Mapping teacher-structured collaborative learning in a context of problem-based learning curriculum redesign

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Abstract

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This dissertation uses a single and comparative case study to examine the work of several teacher-led and driven collaboration groups, known as design teams, as they worked to redesign established curriculum into problem based learning (PBL) curriculum. The study is situated in Cielo Vista High School, a diverse, public, comprehensive high school in the Pacific Northwest. In 2009, teachers and administrators at Cielo Vista High School were awarded a five-year federal grant to redesign their curriculum from a traditional, teacher-centered curriculum to a problem based, student-centered curriculum.

A key component of the curriculum redesign and transformation work was the formation of teacher design teams, in which teachers worked to redesign established curriculum into problem based curriculum. This dissertation focuses on design teams as the unit of analysis, to better understand how teachers structured their collaboration to design problem based curriculum.

Theoretically, I explore several dimensions of teacher collaborative learning that represents current gaps in the research literature. First, I examine how teachers structure their collaboration when they are given the autonomy to do so and how they learn from the routines they establish in their collaborative work together. Second, I examine the social dimensions of

teachers' collaborative work in an effort to identify how uneven levels of teacher status influence how teachers structure their collaborative work.

Methodologically, this dissertation uses Little's (1990) concepts of "sharing" and "joint work" as analytical frames to describe the especially meaningful routines teachers have established in their collaborative teams. In addition, I leverage discourse markers (Schiffrin, 1987) to identify and link teacher turn-taking, argumentation, and decision making to illuminate how interpersonal and social interactions influence how groups of teachers work together. Discourse analysis using discourse markers also helps explain how and why some teams seemed to work more productively than others. I make extensive use of video recorded design team meetings and teacher interviews to examine teachers' collaborative work.

This dissertation informs and extends the research literature around situated teacher collaborative learning by mapping what collaborative routines several teacher-led and driven design teams established in one year of daily design team meetings. I demonstrate that collaboration can be a highly relevant and meaningful setting for teacher learning if such collaboration is anchored in solving problems evidenced in teachers' practice and if teachers are given the autonomy to leverage their expertise to identify and apply solutions to such problems. These findings suggest that schools and districts need not dictate the terms, goals, and structure of collaboration to teachers. Instead, they would be wise to focus on providing teachers with relevant and authentic collaborative tasks, identified in part by the teachers themselves, in order to increase teacher learning and improved instructional practice.

Findings indicate that how teachers structured their collaborative work varied across the school. The teams that leveraged routines of sharing also typically engaged in collaborative work characteristic of "joint work" (Little, 1990). The groups where teachers established an egalitarian

culture, despite differences in teachers' years of experience or depth of content knowledge, also evidenced more instances of sharing and joint work. Broad findings from this dissertation suggest that a combination of teacher buy in to the collaborative task, coupled with explicit norms and teacher control over the structure and product of the collaborative work, and thoughtful and strategic support of collaborative groups can create especially rich collaborative experiences for teachers. Implicit in this dissertation is the argument for a return to principles of school renewal (Sirotnik, 1999) for meaningful school improvement.

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No one does a Ph.D. alone. The task is far too rigorous. Those who complete the dissertation only do so as a result of the collective wisdom of those who have come before us and of those who are equally invested in our endeavor. There is a host of people who act in both big and small ways to support the writing and revisions, the data analysis, the late nights, the early mornings, the anxiety, stress, and mood swings. There are far too many for me to acknowledge here but there are a few who demand special recognition.

For her constant support and patience, my wife Kristi Sutton has been the best wife to me and mother to our children than I could have hoped for. Not only was she my first proof reader and editor, she sacrificed and supported me in ways I know, and ways I don't, to make sure I had the time, space, and motivation to complete this degree. She is my inspiration, my love, my rock, and best friend. I could not have done this without her.

My dad was born between World Wars in Carrickfergus, Northern Ireland in 1929. His father was a military man who took up a mistress at the beginning of the Second World War leaving him alone with his mum to take care of his five siblings. Forced to help feed his siblings instead of attend school, he took up work when he was 15 delivering death notices to families in London during WWII. The mother he adored died shortly before the end of the war. As soon as he could, he escaped to Northern Rhodesia to work as a postman, met my mother, moved to US, and started a life as an educator, helping foreign students learn English and helping them pass the TOEFL so they could realize their dream of attending college. He was both a great teacher and father. He died in the summer of 2011, two years into my doctorate program. Completion of this degree is my gift to him, given three years too late.

His dream for his children was for us to earn Ph.Ds. He always wanted the chance to go back to school and do a Ph.D at the London School of Economics. Between raising a family of six children and his career as a full time teacher, that wish was impossible. The fulfillment of this degree is not just a fulfillment of my dream but one of my father's. It is with great pride in the opportunities my father and mother provided me through decades of hard work and support, that I was able to complete this doctorate degree exactly 5 years after I started it. This degree is as much theirs as it is mine.

I would be remiss if I didn't thank both Doug Sovde and Spencer Welch for their support of me when I was a teacher and their intellectual investment in me as an educator. Much of who I strive to be as an educator I take from the multitude conversations we have had over the years.

Walter Parker, Ken Zeichner, Andy Shouse deserve special recognition. Each provided extensive support and guidance that helped me complete this dissertation. Walter Parker accepted me into the Ph.D program. His advice to his graduate students to, at some point, stop reading and start writing stayed with me throughout my program. Even though he already had a small army of graduate students to shepherd through doctorate programs, Ken Zeichner took me on as one of his own. For this and the support he has given me, I am deeply grateful. Through the opportunity to work as one of his research assistants, Andy Shouse gave me the opportunity to spend three years collecting my dissertation data. That, and his insistence that I constantly write about the data, was ***the*** reason why I completed this degree when I did. Without that opportunity and his constant guidance and feedback, I could not have finished in so short a time.

I cannot thank enough the teachers, administrators, and staff at Cielo Vista High School for opening the doors to their school and classroom to me.

DEDICATION

To Dad. You finally got one.

INTRODUCTION

In many ways, there is nothing new about this story. Five years ago, teachers and administrators working in a highly diverse high school wanted to stem the trend of declining enrollment and nagging achievement gaps among groups of students. This story plays out every day across the US. Teachers, school administrators, district administrators, state educational leaders, all spend countless hours trying to address the needs of students in their schools who need the most help. However, whereas many schools look to bring in different improvement models from consultants or organizations from the outside, Cielo Vista High School took a different approach.

To solve these problems, Cielo Vista High School has taken a transformation, rather than adoption, stance to school renewal. From the very beginning, it was teachers who worked in collaboration with the principal to address the causes of decreasing enrollment and increasing achievement gaps, identify problem based learning (PBL) as a potential solution, apply for the federal grant, and help guide the implementation process.

Although they spent time learning what was going on in other schools and districts, the school did not give teachers a model of PBL to adopt. Instead the school asked teachers to use their collective expertise, in collaboration with university partners, to develop a particular brand of PBL that was grounded in educational research and that worked best for their specific students. One of the consequences of this philosophical and pedagogical stance is that what the school defines as PBL curriculum and pedagogy is in a state of constant flux. But this is to be expected in contexts of school renewal. In the words of Ken Sirotnik, “[School renewal] is not about a point in time; it is about all points in time” (1999, p. 608) meaning, the purpose is not a finished

PBL curriculum but an ongoing process of professional learning in which teachers constantly revise and refine their curriculum to make it more meaningful and relevant to students.

Starting with the idea to move toward PBL pedagogy, teachers and administrators applied for a multi-year federal grant to help them shift their practice in every discipline in the school. Then, when they were awarded the money to do so, the school tapped existing teachers' expertise, as well as locally situated partners, to help them develop a model of PBL pedagogy, anchored in the research literature, that they developed from the ground up.

In some of the most important ways, this is not a story about something new but what we already know works, working again. From the beginning, this was a story about school renewal, not school reform. As opposed to reform, Sirotnik (p. 607-608) describes school renewal as a process of

> Individual and organizational change, about nurturing the spiritual, affective, and intellectual connections in the lives of educators working together to understand and improve their practice. Renewal is not about a point in time; it is about all points in time—it is about continuous, critical inquiry in current practices and principled innovation that might improve education.

When viewed from the perspective of renewal, school improvement takes on a different tone. It becomes long term. It focuses on instructional growth and asks those who are closest to the students to leverage their collective expertise to help everyone improve their practice. It is also about empowering teachers to drive the improvement in ways they deem best for students and the school. It is anchored in a deep faith that teachers can do this work well.

A key component of renewal is the value placed on teachers' expertise evidenced through investments in their time to drive the curriculum redesign effort. Soon after receiving the grant, the school made heavy investments in teachers' professional learning. The most important of these investments was the development of teacher design teams to redesign the established curriculum into PBL curriculum.

In this dissertation I investigate what happened in some of the design teams implemented at Cielo Vista High School, a diverse, public, comprehensive high school in the Pacific Northwest. Funded by a federal grant, the school leveraged teacher learning in collaborative groups they call design teams to redesign their curriculum from a traditional model of teaching and learning to a PBL model. The school provides design team teachers a common, daily planning period to meet and redesign the curriculum for specific courses. The school does not stipulate how teachers are to structure their collaborative work, only that the curriculum they redesign is consistent with PBL pedagogy. This is consistent with the bottom-up, inside-out approach school leaders have taken to implementation of PBL throughout the school. Although different from work they were used to doing, school leaders wagered that established teachers in the school could redesign curriculum, according to PBL principles, better than anyone else.

In the following pages I examine how teachers, working in design teams, structured their collaborative work to redesign curriculum. Although deeply relevant for the work currently underway at Cielo Vista, my study does not deal with the effectiveness of the PBL curriculum teams designed. Given that professional learning and collaboration are at the heart of the implementation agenda the school has put forth, my study deals specifically with how teachers are learning from their teacher-led and driven collaborative efforts and how they navigate the social dimensions of that work. By doing so, I address an under-theorized area of the current

research literature that largely ignores how teachers structure their collaborative efforts when they are given great latitude to do so. In this dissertation I strive to map the terrain of teacher-led and teacher-driven collaboration and learning as it exists at Cielo Vista High School. The questions I pursue in that effort are as follows:

1. What collaborative practices do teachers establish in design teams?
2. In what ways do those practices influence the collaborative learning of design teams?
3. How do teachers navigate the social dimensions of collaborative work, both individually and as a team?
4. What patterns of collaborative practices emerge among design teams throughout the school?

To address these questions, I take a two-pronged approach to my dissertation. To capture the fine-grained interactions between teachers that impact how they choose to structure their collaboration, I use a single case study to examine the English 3 team. In this study I marshal evidence primarily from video recorded design team meetings and teacher interviews to describe the patterns I observed within the team and to provide teachers' perspectives on why the group worked the way it did. To do so, I use a combination of discourse analysis and an analytical framework developed from Little's (1990) concept of "joint work" to examine this team's collaborative practice over time. To capture a part of what was happening across the school in terms of teacher collaboration in design teams, I use comparative case study to compare how the English 2 team, the Social Studies 1 team, and the Math 2 team structured their collaboration. This comparative case study is not by any means comprehensive of what every design team did from the beginning of the PBL initiative. However, in it I describe patterns that emerged between

and amongst teams working in the core content areas and offer insights on why those patterns emerged over four years of design team work at Cielo Vista.

I have organized this dissertation around the following chapters. In Chapter 2, I discuss where in the literature the case of professional learning at Cielo Vista High School lands. Cielo Vista design teams are both similar to other cases of teacher collaborative learning in the research literature and starkly different. In this chapter I describe how I used a framework gleaned from Little's (1990) concepts of "sharing" and "joint work" help make sense of how teachers structured their work in design teams.

In Chapter 3, I describe the Cielo Vista High School as the research context. In it I describe the process school leaders have undergone to identify PBL as the focus of school renewal, how they work to implement PBL throughout the school, and the role that I have played in that process as a university researcher and a former English teacher at Cielo Vista High School.

In Chapter 4, I describe the methodology I used for data collection and analysis. It is here that I describe the past three years of data collection and analysis. In this chapter I introduce the teachers and teams I use in my analysis and argue for why I chose some design teams over others to be the focus of my dissertation.

In Chapter 5, I use a single case study to examine how the English 3 team structured their collaborative work. My analysis of this team leverages "joint work" (Little, 1990) as an analytical lens and utilizes discourse analysis. Little's (1990) concepts of "sharing" and "joint work" provide me with a way to describe the quality of English 3's collaborative work while discourse analysis helps me describe the connective social tissue of their collaboration.

In Chapter 6, I use the same analysis tools and methodology to conduct a comparative case study of three different Cielo Vista design teams. In this analysis I also examine the extent

to which each team engaged in routines of “sharing” and “joint work” when redesigning curriculum in order to identify patterns that exist between teams and discuss how each team worked differently. Additionally, discourse analysis of specific instances from each team provides me with ways of explaining why some teams engaged deeply in routines of sharing and joint work and some teams did not. Using discourse analysis, I explore how each team navigated the social dynamics specific to each group and how those dynamics may have influenced the patterns of their collaborative work.

In Chapter 7, I conclude my dissertation with a discussion of what I learned in my study of design teams and ways my dissertation might be used to influence future practice in the area of teacher professional learning.

CHAPTER 1
LITERATURE REVIEW

Introduction

Although the research on teacher collaboration and learning is robust and instructive, my dissertation addresses a specific gap in what we know about teacher-led and teacher-driven teacher collaboration and learning. Much of the literature that describes how teachers learn from collaboration illustrates mostly highly designed and highly structured collaborative contexts. Meaning, much of the research shows teachers working and learning from each other in collaborative settings designed and structured by university researchers or district or building administrators. Instead, my study documents not just how teachers direct their own learning in highly autonomous collaborative groups, but ways in which those groups can be as productive and successful as those groups situated in highly designed contexts. Data collected on the teacher groups in my study help bridge the gap between what we know are the benefits of teacher collaborative learning present in the literature and what happens in the lightly designed, highly autonomous teacher collaborative groups that are more common in schools. In this literature review I explore those parts of the current research literature that best apply to the groups I am studying knowing that the current research can only take me so far.

This literature review will explore the relevant literature that helps me better understand how teachers structure their collaborative work, how they learn from collaborative work, and how interpersonal and social dynamics influence and impact teachers' collaborative work. This literature review will take stock of the current literature around teacher learning and collaboration, and in so doing, will highlight gaps within that literature where this dissertation may shed some light. First, I will explore learning as a concept. Specifically, I will draw from

Vygotsky (1974) and Wenger (1998) to discuss the fundamental ways teachers learn from collaborative work. Second, I will examine the specific characteristics of teachers' collaborative work that contributes to their learning (Cochran-Smith and Lytle, 1999; McLaughlin and Talbert, 2006; Horn and Little, 2009; Little, 2002; Little, 1990; Little, 2003; Wilson and Berne, 1999; Darling-Hammond and Bransford, 2005; Darling-Hammond, 2010; Hargreaves and Fullan, 2012; Sahlberg, 2010; Mclaughlin and Talbert, 2006). Third, I will examine more closely how the social dynamics of collaborative work are revealed in the discourse (Gee, 2011; Schiffrin, 1987) teachers use and the way in which they position themselves within groups. In this section I will also discuss the ways in which discourse, positioning, and decision making are interconnected. Fourth, I will explore the ways in which collaboration between teachers can deepen their pedagogical and content knowledge expertise (Bransford et al. 2005; Scardamalia and Bereiter, 1993). Lastly, I will examine Judith Little's (1990) concept of "joint work" as an analytical framework for design team data analysis. Anchored in principles and characteristics of deep collaborative learning, Little's (1990) "joint work" provides a flexible yet specific way to conceptualize how teachers learn from the collaborative curriculum redesign they lead and structure. Figure 1 below illustrates how I will be narrowing my analysis of the literature.

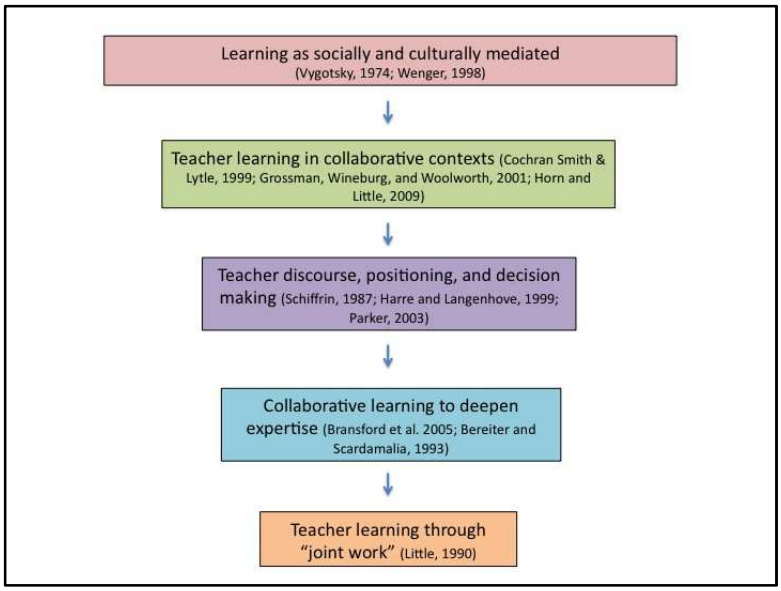

Figure 1. Conceptual model of theoretical framing

Social-cultural learning

Teacher learning communities are social constructs. Ideally, in teacher learning communities, teachers come together as a community of professionals to solve problems that extend beyond the reach of any one teacher. Through collaboration, teachers can learn about their craft and practice. To explain why and how some collaborative efforts are especially meaningful, researchers point to the inherently social nature of collaborative work, focused around "group worthy tasks," as reasons why collaborative settings are prime spaces for creative problem solving (Vygotsky, 1975; Wenger, 1998).

When a teacher encounters a problem they cannot figure out on their own, they ask someone with greater expertise for advice. This can be anything from clearing a paper jam in the photocopy machine or asking advice from colleagues during lunch about how to reach a highly intelligent but unmotivated student. Vygotsky (1975) sheds light on both cases, suggesting we learn from people with more or different expertise in just-in-time situations. These just-in-time instances where we get help from a "more expert other" constitute what Vygotsky (1975)

describes as a person's "zone of proximal development" (ZPD). In this space, people reach the limits of their abilities and expertise and then ask for help, marking the difference between frustration and learning.

Although focused on the learning of individuals, Vygotsky's theory easy applies to the work teachers do in collaborative contexts. In collaborative groups, teachers many times find themselves working with other teachers who either have more experience or more expertise than they do. When teachers focus their collaboration on tasks that demand collaborative problem solving, teacher's zone of proximal development are in constant flux. For example, if a teacher shares a sample of student work that is especially perplexing, they will hear multiple suggestions about how they can approach the problem. When especially active, these kinds of conversations become spaces where both the individual and the group learn.

Wenger (1998) stretches Vygotsky's principles of learning and applies them to collaborative settings and contexts. Wenger (1998) argues that learning arises when people, in this case teachers, share problems of practice from their work in classrooms, with other teachers. Wenger's (1998) theory regarding communities of practice literature is most useful when thinking about the link between participation and reification. When problems are made public (participation), communities of people develop shared meaning (reification) through collaborative problem solving, all of which can further the overall pedagogical expertise of the group (pp. 62-71).

Both Vygotsky and Wenger argue that learning is not just socially and culturally mediated but influenced by the environment and the context. Meaning, both scholars argue that learning results not just from interaction with others but when there is environmental or contextual factors that create urgency to learn. In the case of Vygotsky (1974), learning happens

when a child needs help from an adult to accomplish a task. In the case of Wenger (1998), learning happens when groups of people (participation) need to solve problem within their field or discipline and then develop tools (reification) to help them solve problems better. In both cases, relevance and authenticity is vital.

Complicating the prevalent, decontextualized, one-day model of professional development, Ball and Cohen (1999) argued that learning, especially teachers' professional learning, should be situated in the work teachers are already doing. Ball and Cohen (1999) suggest that a pedagogy of professional practice consists of 1) discreet tasks that teachers look at or involve themselves in, 2) a rigorous discourse between teachers that involves making claims and proposing evidence to support those claims, and 3) support from teacher educators or professional educators to help teachers do that difficult work. Most importantly, Ball and Cohen (1999) reinforce the idea that professional learning can be most powerful when it is situated in the work teachers are either already doing or in new work teachers see as relevant and authentic to their practice.

With few caveats, design teams are essentially communities of practice but without teacher educator or university researcher support[1]. In design teams, teachers grapple with

> What needs to be learned (content), the nature of the content and what that implies about how it might be learned (theories of learning), curriculum and pedagogy (with what materials and what ways the learners can be helped to learn that content, given who they

[1] As the university researcher, I was in the room but was not involved in the day-to-day decision making of the group. At times I would offer suggestions here and there, but not in every group and not on a regular basis. My participation in discussions was greatest in the English 3 group and occasionally in Social Studies 1. In Math 2 and English 2, my participation was minimal and did not include the any decision making within the group. I describe my role and participation in each group more fully in Chapters 4, 5, and 6.

> are, the nature of what there is to be learned, and theories of how it is best learned) (Ball and Cohen, 1999, p. 6).

As such, design teams can be intense learning spaces where teachers quickly adapt and evolve both collaborative routines and curricular materials to serve their purposes. When design teams choose to design and implement new curriculum at the same time, the design team can become a space where teachers share student work, teaching tools and materials, and general experiences with teaching new material. Design teams are historically rich and contextually laden places where teachers are constantly negotiating 1) what relevant knowledge is, 2) shared commitments to the task and shared understanding about what the task means, 3) the disposition of their particular communities, and 4) their relationships to each other. Like the claims processors in Wenger (1998) who adapt policies to do their work more effectively and efficiently, design team teachers take established curriculum and reinvent it to make it more relevant and effective for problem based learning. That work is sophisticated, subtle, political, complicated, and complex.

If viewed from the lens of collaborative learning, professional learning communities, and situated professional learning, Vygotsky (1975), Wenger (1998), and Ball and Cohen (1999) provide persuasive counter-balances to the entrenched model of isolated and decontextualized teacher learning that pervades the professional development landscape. Although teacher learning happens from time to time in solitude, the case for collaborative learning, at least in the realm of teaching and schools, seems stronger and better suited to the social context of schools. Cielo Vista High School design teams, and the strategic school leadership choices they represent, tack closely to the literature in how they have been situated within the school, the task they have been asked to complete, and the collaborative nature in which that work happens.

Teacher learning in collaborative contexts

To further the discussion about how teachers learn in collaborative settings, I connect with research examining how teachers learn from collaborative work. I build on research that describes how contextualized, emergent, and teacher-driven teacher collaboration can encourage powerful teacher learning in schools (McLaughlin and Talbert, 2006; Hargreaves and Fullan 2012; Cochran-Smith and Lytle, 1999). I also leverage the research that examines how teachers learn from their collaborative work in more intimate collaborative settings like teacher learning communities (Little, 1990; Grossman, Wineburg, and Woolworth, 2001; Little, 2002; Little, 2003; Horn and Little, 2009). My research applies the lessons learned from this research to examine largely teacher-driven collaborative settings. In so doing, I strive to better understand how teachers learn from collaborative work with each other when there is no outside guiding hand to lead the process. Attention to this ubiquitous, yet under-researched collaborative setting, will further the knowledge we have of such contexts to better understand how teachers collaborate and what routines they use to structure their collaborative work that help them refine their practice.

In this study, I examine cases of teacher collaboration where the teachers direct and structure their own learning while engaged in the relevant and authentic task of curriculum redesign. What is clear from the research is that powerful teacher learning occurs when teachers have opportunities to learn in and from the work of teaching. The extent to which teachers perceive the task as relevant and authentic to their instructional practice is also important yet is a point often times lost in some of the professional learning community literature (DuFour, 2004; DuFour, Eaker, and DuFour, 2005). For teacher collaboration to become rich contexts for teacher learning, teachers must buy-in to the purpose of the collaborative task. Ensuring buy-in from teachers is often a delicate balancing act as district and school leaders act to provide

collaborative spaces for teachers to plan how to implement various mandated policies that teachers may find intrusive or inauthentic. Various forms of teacher collaboration can work better when there is a shared acknowledgement between administrators and teachers that the task necessitates collaboration and when all stakeholders find the task relevant and authentic to their work as teachers and educators. As the following research literature shows, professional learning communities, teacher learning communities, and communities of practice all provide structured and reliable contexts for teacher learning if teachers perceive the tasks they are asked to complete as relevant and the problems they are asked to solve as authentic.

McLaughlin and Talbert (2006) argue that teacher learning communities serve as incubators of teacher learning that improves teachers' practice through collaborative problem solving. Their research documents how "teacher learning communities…build knowledge; create shared language and standards for practice and student outcomes; and they sustain aspects of their school's culture vital to continued, consistent norms of instructional practice" (p. 5). Similarly, Hargreaves and Fullan (2012) describe how schools and districts can distribute "professional capital" to increase teacher and student learning. Teachers who foster professional capital in each other act through their "relentless, expert-driven pursuit of serving their students and their communities, and in learning, always learning, how to do that better" (p. 5). Both McLaughlin and Talbert (2006) and Hargreaves and Fullan (2012) suggest that schools are better served when they cultivate and pool existing teachers' expertise to improve instructional practice school-wide.

In smaller collaborative settings of groups that consist of between 3-6 teachers, the research describes routines that help teachers learn from their practice. One way teachers learn is to jointly examine problems of practice (Cochran-Smith and Lytle, 1999; McLaughlin and

Talbert, 2006; Horn and Little, 2009; Little, 2002; Little, 1990; Little, 2003; Wilson and Berne, 1999; Darling-Hammond and Bransford, 2005; Darling-Hammond, 2010; Hargreaves and Fullan, 2012; Sahlberg, 2010; Mclaughlin and Talbert, 2006). Teachers may discuss student performance on an exam or on an essay assignment or they may discuss why a particular assignment did not seem to work for their students. The topic matters little. The learning is in the give and take and the staking of claims based on evidence and the qualification of claims to match the specific needs of a student or class (Cochran Smith and Lytle, 1999; McLaughlin and Talbert, 2006; Hargreaves and Fullan, 2012). As clear as the benefits for improved practice may be, for many teachers, this represents new more difficult work, especially when engaged in collaborative settings (Darling-Hammond and Bransford, 2005; Horn and Little, 2009).

