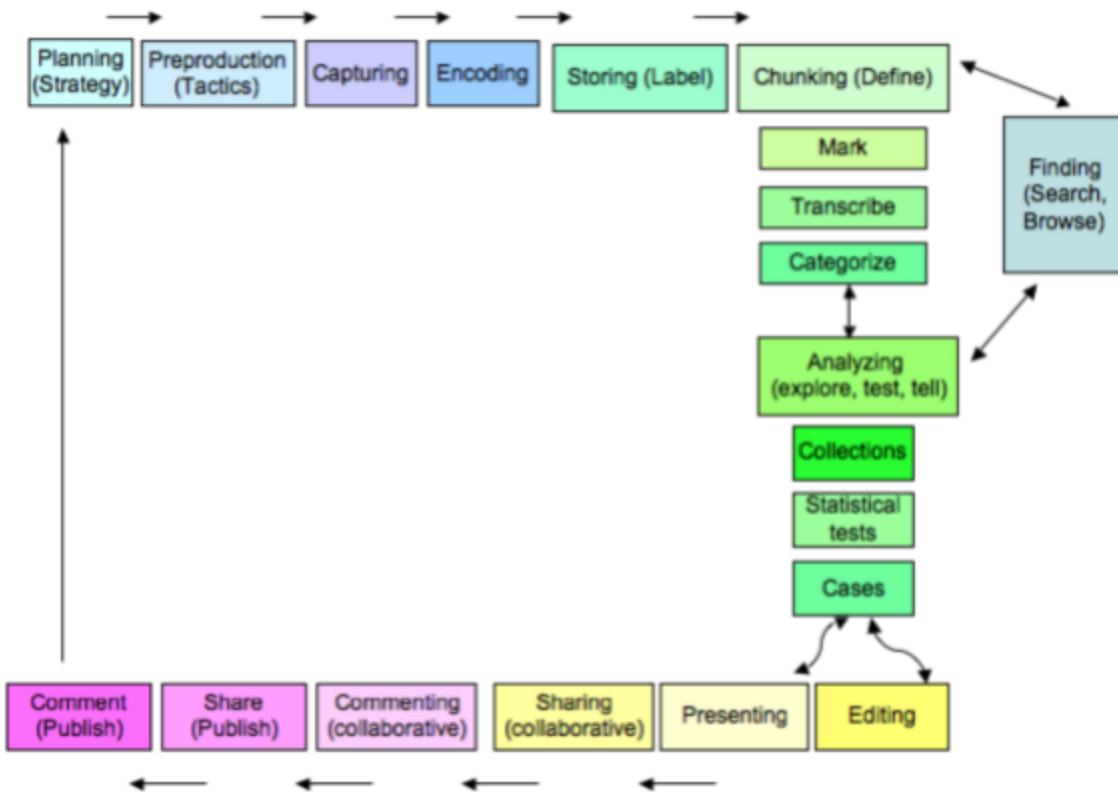
Figure 1. Video research workflow diagram (Pea & Hoffert, 2007, p. 429).

Research Question

In ascending from the abstract notion of video-selection to the concrete application of video "selection," one question dominates this thesis: what kinds of tensions emerge during video editing in a research practice partnership? Specifically, how are video clips selected? My guiding question was "*to cut or not to cut*", and to do so I kept track of the tensions that emerged when editing videos to support collective reflection and their resulting outcomes.

Method

This section outlines the background of the overarching CCCM project and it will be followed by a description of the present study. This study was embedded in a larger project, *Creating, Collaborating, and Computing in Mathematics* (CCCM), which was spearheaded by educational researchers and members of a suburban school board. The goal of CCCM was to design and implement a research-practice partnership (RPP) in order to develop and investigate digital literacy and disciplinary understanding in mathematics classrooms, with a focus on the transition between elementary and secondary school (Heo & Breuleux, 2015).

Study Background

This RPP was funded by the Social Sciences and Humanities Research Council (SSHRC) and Chantier 7 from the Québec Ministère de l'éducation, du loisir, et du sport (MELS). Since 2013, about 40 classroom enactments and 24 face-to-face (f2f) meetings took place (see Table 1). On average four to eight f2f meetings occurred per year. Over the course of the four years, the project leaders orchestrated the progression of these meetings by starting with trust building activities (e.g., classroom visits in year one) to full-cycle lesson study by year four (Heo and Breuleux, 2018). Table 2 presents a summary of the features of the CCCM Project between 2013 and 2017 in terms of teachers involved, number of meetings, and key themes. Typically, CCCM members engaged in three key activities: codesign, enactment, and collective reflection on learning activities (Voogt et al., 2015). Overall, these meetings have led to the production of learning activities and research reports (e.g., Breuleux et al., 2018). Below, I describe the overall pattern of CCCM meetings.

Leadership meetings. At the beginning of each school year for four years, between f2f meetings, and at the end of the year, the leadership team (researchers and consultants) met to plan and debrief on the activities of the CCCM project. Typically, the research team met the consultants at the school board office in a conference room.

Codesign meetings. Each year, at different times, the teachers gathered to collaboratively design learning activities. This process was rich, because it included the teacher in the design of the lesson along with their colleagues and consultants (hence the term "codesign") (Severance et al., 2016). In other words, over the course of the school year, the teachers met and freely chose to split into interest groups (e.g., math journaling, math-talk, inquiry) to collaboratively design learning lessons. At the beginning of the meeting, they would watch a clip from a previous enactment. In the cases of this study, the elementary teachers huddled together and secondary teachers had their own sub-groups. At the end of the codesign meeting, interested teachers would agree to be filmed by the research team during their enactment of the lesson. For further information see Breuleux and Heo (2015).

Classroom enactments. By the second year, mid-school year, the research team visited various classrooms to video record the codesigned mathematics lesson. Afterwards, the teacher was asked to watch the enactment videos and identify events of interest (typically, they were given some release time to do this task). The identification gave way to solo reflection followed by collective reflection.

Collective reflection meetings. Towards the end of the school year, RPP members would gather to discuss the enacted lessons. In year four we achieved a full circle milestone.

Table 1

CCCM Video Activities per Year

CCCM Activities	Face to face meetings	Class videos	Total files
2014	5	15	22
2015	4	13	18
2016	7	5	12
2017	8	7	13
Total	24	40	65

Note. Folders labeled class videos and f2f meetings in oneDrive.

Table 2

Main features of the CCCM Project in 2013-2017

	Year 1 (2013-2014)	Year 2 (2014-2015)	Year 3 (2015-2016)	Year 4 (2016-2017)
Teachers	7 Elementary & 6 Secondary	5 Elementary & 5 Secondary	4 Elementary & 3 Secondary	6 Elementary & 4 Secondary (including 4 new members)
F2F Meetings	Five meetings	Four meetings	Five meetings & a small group meeting per school level	Four meetings & two small group meetings per school level
Key Themes	(a) Collective understanding of the situations (b) Formative assessment (c) Peer observation – Class visits (Across levels)	(a) Formative assessment (b) Math talk (c) Reflection (d) Peer observation – Class visits (Same levels) (e) Video-based lesson study	(a) Student data (b) Learning targets (c) Group work (d) Practices of high quality teaching (e) Video-based reflective practice	* Three key activities (a) Co-design of learning activities (b) Video capture of authentic classroom activities (c) Video-based collective reflection

Note. From Heo & Breuleux (2018)

In summary, the above procedures demonstrate RPP members had established various social infrastructures essential for student success in math across levels (Heo, & Breuleux, 2015). Indeed, RPP members embarked on iterative cycles of codesign, enactment, and coreflection.

Their overall objective was to respond to inter-level mathematics transitional challenges faced by youth sector students as they progress from cycle one to cycle three elementary mathematics to secondary mathematics (Heo & Breuleux, 2015). In other words, this partnership engaged in professional development activities using video-based reflection as their entry door to mitigating student issues of transitioning across grades in mathematics. Next, I describe the present study.

Present Study

This thesis reports on the instrument-creating activity that supported reflections in year 3 (2015) and year 4 (2016) of the CCCM project. The following articulates, through my perspective, as novice researcher turned video editor, how this community dialectically handled issues that arose from the use of video as a primary mediating tool for teacher reflection. Over the course of two years, I witnessed three kinds of actors in a research practice partnership: researchers, teachers, and consultants. In Fall 2015, I joined the CCCM group to observe what seven mathematics teachers do when they gather to discuss issues of transition. Having missed the first two years had its advantages, because the research team had already obtained the necessary ethics approval to collect video data with student assent forms, parental and teacher consent forms. Conversely, it also meant I was unfamiliar with participants' initial reactions; to compensate, in Summer 2016 I began listening to and transcribing end-of-year teacher interviews from the first two years. This allowed me to build a baseline understanding of the participants involved in CCCM. This study focused on two cases involving seven of the twenty four f2f meetings. *Case 1* pertains to video editing decisions related to one secondary enactment, and *Case 2* involved video editing decisions related to four elementary enactments. Specifically, this study compared and contrasted two video editing procedures corresponding to two distinct

learning activities and their outcomes: 2015 "My Favorite No" (*Case 1*) and 2016 "Krispy

Kreme Me" (*Case 2*).

In summary, this study aimed to open a space to talk about the kinds of gaps that

complexified the process, for this researcher, to video-edit classroom events to support teacher

reflection. The next section outlines the participants, the apparatuses, and the procedures for data

collection. It will be followed by the "Narrative Description of Two Cases" section.

Participants

CCCM was a qualitative medium-term longitudinal study, and many participants were

involved throughout its course. CCCM partners were voluntary non-probabilistic, purposive

sample. That is, the school board consultants and administrators invited select teachers to

participate. Their selection consisted of finding teachers who had the time and the characteristics

of being a change leader. Specifically, these teachers had to be comfortable with sharing their

practice by being video recorded. These partners were each at different stages of their career and

personal life, but have been dedicated in participating in CCCM meetings. In 2015, the CCCM

group comprised seven teachers (four elementary, three secondary, see Table 3), two consultants

(one elementary, one secondary), one technology consultant (also known as a RÉCIT animator),

and four researchers. Specifically, for *Case 1*, we had one secondary cycle 1 (i.e. Grade 7)

mathematics class teacher with five years of experience (pseudonym: Lydia), one secondary

consultant, and three researchers. In 2016, for *Case 2* the CCCM group comprised six

elementary teachers from four different schools (pseudonyms: Melody, Kiera, Dona, Kaci, Kate,

& Sabrina), four secondary teachers from two different schools (pseudonyms: Ben, Lin, Lydia, &

Ellen), one interim elementary consultant, one RÉCIT animator, and three researchers (one team

member could not attend the codesign meeting).