When collaborative work is governed by shared norms that guide collaboration; the production of norms is itself a powerful part of the process (Grossman, Wineburg, and Woolworth, 2001; Wenger, 1998; Wilson and Berne, 1999; Little 2003). Setting clear norms serves three important purposes. First, clear norms ensure that teachers approach collaborative work professionally and respectfully. Second, norms can help establish an egalitarian culture within a group (Grossman, Wineburg, and Woolworth, 2001). Like any other professionals, individual teachers bring with them status depending on the years of experience they have, what their perceived expertise is, and what classes they regularly teach and/or official roles they hold within a school. Norm setting provides a space where teachers can establish mechanisms and processes where the less experienced teachers feel comfortable contributing to the work (Grossman, Wineburg, and Woolworth, 2001; Horn and Little, 2009). Third, clear norms can also establish routines whereby teachers can disagree around deeply help pedagogical beliefs. In and of themselves, norms do not automatically make a group functional. As with the case when

teachers examine problems of practice, teacher ownership over the processes by which norms are established and sustained can be just as important as the specific norms that govern a group's interactions (Grossman, Wineburg, and Woolworth, 2001; Hargreaves and Fullan, 2012).

When collaboration is productive, shared norms often govern specific routines teachers consistently engage in over time (Horn and Little, 2009; Little, 2003; Wilson and Berne, 1999; Little, 1990). Routines such as "sharing" can develop into instances "joint work" (Little, 1990) if norms help establish a collaborative culture of respect, openness, transparency with one's instructional practice, and willingness to share one's failure with the group. The same principle holds true when teachers develop and foster community (Grossman, Wineburg, and Woolworth, 2001), when they leverage the collective professional capital that exists within a school (Hargreaves and Fullan, 2012), or when they work to increase their "knowledge-of-practice" (Cochran-Smith and Lytle, 1999, p. 272). In each case, norms can serve to flatten hierarchies within groups to provide space for every teacher to contribute. Again, norms only stretch as far as the agreements that teachers make to abide by them.

A common characteristic of the research is that it largely documents ways teachers learn in highly structured and designed collaborative settings (Grossman, Wineburg, and Woolworth, 2001; Little and Horn, 2009; Little, 2003). That is, settings in which research partners or administrators play an active role in monitoring and supporting the collaboration. For example, in their study of a secondary inter-disciplinary book group, Grossman, Wineburg, and Woolworth (2001) not only provided the funded time for teachers to deliberate around common texts, but they provided the purpose for and structure to teachers' deliberations. In that study, the authors took an active role in structuring teachers' collaboration and scaffolding teachers' learning. With their help, teachers forged a tight-knit and safe learning community.

What remains under-theorized in the literature, yet which is an important characteristic of productive collaboration, is the establishment of a shared commitment to the collaborative task. In the case of Cielo Vista teachers, that shared commitment is the explicit agreement between teachers that they would redesign the curriculum associated with a course according to PBL pedagogy and principles. Such a commitment is fundamental to productive collaborative work at Cielo Vista High School. When and if teachers disagree on either the specifics of an assessment or a project, or on more over-arching pedagogical beliefs and values, what keeps the work moving forward is shared commitment to the task.

Horn and Little's (2009) work evidences the work of two teacher collaborative groups where outside university researchers participated in the collaboration. Whereas Grossman, Wineburg, and Woolworth (2001) worked over two years to structure and sustain community with a specific group of teachers, Horn and Little (2009) had somewhat less influence on what happened in the groups they studied. Nevertheless, Horn and Little's study (2009) evidence a co-constructed and maintained collaborative space, mostly because the authors were interested in certain ways teachers negotiate and process certain problems of practice. Both examples of collaborative work, the highly and lightly structured examples, evidence common principles of collaboration. Those include the value of norm setting so that teachers could engage in thoughtful and rigorous problem solving around common problems of practice.

Much of the teacher collaboration that happens in schools is more likely to occur in more organic and more autonomous settings that are not guided by a team of university researchers or outside experts. As more and more schools and districts turn to structures of collaboration as sites of professional learning, it is imperative that we understand how teachers organically and independently structure productive collaborative routines and what makes those routines

beneficial for teacher learning. Researchers have much to learn about collaborative contexts where teachers guide and drive their own learning.

The social dynamics of design teams

Just because teachers are in the same room does not mean they are learning from each other. In fact, there are many ways collaboration between teachers can derail deep teacher learning. To make the leap between the collaborative group as a context of teacher learning and routines teachers leverage to learn from collaborative work, we should first consider the ways that teacher discourse, positioning, and decision making impact how teachers interact in collaborative groups. Discourse, positioning, and even decision making routines constitute the connective tissue of teacher learning communities. These characteristics of collaboration help reveal the social dynamics present in teachers' collaborative work and can help explain why some design teams develop more productive collaborative routines than others.

Teacher status. Although the breadth of research on professional learning communities illustrates many important facets of *how* they function and *what* it looks like when they function well, without an analysis of the role teacher status plays in the deliberative process of the group, we fail to see *why* some groups function well and why some do not. Unexamined teacher status in professional learning communities constitutes an important gap in our understanding of how teacher collaborative groups function (Lortie, 1974; Grossman, Wineburg, and Woolworth, 2001; Ingersol, 2003; McLaughlin and Talbert, 2006). Because there is little educational research outside of the broad sociological literature that deals with how status is brokered within schools and departments, much of what I will use to make my arguments comes from outside the educational realm.

Van Maanen and Barley (1984) set forth a useful way of describing how organizations function. They focus on status, or what they call "centrality" (p. 324), by examining how people come to have power and control in occupational communities. The authors claim that once people achieve or attain status within organizations, it is difficult for them to lose it. Status has a sticky quality to it. Once teachers are assumed to be particularly skilled or knowledgeable in key areas, they are ascribed a level of status that proves durable throughout the life of their careers, which in turn can afford those individuals positions of centrality within schools. The authors state,

> Individuals who have achieved visible centrality in the community are often identified by the labels of folk types used by members to note occupational wisdom. The 'sage,' 'pro,' 'guru,' 'old hand,' and legendary 'old timer,' are stereotypes in this regard. As these social types suggest, centrality can carry prestige, honor, knowledge, and power (p. 324).

These labels are highly durable within schools and, I have found, are typically attached to teachers that exhibit specific knowledge and skills like strong content knowledge or a reputation for good AP exam pass rates. The authors go on to claim that centrality is linked to three domains within organizations: "the work itself; the setting(s) in which the work is performed; and the network of social relations which surround the work" (p. 325). I believe these domains have corollaries within schools, the most important of these being the domains that are concerned with the work itself and the setting(s) in which the work is performed. Teaching honors or advanced placement classes, being the department head, teaching in a highly coveted classroom or in a highly regarded school, being involved in district-level work as an instructional

or curriculum coach, are some ways in which the work and the setting for teachers' work affords teachers status within a school and department. Most important from Van Maanen and Barley's work is the claim that:

> Central positions may be reserved only for those members who best exhibit and articulate the community's traditional values, norms, and perspectives. Innovators may be widely recognized and perhaps consulted by core members, but they may not be accorded great honor, respect, or position (p. 330).

In a school setting, such as the one I am currently researching, where teachers are tasked with redesigning curriculum in such a way that disrupts traditional thinking about the role of the teacher, the role of the student in the classroom, and teaching and learning in general, there exists a natural tension between those who represent the traditional values, norms, and perspectives about what teaching and learning are and should be, and those who wish to innovate. With explicit efforts to shift fundamental cultural and professional values, norms, and perspectives, some may experience loss and thus, may resist that loss using whatever power they have (Little, 1990; Lortie, 1974). For these reasons, it is important that teachers norm their collaborative practice to allow for opportunities for equal participation from each teacher, democratic decision-making, and routine examinations of student work. Such norming can help flatten the hierarchies that exist as a result of an individual teacher's status but would still create space for all teachers to contribute to the collaborative effort.

Teacher discourse and discourse analysis. Conversation analysis examines everyday talk, whatever the setting or situation whereas discourse analysis examines the context of talk to reveal the power structures and social, cultural, and historical dimensions behind the verbal

interactions people have (Gee, 2011). I use discourse analysis to examine how teachers use their status and power, evidenced in the way they have positioned themselves and been positioned within the social and cultural context of the school and department, to impact the collaborative decisions design teams make. In design teams, teachers use language to get the work done. To better understand how teachers develop and sustain the norms they have established in design teams around a shared commitment to the work, it is important to understand how they interact through discourse.

An analysis of discourse markers reveals how teachers position themselves through argumentation in collaborative settings, and how their choice of discourse markers dictates the processes (debate, negotiation, and deliberation) they use to make decisions as a group. Discourse markers constitute one part of a larger pattern of discourse that people use when they communicate with one another (Schiffrin, 1987). However, the role discourse markers play in framing the trajectory of how people communicate with one another cannot be overstated. Schiffrin (1987) calls out "well," "but," "so," "now," "I mean," "Y'know," "then," "and," "or," "because," "oh," as words that people use to mark time, emphasis, repair, agreement, and disagreement in conversations[2]. Most discourse markers are conjunctions. Schiffrin (1987) describes how

> Conjunctions mark structural relationships between constituent parts of a sentence. Conjunctions also have semantic values which partially restrict what can be connected; such values intersect with the meanings of the propositions being connected in ways which are governed not only by semantic rules of connectivity, but by

[2] See the Appendix for a complete list of discourse markers.

> pragmatic principles through which external and internal meanings are created (p. 188).

Discourse markers have both a grammatical function and purpose based on their role within a sentence as conjunctions. For example, when someone uses the word "but" in reply to a statement made by another person, they are using the functional value of the word to signal a statement of disagreement is to follow. In another instance, a person may use the "now" to both mark very specific and immediate time in a conversation and also to signal an emphatic response, either positive or negative, to a previous statement. So the way people use discourse markers in conversation reflects not just the grammatical structures of the language, but the contextual and situated demands in which they are interacting. The value of conjunctions spreads over both the grammatical function and meaning and the new ways people may use them to position themselves in speech.

Although each marker holds generic value and meaning in most any context, the way it is used by people in specific contexts typically depends on the specific circumstances of the context. People have discourse markers that they use repeatedly in everyday speech that are part of their communicative repertoire. Schiffrin (1987) argues a person may unconsciously use the word "y'know" frequently in everyday interactions to elicit tacit agreement from people he/she is speaking to and they might use "so" to mark their disagreement instead of "but." When conducting a discourse analysis using discourse markers, it is important to track three meanings or values attached to the discourse markers people use: generic or denotative meaning of specific markers (ideational structure), the connotative, contextualized, and situated meaning of each marker (cohesive meaning), and the patterns of usage each participant in a conversation shows over time based on natural speech patterns (interactional move) (Schiffrin, p. 60, 61). In my

analysis of the data, I will use discourse markers to show how the discourse teachers use in their turns impacts the trajectory of discussions and the specific process of decision making they use.

Positioning in design teams. The work design teams have to do is intensely rigorous, personal, and political. Much is at stake. To some, problem based learning represents a radical and ambitious shift in the role of teaching and learning in the classroom. It focuses much more on the student and what knowledge and skills the student can bring to the classroom to inform their own learning. To accomplish this shift, teachers may take up new roles as coaches who guide students through a much more explorative style of learning.

Teachers who have extensive teaching experience teaching a curriculum they feel is highly effective will invariably feel some sense of loss when asked to fundamentally transform and redesign courses. This is potentially problematic when teachers have assumed and have been ascribed status and power within their department and school resulting from their reputation as teachers and their reputation for having extensive content knowledge. They may feel a sense of loss that may show up in various interactions they have with colleagues in design teams. The converse may also be true. Teachers who are more student-centered and who focus on improving their pedagogical content knowledge may be afforded more power and influence in the school as their particular skills better align with PBL pedagogy. Throw both these kinds of teachers in the same room, in addition to teachers who are undecided on the benefits of PBL, and the nature of their collaborative work can become contentious, political, vulnerable, invigorating, and exciting all at the same time.

The relationship between positioning theory (Harre and Langenhove, 1999) and discourse analysis is critical. Discourse is how people position themselves and others. In smaller collaborative settings where teachers have varied levels of power and status, such variations tend

to be accentuated, at least initially. The moves teachers make to position themselves in the beginning of a long-term collaborative effort, can saturate the collaborative dynamic of the group over time, solidifying routines and norms of the work. Discourse analysis reveals the durability or flexibility of teachers' status over time and can highlight the extent to which teachers use their standing and influence within the group to impact or control the collaborative decision-making process.

If we assume that people use discourse consciously and unconsciously in social interactions, discourse analysis becomes an important tool to understand how people position themselves to get what they want in social settings. Harre and Langenhove (1999) describe ways in which people position themselves consciously and unconsciously in social settings, claiming that "positions are relational, in that for one to be positioned as powerful others must be positioned as powerless" (p. 1-2). The authors claim that positioning is accomplished primarily through discourse. Gee (2011) defines discourse as "the study of language in-use" (p. 8). Gee (2011) also claims that language allows us to create identities for ourselves. Sometimes these identities are universal, as with being a father, and sometimes they are situated, as with being a father who is also a commercial real estate broker. Language is also deeply political. We position ourselves and others through language in ways that benefit ourselves. In fact, it is very difficult to escape the social, political, emotional, and cultural parameters we draw as a result of the language we use and identify with. Discourse becomes a powerful tool people use to position themselves in ways consistent with the identity they claim to have.

Harre and Langenhove (1999) draw from social and psychological theory to assert a theory for how people position themselves in various contexts. In describing positioning theory, the authors define a position as "a complex cluster of generic attributes, structured in various

ways, which impinges on the possibilities of interpersonal, intergroup and even intrapersonal action through some assignment of such rights, duties and obligations to an individual as are sustained by the cluster" (p. 1-2). A position depends on an individual's experience with others in a group, as well as their assumed and ascribed power and status. Positioning theory encompasses all the ways people use their histories, experiences, and expertise to accomplish something through discourse, in their interactions with others. The authors argue that

> Positioning theory focuses on understanding how psychological phenomena are produced in discourse. Its starting point is the idea that the constant flow of everyday life in which we all take part, is fragmented through discourse into distinct episodes that constitute the basic elements of both our biographies and of the social world. The skills that people have to talk are not only based on capacities to produce words and sentences but equally on capacities to follow rules that shape the episodes of social life. Not only what we do but also what we can do is restricted by the rights, duties and obligations we acquire, assume or which are imposed upon us in the concrete social contexts of everyday life (p. 4).

Positioning theory explains the ways in which we mediate and navigate ourselves in social spaces and thus, how our actions in that effort simultaneously position others in specific ways. It explains not so much reciprocity but a cause and effect relationship with those with whom we interact. In a conversation on bridge building, for example, if I position myself as the one with the most engineering expertise in a group I simultaneously position others as having different or inferior expertise than mine. This positioning impacts the way I interact with others

and how they will interact with me. Through positioning theory, the authors claim that people's identities are socially constructed by themselves and by others, over time, as a result of the various contexts in which they operate.

Harre and Langenhove's (1999) theory explains how people interact in social settings and how power and status are distributed amongst people in any given interaction as a result of the discourse people use. The authors focus on three "basic features of interaction" we can use to understand and explain what goes on in conversations and how "social and psychological phenomena are 'constructed' (p. 6). These are:

1. "The moral positions of the participants and the rights and duties they have to say certain things,
2. The conversational history and the sequence of things already being said,
3. The actual sayings with their power to shape certain aspects of the social world." (p. 6).

Interestingly, through such interactions, people both solidify and revise the position they hold within groups. Inherent in positioning theory is a sense of flexibility. Although people position themselves in certain ways to seize control and power within systems and groups, the positions people assume remain dynamic as a result of the potentially constant changing dynamics of a collaborative setting. Positioning theory assumes a given level of agency while still explaining the durable nature of the position people come to have over time.

Although not my primary framework for analysis, discourse analysis and positioning theory are pivotal for understanding not just why a design team is productive but why, at times, the social dimensions of collaborative work can be problematic. This is especially true in teacher groups where teachers share personal and professional relationship histories. In many ways, a layered analysis of discourse and positioning can help me understand the extent to which teacher

status impacted design team work, how that status may have impacted a team's "chemistry," all of which can help me understand why some teams were more productive than others.

Democratic decision making. By their nature, design teams are political. Teachers constantly position and reposition themselves as experts on various topics to impact the decisions the group makes regarding how the curriculum is redesigned and what the curriculum eventually looks like. In Parker's (2003) work on teaching democracy in a social studies classroom, he describes the differences between decision-making processes and their relative value and significance when preparing students to be engaged democratic citizens. His delineation of debate, negotiation, and deliberation offer a good framework through which to view how teachers make decisions in design teams. Whereas Allen (2009) describes routines and roles people play in democratic settings, Parker (2003) describes the processes people use in those settings to make decisions. When considering the context of design team work and the goal directed nature of curriculum redesign, it only makes sense to understand debate, negotiation, and deliberation as uniquely different ways teachers can make collaborative decisions, all of which can lead to different outcomes.

Parker (2003) describes debate as "a way of making decisions without the benefit of discussion" (p. 81). Debate is potentially the most problematic decision-making process for teachers to use as it presents the greatest opportunity for teachers to use their status and official roles to control the dialogue. As Parker notes, debates are not discussions. There is typically a moderator who decides when the debate has run its course and when to allow further dialogue. The goal of debates is to win an argument by any means necessary. Such a setting naturally favors those participants who historically position themselves in roles of dominance (Harre and Langenhove, 1999). Although relatively rare in the design team data, debate typically emerges

in groups that have not dealt with differences of opinion regarding pedagogical beliefs and values.

The more a group of teachers uses debate to settle disagreements, the more teachers' roles can become increasingly static within the group. The teacher(s) who assume positions of dominance stand to further that role as the teacher(s) who assume a stance of acquiescence learn it is simply easier to agree than to challenge the dominant ideas of the group.

Parker (2003) describes negotiation as a more complex way of making decisions. Unlike debate, where the goal is to win the argument, in negotiation people assume "competing interests and the discussion is guided by calculating constantly the gains and losses of each interest group [or person]" (p. 81). The purpose of negotiation is for people to come to a mutual agreement where some level of mutual benefit for each party is achieved. In negotiations, sacrifice is necessary as people work toward common ground yet doing so in such a way that they yield as little ground as possible. Negotiations are also competitive, whether that competition is between ideas or people, so stances of dominance and acquiescence can still emerge even if all parties involved have equal opportunity to participate in the discussion. The crux of negotiation is the concluding agreement. People may still dominate and acquiesce in a negotiation, but unlike a debate, all participants bear a shared responsibility for sacrifice even if the extent to which one party sacrifices is not equal to others involved.

In design teams, teachers use negotiation to make decisions about practical matters. The layout of a handout is negotiated, as is whether or not to include question y or question x on an exam, as is deciding who will be responsible for contacting external experts the team could consult. In such instances, the stakes are relatively low for teachers so the net gain and net loss felt by any one teacher is fairly insignificant. In the end, a teacher may have to change the

organization of a handout he/she designed over the weekend, but the pedagogical values that anchor that handout to good practice are not contested.

Of the three, deliberation as a decision making process is the most complicated to achieve and unpack. Research from communication and education scholars offers useful definitions for deliberation. Working in the field of communication, Gastil and Black (2007) describe deliberation as "a form of communication that is based on principles of democracy" (p. 2). The authors go on to describe deliberation

> As an ideal, a way of communicating that groups strive toward, but achieve only in degrees…Traditional conceptions of deliberation emphasize equality, fairness, analysis of ideas, and a focus on the public good…and recent theorists highlight the importance of deliberation's social aspects (Gastil and Black, 2007, p. 2).

The authors define deliberation as a process by which people "carefully examine a problem and arrive at a well-reasoned solution after a period of inclusive, respectful consideration of diverse points of view" (p. 2). More specifically, the authors describe/define the processes of deliberation as

- Creating a solid information base that is commonly accepted by all,
- Participants identify and prioritize the key values at stake in an issue,
- Participants identify a broad range of solutions that might address the problem,
- Participants weigh the pros, cons, and tradeoffs among the solutions by systematically applying their knowledge and values to each alternative, and
- If deliberation takes place within a decision-making body, it ends by making the best decision possible in light of what has been learned through discussion (p. 3).

Deliberative decision-making, as defined by Gastil and Black (2007), undoubtedly implicates 1) a predictable and robust set of norms that would govern such discussions, 2) a discussion that would establish a common set of shared pedagogical beliefs and values to anchor whatever decisions the group makes, and 3) genuine participation and engagement in the problem-solving process.

Parker (2003) agrees with Gastil and Black (2007). Parker offers a thorough description of, and definition for, deliberation as a decision-making process. "Deliberation," he claims, "involves everyone in the group forging together the alternatives and making a decision…Deliberation, in sum, creates an in-between space among people who are not necessarily friends but who need to accomplish a goal that requires joining together (p. 81). He goes on to describe deliberation as

> Creative…a purposeful relationship that requires some measure of getting to know one another, presenting ourselves to one another, expressing opinions and reasons for them, and listening, whether we are particularly fond of one another or not…When a diverse group of people deliberate together, they create a new 'we' in which differences are regarded as an asset, listening as well as expressing occurs, stories and opinions are exchanged, and a decision is forged together (p. 80-81).

Whereas negotiation involves a certain amount of compromise to solve a problem, the fundamental issue at stake remains relatively unchanged. In deliberation, progress is in part defined as the development of new knowledge resulting from the deliberative process. Parker describes this dynamic as an establishment of a "new 'we'" (p. 81). Both Parker (2003) and

Gastil and Black (2007) assume that all parties involved solve problems by developing new solutions. In this way, deliberation seems to have the best potential in collaborative spaces like design team work where the work is to design/redesign something entirely new.

Using debate, negotiation, and deliberation as one way to understand how teachers make decisions in collaborative settings makes sense on a couple of different levels. First, the larger context in which teachers are working creates the possibility for all three processes of decision-making to be employed by design teams. The school is attempting to transform itself into a PBL school. Such a radical shift privileges a more student-centered and constructivist kind of learning and teaching over a more teacher-centered and traditional kind of learning and teaching. Yet, as is the case in many organizations, the teachers who disagree with this shift may not voice their dissent in larger, more public settings like staff meetings or formal professional development events. To publicly disagree with a school reform in a staff meeting is to risk a dilution of one's power and status, as there are invariably some teachers in the room that feel perfectly comfortable confronting that teacher's ideas. However, in the smaller setting of a professional learning community, teachers' power and status is concentrated. Ironically, the smaller setting can afford individual teachers more space to impact the decisions of the group and thus, influence the extent to which the reform agenda is taken up or ignored within a smaller subset of the school, such as the department. Second, the task of curricular transformation itself is a creative problem-solving task. By engaging in the task of curriculum transformation, many teams will invariably engage in deliberation as a means to complete their task. In the same way, curriculum redesign implicates negotiation as teachers revise draft lesson plans, assessments, and student tasks.

Discourse analysis, positioning theory, and democratic decision making combine to offer an interesting set of lenses through which to examine how the social dynamics of groups may impact how teachers structure their collaboration. Within any given instance of teacher "joint work" (Little, 1990), teachers make discursive moves that reveal how they are positioning themselves relative to an idea, tool, or teacher or student artifact. At the same time, the discursive moves that mark teacher's turns also signal to other teachers his/her intentions to challenge (debate), qualify (negotiate), or elaborate upon (deliberate) the relative merits of a shared idea, tool, or artifact. When combined with data about a teacher's history within the school and department, we can begin to see how teachers with higher status use their influence to structure routines of deliberative and creative problem solving that are characteristic of joint work. Over time, the way teachers mark their turns, especially when a colleague shares something with the group, can establish collaborative routines that makes joint work possible.

Collaborative learning to deepen expertise. The research regarding expertise diverges somewhat from the literature around learning in that it asserts the importance of process for deepening expertise. That is not to say that expertise is not a social and collaborative endeavor. It is assumed to be. That is only to say that expertise results at least as much from process and context as it does from being paired with a "more expert other." Furthermore, the research suggests that in the most robust learning environments, it is a combination of a challenging, group worthy task in addition to space and time with equally dedicated colleagues that jumpstarts learning and deepens individual expertise.

In some ways the major challenge of professional development is the to help teachers become what Bransford et al. (2005) calls "adaptive experts." They assert that

> Adaptive experts are far more likely to change their core competencies and continually expand the breadth and depth of their expertise. This restructuring of core ideas, beliefs, and competencies may reduce their efficiency in the short run but make them more flexible in the long run (p. 49).

For all intents and purposes, design teams seem to hold potential for this sort of shift in teaching. The central task of teachers' work, curriculum redesign, is wrought with disagreement, negotiation, and debate through which teachers make explicit any number of beliefs they hold about how they think students learn, the capacity students may or may not have to learn rigorous content, and even what they believe the purpose of schooling should be. If teachers emerge from this process with a vastly different curriculum, so be it. If they emerge from this process as more adaptive expert teachers, even better.

Although not necessarily broad, the research literature on expertise is deep. Synthesizing decades of research on how people learn, Bransford et al. (2005) describe increasingly deeper stages of knowing and doing. The "frustrated novice" (p. 49) is one who is new to a practice, skill, or knowledge and who quickly reaches to limit to which their skill or knowledge can help them overcome problems they encounter. The "routine expert" (p. 49) is a person who has reached a level of competency and facility with a set number of skills and practices yet who does not take steps to improve their skill or practice over time. The routine expert gets good at a thing and keeps doing that thing in the same way because it becomes efficient for them to do so. Bransford et al (2005) refers to these people as "functionally fixed" (p. 50). They cite Hatano and Inagaki (1986) who claim that routine experts "become very good at solving problems but

do not continue to learn throughout their lifetimes (except in the sense of becoming even more efficient at their old routines)" (p. 50).

For various reasons, schools are filled with both kinds of people. New teachers learn very quickly that the job of teaching is far more complex, complicated, and challenging than they ever imagined. When faced with daily frustrations, either resulting from classroom management, learning new content, various administrative tasks, or communicating with parents, many new teachers are tempted to leave the profession when they receive little coaching to help them balance the demands of the profession. Additionally, schools also have their fare share of teachers who have established ways of planning lessons, learning new content when needed, and teaching strategies that have worked for them in the past. Either because teachers have little to no extra time to take meaningful steps to improve their practice, or because the very structure of schools and their job do not allow them time to collaborate with colleagues in meaningful ways, teachers become routine experts out of necessity.

Looking again at "The Dimensions of Adaptive Expertise" put forth by Bransford et al. (2005), collaborative PBL curriculum redesign meets the criteria for learning that would provide teachers with opportunities to "balance efficiency with innovation…[and] include opportunities to experiment with ideas and, in the process, experience the need to change them" (p. 51). Because teachers collaborate around both the practical and philosophical nature of teaching, teachers have space to let go of "previously held beliefs and tolerate the ambiguity of having to rethink one's perspective" (p. 51). Such a process provides the "frustrated novice" teacher with a safe place to collaborative problem solve their problems of practice and the "routine expert" teacher with a safe place to experiment with new strategies, pedagogies, and instructional practices.

When discussing how expertise works within teams or groups of people, Bereiter and Scardamalia (1993) differentiate between types of people and types of tasks those people engage in to describe why some become people seem to further their expertise while other people seem to stagnate. To describe this difference, the authors differentiate between "normal learning" (p. 91) and "progressive problem solving" (p. 112). In normal problem solving, individuals find the known solution to a problem and move on. In progressive problem solving, individuals tackle problems that have ill-defined or multiple solutions and that force individuals to deal with increasing complexity. These processes can be mirrored in design teams. Because many teams tasked with redesigning established curriculum, they have choice as to the extent of that redesign. They choose how ambitious, how radical, how PBL-y they redesign the course. If a design team chooses to redesign curriculum incrementally, in ways that further the established curriculum, or in ways that simply add projects to the end of established units or lessons, the curriculum redesign process will only ask that teachers engage in "normal learning." However, if design teams take the more ambitious path and attempt a wholesale redesign according to PBL pedagogy, their process will demand that they engage in "progressive problem-solving."

How teachers choose to approach the task of curriculum redesign is deeply consequential for the extent to which their teaching expertise will be furthered. "In an expert subculture," Bereiter and Scardamalia argue,

> One of the requirements of adaptation is to participate in the pursuit of ideal goals of the group, and this necessitates continued progressive problem solving…In nonexpert environments, the process of expertise is deviant. Within a subculture, however, progressive problem solving and continued building of competence

> are not deviant but instead are central to one's participation in the life of the expert community. An expert community, we might say, is one which to conform is to grow (although to grow is not necessarily to conform) (p. 105).

The requirements the authors reference here are all undergirded by a shared commitment to the task at hand and to work that is guided and governed by clear norms. Ideally, design team work is progressive problem solving although design teams vary to the degree and extent to which they engage in this work. Teachers work to not just solve the larger problem of defining and describing what PBL looks like within a given content area, but the more they push themselves to design more sophisticated PBL curriculum, they build individual and collective competence and expertise in PBL teaching and curriculum. Yet, in groups where teachers either do not share a common commitment to redesigning curriculum according to PBL principles or in groups where the norms sustain established hierarchies between teachers, teachers will struggle to achieve a level of progressive solving demanded by the task. Additionally, progressive problem solving, as outlined by Bereiter and Scardamalia (1993), demands that teachers approach curriculum redesign not as a competition between teaching materials, teaching styles, and personal pedagogies, but as the creation of something totally novel.

Both Bransford et al. (2005) and Bereiter and Scardamalia's (1993) research suggests that teachers' collaborative work in design teams has the potential to be both new and complex. Whether teams decide to perceive their work in design teams that way varies from team to team. For some, the act of redesigning established curriculum means loss. For others, curriculum redesign brings an opportunity to teach in new and ambitious ways. This is not to say that some teachers have good reason to fight to keep lessons and units that they feel have been particularly

effective for them in the past and this is not to say that experienced teachers do not have pedagogical wisdom to share with more novice teachers. This is only to say that design team teachers must make themselves open to learning new teaching strategies and philosophies in order to embrace the process and complete the task. Without a shared commitment to the task of PBL curriculum redesign and norms to govern how teachers interact, regardless of individual's status resulting from years of experience or expertise or teaching assignment, teams have little chance of getting to the creation part of curriculum redesign.

In sum, the literature shows the benefit of collaboration to teacher learning. It clearly illustrates that professional learning situated in the work of teachers can make the learning more relevant and authentic to them. In addition, the literature shows that routines such as examining problems of practice and establishing clear norms help teachers learn from collaborative work. The literature on expertise suggests that teachers learn when they are asked to work collaboratively on a highly rigorous task that is situated in their teaching. This body of literature also suggests that such collaborative learning environments help deepen teacher's knowledge about teaching and learning and help them refine their teaching practice. All of this literature helps answer the question: In what ways can we expect that teachers will learn from each other in collaborative groups? Much of the data from design teams is informed by this literature. However, the current research on teacher learning and collaboration does not stretch far enough to explain how teachers, working in relatively autonomous design teams, are learning from the work of collaborative curriculum redesign. We need to understand the routines and ways of interacting design teams develop to redesign curriculum. I now turn to Judith Little's (1990) work on "joint work" to describe how design teams establish a culture of learning.

"Joint work" as an analytical frame

In this section, I describe how I use Little's (1990) concept of "joint work" (519) to situate the routines teachers have established to get them to deeper levels of collaboration and learning in design teams. In so doing, I will assert that "joint work" is an extension of sharing between teachers. As teachers implement their newly redesigned curriculum, there is trial and error and experimentation that naturally occurs (Clark and Hollingsworth, 2002). In addition to using the design team space to design and redesign curriculum, teachers also use it to collaboratively problem solve day-to-day issues that arise when they implement the new curriculum. In addition, I will argue that the difficult work of sharing and collaboratively solving problems of practice exists most clearly in design teams that have set norms and have established a common commitment to the task of PBL redesign. Norms may vary in the extent to which they are explicit and clear and the commonality of those commitments might rest on tenuous compromises made between teachers. But without some level of both of these components, "joint work" is hard to come by.

Design teams sit within a context of school culture change through shifts in curriculum and instruction. As a pedagogy, PBL demands that teachers not just shift how and what they teach but, to an extent, how they define themselves as teachers. It would be foolhardy then to think that a shift from more traditional teaching methodology to a problem based learning pedagogy would not imply a shift in how teachers view themselves as professionals and how they approach their jobs.

Based largely on his and others' research in K-12 settings, Thomas Guskey (1987) illustrates a linear process of change. He argues for a shift in how teacher change is conceptualized by showing that teachers change their beliefs about teaching and learning as a result of evidence that a shift in their personal practice can produce positive outcomes. The

second claim, asserted by Clark and Hollingsworth (2002), argues that teacher change is not a linear process, as Guskey's work (1987) claimed, but is cyclical. The model Clark and Hollingsworth (2002) posit affords more interaction between the domains of teacher change. A discussion of Guskey's (1987) and Clark and Hollingsworth's (2002) ideas about teacher change s warranted in this dissertation because they help focus attention on the location of teacher learning within teachers' collaborative work.

Based on his and others' research in various K-12 settings, Thomas Guskey (1987) asserted a widely regarded framework for examining how schools accomplish teacher change through professional growth. He situates formal instances of teacher staff development, or professional development, as the spark of teacher learning but he claims that teacher learning actually happens when teachers experiment with new knowledge or strategies in their classroom. Gusky's framework describes a linear process for how teachers change, starting with professional development that spurs a change in teachers' classroom practice, leading to a change in student learning outcomes, which in turn causes teachers to change their beliefs and attitudes about student learning. Guskey's (1987) contribution to the literature established an opinion among some scholars about how teachers change their beliefs about teaching and learning by asserting that a change in beliefs results from experienced improvement in student outcomes from experimentation with new strategies, rather than resulting from participation in traditional professional development. Figure 2 illustrates this dynamic.

T. Guskey: Educational Researcher 15, (1986), 5-12.

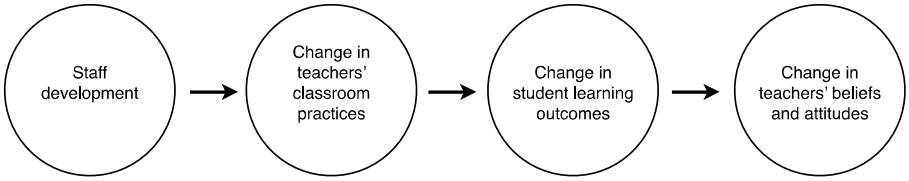

Figure 1. *A Model of the Process of Teacher Change*

Figure 2. A model of the process of teacher change.

However useful for the time, Guskey's model fails to account for the multitude of ways teachers learn informally throughout the day and year. Whether learning results from short conversations in the lunch room, internet research, or by participating in weekend book groups, teachers work to improve their craft in various ways that are not accounted for in Guskey's (1986) model. Acknowledging that weakness, Clark and Hollingsworth (2002) revised Guskey's framework to argue for a more multi-dimensional, cyclical, and interrelated understanding of how teachers come to believe different things about how students learn.

Although intended to track how individual teachers shift their beliefs, Clark and Hollingsworth's (2002) model can provide a way to describe and locate 1) what collaborative practices design teams use to redesign curriculum and 2) how those practices influence the learning of the group. Illustrated in Figure 3 below, their framework represents various ways teachers approach new methodologies and pedagogies before they consider the extent to which they implement them, if at all.

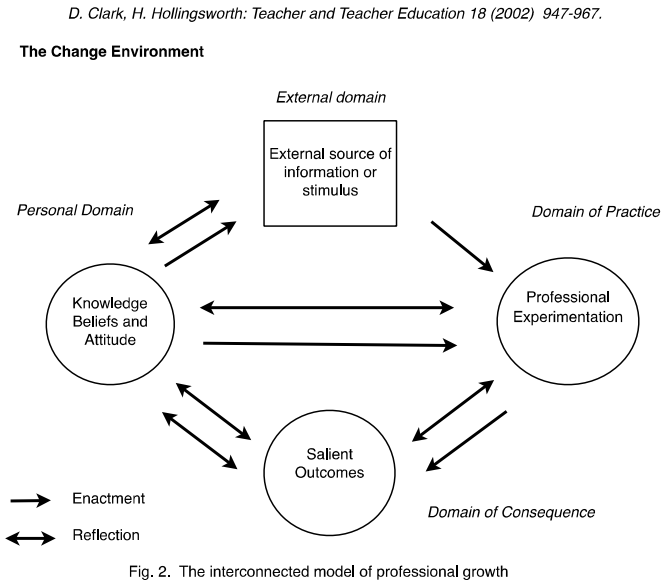

Figure 3. The interconnected model of professional growth.

Clark and Hollingsworth's (2002) model affords both flexibility and complexity for how educators think about teacher change and growth. It asserts a model that affords multiple entry points for teachers as they consider changing practice. Notably, unlike Guskey's framework, Clark and Hollingsworth's framework acknowledges the time teachers spend reflecting on what they learn from professional development instances and how those strategies have worked with students in the classroom. As such, it serves as a useful tool in examining both individual teacher change and the processes *teams* can leverage to spur both group and individual teacher learning and growth. I will be using this model as a lens to examine the broad collaborative practices teams of teachers establish over time. Specifically, I focus on the "domain of practice," that is, teachers' collaboration in design teams to 1) track what new knowledge, texts, and materials teachers leverage in their design teams; 2) examine how and when teachers decide to experiment with new strategies as a team; 3) how they talk about the problems of practice they encounter as a result of that experimentation; and 4) document how each teacher describes their experience in that process and what happens within the team as a result. Although Clark and Hollingsworth

provide a useful framework to understand larger patterns in design teams' collaborative practice, their framework does not provide a useful lens for examining the daily routines, processes, practices design teams use that foster collective learning.

Little (1990) asserts a framework for describing highly productive collaboration between teachers when they share documents, tools, and artifacts that evidence some kind of experimentation resulting from their attempts to implement some element of the newly redesigned curriculum. Little's (1990) "joint work" more specifically explains what happens when teachers share what and how they experimented within Clark and Hollingsworth's (2002) *domain of practice* pictured above. "Joint work" (p. 519) goes beyond collegial interaction between teachers defined by storytelling during lunch, seeking out and providing assistance between classes, and sharing of materials over email or in between classes. Collaboration characteristic of "joint work" involves 1) shared responsibility for the work of teaching, a 2) a collective conception of autonomy, 3) support for teacher's initiative and leadership, and 4) an established group affiliation and identity that is grounded in teachers' professional work (Little, 1990, p. 519). As I illustrate, although the routines teachers use may differ from group to group, the characteristics of "joint work" provides me with an effective way to describe why some collaboration between teachers is more productive than others.

Little's (1990) work on collegiality and collaboration, specifically her description of "sharing" (p. 518) and "joint work" (p. 519), provides a more specific way than the models discussed above to understand the productive routines design teams use to structure their work. Little (1990) describes sharing as "making the ordinary materials of [teacher's] work accessible to one another" (p. 518). Teachers share such things as handouts, quizzes, and homework assignments with colleagues who are looking for new ways of structuring student learning.

Little (1990) describes sharing as "variable in form and consequence…[that] may engage more or fewer teachers, may be fully reciprocal or only marginally so. Teachers may reveal much or little of their thinking or practice in the materials and ideas they share" (p. 518). Through regular engagement in tasks that necessitate "joint work (p. 519)," teachers become a unit of learning. In the context of design teams, the sharing of teaching tools and resources, whether it is a graphic organizer to scaffold students' note-taking or a survey given to students to get their feedback on group work, can lead to the kind of collaboration characteristic of joint work that results in collective learning.

The data has revealed that these instances of sharing can become rich episodes of "joint work" (Little, 1990) when teachers 1) *validate* or *qualify* their reactions to whatever tool or document is shared, 2) *elaborate* on specific ways the tool is useful, and 3) suggest ways the tool can be further *refined* and *revised* to serve the needs of the teacher who shared the tool and the needs of their class. Thus, Little's (1990) concept of "joint work" serves as a primary lens through which I will code and analyze the data. Figure 4 illustrates this interaction.

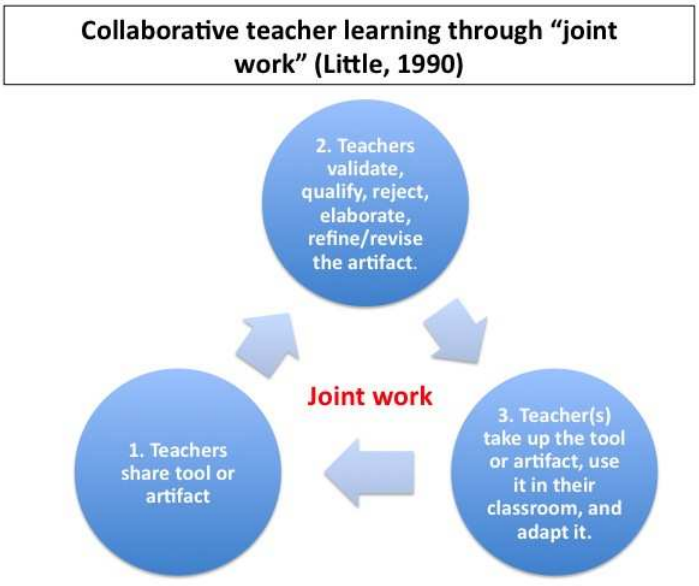

Figure 4. Collaborative teacher learning through joint work

Figure 4 illustrates what this process looks like. Again, it is important to remember that instances of "joint work" are usually situated in design team contexts where teachers have either set clear collaborative norms and/or have established a common commitment to the work of PBL curriculum redesign. One of the most common and potentially most powerful routines of joint work teachers have established starts when a teacher shares a document, tool, or a student artifact for the design team to consider. This sharing sets the stage for design teams to collaboratively consider the shared tool or artifact. In some cases, teachers immediately move to validate, reject, or qualify the shared tool or artifact. It is in this space where joint work is most clear and most complicated. In instances of "joint work" teachers consider the value of what was shared, through their peers' questions, comments, and suggestions, and teachers bring to bear their expertise and make clear their pedagogical values and beliefs about any number of areas of their educational belief systems. In this space, teacher learning is both practical (broad) and pedagogical (deep). Teachers learn both practical ways to revise and refine the tool or artifact and they learn different philosophical reasons why their peers would make some decisions rather than others when refining or revising the tool or artifact. By extension, taking up the tool or artifact by other teachers represents at least superficial interest in and agreement with the way the tool or artifact positions the content students are taught and the pedagogy the tool or artifact represents. Especially engaging or powerful instances of joint work can lead other teachers to experiment with the tool or artifact, which in turn can lead to additional instances of joint work around the slightly adapted tool or artifact. "Joint work" is not just a way to describe an instance of teacher learning and collaboration but it describes a way teachers iterate around specific tools and artifacts over time.

As a collaborative routine, instances of "joint work" are just one routine teachers used to learn more about the effectiveness of a tool or document or to learn more about how students responded to a task. In these instances, teacher learning was not necessarily limited to the shared document, tool, or artifact. This dissertation focuses on instances of joint work that are relatively compact and focused, that start with a clear beginning, that show a teacher or teachers sharing a tool or document. The most productive instances seem to be those that would inspire other teachers to pick up the shared tool or artifact, try it out, and then bring back to the group to share their experiences with implementing it in their classroom. Although this process was part of the larger curriculum redesign process, it consists of one way teachers learned from each other in design teams.

As important as "joint work" is for providing a good framework to examine teachers' collaborative work, routines consistent with "joint work" exist within a context of teacher learning. Teachers do not just start collaborative work using productive routines. In many cases, those routines evolve from intentional efforts on the part of teachers to establish a commitment to work and to set norms to sustain those commitments (Grossman, Wineburg, and Woolworth, 2001). All collaborative work sits within a complicated structure of explicit and tacit norms, personal and professional relationships, and various social and professional dynamics (Lortie, 1975; Ingersoll, 2003). At times those personal and professional dynamics can be treacherous. At other times, they can be empowering. In whatever way those dynamics are manifested in teachers' collaborative work, norms play a big yet undefined role in sustaining them. In instances of "joint work," teachers have established ways of working that help them leverage or mitigate the personal and professional dynamics, and in turn, afford them the space to develop routines of joint work in their collaboration. For Cielo Vista design teams, "joint work" was most common

within design teams that choose to design and implement redesigned curriculum throughout the design year. For whatever reason, not every team made this choice. However, in the design teams where teachers redesigned and commonly implemented new curriculum, the potentially for "joint work" increased because many teachers used some design team meeting time to share their experiences with implementation.

Conclusion

There are two areas the literature on teacher learning and collaboration that have not successfully been accounted for yet: collaborative settings where teachers lead and drive the agenda with little external assistance and the social dynamics of collaborative work. In this dissertation, I attend to both of these gaps.

In this literature review I highlighted 1) the various principles evidenced that describe productive routines of teachers' collaborative work, 2) how discourse, positioning, and decision making can reveal key social dynamics that influence how teachers interact in collaborative setting, and 3) how examining instances of "joint work" (Little, 1990) in design teams can illuminate useful examples of teacher learning. In addition, my use of the research literature exposed two interlocking gaps in the literature pertaining to examples of productive of teacher-led and teacher-driven collaborative work and how teachers navigate the social dynamics of collaborative work. I situate my work first as an extension of the current research on teacher learning in collaborative contexts and second as a way to inform the current gaps in the research literature that I have identified.

CHAPTER 2
THE RESEARCH CONTEXT: CIELO VISTA HIGH SCHOOL

Introduction

I have a long-standing relationship with the Pacific School District and Cielo Vista High School[3]. I was a former English teacher at Cielo Vista High School from 2001-2009 where I was very involved within the school community as an advisor to various student groups, activities, and clubs. I live in Cielo Vista's attendance area and often see former and current students in the local supermarkets and restaurants. I am a district parent with two school-aged kids both of whom would attend Cielo Vista High School if they were teenagers. After a break in 2010, I came back to the school as a university researcher. As such I have deep personal, professional, and historical ties and interests in what happens in the school district and at Cielo Vista High School. My relationships with the people and places in this research setting come with biases about people and policy within the district and school. However, my relationships with them also afford me a privileged perspective that helps me balance what the research reveals against who I have known people in the research setting to be.

I draw much of the information in this chapter from my personal and professional experience working as a teacher and university researcher at the school. At times that information comes from observing teachers work in design teams, at other times that information comes from sitting in on staff meetings or summer professional learning workshops, at other times that information comes from informal conversations I have with teachers and staff during lunch, before or after meetings, or after school.

In this chapter I will be describing 1) how the school decided to apply for a federal grant that centered on PBL, 2) the extent to which teachers were involved in that decision making

[3] All names of people and places are pseudonyms.

process, 4) the relationship between the school and the school district as it pertains to professional learning and curriculum development, 5) how the school has positioned their professional learning agenda within the context of their school renewal (Sirotnik, 1999) efforts, and 6) the roles I have assumed at Cielo Vista and how my history at the school influences how I approach my current research and study.

The School

My research is situated at Cielo Vista High School (CVHS), a public, comprehensive high school in the Pacific Northwest. The school serves students from various racial, ethnic, and socio-economic backgrounds but it is situated in an affluent school district. In addition, the school serves a significant English Language Learner (ELL) and Special Education (SPED) population. Cielo Vista serves approximately 1000 students: 45% of students qualify for free or reduced-price lunch, 10% qualify for ELL support services, 12% qualify for special education services and 47% will be in the first generation of college graduates for their family. In addition, the student population comprises of 6% African American students, 20% Asian students, 20% Hispanic students, 46% White students, and 8% Multi-ethnic students.

Organizing for Renewal[4]

Investigating options. In the 2008-9 academic year a broad, multi-faceted exploration of Cielo Vista was in full swing. This period involved a range of people and ideas working at different levels of the organization and pursuing a host of related but varied questions. What is the rigor and quality of Cielo Vista curriculum? Are students compelled by their experiences? What exciting instructional models exist that could inform Cielo Vista

[4] This section of this chapter was largely excerpted, by permission, from a chapter written by Andrew Shouse. The chapter is part of a book, currently being written by representative from the local university and teachers at the school, that describes various facets of the school renewal process currently underway at Cielo Vista High School.

educators? How can the professional culture of Cielo Vista be supported to foster innovative practice?

Like many creative moments preceding innovation, this is an open-ended, fluid, and somewhat chaotic period of investigation. At least three distinctive groups were engaged in exploring organizing images for the school. One, the Program Delivery Council (PDC), which is a formal representative body, has long been an integral part of school governance at high schools within the district. Consisting of Cielo Vista parents, teachers, and administrators the group was convened to consider the reasons for what was a recent decline in student enrollment and to sketch out strategies for reversing the trend. This group proposed focal themes that students would affiliate with within the school: Global Studies, Visual & Performing Arts, Science/Math Academy. This gave rise to an additional group of science, math and career/technology education (CTE) teachers who explored the broader literature and movement of STEM education. A third ad hoc group of Cielo Vista staff met offsite to explore models for professional learning. They identified a handful of books and articles to read. This group later morphed into a formal Instructional Leadership Team under an initiative launched by the incoming superintendent.

Across these activities teacher leaders, building administration, parents, and the local school foundation took a hard look at the school. They examined student outcomes, attendance patterns, student engagement. They discussed program quality across departments within Cielo Vista and learned about the innovative programs that others in the region and beyond had undertaken, visiting several schools in the region, exploring afterschool programs.

The school community developed a deeper sense of their successes and failures. The strong graduate rate and a rate of students attending 2- or 4-year colleges were clear. And efforts

undertaken in the previous few years increase academic rigor were bearing fruit. The Advanced Placement (AP) enrollment level was among the highest in the nation. These obvious successes notwithstanding, equity was a major concern as enrollment levels disaggregated by ethnicity told a more nuanced and troubling story. Students of color and English learners were underrepresented in STEM-focused (science, technology, engineering, and math) AP courses. African-American and Hispanic students composed 22% of the overall student body, but only 6% of the students passing an AP exam in a STEM course. Students with disabilities, students living in poverty, students of color, and students with a first language other than English, showed consistently lower achievement than their counterparts. Overall course failure rates for science and math classes hovered between 20% and 30%; among English language learners and Hispanic students, the respective rates were 35% and 45%. These insights into equity dimensions of student achievement in Sammamish fed a deep desire among faculty and leadership to rethink and challenge these troubling patterns.

Given rapid changes in society, advances in digital technologies, and increasing globalization, the CVHS teams knew that focusing on traditional measures of school success alone (standardized test scores, GPA, etc.) would not be enough to match current students' needs. They embarked on a study of literature from education and industry perspectives – including the work of David Conley, who had previously visited and profiled CVHS in his books *College Knowledge* and *College and Career Ready*, and Tony Wagner (*The Global Achievement Gap*) – as well as a study of existing schools in the region and nationwide that had adopted innovative practices. From that study emerged a set of key principles and skills, some of which have been termed "21st century skills" – collaboration, critical thinking, creativity, the ability to design and revise and receive feedback, communication, and student ownership of and

responsibility for their own learning (http://www.p21.org/). A focus also emerged on the importance of STEM content and skills. National publications called for an increased emphasis on STEM education in preparation for careers, but also for increased quality of life and participation in society (e.g., making informed decisions about political and civic issues related to their health care, ethical decisions regarding the use of emerging technologies, and the quality of the environment) (National Research Council, 2011).

Moving forward with a plan. At about the same time this process was happening, there were other PBL-like projects and programs happening within the school. One was an emerging after school robotics program that was gaining in popularity amongst students, among other small after school programs and projects where students worked collaboratively to solve authentic problems. Another one was a partnership between the local university and social studies teachers to redesign the Advanced Placement American Government course to include more projects that would involve students in the work of governance. Along with the redesigned AP Government class, classes within the careers, technology, and engineering department had been flirting with PBL pedagogies for years. Lastly, there was a small group of teachers working to describe, in ideal terms, what a student graduating from Cielo Vista High School should be able to do and know.

These three relatively disconnected ideas converged in a meeting that convened sometime time in winter or spring 2009. Either during this meeting or in other meetings that happened around this time (both the principal and teacher interviewed were unsure of the exact timeline), researchers from the local university, the school district, and teachers and administrators from the school articulated an interest in working more closely together around the idea of developing PBL pedagogy within the STEM disciplines. The principal described how,

around this time, the school learned about the Investing in Innovation (i3) being awarded by the federal government from either district administrators or university researchers, or both. To help write the grant, the school recruited a recent Ph.D. graduate who was recommended to them by the university researchers who by this time had become collaborators with the school. The principal described how the grant application was written in five weeks and included a small group of people including the principal, the teacher interviewed for this chapter, and the person recruited to draft the grant language. At some point before or during the grant writing process, the PDC worked with the grant writing team to propose that PBL be implemented throughout the school, not just within the STEM disciplines. The teacher interviewed described the decision to apply for the grant with the school-wide PBL focus as a "consensus decision" within the PDC.

When asked about the extent to which the larger staff was consulted for feedback, the teacher interviewed described various conversations that occurred within the constituency groups that each member of the PDC reported to. The teacher interviewed described these conversations as "a two way street" where teachers would listen and provide feedback and then PDC representatives would report back to the larger PDC body. In addition, the teacher described how she and other members of PDC would present the progress being made in the PDC to teachers in staff meetings. During such meetings, teachers were given the opportunity to ask questions and make comments. The teacher interviewed described this time at the school as "the beginning of greater control…when teachers were at the table, making decisions about things" and leading discussions with the staff about ways the school should change to address the problems they faced. Describing how close collaboration between the leadership team and administration has become, the teacher interviewed stated that "almost everything we do that is successful is a result of teamwork."

This is not to say that all the teachers at Cielo Vista High School were on board and excited about the new direction the school was going in at that time. There were no staff-wide votes conducted during staff meetings. Teachers were not surveyed about their feelings regarding the shift to PBL principles and pedagogy. However, both the principal and the teacher interviewed described the excitement generated by the creative brainstorming generated in the PDC, the generally positive reception they received when they started talking about project and problem based learning, and the enthusiasm generated within the school when they received the grant from the federal government. The teacher interviewed described how, at the time, "The feeling was positive." "Although there were individuals who were hesitant," she said, "the atmosphere around here [in regards to the grant] always seemed to be positive."