Table 3

Summary of Participants by Case in 2015-2016

	Pseudonym	Level	Teaching Experience (years)
2015 Case 1	Lydia	Sec. Cycle 1	5
2016 Case 2	Melody, Kiera, Dona, Kaci, Kate, & Sabrina	Elem. Cycle 3	[8-23]
	Ben, Lin, Lydia, & Ellen	Sec. Cycle 1 and 2	[6-22]

Apparatus

Three sets of concrete equipment and materials were crucial for this study. First, for

video data collection the research team used the following devices: two iPad minis (one

non-stationary and one audio recorder), a Canon VIXIA HF R42 camcorder, a Canon VIXIA HF

R62 with two external SM57 microphones, and two tripods. The second set of equipment were

for editing videos. Specifically, in 2015, my personal device was a 13-inch Macbook Pro 2011

which had 2.3GHz dual-core Intel Core i5 processor, L3 cache, 3MB shared, 4GB (two 2GB

SO-DIMMs) of 1333MHz DDR3 SDRAM of memory, with a 320GB Serial ATA hard drive and

5400 rpm. Later, to better handle the computational demands of video editing, a 15-inch

MacBook Pro 2015 was used with a 2.5GHz Intel Core i7-4870HQ PC CPU, 16GB DDR3

SDRAM 1600MHz PC Memory, 500GB storage, and AMD Radeon R9 M370X Graphics

abilities. Final Cut Pro (FCP) software was used for video-editing and EXPRESS Scribe to

transcribe data. The third, an online video annotation and discussion platform, Vialogues, was

the primary tool that connected all three communities by supporting asynchronous commenting

and discussion about videos of classroom practices.

Procedure for Data Collection

Here I outline the general procedures for data collection (specifically videography).

Video-editing procedures were case dependent, therefore, they are described under each case.

This study adopted Margaret Mead's stationary camera approach, camera on tripod (Mead &

Bateson, 1976), to facilitate continuity editing and analysis. While Barron (2007) has proposed a

"dual camera" approach (p. 172), we used three cameras directed at three different groups.

Data collection consisted of both audio and video recording of leadership meetings,

codesign meetings, classroom enactments, and finally collective reflection meetings. Since the

camera was always positioned further away from participants, our audio recording devices were

always placed on the table near participants to capture their utterances. Afterwards, the research

associate would overlap the audio over the footage, to make audio clearer.

Leadership meetings. Typically, the research team audio recorded these meetings

--usually one to three hours long-- with a camera perched on a tripod somewhere on the outskirt

of the group circle. The team did not use SM57 microphones during leadership meetings since

the group was relatively small. In this study, I only refer to field notes from leadership meetings.

Codesign meetings. During these meetings, the team brought one set of video camera

equipment. For these meetings we used one camera perched on a tripod outside of the group

with a SM57 microphone in the middle of teacher groups, plus two mini iPads that would

audio-record only. Typically, codesign meetings were between 90 to 120 minutes.

Classroom enactments. During enactment in classrooms, typically three moments were audio/video recorded: a) the teacher orienting the group to the activity, b) students working in groups of three or four, c) the teacher recapitulating the activity. During these activities, the two digital video cameras were placed on tripods. The two SM57 microphones were placed at each end of the table between the student of only one group. The iPads were used in a mobile manner for audio and video recording; typically one would be placed on the table to capture audio and the second would capture in movement. This handheld approach was useful to feel the moment (Bateson, 1973, cited in Barron, 2007). Typically, the duration of an enacted learning activity was about 55 minutes.

Collective reflection meetings. The procedures for collecting data at collective reflection meetings were very similar to the codesign meetings, with a camera outside of the group, and two iPad minis placed at each end of the room, except that we did not use external microphones at these meetings. Typically, collective meetings were about 6 hours long. Finally, the videos were never used as sole medium for reflection meetings. A questionnaire for reflection accompanied the footage. Appendix A contains versions before and after adapting video reflection guidelines (Kobiela, Merovitz, & Chandrasekhar, 2017). However, the data collected through the reflection questionnaire and other measures are not discussed in this thesis.

Data sources. Data sources for this thesis consisted of video recordings and their corresponding transcripts, along with transcripts of end-of-year teacher interviews (e.g, teacher commentaries on video aspects of CCCM), and my field notes (e.g., scanning for keywords such a 'criticality', a topic that will be explored later in this thesis). Given that this is a self-study, I report on my experience editing footage and my analysis of how the edited videos were used by

the participants. More specifically, the sources for editing *Case 1* consisted of a one hour

enactment of the learning activity "My Favorite No" in 2015 in the secondary sector, and field

notes from lead meetings. The sources for *Case 2* consisted of one codesign session, plus four

classroom enactments of the learning activity "Krispy Kreme Me" for a total of twelve group

works, in addition to one secondary reflection, one elementary reflection, and one collective

reflection meeting.

Narrative Descriptions of Two Cases

In this section I provide a narrative description of *Case 1* followed by *Case 2*. It will be

followed by the "Analysis" section.

"My Favorite No" *Case 1*

In mid-November of 2015, Lydia invited us to film a grade 7 activity, "My Favorite No,"

about fractions of watches sold. This learning activity is a variation of error analysis, a teaching

method that makes use of erroneous answers as a springboard for teachable moment to curb

students' misconceptions (Herholdt & Sapire, 2014). In other words, errors become learning

opportunities. Lydia's approach was to ask students to come to the board and show their errors.

Given that we filmed three student groups and the whole class discussion, we had a 3-hour video

to edit. That day I got home and took 72 hours to download, edit, and upload clips of various

durations. I edited by segmenting the classroom events into clips: intro (5 min), debrief (10

min), brain break (4 min), etc. At the time, I did not know I was just supposed to compress the

video size and make it shareable on OneDrive. I had misunderstood the act of shrinking to mean

editing footage into events. This was my first data collection field work experience and it took

considerable time. Given that the reflection meeting was scheduled less than a week later, this

approach to video segmenting created a tension with Lydia. Potentially, my delay in sharing the

file impacted the teacher's opportunity to view footage in time for the collective meeting that

was to be held a week later. To avoid time pressure on the teacher, the primary investigator and

the research associate selected parts of the footage and suggested them to Lydia for the collective

reflection meeting. Nearly ten days later, I heard Lydia was "unhappy with video shown"

(handwritten field notes) and subsequently, threatened to back out of being video recorded. In

other words, this teacher was not happy about the video event selected by the research team.

Notably, the complexity of using video recording as research and reflection tool emerges in this

tension, and this incident created the grounds to embark upon the rule-creating activity system of

writing a video-protocol. Further details are available in the "Analysis" section under "Cultural

Historical Activity Theory Applied", subsection "Rules".

"Krispy Kreme Me" Learning Activity *Case 2*

In early February of 2017, we gathered in a conference room at the school board to

codesign a learning lesson. *Case 2* will report on the events related to one of the two lessons that

were created on that day. The three-act "Krispy Kreme Me" (KKM) learning activity is a lesson

categorized under "test my metacognitive abilities" tab on the American mathematics educator

Graham Fletcher's website (see Appendix B). This lesson was introduced to the elementary

consultant at a workshop a few weeks earlier, just in time for the CCCM codesign meeting.

To provide a visual context of where the camera was positioned at each meeting, six

pictures are incorporated in this narrative. As well, the images show the editing exploration of

different screen color to anonymize RPP members. For example, Figure 2 is a blurred picture

taken at about 23 minutes into the codesign meeting. The circled hand belongs to the elementary

consultant as she turned her laptop screen to the group and said: "I did this, this week at [a workshop], like: 'How many Krispy Kreme donuts are in this box?' Right? So just open-ended, but now: 'what questions come to mind?' Right?" Via these utterances the elementary consultant introduced the three-act lesson that will be referred to as the KKM learning lesson in this report.

Following the codesing meeting, I edited the two-hour codesign meeting by inserting slides into the video to introduce the themes. The discussions were segmented and labeled in accordance with the codesign lesson plan. For this task, events that were in no direct way connected to the codesign of the KKM activity were cut. Additionally, I inserted subtitles, they were color coded by participant. Ten days later, we began recording the first of four teachers enacting the KKM lesson. Only one teacher, Kiera, a grade 4 teacher, did not enact this lesson. She had just joined CCCM and was shy, unlike Dona who was open to filming from day one. Lastly, I layered in pictures from Melody's class, at the time she did not want her classroom to be recorded despite being involved with the project for four years.

Notice how the teachers are seated in an L shaped form at this codesing meeting, with their notebooks in middle (see Figure 2). We had just finished watching a video montage of a previously enacted activity (called "Fast Pace") while eating muffins, and the conversation had moved on from students' lack of rigor to the kinds of lessons that could foster rigor. Ten days later, we began filming enactments at the teacher's respective schools. Figure 3 is an extreme long shot of a classroom, and the image of the oversized Krispy Kreme donut box held by four persons is projected to introduce Act 1. Figure 4 is a medium close-up to focus the lens on a group of students working on Act 2 solving the long division of 3000 by 89.

Figure 2. CCCM codesign elementary teacher group meeting.

Figure 3. CCCM enactment ACT 1 KKM, at 1:52 minutes into R62_MVI_0745_Group1.

Figure 4. CCCM Student group work at 36 minutes into KKM, lesson 20170220_KB_G1.

Thereafter, we captured three configurations of our teacher groups for the reflection

cycle. We gathered in the same locale in mid-March, with four secondary teachers, plus four

researchers and three consultants (see Figure 5). Since we were unable to record any enactments

in the secondary classrooms due to weather-related school closures, we used the elementary

footage to facilitate the secondary group reflection. I edited 11 hours of footage from KKM (9

hours enactment, 2 hours codesign) into an intermediate montage of 25-minutes. Following the

secondary group reflection meeting, I incorporated excerpts from secondary teachers KKM

discussion, a total of 18 hours of footage was reduced to 30 minutes for elementary group

reflection (see Figure 6). The last collective reflection meeting was held two weeks later (see

Figure 7) with ten teachers, seven researchers (three visiting researchers), and the three

consultants.

Figure 5. CCCM watching elementary enactment of MVI_0756_Reflection Secondary_Part1.

Figure 6. CCCM elementary group reflection MVI_0766_Reflection Elementary_Part1.

Figure 7. CCCM Collective reflection on KKM 20170407 MVI_0406_x264_02_Video.

Analysis

This section outlines two distinct approaches that guided the processes of video selection, followed by two approaches to video editing. Next, I apply the cultural historical activity theory framework to my study by examining my interaction with each of the six entities in an activity system. It will be followed by the "Outcomes" section.

Video Selection

In regards to video-selection, this study followed two criteria from Ash (2007): 1) sustained conversational segments and 2) recognizable events with beginnings and endings. With selection, the video clip can project "good work" (Little & Curry, 2009, p. 31), "best practices" (Seago, Mumme, & Branca, 2004), or "improvable" practices (Hewitt & Scardamalia, 1998) to facilitate knowledge building (Scardamalia & Bereiter, 1991). Data selection was guided by two criteria. The first one is determining if the event corresponded to the theme of the meeting. For example, teachers discussing their school's upcoming musical during a codesign session was deemed not relevant although, ironically, one of our teachers eventually was delayed because of it.

The second criteria focused on events where a teacher voices a problem of practice. For example, in the audio record of the "Fast Pace" codesign session, we can hear Kate deplore not teaching rigorous explanations: "we do not do that anymore". A year later, this complaint was echoed by Melody at a codesign meeting. This led to the learning activity expanded in *Case 2*.

Video Editing

The first approach to video editing in this study is referred to as data mining (Goldman et al., 2007). This requires labelling videos for future analysis (Goldman et al., 2007). At first, I

utilized a rudimentary process where clips were cut out when they had no action in front of the

camera, no audio available, and when the members were clearly off topic (small talk). For

novice editors, such as myself, the data mining approach was easiest. However, by atomizing the

footage, the edited clip reflects an emphasis on research aims rather than practice aims. In

contrast, the second approach to video editing, is referred to as the narrative approach. It

attempts to "preserve the sequence of interactions" (Barron, 2007, p. 175). In this approach, a

"narrative function" is valuable for telling a story (Goldman et al., 2007, p. 15). In particular, the

narrative approach provides one way to address the tension involving loss of context by

organizing the montage into a coherent sequence of the event (Engle, Conant, & Greeno, 2007).

Cultural Historical Activity Theory Applied

This study is informed by the CHAT perspective's six intertwined elements – objects,

subject, roles, rules, tools and community (Engeström, 1999) – are discussed below.

Objects. The initial object of this study was to produce a video to catalyze teacher

reflection. This supports one of the long-term goals of the CCCM project, which was to foster a

sustainable professional learning community for teachers and consultants (Heo & Breuleux,

2015). This meant that the partners focus on a common object (Engeström, 1999) to support

instructional improvement in math (Little, 2002). In addition, the video was CCCM's boundary

object (Star & Griesemer, 1989), as it bridged the three communities of teaching, consultancy,

and research (Breuleux, 2017). Thus, this object had a short-term and direct goal: to facilitate

teacher reflection using video clips by crossing the boundaries of all three practices involved. It

also had a long-term indirect goal, which was to improve the practice of teaching mathematics

toward student success when transitioning from elementary to secondary school.

According to Engeström (1999) the need-related object of an activity determines the horizon of possible actions, each with its own set of goals. In other words, the parties must unite to reach an object (Engeström, 1999). In reality, though, one general guiding long-term object needs many smaller goals (short-term actions) to achieve the desired outcome. In this case, the edited videos actually catalyze reflection, in turn improving practice, in turn enhancing student success. Finally, through engaging with video as mediating object for teacher reflection, we can see the extent to which the activity of video editing can hinder or scaffold collective reflection (the intended outcome) and how "pleasurable" video research is (Goldman, 2007, p. 10).

Subject. As mentioned in the "Participants" section above, for the broader CCCM project we had about 40 subjects across the four years. For this study, however, the actual subject is me as it will be elaborated in the "Learning Video Editing" section. As a legitimate peripheral participant (LPP) (Lave & Wenger, 1991), I am one step away from the core of the CCCM project. When writing this report I am looking in from the outside, but when video-editing I was inside one of many other activity systems of CCCM project. In the transcript excerpts, my contributions are as 'researcher 3'. When the "we" pronoun is used, I am referring to myself alongside members of the research team (e.g., data collection was always done by at least two researchers). However, when the "I" pronoun is used, I am referring to myself alone in my home office editing videos.

Roles. To ensure smooth interaction, the RPP leadership team developed both general and specific guidelines for division of labour. In what ways did the RPP members assign, define and explore the role of video editing? For example, as documenter of this RPP, the research team carried the responsibility of collecting video data (multi-site travel coordinations,

equipment, storage, sharing, etc). In particular, as research assistant I was in charge of data collection, transcription, analysis, preparation of reports, and participation in project meeting. The task of video editing was not assigned explicitly to any of the participants, but I took it on. As another example, the school board's website provides, on the one hand, a detailed description of the role played by its consultants (e.g., the RÉCIT animator), including "just-in time coaching" (CEFRIO, 2006, p. 9), facilitating the group discussion (e.g. one animator's summarizing voice can be heard throughout the meetings). On the other hand, the teacher's role is not detailed on the website, yet according to teachers' interview responses, most explain their role as facilitators of mathematics teaching. We also had the Assistant Director of Educational Services on board. The mandate of this role was to support the development of professional activities of the school board according to the Quebec Education program (QEP). In summary, each partner occupied a reified division of labour.

Rules. CCCM had several group norms; I will only refer to two. The first was to "withhold judgement" by looking at teaching practice, not the teacher (A. Breuleux, personal communication, April, 2016). Second was the video lesson protocol which guided the procedures for video data collection and selection. Here, I will discuss how the protocol was developed, as it set the tone for all future filming activities. In 2015, the secondary consultant wrote the initial draft of the protocol (see Appendix C). While Goldman (2007) has reminded us that for Geertz (1973), the creation of video artifacts is not a formula nor a "recipe" (p. 32). Video requires more than simply distributing a questionnaire to participants. To help educational video researchers ascend from the abstract notion of constructing video narratives, there need to be specific standards. Yet books fail to show how to concretely produce a nonlinear narrative

around a particular theme at a particular point in time for a particular group of teachers. This

contradiction takes specific shape in every historical phase of the activity system (Virkkunen &

Ahonen, 2011). The following paragraphs will discuss the challenge of data reduction in the

context of mathematics teaching and CCCM.

      The guiding object of this thesis was to keep track of the kinds of tensions that emerge in

my quest to determine which part of the recorded activity should be presented to support

collective sessions of reflection amongst RPP members. As a consequence, the thesis's object

became the need to reflect on our video research method processes. This study reveals another

weakness of mirror data, as they need to be edited and this takes procedural knowledge. I have

witnessed a nested Sierpinski activity system (see Appendix D). As well, researchers need to

provide extra support to participants.

      Support for bitter mirror data. Sometimes the complex mirror data represents an

improvable practice rather than a "best practice" clip (Tochon, 2007, p. 61). This can be bitter.

Even when group norms ask the members to "withhold" judgement, the teacher's character is

still evaluated (Miller & Zhou, 2007). For example, Dona reacted to the loudness of her voice at

the first viewing of her own enactment during elementary meeting and the others agreed. Tobin

and Hsueh (2007) have referred to such reactions as the "tape recorder effect" (p. 91). The

beauty of a strong RPP is when members provide support to each other. Support must be robust

to sustain participation over time without letting the initial bitterness stifle professional growth.

In short, CCCM was successful at providing non-judgmental teacher support (Breuleux et al.,

2018).

      Tools. The reflection tools for CCCM were mainly the codesign and collaborative

reflections with video. These videos have been shown to be important in PD work; for example,

Meyer, Lampron, and Gazé (2014) have reported that teachers demonstrated an increased

"willingness" to significantly change their own practice after watching authentic classroom

videos (p. 76). However, as argued by Virkkunen and Ahonen (2011), the *quality* of reflection

depends to a large extent, on the quality of the tools used, in this case the video representations

of practice. Basically, to organize the activity, we made use of ubiquitous mediating structures

(Pea, 1993). These included concrete primary tools in the environment (computers), and

symbolic secondary tools (i.e., language), and lastly, tertiary tools, which are any artifact created

to advance the activity (i.e. video protocol). However, the quality of the video clips was

impacted both by hardware and my awareness of editing techniques. In fact, a video editing

adept would know that the first laptop was not designed to handle video editing. As a result of

this study, I have submitted a proposal to advocate for a change in institutional practice,

requesting that my university invests in data collection equipments, qualitative data analysis

tools, as well as provide formal training about how to use such tools.

Community. For our purposes, the terms professional learning community (Nong,

Breuleux, & Heo, 2015), research practice partnership (Coburn & Penuel, 2016), and community

of practice (Wenger, 1998) are interrelated. This is a sign of the project's success: the ability to

adapt within the constraints of the provincial political climate in Québec where PLCs have been

experienced --and criticized-- as top-down interventions. Such was not the case for CCCM,

since the RPP community nurtured a safe space where members learned to notice student work

(Kobiela et al., 2017) and situate their practice using videos (Goodwin, 2003).

Outcomes

Here I report on the outcomes of the two cases presented above using transcripts and fieldnotes. I begin with the outcome of *Case 1*, followed by the outcomes of *Case 2*. In short, this study points towards the need to make a distinction between video editing needs relevant to videos used to support collective reflection versus video editing needs to support solo reflection.

Outcomes *Case 1*

In this section I trace the dialectical movement of tensions and their (attempted) resolutions by recounting the ripple effects of Fall 2015 editing, where a 3-hour footage was atomized into clips: some as short as 40 seconds and others as long as 15 minutes. As a result of *Case 1*, three tensions arose: 1) video selection decisions may shatter RPP relationships, 2) teachers were added an extra task, and 3) the protocol in place was not flexible enough to accommodate scheduling issues.

Specifically, tension #1 occurred when our video subject, a secondary teacher, Lydia, expressed her intention to back out of future filming. The resolution of tension #1 was the inception of video lesson protocol v.1 where the roles of teachers and researchers were further specified in relation to the video process. For example, the researchers needed to give teachers at least seven days of viewing time before showing the clip to the entire group. However, the extra task of having to pre-select events for collective reflection led to tension #2: where teachers and consultants expressed their lack of time to watch raw footage in full. This brought us to resolution of tension #2: the research team would identify events, and then the enacting teacher would further select. However, this led to tension #3: the research team could not follow

protocol rules when collective meetings were not adjusted to classroom recording schedules, although this did not require a resolution because the project ended shortly after.