The initiatives that followed at CVHS – problem-based learning as an instructional strategy, a focus on science, technology, engineering, and math (STEM) content and skills, and others – were chosen intentionally in order to align students' high school experiences more closely with these skills that students need to demonstrate in college and in the workplace.

Implementing PBL

In 2009 Cielo Vista was awarded a large federal grant to support its work to 1) develop and support Science Technology Engineering and Math (STEM)-focused coursework; and 2) develop problem-based learning curricula across the school in every content area in order to 3) close specific achievement gaps within the school evidenced by disparities of AP enrollment and pass rates, students' grades in math and science coursework, and graduation rates of various groups of students. By instigating widespread shifts in teaching and learning over multiple years, school leadership has worked to improve the academic and professional culture of the school. Professional learning sits at the center of that systemic change.

An important component of the school's renewal process was the development of the leadership team. When the school first received the grant, it developed an open application process for all Cielo Vista teachers interested in joining the team. Teachers, administrators, and a member of the local university sat on the interview committee. The initial members of the leadership team included a science teacher and a social studies teacher. Later, a person from outside the school was hired to help manage the budget and some logistical and management needs created by the grant. Several teachers have been added over the years. The four teachers added to the team since 2009 include an English language learning (ELL) specialist, a Cielo Vista science teacher who also serves as the school's technology coach, one of the school's reading specialists, and an English teacher who has been experimenting with standards-based grading practices. Mostly consisting of teachers from the Science and Social Studies departments, as well as the principal, the leadership team designs, plans, and implements all the formal professional learning events throughout the school. It was not until the 2013 school year that a teacher from the English department was added to the leadership team. To date, no Math, Foreign Language, Physical Education, Special Education, or Visual Arts teachers have membership on the leadership team.

There are no clear answers as to why this is the case. It is entirely possible that the principal and leadership team look to integrate teachers who have been largely successful with implementing PBL in their classrooms. Data collected by the external evaluator, Knuth Research[5], suggest that the Social Studies and Science departments have been most successful in

[5] Knuth Research is the independent educational research organization responsible for evaluating the relative success of Cielo Vista High School's i3 grant. As stated in the text of the grant, their responsibilities are to measure the outcomes of the innovation (PBL), the extent to which the school has remained faithful to the innovation (PBL), and the extent to which the innovation (PBL) has been implemented within the school. Starting in the Spring of 2013, I have collected interview and classroom observation data for Knuth Research regarding their evaluation of this grant.

making the shift to PBL curriculum and pedagogy. The history of how PBL came to Cielo Vista also suggests that teachers within those departments were already developing expertise within PBL previous to the grant. In the busy day-to-day life of a school, it makes sense that the school looked first to those departments to recruit teachers to serve on the leadership team.

In collaboration with the principal, the leadership team makes policy decisions regarding various components of the PBL work. Leadership Team teachers are given yearlong release time to support the PBL work throughout the life of the grant. Some teachers have one period of release time each day while others have five periods of release time each day. The team has been highly influential in determining how the PBL would be framed internally and externally and in guiding the scope and sequence of how PBL was implemented throughout the school.

From the beginning, school leadership chose to pursue a strategy of renewal instead of reform to move the school improvement process' forward (Sirotnik, 1999). Sirotnik (1999) describes renewal as different from reform in that renewal is a process, engaged by individuals within a community, of constant improvement through collaboration and cooperation. Renewal is a process that comes from and is sustained within the school community. Sirotnik (1999) argues that renewal is different from reform. "Reform," (p. 607-608) he argues,

> Is about whatever is politically fashionable, pendulum-like in popularity, and usually underfunded, lacking in professional development, and short-lived. Renewal is about the process of individual and organizational change, about nurturing the spiritual, affective, and intellectual connections in the lives of educators working together to understand and improve their practice.

Their decision to take renewal-minded perspective to school improvement was intentional and stemmed from their belief that any sustainable school change must result from the existing pedagogical and methodological expertise within the staff. In many schools, either district or building administrators would bring in a new curriculum or leadership structure from somewhere else and implement it within the school. At Cielo Vista High School, the innovation came from within the school itself. Just about every tool or guiding document or partnership the school developed has either originated from the expertise of Cielo Vista teachers and staff or has been adapted and cultivated to be relevant and authentic to the specific dynamics of the school.

The partnership the school established with the University is a good example of the collaborative nature that saturates this project. When it came time to revise the Key Elements document in which the principles of PBL pedagogy are described and defined, as a representative of the university, I worked closely with teacher leaders and the principal to rewrite the document. For example, I provided expertise to align the principles with the research literature and to offer different ways the principles could be articulated. The school's leadership, however, has made all the final decisions regarding organization, specific language choices, and the structure of the document.

One of the goals of the CVHS renewal project is to improve the school's academic culture around teaching and learning. This goal could mean different things to different schools. In the realm of student learning, CVHS works to make learning more relevant and authentic to students across content areas. For example, in AP Chemistry, students worked with oceanographers to analyze data collected in the Pacific Ocean having to do with pH levels in the water or, in the case of Senior English, students might work in groups to brainstorm ways they could address problems such as human trafficking, in their immediate community. In the realm

of teaching, CVHS works to make teaching more public, transparent, and collaborative within and across content areas to improve teachers' practice. In some cases teachers may be given a release day to examine problems of practice or to further refine a unit or assessment to meet the goals of student learning set forth by the school. Renewal in both realms demands an increased investment in time, money, and school-based expertise.

There are many ways the school has worked toward this goal. Professional learning through collaboration is perhaps one of the most important ways the school is working to fundamentally change and improve the culture of teaching. Using the "professional capital" that already exists within the school, the school leadership team is engaged in a process of pushing and pulling teachers to review, revise, and redefine their practice (Hargreaves and Fullan, 2012). Hargreaves and Fullan (p. 135, 2012) describe how teachers are

> *Pulled* into something they find energizing, that they are given time for, and that respects their collective (not individual) professional autonomy and discretion; yet they are also *pushed* to review or revise what has been more or less effective for them, and to acquire practices from other colleagues who may be doing some things better.

Using PBL as the catalyst, school leaders strive to shift the way teachers approach teaching and learning. CVHS defines PBL pedagogy in a document they developed called The 7 Key Elements of Problem-Based Learning Classrooms[6].

This document was the result of a three-year collaboration between teacher leaders and University of Washington researchers from 2009-2012. The principal and University of Washington researchers drafted the first 2-page version in 2009. It was heavily influenced by the research literature. Then, based on feedback from design team teachers, teacher leaders and

[6] See the Appendix for a full copy of the Key Elements document.

University of Washington researchers, the document was revised and expanded, including the addition of key components and a clearly articulated rationale for each Element. Before it was published and presented as a finished document to the staff, the authors received input from teacher committees within the school and the full staff, in addition to gathering feedback from key partners such as Knuth Research. In this document, the school identified the following seven principles of PBL pedagogy

- Collaborative groups
- Culturally Responsive Instruction
- Academic Discourse
- Authentic Problems
- Authentic Assessment
- Student Voice
- Expertise

PBL has become the tool to push and pull teachers to think differently about 1) how students learn and 2) the role they play as teachers in the student learning process. To many teachers at CVHS, PBL pedagogy serves as a significant departure from how they have previously thought about teaching, learning, and curriculum. Previous to the PBL initiative, most teachers taught in ways that would be considered traditional or teacher-centered. From time to time teachers had students working in groups or had them working on various projects, but largely the purpose of those tasks was developed and assigned by the teacher with very specific ends or assessment in mind.

The school invested in the existing expertise and knowledge within the teaching staff to drive the curriculum redesign effort and lead the desired shifts in professional growth and

learning. An important aspect of that theory of action, and the primary unit of analysis in this dissertation is the design team. In design teams, teachers who have experience with teaching the curriculum work together to redesign it. Teachers draw knowledge about PBL 1) from the Key Elements document (which defines PBL at CVHS), 2) from various teacher-led formal professional development sessions offered throughout the year, and 3) from their own research and inquiry into what PBL looks like in other educational settings.

A significant component of the school's larger professional learning strategy was implementation of design teams to redesign coursework. The principal proposed the design team idea based in part on the successful redesign of AP American Government class by teachers within the district, including two teachers at Cielo Vista. He said,

> "We saw the promise in the way of thinking that teachers could do that and then we started thinking, if we did this school wide, what would that really look like. And then even in the grant writing process there were questions about, do we really need to have all this release time and based on what we learned from that…it seems like if teachers are really going to change their practice and engage deeply we have to invest in that way. And that led to the [design team] model that we proposed."

In the first year of curriculum redesign, teachers were asked to participate in design work according to their experience teaching the course and their interest in redesigning the existing curriculum. In part because of the struggles of a couple of design teams, the next year the principal and leadership team asked teachers to collaborate and propose courses they would like to redesign. Throughout the process the leadership team and principal have tried to balance the

need to redesign as much core coursework as possible and the desire to redesign only those courses teachers they had support from teachers to redesign. With the grant ready to expire at the end of the 2015 school year, AP Literature and AP Calculus AB and BC are three examples where the school has not invested in a full course redesign and the teachers have not voiced an interest in redesigning the courses. To many teachers, the design year is a luxury. All the teachers interviewed, even those who were hesitant to fully buy in to PBL, spoke positively about the time they spent redesigning curriculum with colleagues and the respect they felt from the school to be given the time and space to do the design work. Although both the principal and the teacher interviewed both assumed that teachers could have opted out of the design experience, I know of no teacher who did so.

Design teams are an important location for research because school administrators and teacher leaders have positioned each teacher's PBL instructional practice within the classroom and their collaborative work in design teams as major components of the shifts they strive to accomplish throughout the school. In design teams, teachers have time and space to share their practice and their beliefs about various facets of teaching and learning. This represents new work for teachers. Through my research, I am interested in examining 1) what collaborative practices teachers established in the design teams and how they impacted teachers' learning, 2) how teachers navigated the social, inter-personal dimensions of their collaborative work, and 3) the patterns of collaborative learning that emerged between and among design teams throughout the school.

Teachers who worked in design teams met daily during an extra, common planning period. This collaborative work was intense and complex. Every day they negotiated amongst various standards (Common Core, Advanced Placement, 7 Key Elements); various high stakes

assessments (High School Proficiency Exam or HSPE, End of Course Exams, AP exams); various district assessments; various strengths and weaknesses of the established curriculum; and the varied experience and expertise each teacher brought to the curriculum redesign effort. Teachers struggled to negotiate between the competing standards and expectations placed upon them by the school, district, and state, and navigate the competing interests of their colleagues within the design team.

As with any school-wide policy, the way teachers have experienced the design team experience is varied as is the extent to which design teams have successfully redesigned curriculum. For example, some design teams redesigned most of the existing course and continue to refine what they initially planned while other design teams have struggled to redesigned large chunks of curriculum and to find the time to keep refining what they have already planned. There are probably many reasons why particular design teams were more productive than others, some of which are not the topic of my dissertation. However, that variability represents a problem space both for the school, in terms of how to address the consequences of that variability, and for the research, in terms of how to richly describe what factors and characteristics varied and why. The latter is the topic of this dissertation.

For the purposes of my research, design teams are integral. In design teams, teachers have had an opportunity to learn the benefits of collaborative and collective problem solving and decision-making. The more teachers collaborated around the highly complex task of redesigning established curriculum, the more they could potentially come to see the value of collaboration as an integral component of their ongoing practice. As teachers worked to integrate such principles as authenticity, relevance, and student voice into their curriculum, they shared their practice and their pedagogical beliefs with each other. It was and continues to be the school's hope that such

conversations may cause a shift in teachers' beliefs about teaching and learning. School administrators and teacher leaders intend that design teams serve as the incubator for change regarding how students are positioned as learners and how teachers approach their work to improve and refine their practice.

The school's relationship with the district

Before the school began working on the current school improvement project, much of the school improvement policies underway at Cielo Vista High School originated at the district level. In 1996, the school district hired a new superintendent who, over time, sought to improve district schools through the implementation of a common curriculum from kindergarten through 12th grade for every content area, and worked to open access to AP classes for all students. Both the common curriculum and AP open access policies relied heavily on curriculum as the driver of school improvement, and both policies were managed largely at the district level.

Both policies are important to understanding how and why Cielo Vista teachers approach this current school improvement project. First, the policy to open access to AP coursework to all students represented a fundamental shift in thinking for teachers for a couple of reasons. Many teachers were themselves students in AP classes that catered to a small population of students who had the support and resources to be successful in those classes. In many cases rigor was defined by massive amounts of reading homework and memorization to prepare students to be successful on the multiple choice and essay sections in the AP exam. Passing those classes and those exams became a badge of prestige and honor bestowed upon the few who were willing to put in the time and sacrifice. As those students became teachers of AP classes, they learned that prestige, clout, and status came with consistently high pass rates. By opening access to those classes to any students who wanted to take them, regardless of reading ability, motivation, or

learning ability or disability, teachers worried that their pass rates would decline sharply. In some cases, teachers were right. Pass rates did decline at first. Teacher's frustrations were exacerbated when they received few additional resources to support the needs of the diversity of students who now took AP classes. Over time, however, AP pass rates stabilized and even increased as more students took more AP classes. Overall, despite the social justice perspective from which the district talked about both policies, the way the policy was implemented and supported tainted the way many teachers perceived the policy.

Second, the common curriculum served to support the open access AP class policy by scaffolding student learning in rigorous coursework from kindergarten through high school so students would be prepared to take and be successful in AP classes. The district's intention was to have teachers develop and design the common curriculum in grade level teams. Once developed, that curriculum would be posted online where teachers could access it and use it in their classrooms. From time to time teachers across the district would meet and discuss the effectiveness of the curriculum and design common assessments by which they could measure, across schools, the effectiveness of the new curriculum. The district's intention was that this process was to be democratic and collaborative and would increase the quality of student learning across the district by providing relevant and ongoing professional learning opportunities for teachers. However, the common curriculum was not without problems. In some content areas, such as ELA and Math, once written, teachers had little control over adapting and changing the curriculum. In other content areas, such as Social Studies and to a lesser degree Science, the common curriculum never took shape. Over time teachers in different content areas came to have vastly different experiences both with the "commonness" of the curriculum and the extent to which they controlled what they taught to their students.

The choices the school leaders made at Cielo Vista regarding curriculum redesign follows in the district's footsteps but takes a different approach to implementation. The school asks teachers who have experience teaching a course to be part of the redesign effort. The school provides them with the Key Elements as a guiding document, but then gets out of their way and gives them the time and space to redesign the curriculum with colleagues who they know and trust. Either during the redesign year or in the year to follow, those same teachers pilot the curriculum they have redesigned and continue to work together to refine the plans they originally made. Such work implies that they are teaching the same things on the same days in similar ways. In most cases, this approach has provided Cielo Vista teachers with ongoing professional learning experiences they call "the best they have ever experienced." One of the English teachers whose team is part of this study described how "The notion that somebody is giving us the time and taking note that that is an actual, in fact, a vital part of good instruction at the very least, um, is the ability to have time to do your planning and talk about practice. That feels good." However, despite the overwhelmingly positive response all teachers interviewed have given to time allotted to work with colleagues, the PBL pedagogy they are strongly advised to use to redesign curriculum looks to some like an effort to make the curriculum common across classrooms. For those who teach in departments where there are strong norms sustaining teaching privacy and autonomy, such as in the English department, they approach such perceived moves to a common curriculum warily.

The legacy of vastly different experiences with a common curriculum and with what a common curriculum means in theory and practice in part evidences itself in how teachers at Cielo Vista approach the task of curriculum redesign. In those departments where the common curriculum was more rigidly articulated and implemented, teachers approached the idea of a

common curriculum with reticence and suspicion. To them, any move to make curriculum common across classrooms, despite the far-reaching autonomy and control those teachers had in how they redesigned curriculum, represented another move to sterilize and standardize their teaching and the curriculum. The data suggest in those departments where there was essentially no common curriculum, teachers tended to approach the idea of a common curriculum with interest. The data also suggest that in those departments where the common curriculum was most rigid, teachers were more suspicious of the PBL work.

The landscape of professional learning at Cielo Vista

In most cases, the hesitation some teachers felt toward the "commonness" of the redesigned curriculum added just another layer of complexity to an already complicated, complex, and robust landscape of professional learning at Cielo Vista High School.

To support design team work, school leaders developed a summer instructional workshop. The school paid teachers to attend four days of professional learning that is focused around specific key elements that were to be the focus of all professional learning throughout the year. This workshop known as the Summer Institute of Learning and Teaching (SILT), was itself designed around problem-based learning strategies. In SILT, teachers were taught by other Cielo Vista teachers, and were many times asked to consider problems of practice they have wrestled with in their classrooms. In addition, teachers were given the choice to attend various sessions that were designed by teachers around specific problems associated with implementing problem-based learning. One teacher might lead a session on standards-based grading while another might lead a session on research skills. Teachers were taught by their colleagues, were given relevant and authentic problems of practice to consider and workshop with colleagues, and were given choice as to what sessions to attend.

On a monthly basis, teachers attended staff meetings that were also planned and led by Cielo Vista teachers and that were also focused around the implementation of specific key elements. Although teachers were not given as much choice during these meetings, the content of the meetings was mostly relevant to the work teachers were doing in their classrooms and to their work in design teams.

The school designed these three components of professional learning to synergistically support teachers' learning throughout the school. Positive data from various sources within and outside the school support the sense that teachers accessed and leveraged the various sources of learning with great success. These data include high attendance rates at non-mandatory summer professional learning workshops and high ratings from teachers on the sessions they attended In addition, teachers have expressed to me, both formally and informally, that the time and space afforded them when working on a design team has provided them with some of the best professional learning experiences of their careers.

My roles at Cielo Vista High School

I was an English teacher at Cielo Vista High School from 2001 to 2009. During that time I taught the English 9, Honors English 9, English 10, Honors English 10, and English 12 courses. In addition, I taught an array of elective classes ranging from Link Crew, a class that taught upper-level students how to serve as mentors to freshman students, to various levels of the Advancement Via Individual Determination (AVID) classes, to redesigning and teaching all levels of the student leadership curriculum. From 2003-2007, I served as the advisor to the Student Leadership and Activities program. During that time I advised and coached students in various school-wide philanthropic and other small-scale projects such as planning school dances and assemblies.

When the school hired me in 2001, I felt immediately at home within the department. In fact, it was due to meeting several members of the department while touring the school that I decided that I wanted to teach at Cielo Vista High School. My first year was spent doing a lot of listening during lunch. The conversations at lunch in the English department were robust. They moved quickly from literary references, to off-color jokes, to disparaging remarks about the district and administration, to people's personal lives with their kids, spouse, their loved ones. Over time, lunch is where respect was earned, help was given, and relationships made in the English department. I quickly learned that wit and humor were the currency of public discourse within the department, that certain teachers in the department got to teach AP classes based on their perceived deep content knowledge, and that this department thought of themselves as the best group of teachers at the school. There was no thought of joining other departments for lunch when all the best teachers in the school were in one department and all of them were your friends. To the best of my knowledge, this same dynamic within the department exists today.

Rarely during these "meetings" were there any deeper conversations about student learning, or sharing problems of practice that went beyond storytelling. That does not mean conversations about student learning did not happen between individual English teachers either after or before school or between classes. It only means that rarely, as a department, were such topics discussed. One of the reasons for this could be that despite our close professional and personal relationships, there was always the unspoken rule that advice, unless specifically elicited, was not offered and strict norms of privacy and autonomy about each other's practice was the custom. As a teacher in the department I bought in to and helped foster that culture.

During my first two years, I worked very closely with Shannon Cape, a teacher who no longer works at the school. We co-planned and co-taught a freshman remediation class for all

the freshmen students who failed English their first semester of high school. In my first four weeks teaching the class, three fights broke out in my classroom. However rough the experience was, it was made manageable because I was working with a great collaborator. Through that collaboration, Shannon and I problem solved the kinds of issues that resulted from teaching students who experienced significant struggles with reading, writing, and staying on task. I believe a result of my collaboration with Shannon was that many of our students got back on course and earned their way into sophomore English their next year.

After my first couple of years in the department, my focus shifted to extra-curricular programs on campus. I think I was still considered a good English teacher, but it was clear to everyone in the department that I was interested in other things in addition to teaching English.

Throughout my tenure working in the English department, my identity had more to do with my efforts in the student leadership realm than it did as an English teacher. Although I have a Masters degree in English, I never claimed to be, nor was ever thought of, as a content knowledge expert. For a year or two, I was so busy with extra-curricular activities in my work with various student groups that I wouldn't attend the department lunch. Normally, this would guarantee a teacher "outsider" status with the department but my efforts in my extra-curricular work garnered me respect from the English teachers. Whether it was taking offensive sections out of the school yearbook, or making attempts to raise the discourse of the student governance through student election debates, what would normally would have ostracized me from the department instead evidenced to them a willingness to bring order, intellectual rigor, and standards to programs in the rest of the school. To my colleagues, I was merely bringing the best of the English department to other parts of the school.

As a result, I was still invited out for drinks after school on Fridays, to holiday parties, and to the end of the year party at one of the English teacher's houses. As was custom, all of these events were for English department members only.

The relationships I have with other teachers and departments at the school are different. I know most of them professionally, mostly by reputation, and some of them personally. Even though the extent of those relationships is not as deep, they have still afforded me almost universal access to classrooms and departments throughout the school. This has made classroom and design team meeting observations, interviews, and even the informal chat during staff meetings far easier than if I were not a former teacher at the school. It is from these experiences that I can speak with some authority about the inner-workings of the English department specifically, and the other departments in the school more generally. My perspective is in part borne out of my experience at the school which informs how I think about the way teachers approach school change and the various layers of professional learning associated with that change.

I left the school in March of 2009 to take a job as a teaching assistant in the local university teacher education program. By that time I was a Ph.D. student in the College of Education at the local university. Two of the students I evaluated in the teacher education program eventually took jobs teaching in the Cielo Vista English Department. In addition, my current role as a research assistant has brought me back into the school, almost daily, to serve as a researcher, consultant, adviser, and counselor to many of the same teachers I worked with previously. Even though I feel like the same person, my status as a result of my association with the university and my new role at the school, has changed within the building.

Over the last three years I have become a fixture at staff meetings, in leadership team meetings, in the Advisory Board meetings, and have helped draft some of the foundational documents teachers use to guide their design team work. For the past two years I have helped teacher leaders plan the summer professional learning institute at the school. Two years ago I was part of a small team that rewrote the Key Elements document that teachers now use to guide their curriculum design process. I also routinely participate in the leadership team meetings in which the teacher leaders and principal set policy for implementation of the school renewal process. Lastly, since the Spring of 2013, I have worked for Knuth Research, the external evaluator for the grant to conduct teacher interviews and classroom observations to evaluate what PBL looks like in Cielo Vista classrooms and the extent to which PBL has been implemented throughout the school. As such, I am very invested both in the success of the school around their PBL work generally or in the success of design teams specifically and in the research that comes out of the school regarding their work within the PBL initiative.

This overview of my history and my current role at the school is all to say that I have had both an indirect and at times a direct impact on the very phenomenon I am now studying. That tension is ever-present as I work to leverage my knowledge of teachers to inform how I write about them yet stay as grounded as possible in the data. Specifically, it is always difficult to know when and if to detach what I know of teachers historically from what they may say in interviews and in meetings. Interviews, especially, are one place where this tension is most obvious. Because I know many of these teachers personally, I know when and how to ask follow up questions to get teachers to speak more candidly about the specific dynamics of their team, for example.

The data I have garnered from teachers in interviews many times enriched what I saw happening in design teams. At the same time I have routinely shared design team meeting observation and interview protocols, interview transcripts, video footage, and research memos with the research team to get different perspectives on what is happening within specific instances of teacher collaboration and my interpretations of them. These regular checks with the research team have helped me balance my biases with what is evident in the data and adds rigor to my data analysis and findings.

Given the school's relationship to the district and the various policies of school improvement asserted by the district, my role within the school for the past 13 years informs my opinion in ways that deepen my understanding of the ways teachers position themselves within the current school improvement project. As professional learning has taken a more central focus in the current project, I can speak to how teachers engage in their own learning, both individually and collaboratively, in ways that add depth and breadth to the data I have collected.

Conclusion

Five years ago, even before Cielo Vista High School was awarded the federal grant, the principal began to provide space for teachers to take up greater roles within the school to directly impact school policy and governance. The principal empowered teachers to confront the causes of declining enrollment and teacher morale. This work, and what came of it, can serve as a blueprint for how schools can transform themselves by making teachers the center of a process of school renewal. The decision to move forward with PBL as the centerpiece for school transformation came primarily from teachers. Once the school received the grant, school leaders put faith in the existing pedagogical and content knowledge of teachers to redesign courses. Although it would be naïve to assume that every teacher at Cielo Vista has completely bought in

to PBL and the way it has been implemented, the data suggest the school made every effort to keep teachers informed, provide them with space to ask questions, provide feedback, and/or offer criticisms as the idea to move toward PBL pedagogy gained traction.

Since they received the grant, Cielo Vista High School has structured various levels of professional development throughout the school to facilitate the implementation of PBL school wide. The most important of these is the design team where teachers redesign established curriculum. Design teams represent a bottom-up, inside-out school improvement agenda, consistent with principles of school renewal (Sirotnik, 1999).

Using my experience at the school as a teacher and my role as a researcher as complimentary lenses through which to view the research, some aspects of teachers' work are important to understand more fully. First, individual design teams have approached the task of PBL curriculum redesign differently. My experience as a teacher and research at Cielo Vista tells me that this difference should be viewed in part through each teacher's and each department's experience with district curriculum policies over the last decade. Second, in some cases, teachers embraced the idea that design teams commonly design and implement the redesigned PBL curriculum. In other cases, teachers were hesitant to either redesign curriculum according to PBL principles or to commonly implement the curriculum they jointly designed or both. How teachers approached this process may be attributed to 1) the existing departmental culture, 2) the individual experiences of teachers as members of a department and as teachers within the district, and 3) the historical experience individual teachers and departments have with the various curricular policies put forth by the district and the school. In most cases, it is some mixture of all three making each design team unique entities with unique histories nested within a common context.

More generally, my understanding of the school context helps me explain the importance and implications of what I am finding from the data to provide a fuller picture of what is happening broadly within and between design teams.

CHAPTER 3
METHODOLOGY

Introduction

Given the nuances of the research setting, my dissertation uses a case study, grounded theory approach to the research (Miriam, 2009; Erickson, 1986; Strauss & Corbin, 1998). Using case study, I investigate particular contexts of collaborative work that help highlight larger patterns and trends emerging throughout the school and in other educational settings. Because the school presents unique instances of widely used collaborative routines, I utilize a grounded theory approach to investigate both the unique and the ubiquitous in terms of collaborative work found at the school.