To continue with the events of tension #1, by Winter 2016, my field notes indicate that there was a recap of the incident, and that Lydia, "does not want to be recorded anymore". By Fall 2016, I finally heard the story behind the video protocol from the research associate's perspective during a car ride. She explained that the first version was written by the secondary math consultant and that the teachers did not comment when the draft was circulated during a f2f meeting. Table 4 showcases how researchers proposed to update and clarify the video-protocol.

Table 4

Fieldnotes Related to Video Protocol

Participant	Line	Excerpt	Notes
Researcher 2	**162**	distributed the draft protocol to discuss it	Rule setting instrument
Elem Consultant	**163**	maybe we can do it before lunch…	Time management
Researcher 2	**164**	**could we update the process? We don't have a clear idea of the video based reflection processes.**	**Asking for clarification**
Researcher	**165**	**from our point of view, we are interested in failures that can be productive,**	**Productive failures**
Educational services	**166**	**video stems linked to relevant moments. Cut 11, the teacher doesn't need to lead**	**Defining teacher task**
Researcher	167	interesting to get the others to talk about their observation…	Conversation starters
Educational services	168	11 and 12 not relevant….	determining relevance
Researcher 3	169	Vialogue instruction	Tool details
RÉCIT	170	process in the email…	Tool explanations email

Note. CCCM Lead meeting Jan 13, 2017 Typed Field notes, keyword "protocol".

In Line 165, the researcher opens the door to criticality by asking to look at improv*able* moments. My field notes indicate the conversation continued to reword the protocol; for

instance, we added "learning target" and removed the term "best moments" (to avoid judgement). In fact, the educational services partner preferred "relevant" moments. An example of irrelevant video moment is when I extracted the part where the teacher walks around the classroom and sprays a cleaning product on the students' erasable boards. It may seem innocuous, but it took a few minutes and made me think of the time saved if the teacher was not controlling the means for cleaning the boards. This was not a priority but it lingers in thinking about streamlining the learning environment.

Furthermore, the educational services partner deemed points 11 and 12 on the first draft of the video-lesson proctol irrelevant (see line 166). These points stipulated that "the teacher leads parts of the face to face meeting that shows the 'best moments' in his/her lesson", and then "the team reflects and discusses these 'best moments'". I recall the educational services asking us to remove the term "enactment" and add the term "implementation" instead (this is not in my field notes). I remember feeling how each person's role conjures a different interpretation of the terms "enact" and "implement".

In summary, by totally dismembering the classroom activity, viewers could not follow the *story* of the learning activity, plus it led Lydia to almost withdraw from recording activities. This withdrawal would have been in opposition to Lydia' initial sentiment about videos, as expressed at the end-of-year interview in 2014. Table 5 illustrates the teacher's expectation of video as a mean to connect with her enactment practices. This perception had propelled her to participate in video recording activities in the first place. We were delighted when she decided to continue participating in video-recording activities.

Table 5

Teacher Expectations of Video

Participant	Line	Excerpt	Notes
Lydia	198	I am really excited because, after watching the videos you showed us. I was like, **I wonder what i look like when I am up there,**	Video tool expectations
Researcher 3	199	hmm	active listening
Lydia	**200**	**because you are in your own head, all the time**	**too close to reflect**
Researcher	**201**	oh ya.	agreement
Lydia	**202**	**you have no idea like,**	**invisible practice**
Researcher	**203**	yeah	agreement
Lydia	**204**	**if something was clear or something wasn't**	**feedback on students**
Researcher	**205**	hmm	active listening
Lydia	**206**	**or if you are overdoing it, or if you are under doing it, like**	**Ped concerns**
Researcher	207	hmm	active listening
Lydia	**208**	**you don't know [chuckles]"**	**ergo makes visible**

Note. CCCM Interview_LMa_2014.

Outcomes *Case 2*

Below I recount the ripple effects of video editing a 19-hour footage into a narrative clip. As a general rule, I maintained a chronological time flow to sequence the video-data sources from all the phases. Consequently, the sequencing of *Case 2* falls under narrative editing. At the collective reflection meeting, RPP members spent less than an hour of the six hours at the collective meeting to talk about KKM. Although elementary teachers picked the "Krispy Kreme Me" activity to instil rigour by asking relevant math questions. The activity ended up generating a debate amongst students about whether they needed volume or area. Initially, this debate seemed necessary but the KKM activity was actually a geometric configurational multiplication not related to volume (C. Corriveau, personal communication, June, 2017). This reveals an unrelated content tension for future research: how come the teachers did not explain this to their students?

Moreover, RPPs have the potential to create spaces for "critical colleagueship" (Lord, 1994, p. 184), an ideal for teacher reflection (Sherin & Han, 2004). According to Lord, "critical colleagueship" occurs when teachers support each other to improve their practice. Actually, PD hinges on the quality and depth of teachers' capacity to reflect (Steeg, 2016). This is based on the assumption that reflecting on practice for productive improvement of teaching practice is not an intuitive task, just as McKenney et al. (2016) clarified that designing a lesson is not an intuitive task. That as it may be, the reflections in *Case 2* did not improve the KKM Learning activity. In fact, it has regressed to the point that this study suggests it should be used in English class rather than in math. Indeed, nearly a year later, in a brief small-talk conversation, a teacher shared that she made use of the KKM as a warm up, and no longer asks her students to do the calculations. Therefore, reflections via the video did not yield any concrete changes to the lesson: no amendments were made to the codesign sheet.

Furthermore, we know theoretically and from previous research that the chances of improvement are strengthened when teachers collectively question ineffective teaching routines (Little, 2002). This means explicitly selecting instances of improvable practice for collective viewing. In fact, the National Board for Professional Teaching Standards (2016) has suggested to "educate teachers to be critical examiners of their practice" (Lampert-Shepel, Murphy, & Kerin, 2018, p. 1). To this effect, Table 6 illustrates how researchers interjected criticality at a CCCM-Leadership meeting in August, 2016 (Line 10) and the secondary consultant was aware they are "ignoring the ugly" (Line 11). Six months later, criticality was back in the discussion (see Table 7, Line 131). Conversely, Table 8 is a case in point for lack of criticality. In Line 138, a teacher expresses that "not one person's way was better."

Table 6

Typed Field Notes. Keyword "Criticality"

Participant	Line	Excerpt	Notes
Researcher	**10**	**...my interpretation of where we are at we are a good point but we need to increase criticality collegial gentle matter but what needs to b/**	Critically dissect video
Secondary consultant	**11**	**/break the ice, we are embracing the good but ignoring the ugly.**	Ostrich
Researcher	**12**	**maintain climate of trust and comfortable with sharing more serious, deeper into teaching and learning issues,**	Collegiality & criticality
Secondary consultant	**13**	**hmm**	agrees

Note. CCCM Leadership meeting August 22, 2016.

Table 7

Typed Field Notes. "Criticality"

Participant	Line	Excerpt	Notes
Researcher	**131**	**increase the criticality of the video discussion, going into the nitty gritty**	Critically dissect video
RÉCIT	**132**	especially now that we showed them the outsider video	

Note. CCCM Leadership meeting Jan 13, 2017.

Table 8

Manifestation of No-judgment Norm

Participant	Line	Excerpt	Notes
kaci	**136**	**/ That's it. It was fun to see one video back to back, all the different ones. Like I took notes. "Maybe I should've done this, maybe I should've done that."**	Comparison
Kate	**137**	I did the same thing.	agreement
kaci	**138**	**It was fun, it was nice to see. And not one person's way was better.**	withhold judgment norm
everyone	**139**	Hmm	agreement
kaci	**140**	Not one person's way didn't work. It just lead to very different...	no critical evaluation

Note. CCCM f2f Elementary Reflection 20170322 Full Transcripts nb. PART III MVI_0768. Keyword "fun".

Additionally, videos were edited for solo teacher reflection by creating a montage of

KKM enacted by Sabrina and Kate. Each teacher received three complete capsules consisting of

whole group introduction and debrief for student group 1 (camera 1) from a to z. This produced

a one hour lesson. I repeated the same pattern for group 2 (camera 2) and group 3 (ipad). Then

uploaded three video clips per teacher on Vialogues and time-stamped parts of the clip. I had

hoped they would rewatch the intro and the debrief with each student group. However, this

backfired, both teachers commented on how easy it was to fast forward the lesson since the intro

and debriefs were the same. Indeed, watching a clip requires "active engagement" (White, 2009,

p. 405). Table 9, line 113 is a prime example of how teachers did not rewatch the video-clips.

Table 9

Feedback on Timestamps in Vialogues

Participant	Line	Excerpt	Notes
Kate	**113**	From group one. **So the audio was the same. It wasn't watching the whole hour lesson three times.** [several minutes later]	feedback not watching 3h
Kate	**128**	**But I really appreciate the time stamps on the Vialogues video.**	**Feedback on timestamps**

Note. CCCM f2f Elementary Reflection 20170322 Full Transcripts nb during PART III MVI_0768 key vialogues.

One full cycle consisted of: 1 codesign, 4 enactments, and 3 reflections yielded 19 hours

of footage. This was reduced into a 37-minute edited clip (barely 3%) of the entire footage (see

Figure 8). Plus as, Bateson (1976) warned, the camera only captures 1% of what occurred (p.

78). This 3% took 75% of my time (see Figure 9). Figures are colored to match the key

activities. As such, a 12 hours of enactment is denoted in grey, and it took 36 hours to watch. A

2 hour codesign is orange, and it took 6 hours of watching.