In this dissertation I examine different grain sizes of collaborative design team work. I use a single case study to examine how one team structured their collaborative learning and how they balanced the interpersonal dynamics of group work. The single case study provides me with a blueprint of sorts for when I examine the other design teams in my sample. In addition to a single case study, I focus on a comparative case study of four different design teams, all within the core content areas (English, Math, Social Studies) of the high school. Through a comparison of four design teams across core content areas, I identify patterns of how design teams have approached and structured the curriculum redesign process and identify areas of differences and similarities among design teams.

My two-pronged approach to studying what is happening in design teams across the school gives me the potential to speak to the small nuances of teachers' collaborative work in the single case study, and gives me the potential to speak to general trends across the school. Through a combination of both prongs of my dissertation, I can describe specific routines

teachers used and can address ways in which design teams' work could generalize to the field. Table 1 below shows how the data maps on to the research questions I explore in this dissertation.

Table 1.

Research Questions and the Data			
	Design team meeting videos	Teacher interviews	Document review (Teacher generated notes from design team meetings
What collaborative routines do teachers establish in design teams?	X	X	X
In what ways do those routines influence the collaborative learning of design teams?	X	X	
How do teachers navigate the social dimensions of collaborative work, both individually and as a team?	X	X	
What patterns of collaborative practices emerge among design teams throughout the school?	X	X	

Data Collection

I use a qualitative approach to answer my research questions. The data I use to support my findings comes from data I have already collected (2010-2011 school year, 2011-2012 school year, and the 2012-2013 school year).

Focal groups studied. For this dissertation I have chosen to study the English 3 team for the single case study and the English 2, Social Studies 1, and Math 2 teams for the comparative case study. The choice of these teams is intentional.

The English 3 team, observed in the 2011-2012 school year, evidenced equitable and productive collaborative practice throughout the year. As such, they offer an instructive example

for how a team of teachers established productive collaborative practices with little guidance and support. Like all the other design teams studied, each teacher in this group had attended various professional development experiences planned by either the school or the district. Many of these experiences were collaborative in nature. However, in those experiences teachers were usually given specific tasks to work on and an agenda of how they would accomplish those tasks. Although the work completed in these meetings was typically teacher-generated, teachers had little say in how that work was structured or what the product of that work would be. In addition, the teachers in this design team brought a diversity of experience and expertise to the curriculum redesign effort which presents an interesting study of social interaction and status. This team consisted of two novice English teachers (females), one experienced English teacher (male), and the school's ELL facilitator who was also had varied and deep experience in the classroom (male).

Comparative analysis of the English 2, Social Studies 1, and Math 2 teams afforded me the opportunity to examine the various ways some teams approached the collaborative work of curriculum redesign. Approximately 25 design teams have completed or will complete course redesign since 2009. There typically are 3-4 teachers per design team but there has been as many as 8 (BioChem team) and as little as 2 (AP Comparative Government) since design teams started working. In my research at Cielo Vista High School, I have followed seven design teams in the Social Studies, English, and Math departments. Choosing to focus on the collaborative experience of the English 2 and 3 teams, Social Studies 1, and Math 2 provide me with a representative sample of the design team work I observed while researching at Cielo Vista High School from 2010-2013. My sample is in no way comprehensive of all the experiences of every design team at Cielo Vista, but the four I have chosen provide me with a comprehensive

description and analysis of my sample. As such, my comparative analysis highlights practices and routines that were consistent among the teams I followed and examines relevant differences in how they structured their work.

Video recorded design team meetings. I video recorded each and every design team meeting I attended as well as kept field notes of each meeting. Through video, I can revisit previous design team meetings and conduct a fine-grained analysis of how teachers interact both verbally and through body language when redesigning curriculum (Powell, Francisco & Maher, 2003). The use of video and video analysis is especially important for identifying and tracking teachers' discursive moves and subtle interactions (Powell, Francisco & Maher, 2003; Martin, 1999). Thus, video analysis is integral to answering my research questions. Although larger collaborative patterns like routines are easy for me to track during design team meeting observations, the subtlety of discourse patterns is not immediately noticeable during observations. Through repeated video analysis, I can identify and track discourse patterns and markers (Schiffrin, 1987; Gee, 2011) teachers use that influence the ways they problem solve, brainstorm, and make decisions. This is made even more powerful when I collaborate with the research team to analyze the video data. I have found the ability to revisit video clips, many times over with different audiences, a valuable tool for further validating my claims and interpretations of what people say and how they interact in collaborative settings.

Interviews. I relied on semi-structured and stimulated recall interviews (Merriam, 2009; Patton, 2003) with participant teachers to gain their perspective on how their experience in design teams. Given my research design, teacher interviews assumed greater significance, as data from them helped me establish a baseline of teacher's beliefs and attitudes at the beginning of their design team experience. Semi-structured protocols provided me with the flexibility to

ask additional questions when needed and skip questions if teachers answer multiple questions at once.

I used stimulated recall interviews with teachers to gain their insight on specific instances and episodes that seem most pertinent to my research goals. To facilitate these interviews I asked teachers to watch video of an episode of their design team collaborating and describe ways they saw themselves and their colleagues interacting in the group. Stimulated recall interviews can provide opportunities for teachers to reflect, in a focused way on a specific instance, on their behavior and the behavior of their colleagues (Wineburg, 1991; Schepens et al., 2007; Dempsey, 2010). Through stimulated recall interviews, I anchored teacher's perceptions of specific episodes of sharing, joint work, or disagreement, for example, and constructed a fuller understanding of an episode through the perceptions of the teachers who experienced it.

As I developed both types of interview protocols, I shared them with the research team to get feedback. In the past, such feedback has been valuable for fine-tuning and nuancing questions to get more specific answers from teachers.

Document collection. Teacher-generated documents, such as notes from design team meetings and common handouts and copies of PowerPoint slides provide potentially important data points (Merriam, 2009). To account for the issue that the teachers I am working with all use the Microsoft program OneNote, a program not supported by Apple computers or software, I asked teachers to send me Word documents of all notes they take during design team meetings and all relevant classroom artifacts they use when teaching PBL implementation units.

Data Collection Over Time

The data I collected in the 2012-2013 school year is described in Table 2. Upon reflection, it was clear to me that the weekly observations data collection plan I established in the

2011-2012 school year provided me with a limited view into how each team was actually working together on a day-to-day basis. Although the weekly observations design gave me a good indication of their collaborative routines over time, it was difficult to know the extent to which each team was satisficing their behavior on the days I observed. Despite these limitations, the data I collected in year 1 provide me with insights that contribute to the answers I provide to my research questions.

Table 2.

2011-2012 School Year				
	Design team meeting observations	**Interviews**	**Teacher artifacts/notes**	**Classroom observations**
***English 2**	Weekly (September-March) Video recorded	Semi-structured • Fall • Spring	Throughout the year	T1 (3.5.12, 3.30.12) T2 (3.5.13) T3 (3.14.13)
***Social Studies 1**	Weekly (Spetember-March) Video recorded	Semi-structured • Winter • Spring	Throughout the year	Not observed

To compensate for the above stated limitations in year 1 of data collection, in year 2 I implemented a pre/post structure for design team observations to establish an early and late baseline of how teachers were working together as represented in Table 3 below. To accomplish this I observed design teams for a week in September and a week in June. In addition, I negotiated with each design team to observe daily meetings when they were planning a PBL unit they intended to implement at some point during the year. These daily observations provided me with opportunities to observe how teachers resolved conflicts over multiple meetings, how they made decisions regarding minor issues like the layout of a handout and major issues like how to structure a summative assessment, and how they established collaborative routines over the course of a week or month. For example, in one instance I was able to observe how one team dealt with problems of practice as well as how they processed their collaborative practice as a group. Such activities, rarely limited to one meeting, are also important for documenting how

teachers may shift their opinions and beliefs regarding any number of pedagogical topics and issues.

Table 3.

2012-2013 School Year			
	Design team meeting observations	**Interviews**	**Teacher artifacts/notes**
Math 2	Daily for one week in September to establish a baseline of collaborative practice 4 meetings Daily for a month and half (December-January) to observe planning of a complete PBL unit 12 meetings Daily for one week in early June to observe any change or evolution in collaborative practice 1 meeting	Semi-structured protocol in October. Stimulated recall protocol in March. Teachers watched video of a design team meeting and shared insights and observations. Semi-structured protocol in June.	Throughout the year.

Participants

The participants in this study have been selected from the group of teachers who are participating in curriculum redesign work in design teams. With input from the project teacher leaders, the principal selects and invites teachers to participate in the curriculum redesign process. Participants are fully consented previous to data collection. Their participation within the study is voluntary. Design teams consist of teachers who have a diversity of experience teaching the coursework and various content-specific and pedagogical expertise.

My choice of which design teams to study aligns with my background as a former high school English teacher, my ability to offer support regarding questions of content and pedagogy, and the interests of the larger research agenda. As a result, my dissertation draws from data from the following design teams:

- 1 English department design team (English 2),
- 1 Social Studies design team (Social Studies 1),
- 1 Math design team (Math 2).

Each teacher in each design team fully consented to my use of their participation in video recorded design team meetings, interviews, and document review. This includes both the teachers who are on the design team depicted in the single case study and the teachers who are on the design teams depicted in the comparative case study.

Data Analysis

Given the unique research setting at CVHS, I relied upon a grounded theory approach (Merriam, 2009; Erickson, 1987) to develop theory that addresses my research questions. Because some of what I learned about design teams is difficult to anticipate in advance, grounded theory afforded me the option of building theory from the data as a result of gaps or discrepancies between the research literature and the data (Merriam, 2009). I entered this investigation with my existing theoretical framework knowing that through the data collected on these design teams, my findings elaborated and expanded on the existing research. Although some findings may be novel, they are anchored at least in part in the research literature. In addition, I triangulated the data by pulling from design team meeting video, teacher-generated documentation from design team meetings, and teacher interviews. Table 4 below illustrates how each data source provides evidence to speak to each research topic I've identified.

Table 4.

Data Triangulation and Research Topics			
	Design team meeting video	Teacher-generated documentation from design team meetings	Teacher interviews
Research topic #1: The collaborative routines teachers establish in design teams to redesign curriculum.	X	X	X
Research topic #2: The ways those routines may or may not influence the collective learning within design teams.	X	X	X
Research sub-topic #3: The ways teacher's status shapes how groups collaborate and the ways status may shift within groups and settings.	X	NA	X

Theoretical framework. A multi-layered framework guides my analysis of the data illustrated below in Diagram 1. First, I use the concept of "joint work" (Little 1990) to identify instances of sharing that turned into instances of collaborative problem solving. Little (1990) describes "sharing" as occasions when teachers make "the ordinary materials of their work accessible to one another" (p. 518). I define an instance as an event that

1. Starts when one teacher shares a tool, document, a teaching or student artifact with the design team,
2. Lasts between 2-15 minutes,
3. All the teachers present on the design team verbally participate in the discussion to solve whatever problem a teacher on the team has presented to them.

These instances show various characteristics of what Little (1990) describes as "joint work." "Joint work" is defined as "encounters among teachers that rest on shared responsibility

for the work of teaching (interdependence), collective conceptions of autonomy, support for teachers' initiative and leadership with regard to professional practice, and group affiliations grounded in professional work" (p. 519). After I identified potential instances of "sharing" or "joint work" in the video, I examined them further according to Little's (1990) characteristics of "joint work." Amongst all the video at my disposal, it is only those instances of sharing that turned into collaborative problem solving that I examined further. Many times I had already identified these instances in the field notes I took during the observation.

Second, after I identified an instance of "joint work," I went back through the video to identify the kinds of discourse markers teacher used as they interacted. Discourse markers constitute one part of a larger pattern of discourse that people use when they communicate with one another (Schiffrin, 1987). However, the role discourse markers play in framing the trajectory of how people communicate with one another cannot be overstated. Schiffrin (1987) calls out "well," "but," "so," "now," "I mean," "Y'know," "then," "and," "or," "because," "oh," as words that people use to mark time, emphasis, repair, agreement, and disagreement in conversations. Most discourse markers are conjunctions. Schiffrin (1987) describes how

> Conjunctions mark structural relationships between constituent parts of a sentence. Conjunctions also have semantic values which partially restrict what can be connected; such values intersect with the meanings of the propositions being connected in ways which are governed not only by semantic rules of connectivity, but by pragmatic principles through which external and internal meanings are created (p. 188).

Discourse markers have both a grammatical function and purpose based on their role within a sentence as conjunctions. For example, when someone uses the word "but" in reply to a statement made by another person, they are using the functional value of the word to signal a statement of disagreement is to follow. In another instance, a person may use the "now" to both mark very specific and immediate time in a conversation and also to signal an emphatic response, either positive or negative, to a previous statement. So the way people use discourse markers in conversation reflects not just the grammatical structures of the language, but the contextual and situated demands in which they are interacting. The value of conjunctions spreads over both the grammatical function and meaning and the new ways people may use them to position themselves in speech.

Although each marker holds generic value and meaning in most any context, the way it is used by people in specific contexts typically depends on the specific circumstances of the context. People themselves have discourse markers that they use repeatedly in everyday speech with people that are part of their communicative repertoire. A person may use the word "y'know" frequently in everyday interactions to elicit tacit agreement from people he/she is speaking to and they might use "so" to mark their disagreement instead of "but." When conducting a discourse analysis using discourse markers, it is important to track three meanings or values attached to the discourse markers people use: generic or denotative meaning of specific markers (ideational structure), the connotative, contextualized, and situated meaning of each marker (cohesive meaning), and the patterns of usage each participant in a conversation shows over time based on natural speech patterns (interactional move) (Schiffrin, p. 60, 61). A full list of the discourse markers Schiffrin (1987) used and what each means can be found in Appendix A.

Discourse markers provides me with a way to examine not just how teachers interacted on an interpersonal level but they provide me with a way to identify how their interactions lead to larger decisions they may make as a team regarding the document, tool, or artifact a teacher has shared. Discourse markers suggest not just how teachers navigated the social dynamics of collaborative work but how their ways of working together led them to repeatedly use specific kinds of decision making processes (Parker, 2004). A team whose discourse is typically marked by disagreement may depend on debate as a decision making process. On the contrary, a team whose discourse is typically marked by agreement and elaboration may depend on deliberation as a decision making process. Those patterns provide one way to explain how some teams established more productive routines than others.

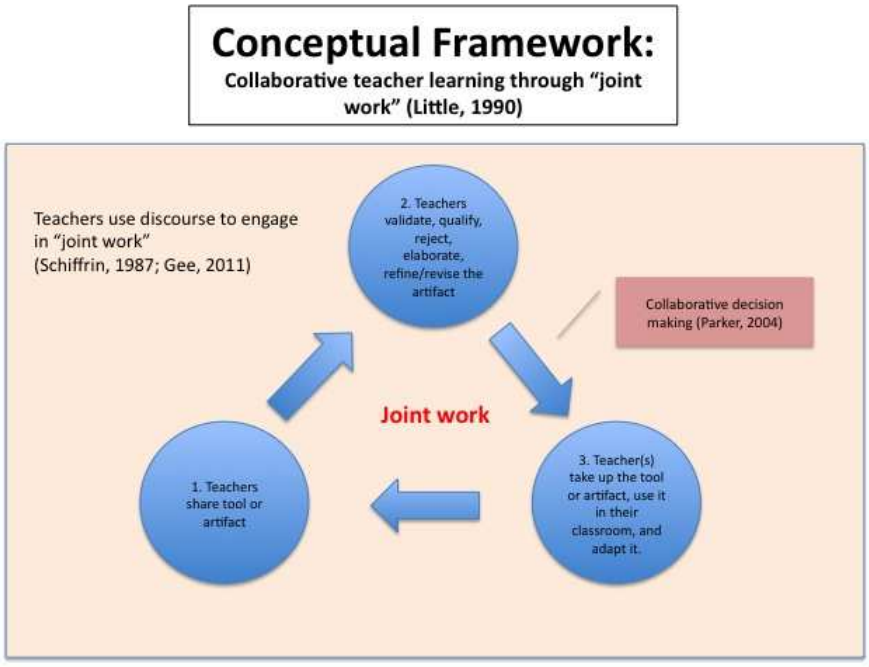

Figure 5. Conceptual framework: Collaborative teacher learning through joint work

The data suggest that these instances of sharing can become rich episodes of "joint work" (Little, 1990) when teachers 1) *validate* or *qualify* their reactions to whatever tool or document is

shared, 2) *elaborate* on specific ways the tool is useful, and 3) suggest ways the tool can be further *refined* and *revised* to serve the needs of the teacher who shared the tool and the needs of their class. Validation, qualification, rejection, and elaboration can be evidenced in the way teachers mark their discursive turns. For example, if a teacher marks their turn with "but," it implies to the group that the teacher will be expressing a level of disagreement with whatever was said or shared. In addition, when teacher's discourse is analyzed to identify the discourse patterns teams use when immersed in "joint work," the discourse can reveal the decision making processes teams use and thus can suggest reasons why some teams are more productive than others. For example, episodes where teachers overwhelmingly mark their discursive turns with "and," suggest that teachers are in a creative problem-solving space consistent with deliberation. Thus, Little's (1990) concept of "joint work" serves as a primary lens through which I code and analyze the data.

For my specific research interests and questions, grounded theory illuminates findings that emerge from the data that may address the various gaps in the current literature regarding teachers' collaboration. This pertains to how teachers structure their collaborative work, how they interact professionally in times of disagreement, inquiry, and creative problem solving, and how they manage those interactions to navigate differences in status to move their work forward. To develop that theory, I analyze data collaboratively with my research team and do so using Atlas.ti [or a similar qualitative data analysis tool]. Using this data analysis tool, I combined all the various forms of data I had to reveal both specific patterns of collaborative practice within specific teams and larger patterns of collaborative practice amongst multiple teams. In most cases of collaborative data analysis, I share specific instances of video recorded design team collaboration to structure a team discussion in which we coded the data according to specific

parts of my theoretical framework. In addition, using a collaborative approach to data analysis ensures that when patterns emerge in the data, those patterns are deliberated about and validated by members of the research team.

Initially, I used the processes of validation/qualification, elaboration, and refinement to code instances of joint work in video recorded design team meetings. In addition, my initial use of this process to code the data may revealed the extent to which iterations of tools and the sharing of those iterations were leveraged by individual teachers and the design team.

Coding. The process through which I analyzed the video recorded data is as follows. I used my field notes to identify instances within the video recorded design team meetings that evidence sharing of a specific document, tool, teaching or student artifact. Field notes have been integral in helping me quickly identify instances, typically between 3-15 minutes, within the hours and hours of video data I have collected. I transcribed each instance and then engaged in a process of open coding and then more focused coding derived from my analytical framework (Emerson et al, 1995). Specific codes cover various topics from the kind of decision making teachers engage in to the topics of discussion. At various points in the process, I engaged the research team in collaborative data analysis to identify existing codes within the data and to reveal additional codes that may be helpful. In addition, throughout the data analysis process, I have produced various research memos that I have also shared with the research team for their feedback. Over time, this method of analysis and reanalysis of the data has helped me whittle my coding down to some specific themes and my current analytic framework.

The process I used to analyze the teacher interviews and the documents I collected from teachers was similar to the process I used to analyze the video data. I engaged in a process of open coding, followed by more specific coding, grouped by theme and topic,that then informed

the analytic framework. In addition, the interviews were helpful in triangulating the video data. I designed the semi-structured and simulated recall protocols to get teachers talking about collaborative routines that were established over time such as various kinds of norms that existed within the group, the extent to which teachers thought they were learning from the experience, and their interpretation of the professional and social dynamics at play within the team. The stimulated recall interviews, especially, became an integral way for me to triangulate the data around specific instances in design team meetings that I documented in the video. By watching video of themselves working collaboratively, teachers were well primed to recall how and what they learned from specific instances and the ways in which the social dynamics within the team played itself out in that specific instance.

The research team. The research team consisted of the primary investigator, who is a university research associate in the College of Education, me, and two to three other graduate students, al of whom were also involved in either collecting data at Cielo Vista High School for their own studies or were helping to write about the research conducted at Cielo Vista. Over the past three years, we have met every two weeks. The focus of those meetings was both logistical (to identify who was available to attend what meeting at the research site, for example) and research and/or data associated (to discuss a segment of an interview, video recorded class or meeting, survey, or written research memo).

Single Case Study of Teacher Learning through Collaboration: English 3

This section examines the collaborative culture of a single design team. Using primarily Little's (1990) concept of "joint work" as a theoretical and conceptual framework for my examination of the English 3 team observed during the 2011-2012 school year, this study will address or examine the following research questions

1. How does the English 3 design team structure their collaborative practice?
2. What relationships exist between this team's collaborative practice and the extent to which the team learns collaboratively?
3. How does the English 3 design team navigate the social dynamics of the collaborative work?

Participants (brief overview). The English 3 design team met during the 2012-2013 school year. The team consisted of Roger, a white male teacher with approximately 9 years of teaching experience. Isaac, a white male with 5 years teaching experience who served as the school's ELL support person and who also taught ELL classes at the school. Autumn, a white female with 2 years teaching experience and Deborah, a white female with 2 years teaching experience. Autumn and Deborah both attended the same local university teaching education program. In that program, I was their university coach. In addition, the year before Roger was on the English 2 design team. Roger's experience on the English 2 team was problematic. Roger and his English 2 colleagues struggled to see eye to eye on the extent to which they would leverage PBL principles in the curriculum they redesigned. As a proponent of PBL pedagogy, Roger found it difficult to reach a consensus with his design team colleagues. Committed to having a different design team experience with his new team, Roger made explicit moves at the beginning of the year to make sure that his new team approached the redesign task from a similar perspective.

Data sources. Data that evidences this design team's collaborative practice come from video recorded design team meetings, field notes taken during design team meetings, interviews, and document review.

Comparative Case Study of Teacher Learning Through Collaboration: Design Teams Across the School

This section examines and reveals patterns of collaborative practice, across multiple design teams, and the relationships that exist between collaborative work and teacher learning and growth.

This study deals with two levels of analysis. First, I examine each design team's collaborative practice through the lens of Little's (1990) concept of "joint work." This first level of data analysis will look closely at all the data I have collected on each design team including interviews, design team meeting observations, document reviews, and classroom observations. Focusing on design team meeting video and teacher interviews I develop rich descriptions of each team; focusing on teachers' perceptions of how they saw their practice changing through design team work and comparing what they said to specific episodes within the video. Then, I take a step back to find similarities and differences among the groups to see if any patterns emerge amongst all the teams in my sample. Specifically, this analysis compares the collaborative routines of each group to establish ways they learned, or in some cases did not learn, from their collaboration. It will be in this second phase of analysis, where I will identify patterns between specific routines design teams use and the extent to which teachers perceive a shift in their thinking about teaching and learning. This study will address the following research questions:

1. How does each design team (English 2, Math 2, Social Studies 1) structure their collaborative routines?
2. What, if any, teacher learning emerges from each team's collaborative routines?

3. What relationships and patterns exist, across all the design teams studied, between their collaborative practice and extent to which design team teachers learn collectively?

Data Sources. Data used to evidence claims made in this study will come from video recorded design team meetings, field notes taken during design team meetings, teacher interviews, classroom observations (if available), and document review.

Conclusion

Throughout both the data collection and analysis process, great care was taken to ensure that my interpretations of what was happening in design teams were grounded in the data. The combination of hours upon hours of video recorded design team meetings and teacher interviews provided a solid base on which I made claims about how teachers structured their work together. Although I used document review sparingly, it was an important component of analysis to compare what teachers said they intended to do in their interviews and design team meetings, with what they actually did with students in the classroom.

CHAPTER 4
SINGLE CASE STUDY – THE ENGLISH 3 TEAM

Introduction

The research literature on teacher learning and collaboration suggests that teachers learn from collaborative routines that are guided by commonly held norms (Wenger, 1998; Grossman, Wineburg, and Woolworth, 2001; McLaughlin and Talbert, 2006) that immerse teachers in authentic problem-solving tasks that are situated in their daily work (Wenger, 1998; Ball and Cohen, 1999; Cochran Smith and Lytle, 1999; Wilson and Berne, 1999; Darling-Hammond and Bransford, 2005; McLaughlin and Talbert, 2006; Hargreaves and Fullan, 2012). Much of the literature on teacher collaborative learning posits teacher learning as a worthy and explicit goal of professional collaboration. I take this same approach.

Much of the research on teacher collaborative learning is situated in designed settings, where university researchers structure what teachers collaborate about and how they collaborate. Although the principles from this research have proven useful for understanding how teachers from one high school learn from their collaboration in design teams, there is still much to be learned by examining collaborative settings where teachers structure, lead, and drive their work and learning. Through my examination of how a team of English teachers learned from their collaborative efforts to redesign curriculum, I hope to inform that gap in the literature.

In this single case study, I examine a group of teachers who worked throughout the year to redesign an established curriculum into a problem-based learning curriculum. To do this work, the school provided them with guiding PBL principles described in the Key Elements document and a common, extra planning period during which they were expected to collaborate to redesign

the curriculum. From the beginning, these teachers were in almost full control of how they collaborated and what the curriculum eventually became.

This group of teachers (English 3) redesigned the junior level English course. Two of the teachers on the team were teaching the junior core class (Autumn and Deborah), one of the teachers taught a section of the AP junior class (Roger), and one of the teachers taught the junior level ELL class (Isaac). Even though most of the team's planning was focused on the junior core class, the redesigned curriculum was implemented in all three levels of the junior classes.

I will be exploring the following research questions in this part of my dissertation:

1. What collaborative routines and norms did the English 3 teachers establish in their design team?
2. In what ways did those routines and norms influence the collaborative learning of the design team?
3. How did the English 3 teachers navigate the social dimensions of their collaborative work?

Literature review

In this study, I take a social-cultural perspective to teacher collaborative learning (Vygotsky, 1975; Wenger, 1998). Although teachers can learn from doing individual research or investigations into their practice, that learning is potentially increased and deepened when they act collaboratively to solve problems that emerge out of their teaching practice (Wenger, 1998; Ball and Cohen, 1999). The research around developing expertise also supports the notion of collaborative learning and argues that processes like "progressive problem solving" (Bereiter and Scardamalia, 1993) can, over time, help teachers become "adaptive experts" (Bransford et al. 2005). Although collaboration has the potential to be fraught with disagreement as teachers make

their beliefs and values explicit, collaboration among teachers also holds great promise for helping teachers shift their practice over time.