In summary, to edit rigorously I embarked on an iterative cycle of watching, noticing,

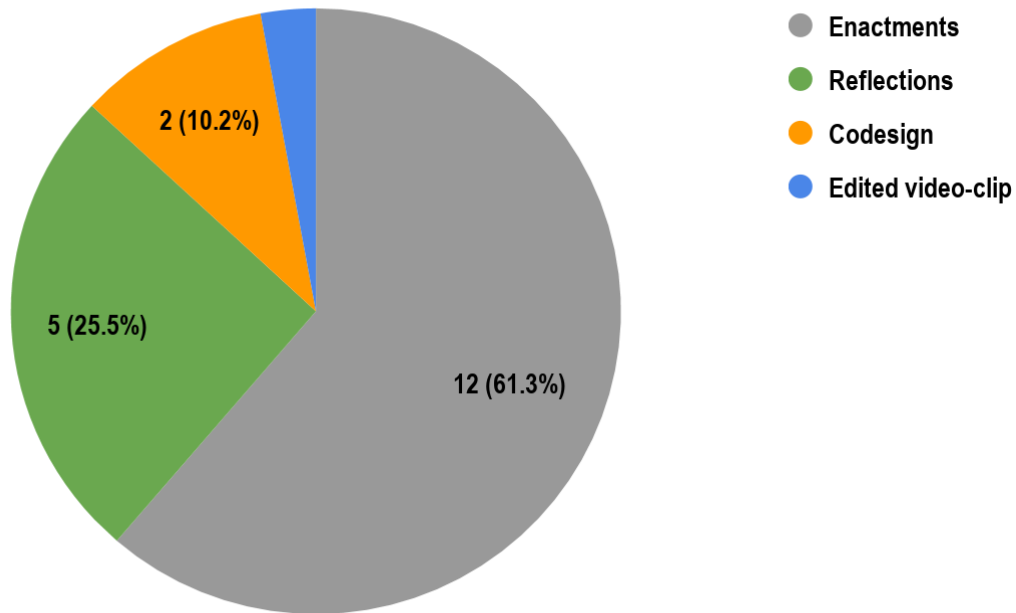rewatching, and cutting (Jordan & Henderson, 1995).

Figure 8. One full cycle on Krispy Kreme learning activity (19 hours of footage).
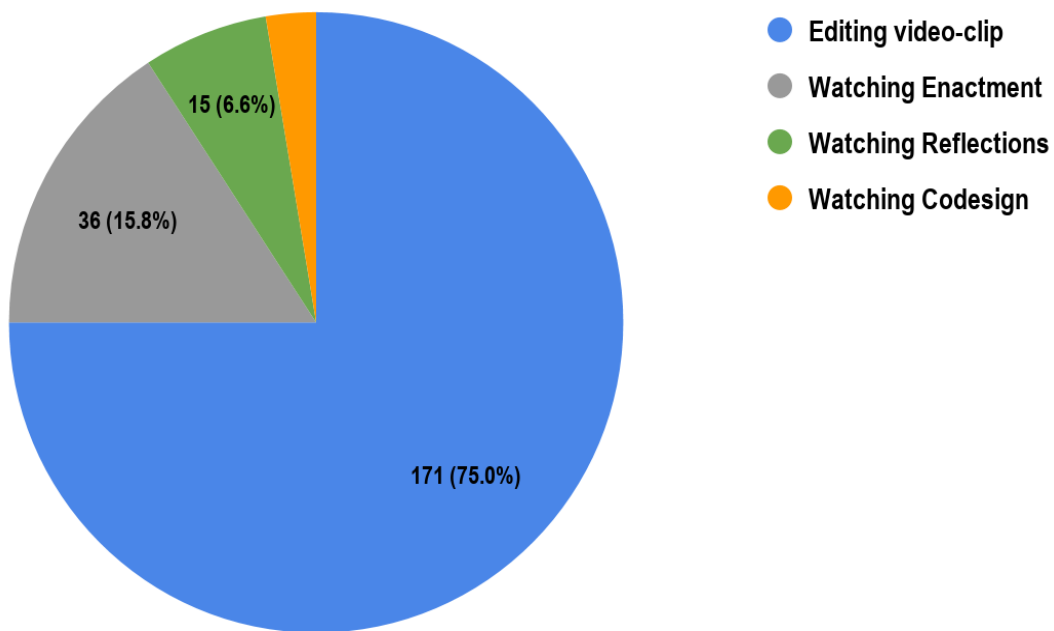

Figure 9. Watching and editing one full cycle on Krispy Kreme learning activity.

Tensions Encountered

In this section I will discuss the general tensions that were encountered in the activities of video selection and editing; technological tensions, selection factors, and ethical considerations. This will be followed by the "Discussion" section.

Technological tensions. There were innumerable technological concerns that arose because I, a researcher, lacked software knowledge and this hindered the careful extraction of video data. Throughout the process I asked myself: can there be a technical standard? Derry (2007) has considered whether video research might benefit by having standards for videos. Other Learning Sciences scholars have addressed the questions of "systematization" in video selection (Goldman, Erickson, Lemke, & Derry, 2007, p. 15). According to them, video technology provides for comprehensive analysis, since we can get into a finer grain of interactional details and we can store video data for reanalysis by multiple investigators at any point in time (Goldman et al., 2007). Such a discussion is important in creating video clips to attain what Dewey (1986) refers to as "warranted assertabilities" (cited in Gelfuso 2016, p. 69), in other words, justified claims. According to Gelfuso (2016), to operationalize reflection, the teacher educators must explain to participants that they will be examining their beliefs about teaching and learning.

Additionally, having only one set of audio enhancers directly impacted our data quality. Actually, without proper sound quality, the teacher does not view the clip. As Atkinson dramatically puts it, producing videos from a classroom will have more audio problems than a "war zone" (Baron, 2007, p. 172). Table 10, Lines 119 to 126 indicate how audio difficulties directly impact which student groups are watched (with mics) and which are not (without mics).

Table 10

Audio Difficulties Hinders Watching

Participant	Line	Excerpt	Notes
Kate	**119**	So I had a **lot more to say about that group that I watched, because I could hear them more. I was a bit disappointed from that point of view.** And then the other group, there was a girl who by far is the weakest math student in the class, who ended up somehow being a group leader.	Technology difficulties impact what's watched plus Assessment of student character
	120	[laughing]…. [A while later]	convivial
Kaci	**124**	**That's our reality too, right? Because we don't have you guys, we don't have this stuff. I used iPads, and to have six groups of three in one class, you would never hear.** So then you have them spread out into the hallway. Then it means that I **definitely have to listen to their recording, because I heard nothing. And then you get the recordings and you can barely hea**r.	Owning and access to video means plus technological difficulties
Researcher	125	yeah	agreement
Kaci	**126**	**Like a muffled... you have it on max and you're like, "uh?" It's hard. Technology is always a…**	**Audio difficulties**

Note. CCCM f2f Elementary Reflection 20170322 Full Transcripts nb.

Selection tensions. In addition to the technological tensions, this study witnessed

tensions when deciding which part of the raw footage makes it to the final clip. To cut or not to

cut? This echoes LeFevre's (2004) video content concerns as I wondered whether to show

student mastery or struggles (Little et al., 2003). A second dilemma pertains to issues of

representativeness and validity claims that I cannot make once I "cherry pick" (Erickson, 2007)

clips from a larger video corpus. This second dilemma is not pondered upon in this report

because it deserves a more detailed analysis that this thesis can not perform.

The first, contradiction, is illustrated through the discussion on the need to balance

succinctness with context at the same time (see Table 11, Line 369). We had paused the

elementary enactment video to discuss a blackboard note "1D" (see Figure 10). Consider how

secondary teachers make sense of the teacher's blackboard visual representation of KKM

activity.

Table 11

Articulation of Double Bind

Participant	Line	Excerpt	Notes
Ellen	**357**	**That's where, when you have the explanation, we would've known that that was a D, right?**	Missing context
Lydia	**358**	Yeah.	
Researcher 3	**359**	mhm	
Lydia	**360**	Okay.	
Researcher 3	**361**	But it goes to show how important labelling is, right?	
others	**362-4**	Yeah.	
Researcher	**365**	**And it's also... I mean, right, it's not fair to look at this without the context**	Need context
researcher 3	**366**	mhm	
Researcher	**367**	and without having further info,	
Lydia	**368**	Right.	
Researcher	**369**	**so we have to be careful. One of the things that I'm interested in getting from this conversation is, to what extent this kind of video, ok, with the combination of the design, the implementation, the debriefing, how much is that useful for the work that we're doing in this group? How can we improve that? Because without precipitating the conversation around that, we have dilemmas. We don't want to show a thirty minute clip, a sixty minute clip, with all the details, but then we don't want to kind of short circuit the capacity to make sense from the clip.**	Dilemmas
Lin	**370**	**But this is also reflective of when an exam is given out**	

Note. CCCM f2f Secondary Reflection 20170320 Transcripts Full nb. PART 3. MVI_0758 [Lines 357-370].
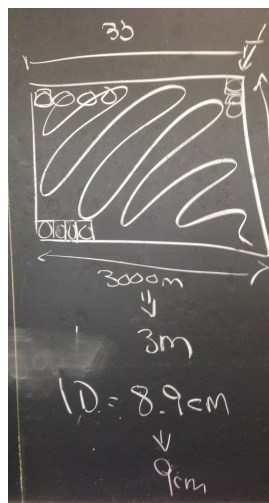

Figure 10. Teacher's blackboard representation.

The discussion above indicates, the need to balance context and duration is compounded during collective video reflections. In fact, line 365 also expresses the editor's double bind. While Lin connects the clip to something within their reality, when the students' articulation on assessment does not show their process, it is hard to understand their solution (see Line 370). Lin had over eight years of teaching experience. It was her first year with CCCM project.

The second contradiction is the excerpt in Table 12, line 130, indicating how a teacher is comfortable not taking any decisions about video selection. This means they are not actively engaged in watching and rewatching.

Table 12

Decisions About Video Selection

Participant	Line	Excerpt	Notes
Researcher 4	110	So maybe one of the next steps for the project would be to do that across the cycles in elementary, and also to set them up. When we, **as nb mentioned, when we need to select, cut and put together clips from the first meeting, and then different classrooms. So we had to make decisions. We cannot represent everybody, everything. We need to make decisions. But if you have any thoughts on how we could continue doing that... Maybe better, do we, would you like to see more different, on your own. We could put some of that on Vialogues. Last time the comment was, it's too time consuming for everybody to watch the three hour videos from your class, because they're three groups of about an hour**. [15:00] So that's when we decided to get... Yeah. Kate?	To save time decision making onto researchers
Kate	111	It **was much easier this time, with the stamps on Vialogues**. Because I ended up really watching it once. So I randomly picked group one and I watched it all the way through. But then when I watched group two and three, **I skipped all the whole group stuff, because I knew that I had just got it from a slightly different camera angle**.	**Editing and Web tool positive feedback**
Researcher	112	Yeah. [...]	
Kaci	130	**I can't say anything. I was videotaped yesterday. You made all the decisions. I didn't have anything to do. So that was great. Thanks.**	Time limitations at play
	131	[laughing]	
Dona	132	True story.	