In the research literature, scholars describe routines that help teachers learn from their practice when situated in smaller collaborative settings. One way teachers learn is to jointly examine problems of practice (Cochran-Smith and Lytle, 1999; McLaughlin and Talbert, 2006; Horn and Little, 2009; Little, 2002; Little, 1990; Little, 2003; Wilson and Berne, 1999; Darling-Hammond and Bransford, 2005; Darling-Hammond, 2010; Hargreaves and Fullan, 2012; Sahlberg, 2010; Mclaughlin and Talbert, 2006). Teachers may discuss student performance on an exam or on an essay assignment or they may discuss why a particular did not seem to work for their students. Although important, the topic may not matter as much as the conversation itself. Teachers learn as they make claims based on evidence and qualify those claims to problem solve issues students experience in class (Cochran Smith and Lytle, 1999; McLaughlin and Talbert, 2006; Hargreaves and Fullan, 2012). As clear as the benefits for improved practice may be, for many teachers, this represents new more difficult work, especially when engaged in collaborative settings (Darling-Hammond and Bransford, 2005; Horn and Little, 2009).

When collaborative work is governed by shared norms that guide collaboration; the production of norms is itself a powerful part of the process (Grossman, Wineburg, and Woolworth, 2001; Wenger, 1998; Wilson and Berne, 1999; Little 2003). Setting clear norms serves three important purposes. First, clear norms ensure that teachers approach collaborative work professionally and respectfully. Second, norms can help establish an egalitarian culture within a group (Grossman, Wineburg, and Woolworth, 2001). Like any other professionals, individual teachers are ascribed “status” within their immediate peers groups, reflecting years of experience they have, perceived expertise, and what classes they regularly teach, educational

background, social class, and official roles they hold within a school. Norm setting provides a space where teachers can establish mechanisms and processes, such as sharing materials and establishing fixed and flexible roles within groups, where the less experienced teachers feel comfortable contributing to the work (Grossman, Wineburg, and Woolworth, 2001; Horn and Little, 2009). Third, by establishing clear norms, teachers can facilitate safe interactions whereby they can disagree around deeply help pedagogical beliefs. In and of themselves, norms do not automatically make a group functional. As with the case when teachers examine problems of practice, teacher ownership over the processes by which norms are established and sustained can be just as important as the specific norms that govern a group's interactions (Grossman, Wineburg, and Woolworth, 2001; Hargreaves and Fullan, 2012).

When teachers' collaboration is productive, the shared norms they establish often govern specific routines they consistently leverage over time (Horn and Little, 2009; Little, 2003; Wilson and Berne, 1999; Little, 1990). Routines such as "sharing" can develop into instances of "joint work" (Little, 1990) if the norms teachers establish create a collaborative culture of respect, openness, transparency with one's instructional practice, and willingness to share one's failure with the group. The same principle holds true when teachers develop and foster community (Grossman, Wineburg, and Woolworth, 2001), when they leverage the collective professional capital that exists within a school (Hargreaves and Fullan, 2012), or when they work to increase their "knowledge-of-practice" (Cochran-Smith and Lytle, 1999, p. 272). In each case, the norms teachers establish can flatten hierarchies within groups to provide space for every teacher to contribute. Again, norms only stretch as far as the agreements that teachers make to abide by them.

A common characteristic of the research is that it largely documents ways teachers learn in highly structured and designed collaborative settings (Grossman, Wineburg, and Woolworth, 2001; Little and Horn, 2009; Little, 2003). That is, settings in which research partners or administrators play an active role in monitoring and supporting the collaboration or in which predetermined protocols are enacted. For example, in their study of a secondary inter-disciplinary book group, Grossman, Wineburg, and Woolworth (2001) not only provided the funded time for teachers to deliberate around common texts, but they provided the purpose for and structure to teachers' deliberations. In that study, the authors took an active role in structuring teachers' collaboration and scaffolding teachers' learning. With their help, teachers forged a tight-knit and safe learning community.

What remains under-theorized in the literature, yet which is an important characteristic of productive collaboration, is the establishment of a shared commitment to the collaborative task. In the case of Cielo Vista teachers, that shared commitment is the explicit agreement between teachers that they would redesign the curriculum associated with a course according to PBL pedagogy and principles. Such a commitment was fundamental to productive collaborative work at Cielo Vista High School. When and if teachers disagreed on either the specifics of an assessment or a project, or on more over-arching pedagogical beliefs and values, what would keep the work moving forward is their shared commitment to the task.

This study also addresses a second gap in the literature regarding teacher led and driven collaborative work. Much of the research that deals with teacher learning in collaborative contexts documents either researcher or administrator designed collaborative spaces or predetermined collaborative tasks. This was not the case for this team or any other design team at

Cielo Vista High School. Teachers determined how they would structure their collaborative efforts and largely what the product of that collaborative work would be.

In this study, I map the terrain of teacher collaboration in the wild, revealing the ways teachers structure their work together, with little support from either school leadership or tools from outside sources, through established routines and the ways they navigate the social dimensions of collaborative work.

Context

Confronted by stubborn achievement gaps between various groups of students and gradually declining enrollment, four years ago Cielo Vista High School applied for and was awarded a federal grant to shift the school from a traditional model of teaching and learning to a more problem-based learning model of education. Leaning on educational research, school leaders were convinced that shifting to a problem-based learning approach would increase student engagement and motivation and would better prepare students for success in college and science, technology, engineering, and mathematics (STEM) careers (Blumenfeld et al., 1991; Barron and Darling-Hammond, 2008; Baoler and Staples, 2008; Belland, Glazewski and Ertmer, 2009; Conley, 2010). Previous to the federal grant, teachers taught in mostly traditional ways across the school. Instructional practice ranged from teacher-centered and directed such as lecture or direct instruction to heavily student-centered throughout the school. Although it was common to find students working in groups together in various ways and for various purposes, classes were mostly organized around teachers' expertise and knowledge.

Confronted by a wide array of ideas about what PBL is and is not, the school took an inside-out approach to developing PBL that would best meet the needs of their specific teachers and students. In collaboration with local university, the school developed the 7 Key Elements of

a Problem Based Learning Classroom document. In it, the school identified seven principles of PBL (expertise, student collaboration, authentic problems, authentic assessment, academic discourse, culturally responsive instruction, professional collaboration) to guide teachers as they worked to redesign the established curriculum into PBL curriculum. The school provided teams of teachers, consisting of between 3-4 teachers, with a one-year release of a shared, common, daily planning period to redesign the curriculum. Teacher's involvement in design team work was voluntary.

From the very beginning, the English 3 teachers approached the task of PBL redesign with enthusiasm and vigor. They met once in the middle of August 2011 to discuss their initial thinking around the curriculum and to get to know each other better as professionals. Based on my observations of design teams the previous school year, I suggested to the English 3 team that getting together to set norms and discuss their ideas prior to starting their redesign work would be something worth pursuing. It was during this meeting that teachers took it upon themselves to publicly stated their support of PBL curriculum redesign, shared personal learning styles and work preferences, and where they all expressed an interest in developing systems whereby they would "check in" with each other to make sure everyone had a chance to air differences or suggest changes to the way the team was working.

Because I became a frequent member of their design team meetings, I became an observer participant within the team (Geertz, 1973). At times I would participate in the discussion to make suggestions or to help the team process their thinking around a specific topic. The following table documents the frequency by which I participated in the English 3 design team meetings documented in this study. Data from this table comes from my field notes of documented design team meetings

Table 5.

Researcher Contribution to English 3 Design Team Meetings	
Date of meeting	**Contribution**
11/16/12	No record of participation.
11/19/12	Conversation w/Deborah about student reflections.
12/4/12	No record of participation.
12/7/12	Participated in problem solving conversation about student response to Peggy McIntosh article "Unpacking White Privilege".
12/10/12	No record of participation.
12/11/12	No record of participation.
12/12/12	Participated in conversation around how to engage students in a conversation focused on students' survey responses.
12/18/12	No record of participation.
12/19/12	Suggested to teachers that they consider planning a completely PBL unit to implement in second semester. Teachers brainstorm what that unit might look like.
12/21/12	Participated in conversation about what a PBL unit in this course could look like.

In addition, throughout the year I had many informal conversations with individual English 3 teachers on various topics ranging from PBL and the Key Elements to departmental dynamics to wedding planning. Based in part on my personal relationship with each teacher on the team, I was a trusted resource and colleague to these teachers.

Participants. The English 3 design team included one veteran Cielo Vista High School teacher of 10 years, two 3rd year teachers, and the school's ELL facilitator. These teachers had worked in the same department together for 1 year. Deborah and Autumn routinely collaborated together on common courses they were teaching. Roger and Isaac were typically not a part of that work.

Roger. Roger Casey is in his tenth year teaching English at Cielo Vista High School. He attended the local university and graduated with a bachelors of arts degree in the Cultural History of Ideas (CHID). CHID is an inter-disciplinary degree spanning sociology, psychology, anthropology, and history. Before receiving his masters in teaching from a traditional university

teacher education program, he ran a before and after school program for students with special needs and worked as a district para-educator which included experience with teaching autistic children.

Roger is a well-tattooed, 32 year-old single, white male. Like many people his age, he partially paid for college by taking out student loans, which now accounts for his relatively modest lifestyle. He's often bragged to the department about how some of the best deals in town can be found in Goodwill on a Sunday morning, after people spend their Saturday cleaning out their closets and garages.

Roger takes an expansive approach to his work and a student-centered approach to his job. He has been the advisor to many clubs at the high school, including Latino Heat, the club that promotes Hispanic cultures in the school; AVID, the pull out program that supports first generation students in their endeavor to be accepted to and attend college; and Walk for Aidan, the student-run fundraiser for Duchene Muscular Dystrophy. As in the case of Sampson, a transplanted orphan and former student from Sierra Leone, he offers students support like driving them to and from school and helping pay for their school supplies.

Over time he has gained a reputation as an early adopter of new instructional strategies and the latest problem-based learning initiative is no exception. His classroom is crowded with pictures, posters, student artwork, instructional guides, and whiteboards becoming old and chipped from students' overuse. His students are often working collaboratively in groups to produce writing or prepare for discussions or class presentations. Both times I observed his teaching, he organized the class around small group work where students justified different ways they identified themselves. To one African American student he said, "Don't tell me that you're black and young; tell me why that matters." He defines content as "inquiry skills, collaborative

skills, reading skills, and writing skills." He says that the book is "not an essential part of the English classroom. A traditional part, yes. An essential part, no." He calls "antiquated" the belief of "reading and writing which means that [they] will read an entire book and [they] will write a five paragraph or five page essay and that will show [their] ability to read and write." To Roger, such practices "lose kids." To him, a teacher should "Teach [students] the skills, [and] use whatever on planet earth you need to teach them those skills." Engaging students by using texts, materials, and tasks that are relevant to them, is a teacher's most important job. In 2013, all of his students who took the state reading test, passed.

In the English 3 team, Roger assumes the leader/facilitator and primary note taker of the group as evidenced in such questions he asks at the beginning of meetings as "What did you do on week three? What worked? What didn't…?" He routinely shares his personal experience teaching juniors the content in question. He also typically serves as the content expert for the group due to his experience teaching the content and the reading and writing he does outside of work. This was evident in one meeting when he provided background information on a Patrick Henry speech the group decided to use. He also functions as a source of curricular institutional memory. He describes his role within the group as "note taker," "to provide models" of past handouts or things that have worked for him in the past, and a content and curriculum resource for the group. His self-appointed role as note-taker also helps him listen to what his colleagues have to say. Despite his efforts, his enthusiasm can occasionally cause him to dominate conversations by talking too much.

Deborah. Deborah is a third year English teacher at Cielo Vista High School. She graduated from the local university with both a bachelors degree in English and a masters in teaching secondary language arts. She is also endorsed in special education. She minored in

music and multicultural studies. Deborah was very successful in her student teaching experience in Hillsdale School District, a neighboring school district, where she routinely received glowing observations from her cooperating teacher and from her content coach. This is her first teaching job.

Deborah is an inquisitive, Asian American woman in her early twenties. She reads heavily outside of school in topics ranging from sociology, leadership, and literature. Along with teaching core seniors and juniors, she also teaches the student leadership class. One teacher in the department called Deborah the "silent assassin" of the department because she will sit and listen to someone speak at length and then ask a question that stops them in their tracks. She has a reputation for being a quiet intellectual force within the department.

Deborah was engaged to be married in the summer of 2013. She is a private person and rarely sees her colleagues socially. From informal conversations I've had with her over the years, she seems to be actively involved in her church and centers her social life around her religious activities.

Deborah was initially drawn into teaching through her studies in equity and education. She says, "I started learning about the social context of education and how education was really powerful in my life." Although majoring in English has turned out to be useful for her, she doesn't profess a deep love of English. Her passion is more aligned with her desire to make education more equitable for her students. As time goes on it will be interesting to note how Deborah negotiates between the traditional, teacher centered way in which she was taught throughout school, and the more student-centered PBL approach she is encouraged to use at Cielo Vista.

In her design team, Deborah chooses to ask questions and probe others' ideas when she participates. Although she also spends time cheerleading for the good ideas that bubble up, she tends to listen to what her colleagues say and then ask questions that push their thinking. She describes herself as the "quietest" teacher on her team. She focuses her contributions on "trying to figure out how to take all of our big discussions a little bit more tangible" and grounded in specifics. This is consistent with how her colleagues perceive her. Throughout the year, Deborah gained confidence with facilitating the discussion within her team, sharing examples of student work, and setting the agenda.

Autumn. Autumn is a third year English teacher at Cielo Vista High School. She graduated from a university located on the east coast with a bachelors degree in English, with minors in Irish studies and psychology. She attended the local university teacher education program where she received her teaching certificate in high school English and received an ELL endorsement from another local university.

Autumn is a young, enthusiastic, white female teacher in her mid-twenties. She was married in the summer of 2012. She loves to bake and many times uses baked goods to bribe her students into completing assignments, especially near the end of the year when her seniors occasionally need a little extra push.

She was originally drawn into teaching because she wanted to "help others see the beauty in literature." This motivation, however, was somewhat trumped by the inequities in educational opportunities she saw as she did observations in various schools and in what she read in the educational research literature. Now, she says her reason for being a teacher is to "provide students with more opportunities and [to] teach them practical skills so they can pursue whatever it is that they like [in life]." She describes this shift in her thinking about teaching as something

it took her awhile to be okay with. She says, "I might not convince so-and-so to love this book like I do and that was almost kind of selfish" to approach the role in that way. She describes her expertise not in terms of her content knowledge but in terms of her ability to teach students in such a way that the instruction "is related back to their everyday life." "All the crappy lessons,' she claims, "were ones where I couldn't explain why we were doing it."

Autumn approaches her job with enthusiasm and frustration. At times she gets frustrated by her students' low completion rate on homework and assignments and at other times, sometimes in the same breath, she talks enthusiastically about a assignments like the persuasive essay she taught her juniors during the 2012 school year. For the persuasive essay assignment, "students had to advocate for something that was important to them." Autumn describes how, contrary to other assignments she assigned, ***all*** her students did the project. "It just blew my socks off that every single kids had something done," she explained, "I got all teary-eyed afterward because I was so overjoyed and the kids were too."

Having taught in a problem-based learning school in a neighboring district for her student teaching, Autumn was often frustrated by the "contrived" nature of student choice, student voice, and relevance in the curriculum the school was teaching. Now that she is more in control of what she teaches, Autumn is unafraid to try out new strategies with her students. Last year she routinely surveyed her students to both gauge their interest regarding various texts and topics for units and also to get their feedback about lessons and units she taught. She also experimented with the online platform Edmodo in an effort to get students to interact and collaborate online during times when they were not in school. Both instances illustrate Autumn's desire to design lessons and activities that authentically engage students.

When working with other teachers, Autumn is both a critical and generous collaborator. She appears unafraid to ask questions of her colleagues when she needs clarification or when she disagrees with an opinion yet she is quick to cheerlead during design team meetings with short exclamations of agreement or interest. At the end of the 2013-2104 school year, Autumn resigned from her teaching job at Cielo Vista High School to pursue a career in public relations.

Isaac. Isaac is a third year teacher at Cielo Vista High School, but is in his eighth year teaching in the district. In addition, he has experience teaching biblical philosophy and sociology in a small Christian high school In Honduras after completing his undergraduate degree at a college in California. He has a bachelors degree in Biblical Studies and a masters in teaching English from a local university with an ELL endorsement. He originally applied for ELL teaching positions in the district because there were more jobs available in that specific area.

Isaac is a thoughtful, humorous white male teacher in his late twenties or early thirties. Despite the arrival of his first child in the summer of 2013, Isaac still goes out to concerts and shows from time to time describing fatherhood as "not really that life changing as of yet."

Isaac's reason for entering the teaching professional was not grounded in a higher calling. He went into teaching almost accidentally, as a result of not knowing what else he could do professionally. Once he started teaching in Honduras he realized that he "had no idea how to teach or put together a lesson plan." As a result, he based his initial teaching style off one of his favorite professors in college but soon realized that "standing up and lecturing about interesting subjects isn't that engaging" for students. When he arrived back in the US he went back to school to learn how to teach.

Now, in his role as an ELL teacher and the school's ELL facilitator, he feels he has become proficient in "looking at the student and the content and bridge [the two] in a way that's

successful…I think I've developed an ability to understand where a student is at [in the English language acquisition process] and diagnose it and try and help them goal set to get passed it." Despite his standing within the school and as a project teacher leader, Joey's expertise is many times squandered within the English department. Although all of the English teachers like him personally, they have come see him as someone whose role as the ELL facilitator is "a waste of resources." Few have asked him for advice on pedagogical strategies regarding ELL students. However, his standing within the department does not spread into the ELA 11 design team where he enjoys full membership as a teacher, colleague, and ELL expert.

At the beginning of each meeting, the design team typically engages in small talk with humorous and light-hearted stories about their spouses, pets, students, and teaching blunders. As he is especially close with Roger and Autumn, Isaac is typically part of those conversations. As the meetings became more focused, Isaac typically encouraged his colleagues and elaborated on their ideas. His contributions around questions of English content routinely started with the phrase, "And, I also wonder if…" Within the team he also facilitated big picture conversations about topics like how teachers articulated the purpose of a unit to students now and in the future or what the purpose of using a specific text is. A breakthrough the team experienced came about when Isaac asked the group, "I wonder if we thought about how to communicate that [connection between students and primary document] to students?" He accurately described his role within the group as someone who serves as a "sounding board" and someone who asks the group "probing questions" to help them plan units that are accessible to all students.

Methodology

In this study, I use a case study approach to examining the work of this single design team throughout the 2012-2013 school year. I observed the team for a week at the beginning of

the year (September) to establish a baseline of sorts of how they structured their meetings and how they interacted. Later in the year I followed the team as they planned two different units of study. During this time, I observed them every day. The first group of these daily observations extended from the beginning of November 2013 until the middle of December 2013. During this time the team was planning their satire unit. This group of observations are the focus of this study.

The second group of daily observations extended from the beginning of January until the middle of February. During this time the team was planning the unit they would teach at the beginning of the year. I video recorded each design team meeting I observed and took extensive field notes guided by a design team meeting protocol that was developed in collaboration with my research team.

It should be noted that the boundary between when the team was planning lessons and materials for specific units and when they worked on other curricula was extremely porous. It was not uncommon for the team to be both planning curriculum for a future unit and be refining lessons they were currently planning. In fact, their ability to plan and implement at the same time became a key routine for this design team.

In addition to design team meeting observations, I also conducted interviews with each teacher throughout the year. I interviewed each teacher once at the beginning and end of the year. I used a semi-structured protocol for these interviews (Merriam, 2009; Patton, 2003). I also interviewed them in the middle of the year, at the same time I was also observing their design team meetings. For these interviews, I used a stimulated recall interview protocol. Stimulated recall interviews can provide ways for teachers to reflect on specific interactions captured on video (Wineburg, 1991; Schepens et al., 2007; Dempsey, 2010). Using stimulated recall

interviews, I could ask teachers about specific interactions with their colleagues that represented larger patterns in their collaborative work.

I coded and analyzed the data collaboratively, with the research team, and also independently based on the analytical framework grounded in the concept of sharing and joint work (Little, 1990). Research team members included the primary investigator and three other graduate students who also conducted research having to do with PBL implementation at Cielo Vista High School. I routinely shared both video footage and interview transcripts with the research team during bi-weekly research team meetings during which we would examine, re-examine, and analyze specific clips of data. Such meetings not only solidified and vetted claims over time, but they also helped me keep my biases in check that were a result of my extensive experience at the school.

Key terms

There are several key terms I use throughout the analysis of this team's data that demand further clarification.

Instance. In this section, I analyze instances of teachers' collaborative work. These instances come from video recorded design team meetings. An instance is a slice of data, usually between 3-15 minutes, where teachers shared a document, tool, teaching or student artifact, and then engaged in collaborative problem solving around that text characteristic of "joint work" (Little, 1990). Data collected suggest that not every teacher needs to participate, but engaged participation from all present is optimal. Although the data is rife with instances of many different routines the team engaged in, for this study I focus only on those instances that evidence joint work.

Productive collaboration. For the purposes of this dissertation, I define productive collaboration as a process of how design teams structured their collaborative work over time in ways that fostered teacher learning. An integral part of that process was how team members established a culture of responsibility and accountability toward each other through a shared commitment to the task of PBL curriculum redesign and through a commitment to genuinely engage the task by leveraging the expertise each teacher brought to the process. I do not define "productive collaboration" by using student learning outcome data but I do include a brief description of how much curriculum the team produced by the end of the year.

Sharing. I take my definition of sharing in a professional learning context directly from Judith Little's (1990) work on collegiality and collaboration. She states:

> Through routine sharing, teaching is presumably made less private, more public. In principle, the pool of ideas and methods is expanded. The coordination of teachers' work and students' careers is made possible in ways that cannot be achieved through other forms of collegial contact. By making the ordinary materials of their work accessible to one another, teachers expose their ideas and intentions to others. (p. 518)

Here sharing is an activity between teachers when one teacher shares a document, tool, teacher or student artifact that evidences some problem they need help resolving. Many times teachers share materials they either are thinking about experimenting with in their classroom or have already experimented with in their classroom. The materials the English 3 teachers shared with each other were not necessarily representative of problem-based learning but in many cases

those materials were a part of a larger unit or lesson in which teachers attempted to implement PBL strategies into their classroom practice.

Joint work. As with sharing, I take my definition of joint work in a professional learning context directly from Judith Little's (1990) work on collegiality and collaboration. She states:

> I reserve the term *joint work* for encounters among teachers that rest on shared responsibility for the work of teaching (interdependence), collective conceptions of autonomy, support for teachers' initiative and leadership with regard to professional practice, and group affiliations grounded in professional work. Joint work is dependent on the structural organization of task, time, and other resources in ways not characteristic of other forms of collegiality, and thus is both responsive to larger institutional purposes and vulnerable to external manipulations. Collegiality as collaboration or as joint work anticipates truly collective action—teachers' decisions to pursue a single course of action in concert or, alternatively, to decide on a set of basic priorities that in turn guide the independent choices of individual teachers. (p. 519)

Here joint work is an activity between the English 3 teachers that many times resulted from an instance of sharing. However, sharing and joint work are different kinds of activities. Teachers may share materials such as a quiz or students activity informally over lunch, between classes, or after school. But the act sharing does not imply that collaborative work around what was shared took place. A teacher may even learn something from another teacher's shared tool, document, or artifact without having a conversation with them. Although data from the English 3 team shows

that their sharing often? led to joint work, joint work is different by nature than sharing. Instances of joint work demand in-the-moment, face-to-face, focused interaction between teachers. For this design team, sharing served as the impetus for joint work. Joint work may occur when teachers solve problems of practice or it may occur when teachers redesign some part of the established curriculum to better meet the needs of their students. Within the English 3 team, instances of sharing developed into joint work when the problem solving task demanded prolonged, intellectual "heavy lifting" by all members of the team.

Implicit in Little's (1990) descriptions of sharing and joint work is the claim that each provides the potential for teacher learning. As I already described, in the case of sharing, teachers may learn a different way of designing a graphic organizer or a quiz. Although valuable, sharing alone creates more of a potential for technical learning about practice. (In the case of joint work, teacher learning is denser.) Teachers may also pick up various technical strategies to use in their classroom or planning and they also may shift their pedagogical values and beliefs over time. Both sharing and joint work represent learning opportunities for teachers, but in the context of design team work where teachers redesign curriculum according to different pedagogical principles, engagement in joint work is important if teachers are to shift their instructional practice and beliefs to align with PBL pedagogy.

Findings

The English 3 team worked in a largely autonomous, collaborative setting. In the 2012-2013 school year, I observed the English 3 team 25 times. My field notes evidence that out of those 25 times, a teacher leader for the PBL initiative visited the group twice to check in with them and offer support. My field notes show that both of these meetings were friendly and respectful. In these meetings, teachers did not share specific documents or materials with the

teacher leader nor did the teacher leader make any strong recommendations for how the team should improve or change what they were planning. Teachers stated in interviews that sometime in late Spring, the district curriculum coordinator and principal visited the team to hear about the scope, sequence, and specific planning the team had done throughout the year. In this meeting the team received feedback that caused them to change course with several of their units. During the 11/21/12 design team meeting, I shared a research memo with the English 3 team I had written about them and how they work as a group. In this memo, I referenced several studies on teacher learning and collaboration. My field notes show this conversation lasted approximately 15 minutes.

The data evidence four components of their collaborative work that were key for establishing productive routines. First, the team established a shared commitment to redesigning curriculum according to PBL principles and pedagogy. Second, they established inquiry cycles of design and implementation. When implementing lessons connected to more PBL centered units, teachers used design team meetings to share their experiences implementing tools, teaching and student artifacts to solve emerging problems of practice. Third, instances of sharing developed into instances of joint work as teachers collaborated to creatively solve problems of practice. Not every instance of sharing developed into joint work. Sharing developed into joint work when the problems teachers experienced proved either pedagogically critical or complex for one teacher to solve on their own. Fourth, the discourse patterns from the English 3 design team meetings suggest that the team routinely used deliberation as their primary decision making strategy when engaged in joint work. The routine use of deliberation suggests that the teacher(s) who had status in the group made intentional moves to create a collaborative and egalitarian team culture and that they helped create a collaborative setting where each teacher's expertise was leveraged in the problem-solving process. As a decision-making strategy, deliberation also describes a process

whereby new solutions are devised from the collective knowledge and expertise of the group. No one person has the right answer. In deliberation, problem-solving is a creative and collaborative process. In this section, I will evidence each claim in turn.

Claim #1: The team shared a commitment to designing PBL curriculum

Grossman, Wineburg, and Woolworth (2001) argue that until a shared purpose for teachers' collaborative work can be established, little substantial collaborative work and teacher community can be accomplished. Before the English 3 team started redesigning curriculum in the fall, they met during the summer to set norms and brainstorm ideas for the scope of the English 3 course. In August 2011, I secured a space for them to work and suggested they do some initial norm setting to lay the foundation for future collaborative work together. This norm setting was not guided by protocols. I suggested the team discuss ways they work best individually and in groups. I also suggested they share with each other whatever initial thinking they had done about the curriculum. Both suggestions I had seen used at various times both when I was a teacher and when I had observed a previous Cielo Vista High School design team. At no point did I make explicit the connections between what they were doing to norm setting that may exist in the research literature. In the meeting, teachers discussed how they work best individually and in groups. Isaac was not present for this meeting. Roger, especially, pointed to that meeting as a positive first step towards a productive collaboration with the team. He explains,

> We had that norming discussion and I said, look, guys, I just want to create a really great PBL product. And Deborah and Autumn immediately go, "Oh my god, that's exactly what I want to do." I

> want to create the best thing possible. And that was one of the best premises we had.

This was an important first step, especially for Roger. Having been frustrated with a design team experience from the previous year in which teachers were slow to accept PBL as a valid pedagogy, Roger considered it integral that the English 3 teachers express a willingness to engage in PBL curriculum redesign. Although the other teachers on the team did not recall this interaction or this meeting specifically as a pivotal for all future design team work, observations of numerous design teams show a team deeply engaged in PBL redesign.

As it turned out, this was also an important step for the team. Not only did a shared commitment to the PBL redesign task create common pedagogical and philosophical terrain from which to start planning a new curriculum, it also bought them valuable planning time in the future. They could dive straight into the brainstorming and planning process without rehashing potentially lengthy conversations about whether or not PBL is a valid pedagogy for English content. Disagreements around *what* content was to be included in the new curriculum and to a certain extent *how* they taught the content were inevitable and healthy (Grossman, Wineburg, and Woolworth, 2001; Hargreaves and Fullan, 2012). However, the English 3 teachers' ability to establish a shared commitment to the task gave them the freedom to debate the details of curriculum redesign respectfully, knowing that any such expressed differences would not derail the whole process. In retrospect, Roger attributes this initial instance of norm setting as vital for the long-term health of the group. "Once we had that," he described, "the sky was the limit as far as our connection [and] our openness with each other."

Claim #2: Teachers established "sharing" as a collaborative routine

I observed the English 3 team 10 times between November and December 2011. In those meetings, the English 3 team was redesigning a unit on satire. Out of the 10 meetings, teachers shared a document, tool, or artifact in 10 of them. One of the most notable characteristics of how the English 3 team worked together was their willingness to share their experiences implementing redesigned lessons. At times they would share anecdotes from their class or ideas for future lessons. At other times, they would share documents, tools, and teacher and student artifacts with the each other in order to enlist the team's help in refining whatever was shared further.

Table 6 below illustrates the meetings in which I observed (x axis) teachers sharing documents, tools, and teacher or student artifacts (y axis) with the group.

Table 6.

Instances of "sharing" of instructional tools and materials in Satire Unit										
Topics	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Student surveys (design, data analysis, feedback)	**x**		**x**	**x**				**x**	**x**	**x**
Scaffolding note-taking strategies	**x**									
Class manifesto	**x**									
Teacher developed model essay	**x**									
Student peer evaluation/self evaluation handout		**x**								
English content handout (various)				**x**			**x**			
Unit calendar							**x**			
Various student work/artifacts						**x**			**x**	
Lesson plans					**x**		**x**	**x**		

The information in this table clearly shows a well-worn pattern of sharing within the group. By sharing, I mean that a teacher shared a tool, document, student or teaching artifact with the group that may or may not have been taken up by the group as a focus of discussion. In some cases, such as meeting 1, teachers shared several tools, documents, or materials at different times in the meeting. Not every instance of sharing, however, developed into joint work between teachers. This table also evidences various things about the school context in which they were working. Because design teams met every day, there were many more opportunities for teachers to bring tools, documents, and artifacts into the design team meetings. Most importantly, routine sharing seems to suggest at least a minimal degree of trust between teachers and a shared commitment that they would commonly implement the redesigned curriculum similarly.

Claim #3: "Sharing" to "joint work"

In the English 3 team, the data show that occasions of sharing routinely developed into instances of joint work. Many times when a teacher shared a tool, document, or artifact, it prompted a creative problem-solving conversation between teachers in which teachers exchanged ideas about how they dealt with the specific problem in their practice and also many times prompted deeper pedagogical discussions regarding the topic at hand.

Table 7 below shows essentially the same information as Table 6 but it highlights the occasions of sharing that developed into joint work.

Table 7.

Instances of "sharing" of instructional tools and materials in Satire Unit										
Topics	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Student surveys (design, data analysis, feedback)	**z**		**X**	**X**				**X**	**z**	**Z**
Scaffolding note-taking strategies	**X**									
Class manifesto	**z**									
Teacher developed model essay	**X**									
Student peer evaluation/self evaluation handout		**X**								
English content handout (various)				**X**			**X**			
Unit calendar							**z**			
Various student work/artifacts						**X**			**Y**	
Lesson plans					**z**		**z**	**z**		

KEY:
Capital "X" = Artifact shared by novice teacher that led to joint work.
Capital "Y" = Artifact shared by an experienced teacher that led to joint work.
Lower case "z" = Artifact shared but did not lead to joint work.

Out of the 10 observations I conducted with the English 3 team from November to December 2011, 10 meetings evidenced sharing between teachers. Some meetings evidenced multiple occasions of sharing. Out of the 18 *occasions* of sharing I observed, 10 developed into instances of joint work. Out of the 10 instances of joint work, a novice teacher in the group initiated 8 of the instances. To illustrate the difference between "sharing" and "joint work" I first share a typical instance of sharing and then share an instance of joint work.

The following instance of sharing comes from the 12.4.12 English 3 meeting. In this instance, Roger starts the design team meeting by sharing teaching materials he will be using to teach satire to his students.

(1)Roger: So I'm starting that today and I stole that from Autumn and I'm doing the Brad Pitt, Chanel #5 parody of that and then the thing I did for satire is to show them the real news article of the banning of the Mexican American Studies program in Arizona.
Deborah: Mhmm.
Roger: And then just like what the issue is and then the satirization of that issue which is the Daily Show interviewing and talking about it and that kind of thing.
(10)Autumn: Could you send that to me?
Roger: Um, sure. Just like the link?
Autumn: Yeah//
Roger: Sure.
Autumn: That'd be great. Thanks.
Roger: Um, yeah, because I was having a hard time at home yesterday just like, how the hell do I do—I just want to make a hard distinction between parody and satire and what it is//
Autumn: (Inaudible)
Roger: And it's difficult. Sometimes.
(20)Autumn: I'm really frustrated in teaching satire right now.

In this instance, Roger shares materials he intends to use with his students. Autumn shows interest in his materials and asks him to email them to her. The team's response to Roger's sharing is polite, marked by Deborah's validated response of "Mhmm," and Autumns request that he "send that to [her]," but they fail to take up Roger's materials as a focal point of the conversation and use them to improve how they engage students using these specific materials.

At the end of this exchange, Autumn changes the subject to talk about her frustrations with her students' literal approach to satirical texts. Although Autumn stays on the topic of teaching satire, she refocuses the team's attention away from Roger's materials (his effort to use the materials to make a hard distinction between parody and satire) to her problems with teaching satire to her students in general. As the first person to respond to Roger's materials with more just "Mhmm" (line 6), Autumn's response of "Could you send that to me" (line 10) does little to set the stage for further discussion and problem solving around Roger's documents. The

discussion about Roger's materials ends abruptly. As such, this instance represents an example of "sharing" within the English 3 team but not "joint work" (Little, 1990). As we will see below, sharing becomes joint work when teachers use the materials or documents one of them shares to anchor deeper, more substantial conversations whereby teachers engage in creative problem solving as a group.

The instance I call "Autumn's Note-taking Problem" opened design team meeting 1 in Table 1 and represents an example of joint work between teachers. In this instance, Autumn, a novice teacher, shared a note-taking graphic organizer she had developed to help focus her students' viewing of a video. Autumn's problem was how to make note-taking more of a collaborative venture for students and how to make student learning as a result of the video more accessible and transferable to other content within the unit. As the transcript below shows, the conversation between teachers started as a discussion focused on validating the graphic organizer (is this a "good" or "bad" document) and then quickly developed into a conversation about how to make note-taking a more relevant and authentic experience for students using the document as a focus. The fluidity between discussing the specific artifact and discussing the pedagogical implication inherent in the artifact seemed to be a common characteristic of active problem solving in this team. In these meetings, topics were discussed cyclically and recursively, not linearly. Instances of joint work take time to develop, so the chunks I share are lengthy.

(1)Roger:	I think this is really good.
Isaac:	This is the one that you emailed all of us, right?
Autumn:	This is the um, the notes that I'm, just like the template for everything//
Isaac:	Oh yeah. Really good.
Autumn:	It's nothing special.
Roger:	No//
Isaac:	They're just taking notes as individual, individually?

Autumn: I think so but I think I'm going to have them time, give them time, um maybe give them time to, like, talk about their notes to their group and like share information.
(11)Isaac: Okay.
Autumn: And maybe they can be even like//
Roger: They could post their notes on Edmodo.
Autumn: (Inaudible) They could post their notes on Edmodo.
Roger: I think that's good and bad. I think it's good because, one, they're taking notes in class. Then they're typing the notes up. So it's essentially reviewing the notes when they type them on Edmodo. Just to type them.
Autumn: Yeah.
Roger: You know? And then, other kids, maybe they didn't take great notes or don't know what they are, so it's kind of a modeling activity.
(21)Autumn: Mhmm.
Roger: You know what I mean as opposed to like an enabling thing?
Autumn: Right.
Roger: Um... I think it's, I think that's fine.

In the above transcript, the team is facing an electronic whiteboard on which Autumn's graphic organizer is projected. As is typical of the English 3 team, teachers almost immediately move to validate whatever was shared. Sometimes this validation comes from all the teachers, or, in this case, it comes from Roger who immediately says, "I think this is really good" (Line 1). Although a small thing, such validation is a way these teachers set the stage for further consideration and discussion around shared artifacts. The validation communicates to the teacher who shared the artifact that the quality is good and that it is worth discussing further. More importantly, such validation further communicates to the other teachers in the team that the group is a safe place to share experiments or risks teachers may have taken in their classroom.

When contrasting the enthusiastic way in which Roger ("I think this is really good") and Issac ("Oh yeah, really good") respond to Autumn's note-taking tool here to the way Autumn responded ("Could you send that to me") to Roger's materials in the previous example of sharing above, the difference between the two is clear. "Could you send it to me" implies that Autumn

wants to review it herself before she passes judgment whereas “I think this is really good” is a publicly stated opinion about the quality of the tool. Although subtle, Roger’s enthusiastic validation seems to open the collaborative space up for others to contribute whereas Autumn’s neutral response does not seem to further the conversation or invite others to elaborate on Roger’s materials.

As is typical within this group, at this point in the conversation, teachers asked for clarification about the use and general intent of the artifact, as is the case with Isaac (Line 7). In Line 13, Roger’s suggestion about alternative ways students could use or share notes marks a transition to a larger conversation about note-taking strategies in general. Roger’s suggestion also marks the point in which teachers transition from a conversation about the general merits of the artifact to a conversation more characteristic of joint work, about the role, purpose, and pedagogical value of note-taking in general. The conversation continues with Deborah’s question that furthers Roger’s suggestion about students typing up their notes in Edmodo (Line 15-17).

(25)Deborah:	You want to have them type their notes, um, after they watch their notes?
Autumn:	I don't think I'm going to have them type them. I feel like it would take so much time.
Roger:	I, yeah, I, I'll just, I just tell my kids whatever notes they take in class they have to uh, post on Edmodo. Which means that they have to retype them. Uh, which means that they have to study them. Because I think retyping is studying.
(32)Autumn:	In a way because they're, you're processing it again.
Roger:	Exactly. And you're formatting, you're reformatting it and a lot of times when you take notes it's in your own hand and then you need to think about, how do I need to reformat this so other people can understand it. So like that thought process.
Autumn:	It's just the time aspect.
Roger:	Mhmm. It takes a lot of time.
(39)Autumn:	It takes a lot of time.

In line 25 of this instance, Deborah asks Autumn a direct question about whether she intends students to type their notes after they watch the video. As was typical of Deborah’s

participation in the team, her question summarizes Roger's suggestion in such a way that she gives Autumn the opportunity to confront it directly. Autumn's response to Deborah's question, "I don't think I'm going to have them type them" (Line 26) prompts Roger to offer a rationale for why he has students type their notes. Roger's rationale, starting on Line 28, deepens the discussion further. Whereas Autumn and Deborah are trying to figure out ways to better implement this specific note-taking task, Roger offers pedagogical reasoning for why he has students retype their notes. His comment reframes the conversation, making it about solving the dilemma of how students can learn better from taking notes, not just how to get students to complete the task of note-taking. What started as a conversation about whether or not a note-taking tool is "good" or not has developed into a discussion about how teachers can better structure note-taking tasks to make them more authentic and relevant for students. Implicit in Roger's comment is the suggestion that note-taking tasks should ask students to synthesize a given amount of information, and do so in a way that students can share them with peers.

(40) Deborah:	But if you have them look at their notes and type up just the, the two strongest points.
Roger:	There you go.
Autumn:	Perfect.
Roger:	Maybe that is kind of like an outline?
Autumn:	Mhmm.
Roger:	Like, look at all your notes. Synthesize these down to the two most important components or four CDs or whatever.
Deborah:	Right. Yeah.
Roger:	That's a really good idea.
(50)Autumn:	I mean, could you do that without having them type it up?
Roger:	Of course.
Autumn:	Like, highlight, like could you have them highlight them?
Roger:	Mhmm.

In Line 40, Deborah picks up on the implication of Roger's comment and suggests ways that Autumn could achieve the same goal of having students revisit and synthesize their notes

without having them retype all of them or post them to Edmodo. She says, “But if you have them look at their notes and type up just the, the two strongest points.” Both Roger and Autumn validate Deborah’s idea and begin to elaborate on the various ways Autumn could achieve those goals. At this point in the conversation, a resolution has been reached to Autumn’s original note-taking problem. The team has arrived at the solution collaboratively, in ways consistent with deliberative decision making. For all intents and purposes, Autumn’s suggestion regarding highlighting ends the part of the discussion characteristic of joint work. However, as the conversation continues below, Roger returns to his original suggestion (students retype their notes and post them online) and in the process, deepens the conversation further.

(54) Roger:	Um, but yeah, I think you could do it any way. As long as they are-- I, I love it when the kids are communicating online. I think that's really great. Like, they created some documents to use. Which I thought was fantastic. They made like refutation and lampoon document. Like a graphic organizer.
Autumn:	That's awesome.
Isaac:	On their own?
Roger:	Yeah and they were passing it around to each other. I was like, what the hell is that document?
Autumn:	Cool.
Roger:	I was like, what is that? Oh, they made it! It's awesome.
Deborah:	Yeah, that's cool. Pretty awesome.

Even though the conversation was fairly complete before Roger’s turn in line 54, his continued rationale around students’ work on the online platform Edmodo marks this discussion as a potentially powerful moment of teacher learning that would not have happened if Autumn had not initially shared an example of how she structures note-taking in her class. He shares with the team how students adapted a document he had given them and started using it for their own purposes (Lines 54-58). In so doing, in a roundabout way Roger completes his argument that envelopes both note-taking strategies and PBL pedagogy in order to evidence to his team how

students can take an ubiquitous task like note-taking, and if given the space and freedom to play with it, can turn it into something entirely relevant and authentic for themselves.

In all likelihood, Autumn left this meeting with an improved strategy for motivating students to process the notes they will take in her class. I would argue, however, that the most important learning these teachers experienced had little to do with the actual artifact Autumn shared. In the above instance, teachers learned 1) that sharing and collaborative problem solving improves whatever artifact was shared, 2) that there are different ways note-taking strategies can be structured to optimize student learning, and 3) that students potentially get more from note-taking tasks when that task is relevant to them and when they are given the freedom to adapt that task to meet their specific needs. Teachers not only helped Autumn solve a problem relevant to her practice, in the process they developed strategies they could each use to refine their practice as individuals. Over time, conversations like these become the connective tissue of productive collaboration.

As is illustrated in Table 8 below, in this instance teachers interacted in ways characteristic of joint work (Little 1990). In this table, teachers participation turns are categorized according to characteristics of joint work as described by Little (1990). While not every turn in this instance counts as evidence of joint work, a large portion of the discussion does, especially those turns that evidence teachers' "shared responsibility for the work of teaching" (Little, 1990, p. 519). Through participation in the discussion, each teacher shares responsibility to help Autumn solve her problem, which then becomes *their* problem. This aspect, along with how this team continuously supported teachers' initiatives, experimentation, and risk taking in regards to newly designed curriculum, helped them establish a productive collaborative culture.

Table 8.

Characteristics of Joint Work and Teachers' Contributions	
Characteristics of joint work	**Evidence**
Shared responsibility for the work of teaching (interdependence) Turns marked by… *Teacher elaboration, repurposing, expanding of ideas under consideration. *Questions for knowledge, clarification	I/M: "They could post their notes to Edmodo" (07:32) I/M: "I think it's good because, one, they're taking notes in class. Then they're typing the notes up. So it's essentially reviewing the notes when they type them up on Edmodo" (07:35) I/M: "It's kind of a modeling activity" [Typing notes on Edmodo] (07:44) R/M: Asks a question about typing notes (07:58) I/M: "I think retyping is studying" (08:06) M/I: "In a way because you're processing it again" (08:22) J/Group: "It's like tricking them into studying" (08:41) I/Group: Like an outline? (08:50) M/I: Highlighting? (09:01) I/Group: Student created rubric on Edmodo (09:11) I/Group: Uses rubric to grade student work after students have graded own work first (09:52) M/I: Supports I's idea [students grade own work first] (10:14) R/Group: Students annotate own essays in her class (10:53)
Collective conceptions of autonomy Turns marked by… *Plural pronoun usage (we, us, all)	
Support for teachers' initiative with regard to professional practice Turns marked by… *Positive discourse markers (and, also, this is good, awesome, right, yup)	I/M: "I think this is really good" (07:10) J/M: "Really good" (07:18)
Support for teachers' leadership with regard to professional practice	
Group affiliations grounded in professional work	

Claim #4: Social dynamics in collaborative groups

Maybe more so than any other aspect of collaborative work, the interactions between and among teachers, evidenced in their discourse, can dictate how successful teams of teachers can be when redesigning curriculum. This is especially true of the work Cielo Vista teachers do in design teams. PBL curriculum redesign requires not just an accounting of the established curriculum according to student learning goals, but a shared commitment between teachers to accept and

implement a pedagogy very few of them have ever used. Such a task demands that teachers trust whatever experience and expertise each teacher brings to the discussion. It also demands some common understandings about how students learn, the strengths and weaknesses of the established curriculum, and what counts as evidence as teachers hash out differences. Although some difference, dissent, and debate are necessary, too much (and it varies team to team) can derail the whole process and cause animosity and distrust between teachers (Grossman, Wineburg, and Woolworth, 2001).

Adding more complexity to the chemistry within design teams, teachers approach the curriculum redesign task from different vantage points they have established over years of accumulated experience in the classroom. In addition to the status gained through multiple years of teaching experience, some expertise seems to matter more than others. Again, this can vary from department to department and even design team to design team, but the data show that teacher's deep content knowledge can hold them in higher standing from the perspective of their colleagues. Both years of teaching experience and specific teaching expertise can gain teachers "centrality" (Van Maanen and Barley, 1984, p. 324) within the school, department, and team. Van Maanen and Barley (1984) argue that once people achieve or attain status or "centrality" within organizations, it can be difficult for them to lose it. Over time it is easy to see how individual teachers would move, either intentionally or unintentionally, to position themselves as experts or leaders within a group. In some cases, it would be advantageous for individual teachers to leverage their power to influence the trajectory of the redesign effort in order to preserve or shift established components of the curriculum. In smaller groups, such as those the size of design teams, such status may be concentrated, especially if the teachers on the design team work within the same department. Harre and Langenhove (1999) argue that positions within groups are

relational and positioning becomes a zero-sum game. “For one to be positioned as powerful,” they claim, “others must be positioned as powerless” (p. 1-2). In some teacher groups, the opposite may also be true. The teacher with more ascribed or assumed status may take intentional steps to mitigate their status by empowering the teachers around them to assume leadership positions (Grossman, Wineburg, and Woolworth, 2001; Horn and Little, 2009). In these groups, the lead teacher makes space for the more novice or low status teachers within the group to take and share their instructional risks with the group.

In my analysis, I use teaching experience and perceived expertise to describe the ascribed and assumed status teachers have. I use both variables because those are the ones teachers use to identify those around them who have high or low status within the group. For all of these reasons, any analysis of how a group of teachers collaborate should, at least in part, be anchored in an analysis of how they interact professionally. This analysis starts with discourse analysis of how teachers interact in design team meetings. In addition, I use interview data and research on democratic decision making to support my findings from discourse analysis.

Discourse and deliberation. Discourse patterns from English 3 design team meetings suggest the team routinely used deliberation as their primary decision making strategy. Deliberation builds on the expertise of the group to develop new ways to address problems. Deliberation demands engaged participation from all group members. As opposed to negotiation or debate in which parties come to a discussion with an outcome in mind, deliberation describes the process by which people work together to develop new solutions that take into consideration the knowledge and expertise of each participant. In the context of Cielo Vista design teams, deliberation between teachers is marked by discourse of validation and elaboration. Turns of validation and elaboration are key components of deliberation because such discourse creates

collaborative space where people can digest various ideas without rejecting them outright and where people can exhaust the limits of whatever ideas are under discussion. The data from the English 3 design team show a group of teachers who "carefully examine a problem and arrive at a well-reasoned solution after a period of inclusive, respectful consideration of diverse points of view" (Gastil and Black, 2007, p. 2). Instances in which teachers' discursive turns are heavily marked by validation and elaboration evidence one form of inclusive and respectful consideration. Discourse analysis of teachers' interactions during the "Autumn's Note-taking Problem" instance show discourse marked primarily by validation and elaboration.

Based on his extensive teaching experience within the department, the respect afforded him by his colleagues, and the fact that he came to the English 3 team with knowledge and experience in the redesign process, Roger was ascribed high status within the team. At the beginning of the year, both Autumn and Deborah assumed Roger to be the "leader" of the group. Isaac was also ascribed high status within the team because he served on the school's leadership team. However, because he was not teaching a mainstream English class in the time when teachers were redesigning curriculum, he did not assume much status within the team. Because they were both novice teachers with only 2 years of teaching experience and because they were new to the redesign process, both Autumn and Deborah were ascribed lower status within the team. At this point I should point out that this description of teacher's ascribed and assumed status is a bit simplistic in regards to this team. From the beginning, all teachers involved approached the redesign process with an expectation that the best possible curriculum would involve heavy intellectual lifting from all involved. From the beginning the team assumed that no one teacher within the group had all the answers. In addition, the data show that none of the

teachers within the team assumed or ascribed to others status based on perceived content knowledge expertise.

If we return to the "Autumn's Note-taking Problem" instance, and look just at the way teachers marked their discourse or turns, a strong pattern of validation and elaboration is evident. In this passage, discourse markers are **bolded**. When teachers marked their discursive turns with validation and/or elaboration, those words are also **underlined**.

Roger:	**I think this is really good**.
Isaac:	This is the one that you emailed all of us, right?
Autumn:	This is the um, the notes that I'm, just like the template for everything//
Isaac:	**Oh yeah. Really good.**
Autumn:	It's nothing special.
Roger:	**No**//
Isaac:	They're just taking notes as individual, individually?
Autumn:	**I think so but** I think I'm going to have them time, give them time, um maybe give them time to, like, talk about their notes to their group and like share information.
Isaac:	**Okay.**
Autumn:	**And maybe** they can be even like//
Roger:	They **could** post their notes on Edmodo.
Autumn:	(Inaudible) They **could** post their notes on Edmodo.
Roger:	I think that's good **and** bad. I think it's good because, one, they're taking notes in class. Then they're typing the notes up. So it's essentially reviewing the notes when they type them on Edmodo. Just to type them.
Autumn:	**Yeah.**
Roger:	**You know?** And then, other kids, maybe they didn't take great notes or don't know what they are, so it's kind of a modeling activity.
Autumn:	**Mhmm.**
Roger:	**You know what I mean** as opposed to like an enabling thing?
Autumn:	**Right.**
Roger:	Um... I think it's, **I think that's fine.**
24 Deborah:	You want to have them type their notes, um, after they watch their notes?
Autumn:	**I don't think** I'm going to have them type them. I feel like it would take so much time.
Roger:	I, **yeah**, I, I'll just, I just tell my kids whatever notes they take in class they have to uh, post on Edmodo. Which means that they

	have to retype them. Uh, which means that they have to study them. Because I think retyping is studying.
Autumn:	**In a way because** they're, you're processing it again.
Roger:	**Exactly. And** you're formatting, you're reformatting it and a lot of times when you take notes it's in your own hand and then you need to think about, how do I need to reformat this so other people can understand it. So like that thought process.
Autumn:	It's just the time aspect.
Roger:	**Mhmm**. It takes a lot of time.
Autumn:	It takes a lot of time.
39 Deborah:	**But** if you have them look at their notes and type up just the, the two strongest points.

Throughout Autumn's and Roger's interaction, they use both validating, elaboration, and qualification markers in their turns. This portion of the instance is more closely aligned with discourse we would expect with a negotiation, even though their turns are more heavily peppered with validating and elaborating turns. Both Autumn and Roger seem to be giving a little bit with each turn to forge a negotiated solution. However, it should be noted that by validating Autumn's initiative and artifact, Roger positions Autumn's contribution as valuable and valid and worthy of deep consideration. Roger's immediate validation is representative of a collaborative pattern the team established. Although it is nearly impossible to say when this pattern was established and by whom, the pattern suggests a team that has established an egalitarian and distributed form of leadership. As the assumed team "leader," at some point Roger's actions and discursive moves helped establish a collaborative culture where teachers felt safe sharing and getting feedback on artifacts and where they felt empowered to take the initiative in design team meetings. Over time, teachers' use of validation and elaboration would establish a collaborative pattern that would evenly spread status throughout the team. In the event that this did happen, Roger did not give up any status. The pattern of validation , qualification, and elaboration in instances like these served to raise the status of all teachers involved.

Interestingly, Deborah's turn in line 39 is marked by "But…" which typically implies a refutation of whatever was said previously, in this case the back in forth between Roger and Autumn regarding the obstacle of time. However, Deborah's suggestion that students collapse their notes into the two strongest points represents a new solution to the dilemma of the amount of time spent typing up notes. As such, her turn transitions the group from a negotiation to a more deliberative style of problem solving. As the discussion picks up again (Line 40), Roger and Autumn immediately move to validate Deborah's suggestion and move to suggest more possibilities for how students could revisit their notes.