Note. CCCM f2f Elementary Reflection 20170322 Full Transcripts nb PART III MVI_0768.

As good as Kate's video feedback is Kaci's testimony indicates that in reality, a video may be edited overnight without teacher input to accommodate multi-sited teacher PD. The need to edit for next-day collective meeting makes applying the rules of the new version of our video-protocol untenable. Nevertheless, as editor I take solace in my work as I hear positive teacher feedback on video editing (Table 13). In Line 247, Sabrina, an elementary teacher with fourteen years of experience, captures the value of video montage at the end-of-year interview. This was her third year participating in CCCM. This illustrates a strength of montage video editing as it provides the teacher with window into different versions of the same lesson.

Table 13

Teacher Feedback on Video Editing

Participant	Line	Excerpt	Notes
Researcher	242	But I'm interested in your thoughts on that process.	Open-ended
Sabrina	**243**	**Okay, so how we all did the same activity, and we viewed, then, each other's versions of it in the classroom,**	See different versions
Researcher	244	yeah	Active listening
Sabrina	245	and how the students responded?	Looking at student work
Researcher	246	Yes.	agreeing
Sabrina	**247**	**I thought that was... I mean, it was probably one of the most valuable activities that we've done so far, in terms of the videotaping, because it was much easier to compare, and contrast too, you know, the students' reactions, the students' results, the students' success at everything. So...**	**Montage feedback**

Note. CCCM Interview_SD_170517 Coded nb line.

Ethical tensions. Apart from technological and selection tensions, I encountered ethical tensions. In this study ethical tensions arose when the research team had to make selection and editing decisions.

Additionally, I encountered ethical tensions in regards to unspecified rules of engagement for the video method. Moreover, I wondered what happens when not everyone consent (Pepler & Craig, 1995). For instance, in *Case 1* I was more concerned about a student who had not given consent than analyzing the math talk of students whose permission we had obtained. I struggled with the need to anonymize data but simultaneously provide the audience with nitty gritty details (Ash, 2007).

To summarise, in this study I attempted to analyze the effects of a data mining approach in *Case 1* and of a narrative approach in *Case 2*. In essence, for *Case 1* I atomized a one hour enactment video from a secondary class while for *Case 2* I stitched four teacher enactments of one learning lesson recorded at four elementary classes located in three different schools. However, it is important to highlight, that at the time I was unaware of video editing approaches in the field of educational research. In brief, the decision between a narrative and mining approach resides in the researcher's object (Goldman et al., 2007). In light of tensions encountered, I would add, the choice of approach also resides in the researcher's editing skills. As evidenced by *Case 1* it was easier to create tiny segments using deductive logic and chunk themes by blading (cut) the footage without having to zoom-in on the nitty gritty. Once cut, I could label for analysis later without transition, therefore, no suturing required. Finally, the outcome of these cases led the research team to problematize our video processes as *Case 1* threatened the RPP relationships and *Case 2* was too long to allow viewers to take in all the information. This threatened RPP member's deep reflection on the lesson enacted.

Discussion

In this discussion section I share the personal learning that I have experienced and that can be useful to others engaging in similar research using video as a tool to support reflection, in education. My observations on video editing activity reveal that it should produce hybrids: a deliberate montage where video data is both mined and sequenced into a narrative focused on the learning activity's structure (Goldman et al., 2007). And this hybridity is not just instances of combing data mining approach with narrative but also constructing prompts to be used before, during, and after viewing.

> For videos to function as provocation and stimulus, they must be hybrid constructions, blurred genres that are simultaneously social scientific documents and works of art-- if they come across as insufficiently systematic, they will be dismissed for lacking rigor; if they feel insufficiently artful, they will be ignored for being boring and visually unappealing (Tobin & Hsueh, 2007, p.79).

In other words, Tobin and Hsueh (2007) have advised video editors to be mindful of scientific rigour (accurate representation of events) and art (visually appealing). If one or the other is absent then viewership declines. For example, it was too hopeful to assume that a 37-minute video clip could support rich collective reflection. In fact, Erickson (2007) clarified that a strip may be as long as two and a half minutes but, usually it should be less than a minute in duration otherwise it overloads audiences with too many informational details. As editor I read this caution rather later in the project. For this reason, editing should start by balancing context, duration, and audience expectations from the beginning (Tobin & Hsueh, 2007).

As the above outcomes reflect a research study that utilizes both RPP and videos will have several occasions to encounter tensions. Indeed, RPPs do not exist without tensions (Cobburn & Penuel, 2016). These tensions, however big or small, put constraints on professional development (Rogoff, 1995). Basically, video use in the context of video pedagogy

is not "tensionless" (Miller & Zhou, 2007, p. 321). Nonetheless, the unfolding of these events

indicate that the videos enabled members of this RPP to cross the frontiers between the

classroom, enactment, and reflection. Therefore, the object of the three activity systems

undervent expansion (ACFAS, 2017 Symposium). For instance, in the first two years of the

CCCM project, the research team conceptualized the diagram of iterative cycles of activities as

three rectangles one looping into the next (Codesign→ Enactment→Reflection) with a box in the

middle "inquiry/facilitation" (see Appendix E). At the time only enactment rectangle included

video. By year four we had four key activities, and the video component was used in all the

cycles. Below I discuss what I have learned about editing videos.

Learning Video Editing

> [Videos] have the potential to support teacher learning as well as the kinds of learning we
> might expect (Sherin & Sherin, 2007, p. 47).

This section covers learning outcomes from my perspective as research assistant editor. It will

be followed by "Study Limitations" section. Sherin and Sherin (2007) asked what is learned with

and from video. As editor I learned it is not possible to manage the camera and take notes on a

computer simultaneously. Such an attempt yields mostly inadequate notes. Additionally, I

learned that I, too, am a cautious editor: I keep everything from the classroom, because all pieces

are integral for reflection. This feeling, similar to Goldman-Segall's consideration of all her

footage as "sacred" (p. 128), opposes the view that the main point of video editing is massive

reduction (A. Breuleux, personal communication, May, 2017).

Mainly I learned, after two years of working in the field of educational research, that

video is not a standalone media (Miller & Zhou, 2007). If I had read the book *Video Research in*

the Learning Sciences before starting in the field, perhaps I would not have committed the error

of assuming the "video data will speak for itself" (Roschelle, 2000, cited in Miller & Zhou, 2007, p. 323). As Tochon (2007) would say, the context of a case is often found in the "accompanying text" (p. 63). Thus video clips need titles, subtitles, chapters, transitions, and solid facilitation skills. But what kind of font and size? How long should the text appear? All these become nitty gritty question that take time, unless we have a protocol. To learn about the mechanics of video editing I used YouTube to find Final Cut Pro tutorials and got two face-to-face tutorials by a McGill media contact found through the education department's resource person. I learned about the settings required to compress data and to stop automatic rendering. I learned to add transitions (though not clear about how many seconds), to use the "Ken Burns" effect to zoom into particular segments of a picture, accelerate, time stamp the footage, to "mark" events, along with layering of different mediums, text, audio, video, and pictures. Learned to add timestamps to trace events back to original clips. Pacing was also an important aspect in the process. For example, only 1 out of 4 teachers checked in with us before she began her lesson, this allowed us to press "record" on time. With others, my timing was off, and thus some parts are not recorded.

Finally, I have viscerally learnt (vivencia *à la* Freire, 1970), what Margaret Mead (1995) asserted about how it is better to be an "ethnographer *and* a filmmaker" (p. 7, italics added). I need to become an educational ethnographer and filmmaker to improve my practice. This is important because instead of spending my time analyzing data, I spent countless hours outside of the field, editing footage which led me to adapt the video workflow by Pea and Hoffert (2007) in Figure 11.

In summary, Luttrell (2010) has used the term "daunting" to describe the task of systematising and honouring the wealth of information communicated through photography (p. 225). This applies to videos; I would argue the task is even more daunting.
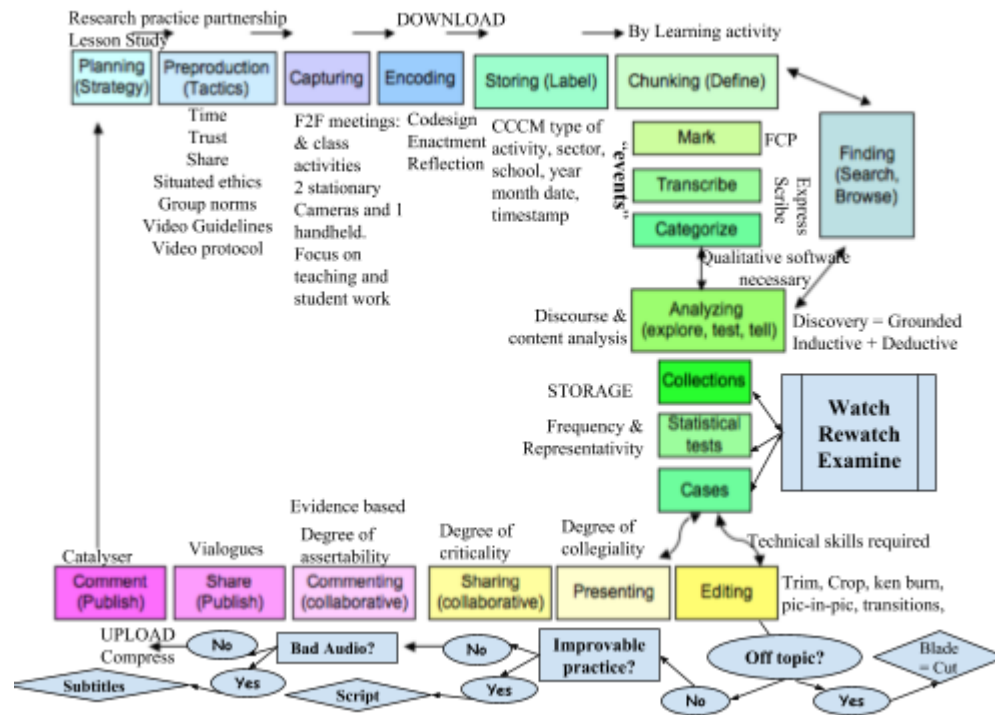

Figure 11. Adapted Pea & Hoffert (2007) video workflow.

Study Limitations

Several limitations are accounted for in this section. First, this thesis is yet another first-person reflection written from a researcher perspective (Coburn & Penuel, 2016). Therefore, the vacillation between CCCM (the we) and editing (the I) demonstrates how my subjectivity, my personal microsystem (Bronfenbrenner, 1979; Rogoff, 1995) influenced the collection, editing, and interpretation of videos (Birks, Chapman, & Francis, 2008). For this reason, there is no coverage of how other members lived through the meetings with the mirror data, because the process of preparing videos for reflections took longer than analysis of teacher's enactment of the lesson.

A second limitation is felt via Blumer (1969) criticism of scholars who embarked in social life without firsthand acquaintance. Such was my case, I had no technological pedagogical content knowledge in mathematics. Due to this outsider position, I remain unaware of what takes place in a classroom on "any given day" (Blumer 1969, p. 35, cited in Becker, 1998, p. 11). A third limitation is that the video camera on a tripod was not "a silent observer" (Harel, 1991, p. 449). I was neither an invisible or a silent observer. A case in point is available in the records of the elementary reflection meeting.

Barron (2007) rhetorically asked how does one decide which events to look at, and immediately responded that the *wise* researcher develops a "systematic approach" to categorizing video events (p.173). This wisdom is not in a neophyte's start up tool kit but it can be acquired through formal training and by the deliberate practice of video editing in RPP.

At the end of my first year (2015), I experienced the limitations of hand writing notes during meetings. By the second year I began taking my laptop to the field while feeling guilty that it was a noisy solution and soon realized that no matter how fast I typed, I could not catch up with the dynamic conversations. Therefore, I began to advocate for collective editing and collective note taking by sharing the link to Google Docs. However, this so-called "participation" was limited (Cashman et al., 2008). According to Cashman et al. (2008), there are degrees involved in the extent of participation, determined by each partner's willingness to partake. In fact, Minkler and Wallerstein (2008) have reported that participation drastically diminishes during two stages: a) data analysis and b) interpretation.

For example, in Table 14, Dona, an elementary teacher with nine years of experience, ascribed the role of watching mirror data to the researchers during her first end-of-year interview

in May 2017. At the time, we did not know it would be CCCM's last year. Her response

assumes that we, the research team, know what we are "looking for" (see Line 144). In this

practical argument researchers are positioned as selection experts.

Table 14

Teacher Assigns Role of Video Selection to Researchers

Participant	Line	Excerpt	Notes
Researcher	**141**	**That's interesting. So at one point we talked about, in the group with the other teachers, whether to ask the teachers to view the entire recording of, let's say, your class, to identify moments you might want to share with the other. But that's time consuming, so the general consensus was us, the research team, picking a couple of clips. What's your position on that? Do you prefer viewing the whole thing yourself, or us doing it, or?**	**Asking participant's preference**
Dona	142	To be honest, because the purpose of the... You know, you are the researchers, right?	
Researcher	143	mhm	
Dona	**144**	**You guys know what you're looking for, and what you're trying to... I think when you're a researcher you're trying to kind of see where things are going, and you kind of have a better idea of what could maybe produce more of a discussion than I would, right?**	**Researcher as expert selecting footage**
Researcher	145	hm, um/	
Dona	146	/That's my opinion. You might see it differently because what you necessarily think might be there, might not come up, right?	
Researcher	147	That's right. That's right.	
Dona	**148**	**But no. Because honestly going back and watching, I wouldn't know what to say is…**	
Researcher	149	mhm	
Dona	150	Other than, "oh her point was a good point."	
Researcher	151	mhm	
Dona	**152**	**Like a student who said something that was a relevant point. You guys can kind of... kind of**	

Note. CCM Interview_DN_170519 Coded nb. The first and last end-of-year interview with DN.

Furthermore, in reality, when we film to obtain authentic video footage of classrooms

and teacher meetings, we cannot rewind the actions of the members. In educational video

research, there is no chance for a mulligan. That is, there is no chance of asking teachers and

students to hold for dissolve to fade one clip into another; if there is no buffer, the dissolve becomes obvious.

Moreover, limitations also reside in the non-exhaustive literature review. Particular space was given to English articles with video-editing, selection and video reflection in their title. Lastly, not all original works were read. For all of the above-mentioned limitations this self-study is not generalizable. Next, I discuss this study's implications and paths for future research.

Implications

Some would believe that I got sidetracked with the video aspect of the CCCM project. For many, video editing is just a minor aspect of studying the dynamics of a RPP. Yet it consumed the majority of my time. This self-study suggests that it may be time to view video editing as an important cog in the orchestration of the ideal scenario for effective iterative lesson study cycles (i.e, video-based reflection). Why is it important for researchers in education to take into account editing requirements that influence the production of rich artefacts? Because videos need to be tailored and this takes time and skills. If not, it detracts time away from other aspects of conducting research, namely, producing a clear written report of the results. In particular, if researchers aspire to have the video play a facilitation role, a person act as mediator. Consequently, we must learn video facilitation and video support techniques to improve teacher reflection. Future paths are discussed below.

Paths for Future Inquiry

In the future, we could incorporate a third model of reflection: video as tool (Maher, 2008), by instituting a pre-watching ritual to tackle the same math question with a didactician. This might consequently facilitate explicit lesson analysis (Santagata & Angelici, 2010).

In other words, as Roschelle (2000) posited, for explicit lesson analysis to occur a didactician must support teacher learning (Coles, 2014). First, we could start with the conditions that provide the optimal level of richness to promote transformation of practitioner's zone of actual performance (ZAP) (Lompscher, 1999). Then, we could perform, a complete content analysis of the meetings to draw any conclusion about the effectiveness of using edited video clips as springboard for collective discussion on practice.

Additionally, we can also cowatch with a mathematics PhD student to closely examine the teacher's mathematical explanation and gestures, for instance, Kaci when she gestured with her arms parallel to indicate the "flatness" of a box or Dona's use of the Kleenex box to indicate length, height and width, during the enactment of the KKM lesson. According to Alibali and Goldin-Meadow (1993), gestures are rich in uncovering student's understanding (in our case, teacher understanding). Also what would the final video clip look like if a teacher edited it? Would it differ from a researcher mathematician selection?

Lastly, some researchers have argued that we are saturated with guidelines to the point that the field cannot be enriched by yet another "know-how" mainly inductive research report on a few situated cases (Goldman et al., 2007). It is true that a group's step-by-step procedures may not be useful for another, but this study would have benefited from having access to resources for managing the video corpus. Therefore, this study also suggests the need to update the decade old

Video research in the learning sciences book. We could begin by adding "shoot to edit" tutorials

(Barbash & Taylor, 1997, p. 123) to collect better footage and then dedicate a module on video

editing.

In summary, this researcher requests a second chance at the CCCM video corpus in order

to select and edit better, and to sharpen our next assumptions while shattering others. Lastly,

there is a palpable need for "frame-by-frame analysis" (Goldman, 2007, p. 27). In the following

section, I present my concluding remarks.

Conclusion

This study described some of the tensions that arose while editing raw video footage

collected from "My Favorite No" and "Krispy Kreme Me" learning activities and the outcomes

of these editing decisions. There is a void in educational research; in particular, literature rarely

describes post-production procedures in the context of collective reflection in cross-sectional

teacher groups. We presume that videos created for collective reflection are the same as videos

for solo reflection. Such is not the case. The purpose of this thesis was to open up a discussion

about video capture as a research method, and to problematize the implicit assumption that

videos require the same processes regardless of the type of reflection. For solo reflection,

researchers may not need to edit the video if teachers can commit to watching the entire footage,

but for collective reflection meetings, the video has to be carefully selected and edited. Finally,

the outcomes suggest that for meaningful actionable reflection to occur, RPP members must

cowatch and surgically coedit (through weaving illustrative clips and suturing skillful

facilitation) prior to the reflection meeting. Since data does not exist unaltered (Bateson, 1972)

we might as well learn to alter it appropriately.

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Appendices

Appendix A

Reflection Questionnaires V. 2

Reflection on Learning Activities

Learning Topic			
Name		Date and Time	
Class	Grade:	Number of students:	

Before the Learning Activities:

1. What are student learning objectives?

2. What are your target teaching practices? (Choose two or more teaching practices)

- ☐ Teaching toward an instructional goal
- ☐ Eliciting and responding to student thinking
- ☐ Orienting students to each other's ideas
- ☐ Positioning students competently
- ☐ Establishing and maintaining expectations for student participation
- ☐ Representing student thinking key ideas
- ☐ Using a public record of student thinking

3. Brief description of the learning activities

4. What do you anticipate to see in terms of students' work?

5. What data will be collected to monitor that students have met the objectives?

After the Learning Activities:

6. Review of the student leaning data (e.g., video clips)

    a)   What do the data tell you about student thinking and learning?

    b)   What were your surprises and/or difficulties?

7. Reflection on your target teaching practices

8. Reflection on the overall learning activities (including students learning)

9. Future planning:

    a)   How would you revise learning objectives and teaching practices?

    b)   How would you apply it to your future class and students?

Reflection Questionnaires V. 3

Reflection on Learning Activities 1

Learning Topic			
Name		Date and Time	
Class	Grade:	Number of students:	

1. After reviewing the video footage, reflect on the overall learning activity.

    a) Write a brief description of salient moments (Please provide Vialogues time stamps).

    b) Explain how and why you enacted the learning activity in this way. Refer to the practices of high quality teaching (see Table 1 below).

2. Review of the student learning data (including the video data)

    a) What do the data tell you about student thinking and learning in relation to the learning target?

    b) Were there any surprises and/or difficulties?

3. **Future planning**

    a) How would you revise the way you implemented the learning activity, the learning target and/or the target teaching practices?

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Reflection on Learning Activities 2

Learning Topic			
Name		Date and Time	
Class	Grade:	Number of students:	

Table 1: Practices of high quality teaching from *"High Leverage Practices"* (TeachingWorks, University of Michigan, 2013) http://www.teachingworks.org/work-of-teaching/high-leverage-practices

❏ Teaching toward an instructional goal	Composed of two categories: 1) *Learning targets*, inform students what is expected of them to learn. 2) *Target teaching practices*, describe what you plan to teach (road map).
❏ Eliciting and responding to student thinking	Describe how you elicited students' thinking (e.g., the initial questions you asked, student responses, and your reply, etc.) Describe how your questions helped students reach the mathematical instructional goal. Why did you choose to orient students in this manner?
❏ Orienting students to each other's ideas	Describe how you oriented students to each other's thinking (e.g., the wording you used, etc.). Why did you do it in that way? Why was this move important for supporting students' learning of your particular mathematical instructional goal?
❏ Positioning students competently	Frame mathematical ideas and their use in a way that productively challenges students without going beyond their abilities. (*See 'Cognitive Demand'* http://map.mathshell.org/trumath.php#truframework)
❏ Establishing and maintaining expectations for student participation	Select instances where: 1) you set specific expectations for student' mathematical participation; 2) you maintained expectations for mathematical learning. Describe how you set particular expectations within each phase. How did you help students make sense of these expectations? How did you hold students accountable to these expectations? (Please move beyond classroom management expectations, such as raising hand, etc). Why were these moves important for targeting your specific mathematical instructional goal?
❏ Representing student thinking	Referring to your mathematical instructional goal, describe how you represented student mathematical contribution. Why did you choose to represent the students' mathematical thinking in that way? (e.g., Describe what you drew on the board to represent students' thinking.) Why was the move important for supporting students' learning?
❏ Using a public record of student thinking	Describe how this activity will make students' thinking and work visible. For example, photo album of projects, math journals, posters, class book, chart paper, on smart board, blackboard, white board, Padlet app. For more examples: https://onedrive.live.com/view.aspx?resid=4AC891949A1871F1!1644&it hint=onenote%2c&app=OneNote&authkey=!ABiqb8v0EZhHAJ8

Appendix B

Krispy Kreme Me Lesson Plan

Note: Why did not they fill assessment? Perhaps because the design of the Codesing template put the assessment question towards the end. This design flaw brings the topic of evaluation at the end of meeting, too tired to tackle.

From: HayleyHutchison
07/10/2014 13:21:36

Hi Graham,
We hope the information below helps:
The box was created to allow 3 x layers of ▢ doughnuts (▢ x ▢ doughnuts on each layer)
Each doughnut is approximately 89 millimetres in diameter.
The box is 3000 mm x 2300 mm which allows a gap between each doughnut to sit comfortably.
We do not have any schematics to share as they are for internal use only but we wish you all the best with your class.
Kind regards,
Krispy Kreme

Appendix C

Progression of Video Lesson Study Protocol

Video Lesson Study Protocol
CCC-M 2015-2016

1. Research team (and consultant) meets with teacher to plan a date and the focus of the lesson.

2. Research team sends Reflection Sheet to teacher.

3. Teacher completes the pre-lesson reflection which includes highlighting the two Practices of High Quality Teaching that will be enacted during the lesson.

4. Research team (and consultant) records the lesson.

5. A conversation about the lesson can occur immediately after the lesson with the consultant (and research team), if time allows.

6. Research team prepares raw footage of lesson (video recording of entire lesson).

7. Raw footage is sent to teacher and consultant only first.

8. Teacher is given 7 days (minimum) to view the footage and complete the Reflection Sheet.

9. Teacher meets with educational consultant (and one research team member, if teacher agrees). Together, they will select video stamps of the "best moments", the moments that highlight the Practices of High Quality Teaching.

10. Research team prepares video footage of "best moments" (identified by both teacher and consultant only) to share with the rest of the group.

11. Teacher leads part of the face to face meeting that shows the "best moments" in his/her lesson.

12. The team reflects and discusses these "best moments".

CCCMVideoLessonStudyProtocol2015-16_Final

Video Lesson Study Protocol
CCC-M 2015-2016

1. Research team meets with teacher to plan a date and the focus of the lesson.

2. Research team sends Reflection Sheet to teacher.

3. Teacher completes the pre-lesson reflection which includes highlighting the two Practices of High Quality Teaching that will be enacted during the lesson.

4. Research team (and consultant) records the lesson.

5. A conversation about the lesson can occur immediately after the lesson with the consultant (and research team), if time allows.

6. Research team prepares raw footage of lesson (video recording of entire lesson).

7. Raw footage is sent to teacher and consultant only first.

8. Teacher is given 7 days to view the footage and complete the Reflection Sheet.

9. Teacher meets with educational consultant (and one research team member, if teacher agrees). Together, they will select video stamps of the "best moments", the moments that highlight the Practices of High Quality Teaching.

10. Research team prepares video footage of "best moments" (identified by both teacher and consultant only) to share with the rest of the group.

11. Teacher leads part of the face to face meeting that shows the "best moments" in his/her lesson.

12. The team reflects and discusses these "best moments".

Video Lesson Study Protocol

1. Teacher plans a date and the focus of the lesson with consultant and research team.

2. Research team sends Reflection Sheet to teacher.

3. Teacher completes the pre-lesson reflection ("Before the Learning Activities") which includes highlighting Learning Targets that have been selected for this lesson.

4. Research team (and consultant) records the lesson.

5. A conversation about the lesson can occur immediately after the lesson with the consultant (and research team), if time allows.

6. Research team prepares raw footage of lesson (video recording of entire lesson).

7. The research team will upload the raw footage on Vialogues.

8. Teacher is given approximately two weeks to view the footage, to leave comments on Vialogues, and to send the completed post-lesson Reflection Sheet to the research team and consultant.

9. Teacher meets with consultant (and research team, if teacher agrees) to reflect on the lesson and to select relevant moments highlighting the identified Learning Targets (#3).

10. Research team prepares video footage of the relevant moments identified (# 9) to share with the rest of the group.

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Video Lesson Study Protocol

1. Teacher(s) complete "(Co) Design of Learning Activities" lesson plan and send completed form to research team.

2. Teacher organizes a date and the focus of the lesson with consultant and research team.

3. Research team (and consultant) video records the lesson.

4. If time allows, the teacher discusses with research team (and consultant) their immediate reaction to the lesson.

5. Research team prepares raw footage of lesson in consideration of the highlighted Learning Targets (#1) and the teacher's feedback (#4).

6. Research team will upload the footage (#5) to Vialogues.

7. Teacher is given approximately two weeks to view the footage, to leave comments on Vialogues, and to send the completed sheet "Reflection on Learning Activities" to research team and consultant.

8. Teacher meets with consultant (and research team) to reflect on the lesson and to select relevant moments highlighting the identified Learning Targets (#1).

9. Research team prepares video footage of the relevant moments identified (#8) to share with the rest of the group.

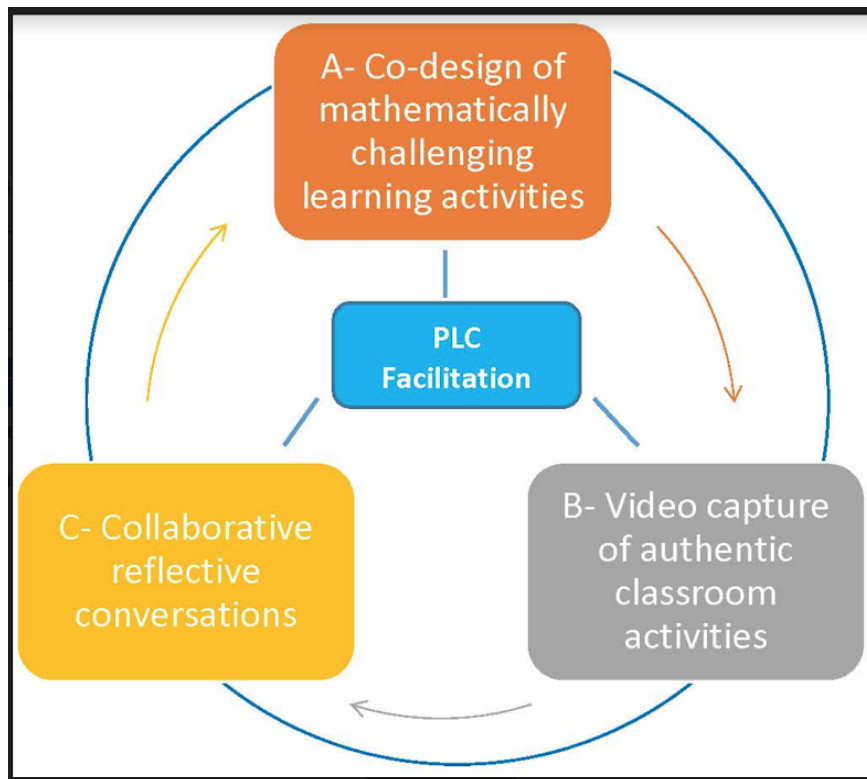Riverside School Board   February 10 2017   McGill University
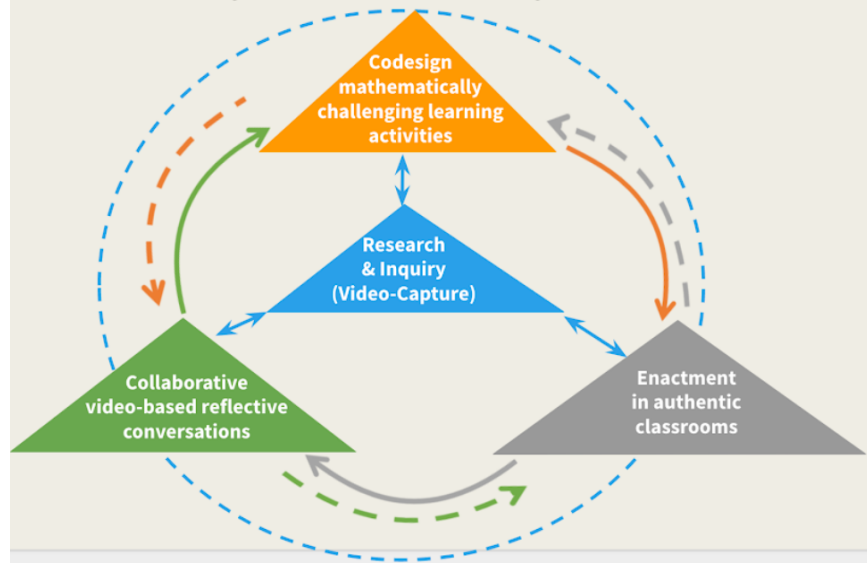
Appendix D

CCCM Sierpinski Concept Maps

Note. These can be made into computerized diagram if necessary.

Appendix E

CCCM Three Key Activities V.1 To Four Key Activities V. 2

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