Roger:	**There you go**.
Autumn:	**Perfect.**
Roger:	**Maybe** that is kind of like an outline?
Autumn:	**Mhmm.**
Roger:	**Like**, look at all your notes. Synthesize these down to the two most important components or four CDs or whatever.
Deborah:	**Right. Yeah.**
Roger:	**That's a really good idea.**
Autumn:	I mean, **could you** do that without having them type it up?
Roger:	**Of course.**
Autumn:	**Like**, highlight, like **could you** have them highlight them?
Roger:	**Mhmm.**
53 Roger:	Um, but **yeah**, **I think you could do it any way**. As long as they are-- I, I love it when the kids are communicating online. I think that's really great. Like, they created some documents to use. Which I thought was fantastic. They made like refutation and lampoon document. Like a graphic organizer.
Autumn:	**That's awesome.**
Isaac:	On their own?
Roger:	**Yeah** and they were passing it around to each other. I was like, what the hell is that document?
Autumn:	**Cool.**
Roger:	I was like, what is that? Oh, they made it! It's awesome.
Deborah:	**Yeah, that's cool. Pretty awesome.**

After Deborah's suggestion that students just type up their two strongest points, the discussion quickly becomes an intense brainstorming session where teachers suggest various

ways students could reprocess their notes. This half of the discussion is heavily marked with discourse evidencing validation and elaboration. Once Deborah suggested a solution that would satisfy Autumn and Roger's concerns, the discussion becomes much more open-ended and creative.

Based on the language teachers used and the way they marked their turns within this instance, Table 9 illustrates the number of times teachers validated, qualified, refuted, elaborated, interrogated, or asked for clarification on something someone said within the group.

Table 9.

Teachers	**Turns**	**Validates** ("Yeah," "Mhmm")	**Qualifies** ("It's just," "In a way")	**Refutes** ("I don't think…")	**Elaborates** ("You know?")	**Integrates others' ideas**	**Asks for clarification** ("Wait…?)
Deborah	12	6				1	1
Roger	33	16	2		7		
Isaac	8	4					1
Autumn	28	15	4	1	1		

Seeing the data in this way, a couple of things are clear about how teachers interacted in this instance. First, Roger and Autumn dominated the discussion. Second, teachers marked their turns in this instance by language of validation. Third, teachers qualified and elaborated on ideas put forth by the team. These patterns held true in many English 3 design team meetings.

If we look at the data quantified by turn from another instance of joint work within this same group of meetings (Table 10), we see a similar pattern of interaction. In this instance, Autumn shared student survey results with the group and asked them to help her think through how to use them to start a discussion in her class. Of note in this instance are the topic and participation patterns. Surveying students, using an online survey generator, represented a new practice for this group of teachers. Also, because I had some experience with using surveys in

my role with the school, I offered some suggestions to Autumn about how she could use them to generate a discussion. Again, in this instance from the English 3 team, teachers' instances of joint work are marked primarily by turns of validation and elaboration.

Table 10.

Teachers	**Turns**	**Validates** ("Yeah," "Mhmm")	**Qualifies** ("It's just," "In a way")	**Refutes** ("I don't think…")	**Elaborates** ("You know?")	**Integrates others' ideas**	**Asks for clarification** ("Wait…?)
Deborah	15	13	1		1		2
Roger	32	9			20	2	1
Isaac	14	5	2		9		
Autumn	49	37			2	2	
Researcher	22	4	2		13		

Over time, this pattern of interaction helped foster a collaborative culture whereby teachers would deeply engage in collaborative problem solving and where they would support the initiative each teacher showed when they shared an artifact from their individual teaching practice. Both characteristics are indicative of joint work and, when combined with the discursive patterns between teachers, are indicative of an egalitarian group structure that is conducive to deliberative decision making.

Table 11 below illustrates another example of how validation and elaboration dominated the interactions of the English 3 team. The table illustrates an instance where Deborah shared an idea with the team about how she wanted students to analyze "A Modest Proposal." This instance was not included in the sharing and joint work table above because no artifacts or documents were shared in this instance. However, every member of the design team was deeply engaged in the conversation to both understand what Deborah's idea was and to help Deborah problem solve how she wanted to design it better for her class.

Table 11.

Teachers	**Turns**	**Validates** ("Yeah," "Mhmm")	**Qualifies** ("It's just," "In a way")	**Refutes** ("I don't think…")	**Elaborates** ("You know?")	**Integrates others' ideas**	**Asks for clarification** ("Wait…?)
Deborah	36	14	9	1	8		1
Roger	23	8	2		1	3	11
Isaac	7	1			6		
Autumn	19	12	5		6	1	1

Again, Table 11 clearly illustrates a pattern of validation and elaboration between teachers. They all participated in conversation and were all invested in helping Deborah find a solution to her problem. Although there was more qualification of ideas in this instance, as with a majority of this team's interactions, there were very little, if at all, turns of refutation.

The data suggest the English 3 team leveraged sharing as an entry point to engage in creative problem solving around problems of practice. That they established sharing as a routine also suggests that they took intentional steps to create an egalitarian collaborative team culture. From the beginning, teachers established a shared commitment to redesigning the curriculum according to PBL principles. Their shared commitment to the work created a foundation on which they established productive norms of interaction. The assumed "lead" teacher in the group created space for the more novice teachers in the group to take up various leadership roles within the team. For their part, the novice teachers willingly took up various leadership roles within the group.

Over time, all four teachers came to see each other as uniquely expert in different facets of teaching English and equal as professionals. Autumn described how Roger's expertise is the "big idea guy," how Deborah "takes [their] ideas and puts them into documents we can use with students," and Isaac's "is the amazing diplomat who floats through different roles and helps

refine Roger's ideas…and does a nice job thinking about accommodations for ELL students." Autumn also spoke to her increased comfort with "disagreeing with people and saying I'm going to try out something different." In one of her interviews, Deborah also talked about how she became "more independent and assertive as the year went on." When Autumn and Roger did disagree on a topic, such as the role of the novel in English coursework, Autumn described how they came to a compromise by allowing students to choose some of the books they would read. Autumn described this ongoing discussion as at times "heated" but never "uncomfortable." Even though Roger was the senior and most experienced English teacher on the team and Autumn was a novice teacher, based on Autumn's account of the ongoing discussion, the debate was both respectful and professional. Deborah also remarked that this and other disagreements were never "confrontational, emotional, or disrespectful." Again, these comments are more striking in that they originate from the novice teachers in the group. They suggest that when the cameras were not rolling in the meetings, these teachers established ways of dealing with disagreements in ways that were respectful of each member of the team. For this team, these interpersonal dynamics helped create a rich collaborative context for teacher learning.

Learning from joint work. The literature asserts that teachers learn when they collaborate to solve problems of practice (Cochran-Smith and Lytle, 1999; McLaughlin and Talbert, 2006; Horn and Little, 2009; Little, 2002; Little, 1990; Little, 2003; Wilson and Berne, 1999; Darling-Hammond and Bransford, 2005; Darling-Hammond, 2010; Hargreaves and Fullan, 2012; Sahlberg, 2010; Mclaughlin and Talbert, 2006). Such collaboration can deepen teachers' expertise specifically, around various teaching strategies and methods and also around the teaching craft in general (Bransford et al. 2005; Berteiter and Scardamalia, 1993). The data show that teachers

learned a multitude of things from the specific collaborative routines of the team and from the chance to work collaboratively with peers throughout the year.

Table 7 (see above) clearly shows that over the course of 10 design team meetings, teachers engaged in collaboration characteristic of joint work 10 times. More importantly, Table 7 evidences teacher learning over time. Over the course 10 meetings, teachers revisited the topic of student surveys 6 times, 3 of which developed into instances of joint work. At times a teacher would share ways they surveyed their students and at other times teachers would share the data they received from students in hopes of getting some idea of what the survey results meant. The extent to which ideas travel over time and between teachers within a design team evidences one kind of teacher learning.

Interviews conducted with teachers at the end of the year also provide some insight into what teachers say they learned from the collaborative experience. In these interviews I asked teachers to think broadly about the design team experience as a whole. Although somewhat general in their responses, teacher's responses suggest a deepening of their expertise, their awareness of who they are as teachers, and a new found respect with the connection between collaborative problem solving and the ways in which such collaborative work makes them better teachers. Autumn anchored her learning in her experience with working closely with other teachers who held "different levels of expertise." Generally, she spoke about the collaborative space as a place where she could "come to them [the design team] and say 'this thing happened in my class today, what do I do?...'" To Autumn, "Everything [they] designed together is better than anything I designed individually." Specifically, Autumn talked about "the value of starting with the students and not with the curriculum." To her, "the surveying of students and data gathering

made the curriculum more meaningful for [her] students." She recalls students telling her that the class "feels more relevant…more real" to them.

Deborah had similar descriptions about what she learned from the experience. She talked about how design team work "made teaching feel a lot less isolated [with} a lot more processing happening externally." Specifically, Deborah described how the design team gave her a safe place to fail and to share her failures. She said, "As a teacher it gave me more freedom to try things because as a team we have decided that this is a good idea so if it completely fails, it's not all my fault. So I'm just going to go for it." When asked, Deborah provided an explanation for why she thinks the group developed this kind of camaraderie. She said,

> I think Roger's been really good in making that happen in some ways, because just naturally I feel like he'd be the authority because he has the most teaching experience and his personality is just kind of like that. But I feel like he's been really great about trying to value the ideas that we all put out on the table and never coming from this kind of, like, 'Well I tried that and it didn't work.' He's very quick to praise everyone's ideas and to be open to suggestions that are different than his. You know, all those things I think were really huge in making it feel equal.

Based on previous interviews I conducted with Roger, this was a stated goal of his for this team. Coming from a difficult design team experience the year before where he did not feel as though he had much power within the group, it was important to Roger that Autumn and Deborah especially, felt comfortable asking questions, pushing back against ideas, and taking up

leadership roles within the group. For the other teachers in this group, this was their first design team experience.

At the beginning of the English 3 design team year, Roger describes how he caught himself directing the trajectory of the planning within the group and how he knew he had to change his behavior to create space where Autumn and Deborah could contribute. He said,

> I'm now being the person with the content knowledge that's saying, oh, I know how to do this. And when I realized that they were going to accept whatever I said, wow, this is going to go bad. You know, because I saw them shut down. Not shut down but, you know, when you say, oh this is what good teaching is, and, you know, they've taught one year and I've taught, you know, this is eight, nine years. They're going to say, well, okay, you're probably right. And so I realized it that my, my note taking was going to be a really, really big part of this because it was going to be the only thing that could shut my loud mouth up.

Roger used the role of note-taker to help flatten the hierarchy within the group open up space for others to discuss and make contributions. Over time this, in combination with his routine of validating the contributions other teachers made in the group, empowered both Autumn and Deborah and led to more sharing and subsequently, more instances of joint work within the team. The data clearly bears this out. Most of the instances of joint work I observed were a result of an artifact or document one of the novice teachers shared. They both felt comfortable taking risks and sharing experiments they had attempted in their classrooms.

The descriptions of what teachers on the English 3 team learned and how they learned from the design team experience suggest that collaborative teacher learning has as much to do with how a team collaborates as what they collaborate about. These data suggest that in order for teachers to learn from each other, it helps for them to establish an atmosphere of trust and safety within the group that in turn sets the stage for the kind of collaborative problems solving that instigates both technical and pedagogical teacher learning. Not only did teachers in the English 3 team learn various strategies for structuring student learning but they also learned different ways of approaching the task of teaching and ways of thinking about what it means to be a teacher.

Discussion

The English 3 team displayed collaboration that was grounded in a shared commitment to the task of redesigning curriculum according to PBL principles and they developed norms that facilitated their collaborative work toward that end. These two components created a safe place where teachers could share and resolve their problems of practice with the group. With little guidance from me, the university researcher in the room, and from the teacher leaders who supported the work of design teams, the English 3 team established a productive collaborative culture that encouraged risk-taking, cooperation, and learning. They did so because the central task of their work was both relevant and authentic to them. They believed in the work they were doing. They were bought in.

Data from the English 3 team strongly suggests that all of these characteristics of their collaboration influenced the productive collaborative culture they established as team. These findings further support the research that suggests that teachers can structure their collaboration in ways that establishes productive and supportive routines for teacher learning with strategic support and guidance around key components of collaborative work (Cochran-Smith and Lytle,

1999; McLaughlin and Talbert, 2006; Horn and Little, 2009; Hargreaves and Fullan, 2012). To be sure, there are dynamics that exist within this team that may not exist within teams in other contexts, such as their personal relationships with each other. However, what is striking about this team is that despite their personal relationships they still chose to set norms and explicitly state their commitment to the work. For this team, the norm setting and explicitly stated shared commitment to the work seemed to build upon whatever personal relationships they had before they started working together. In addition, the data suggest that time is an important variable if teachers are to go beyond merely sharing materials to having constructive and thoughtful discussions around the implications of the materials they use in classrooms. Sharing, by itself, does not seem to be enough if teachers are to examine their own practice and reconsider their own pedagogical beliefs.

Although processes and routines are important, perhaps what is most striking about how this team worked together was how their collaborative practice can be distilled down to a few principles that helped them establish productive collaboration. First, they all approached the collaborative task with an attitude of humility. No one person claimed to have all the answers despite the fact that one of the teachers had more than 8 years teaching experience. They all made their practice transparent to each other in ways that fostered their learning and the learning of the group. They all supported the risks each other took when they experimented with a new strategy. This culture of safe failure fueled the transmission of ideas each teacher deemed as exciting and interesting, such as the student surveys. Lastly, in other instances where various experiments with the curriculum were shared, the team examined the shared artifact from both a technical and pedagogical perspective. In the case of the note-taking tool shared by Autumn, teachers gave suggestions for how the tool could be improved and they discussed the value of note taking from

various pedagogical perspectives. With little knowledge of the research to draw from, the English 3 team established these routines by themselves.

Team leadership also seems to play a role in how productive teams can be over time. In the English 3 team, Roger made intentional moves to distribute leadership throughout the group. As the assumed leader at the beginning of the year, Roger realized the status he had within the group and took steps to further empower his colleagues to take initiative and risks with implementation of the redesigned curriculum. Grossman, Wineburg, and Woolworth (2001) and Horn and Little (2009) describe how group leadership makes a difference in setting up norms that allow each person within the group to participate and engage in the collaborative effort. This was especially important for the two novice teachers, Autumn and Deborah, who increasingly pushed the agenda for meetings and shared back with the group various ways they were experimenting with the curriculum in their classrooms.

According to interviews conducted with each teacher at the end of the year, by the end of the year the English 3 team redesigned approximately three fourths of the English 3 course. Teachers agreed to a scope and sequence of units throughout the year but those plans did not include daily lesson plans. One of the frustrations all four teachers spoke to was a pivotal meeting held at the end of the year where the district curriculum coordinator and the principal asked them to revise their curriculum to add more novels and to make teaching of those novels common to all students. (I was not present during this meeting.) Teachers discussed how it caused them to rethink their plans and scramble to make significant revisions to the curriculum before the end of the school year. This specific event was unique to this team and caused them to drop and/or adapt several units from their plans. It also caused some animosity between the teachers and principal and district curriculum coordinator. Ironically, such an example of how the team gathered

themselves and made some revisions before the end of the year highlights the collaborative strength of the team.

Limitations

There are several factors in this study that limit the extent to which my findings can be fully trusted. The first of these is the extent to which my history teaching in this department and my long held relationships with these teachers, in particular, had the potential to shade my interpretations. This criticism is valid in some ways. One's biases, especially in my case with these teachers, have likely influenced how I have interpreted my observations of this team. However, I shared this team's data extensively with the research team over the courser of two years. On multiple occasions we watched various video recorded instances from their design team meetings together and discussed what we thought was happening. Those conversations continued to happen and were refined as I produced various research memos on different snippets of data garnered from either their design team meetings or my interviews with them.

Another limitation of this study has to do with the relationship between data collection and data analysis. Although rich, data collected for this team did not always match with what I later came to understand about what was happening in the group in terms of joint work, as a result of intense and focused data analysis. An example of this was the questions I asked during interviews. Although I saw them as pertinent and important at the time, I sometimes failed to ask teachers to comment on specific aspects of either how they saw norms operating within the group or why and how they developed the collaborative routines evidenced in their design team meetings. Looking back, it would have been helpful to have either individual teachers or the team watch a specific instance of joint work and then talk about how they interpreted the process. This is just one example where I either missed an opportunity to ask teachers specific questions about

their process or where what I asked teachers on interviews may not represent what I really wanted to know once I started analyzing the data.

Conclusion

Data from this design team suggest that when given the space and time and autonomy to structure not just their collaborative practice but shape the product of their collaboration, teachers can establish systems and routines that mirror the best examples of teacher collaboration present in the research literature. Although the school context this team was working in is highly unique, that uniqueness should not overshadow the lessons learned from this design team. First, before teachers engage in collaborative work together, they should be given the choice to participate in such work and should share a commitment to completing the task. In this case, teachers came to the design team process wanting to redesign established curriculum to PBL curriculum. They were already bought in. There were other design teams at Cielo Vista where this was not the case. Those design teams struggled both to work together in an equitable fashion and to redesign curriculum according to PBL principles. Teachers cannot and should not be forced to do the work. School leaders and administrators would be wise to spend time in the beginning clearly articulating a vision to participating teachers and ensuring that they have bought in to both the larger vision and the specific purpose of the collaborative task. Second, it is important that teachers establish clear norms to govern how they work together, especially if the work they are being asked to do is with people they know well and if it constitutes new work for them. That may sound contradictory, but strong norms help teachers sustain equitable collaboration. Other data from Cielo Vista suggest that when teachers do not establish clear norms, it is far too easy for them to default to how they interact within the department. For some groups, this may be a positive thing. For others it may not. Third, the personal relationships teachers share can impact

how teachers interact as colleagues. How and why in some contexts and not others, and to what extent, is less clear. The English 3 team managed to exploit the personal relationships that existed between members to improve the professional dynamic within the team. For this team, setting norms and making their intentions around curriculum redesign seemed to make a difference in that specific area. Mostly, this study strongly argues that inside-out, teacher guided and driven renewal is worth the time and investment.

CHAPTER 5
COMPARATIVE CASE STUDY: ENGLISH 2, SOCIAL STUDIES 1, MATH 2

Introduction

The research literature on teacher learning and collaboration suggests that teachers learn from collaborative routines that are guided by commonly held norms (Wenger, 1998; Grossman, Wineburg, and Woolworth, 2001; McLaughlin and Talbert, 2006) and that immerse teachers in authentic problem-solving tasks that are situated in their daily work (Wenger, 1998; Ball and Cohen, 1999; Cochran Smith and Lytle, 1999; Wilson and Berne, 1999; Darling-Hammond and Bransford, 2005; McLaughlin and Talbert, 2006; Hargreaves and Fullan, 2012). Much of the literature on teacher collaborative learning posits teacher learning as a worthy and explicit goal of professional collaboration. I take this same approach.

Much of this research on teacher collaborative learning is situated in designed settings, where university researchers structure what teachers collaborate about and how they collaborate. Although the principles from this research have proven useful for understanding how teachers from one high school learn from their collaboration in design teams, there is still much to be learned by examining collaborative settings where teachers structure, lead, and drive their work and learning. In addition, much of the qualitative, case study research on teacher collaborative learning focuses on the work of one, possibly two teacher groups (Grossman, Wineburg, and Woolworth, 2001; Little, 2003; Horn and Little, 2009). In this study, I compare how three different design teams, working at Cielo Vista High School, a comprehensive, public high school, structured their collaborative work to redesign curriculum according to problem based learning (PBL) principles. Both the comparative case study approach and the relatively unique research context makes this study an especially interesting yet under-theorized research space to explore.

In this comparative case study, I examine three teams of teachers who worked throughout the year to redesign an established curriculum into a PBL curriculum. The school provided each team with an extra, daily, common planning period throughout the whole school year to complete the work. From the beginning, these teachers were in almost full control of how they collaborated and what the curriculum eventually became. To guide their work, the school provided them with guiding PBL principles.

The three design teams examined for this study include English 2, Social Studies 1, and Math 2. I chose these teams specifically because they represent three out of the four core content areas within the school. In addition, the English team and Math team also worked under various layers of school, district, and state policies that could potentially constrain the extent to which they redesigned curriculum according to PBL principles.

I will explore the following research questions in this part of my dissertation:

4. What collaborative routines and norms did teachers establish in their design teams?
5. In what ways did those routines and norms influence the collaborative learning of the design team?
6. Given that each team had autonomy to structure and norm their collaborative work differently, what patterns, if any, exist among teams regarding how they structured their work together?

Literature Review

In this study, I take a social-cultural perspective to teacher collaborative learning (Vygotsky, 1975; Wenger, 1998). Although teachers can learn from doing individual research or investigations into their practice, that learning is increased and deepened when they act collaboratively to solve problems that emerge out of their teaching practice (Wenger, 1998; Ball

and Cohen, 1999). The research around developing expertise also supports the notion of collaborative learning and argues that processes like “progressive problem solving” (Bereiter and Scardamalia, 1993) can, over time, help teachers become “adaptive experts” (Bransford et al. 2005). Although collaboration has the potential to be fraught with disagreement as teachers make their beliefs and values explicit, collaboration among teachers also holds great promise for helping teachers shift their practice over time.

In smaller collaborative settings of groups that consist of between 3-6 teachers, the research describes routines that help teachers learn from their practice. One way teachers learn is to jointly examine problems of practice (Cochran-Smith and Lytle, 1999; McLaughlin and Talbert, 2006; Horn and Little, 2009; Little, 2002; Little, 1990; Little, 2003; Wilson and Berne, 1999; Darling-Hammond and Bransford, 2005; Darling-Hammond, 2010; Hargreaves and Fullan, 2012; Sahlberg, 2010; Mclaughlin and Talbert, 2006). Teachers may discuss student performance on an exam or on an essay assignment or they may discuss why a particular did not seem to work for their students. The topic matters little. Teachers also learn any number of things from the process of staking and defending a claim based on evidence and qualifying and challenging the claims of others in critical but respectful ways (Cochran Smith and Lytle, 1999; McLaughlin and Talbert, 2006; Hargreaves and Fullan, 2012). As clear as the benefits for improved practice may be, for many teachers, this represents new more difficult work, especially when engaged in collaborative settings (Darling-Hammond and Bransford, 2005; Horn and Little, 2009).

When collaborative work is governed by shared norms, the production of norms is itself a powerful part of the process (Grossman, Wineburg, and Woolworth, 2001; Wenger, 1998; Wilson and Berne, 1999; Little 2003). Setting clear norms serves three important purposes. First,

clear norms ensure that teachers approach collaborative work professionally and respectfully. Second, norms can help establish an egalitarian culture within a group (Grossman, Wineburg, and Woolworth, 2001). Like any other professionals, individual teachers bring with them status depending on the years of experience they have, what their perceived expertise is, and what classes they regularly teach and/or official roles they hold within a school. Norms help teachers provides a space where they can establish mechanisms and processes where the less experienced teachers feel comfortable contributing to the work (Grossman, Wineburg, and Woolworth, 2001; Horn and Little, 2009). Third, norms help teachers establish routines whereby they can disagree around deeply help pedagogical beliefs. In and of themselves, norms do not automatically make a group functional.

When collaboration is productive, shared norms often govern specific routines teachers consistently engage in over time (Horn and Little, 2009; Little, 2003; Wilson and Berne, 1999; Little, 1990). Routines such as "sharing" can develop into instances "joint work" (Little, 1990) if the norms teachers establish help create a collaborative culture of respect, openness, transparency with one's instructional practice, and willingness to share one's failure with the group. The same principle holds true when teachers develop and foster community (Grossman, Wineburg, and Woolworth, 2001), when they leverage the collective professional capital that exists within a school (Hargreaves and Fullan, 2012), or when they work to increase their "knowledge-of-practice" (Cochran-Smith and Lytle, 1999, p. 272). In each case, norms can serve to flatten hierarchies within groups to provide space for every teacher to contribute. Again, norms only stretch as far as the agreements that teachers make to abide by them.

A common characteristic of the research is that it largely documents ways teachers learn in highly structured and designed collaborative settings (Grossman, Wineburg, and Woolworth,

2001; Little and Horn, 2009; Little, 2003). That is, settings in which research partners or administrators play an active role in monitoring and supporting the collaboration. For example, in their study of a secondary inter-disciplinary book group, Grossman, Wineburg, and Woolworth (2001) not only provided the funded time for teachers to deliberate around common texts, they also provided the purpose for and structure to teachers' deliberations. In that study, the authors took an active role in structuring teachers' collaboration and scaffolding teachers' learning. With their help, teachers forged a tight-knit and safe learning community.

This study addresses several gaps within the teacher collaborative learning literature. What remains under-theorized in the literature, yet which is an important characteristic of productive collaboration, is the establishment of a shared commitment to the collaborative task. The existence of this gap is not surprising. Many times when teachers engage in formalized collaboration, that work is structured and shaped either by school or district leaders or by university researchers who facilitate the process. In the case of Cielo Vista teachers, that shared commitment is the explicit agreement between teachers that they will redesign the curriculum associated with a course according to PBL pedagogy and principles. Although basic, such a commitment is fundamental to productive collaborative work at Cielo Vista High School for the very fact that no one is guiding how teachers interact in design teams. When and if teachers disagree on either the specifics of an assessment or a project, or on more over-arching pedagogical beliefs and values, what keeps the work moving forward is shared commitment to the task.

This study also addresses a gap in the literature regarding teacher led and driven collaborative work that is situated within formalized and predictable spaces and times put aside for collaboration. Much of the research on teacher collaboration documents settings where

university researchers or school or district leaders design and structure teachers collaborative work. Facilitators may use protocols to structure this work. This was not the case for the design teams working at Cielo Vista High School. Teachers largely determined how they would structure their collaborative work and decided what the product of that work would be. In this study, I map the terrain of teacher collaboration in the wild, across three design teams working at the same school, revealing the ways teachers structure their work together through established routines and the ways they navigate the social dimensions of collaborative work.

Context

Confronted by stubborn achievement gaps between various groups of students and gradually declining enrollment, four years ago Cielo Vista High School applied for and was awarded a federal grant to shift the school from a traditional model of teaching and learning to a more problem-based learning model of education. Leaning on educational research, school leaders were convinced that shifting to a problem-based learning approach would increase student engagement and motivation and would better prepare students for success in college and science, technology, engineering, and mathematics (STEM) careers (Blumenfeld et al., 1991; Barron and Darling-Hammond, 2008; Baoler and Staples, 2008; Belland, Glazewski and Ertmer, 2009; Conley, 2010). Previous to the federal grant, teachers taught in mostly traditional ways across the school. Instructional practice ranged from teacher-centered and directed such as lecture or direct instruction to student-centered throughout the school. Although it was common to find students working in groups together in various ways and for various purposes, classes were mostly organized around teachers' expertise and knowledge.

Confronted by a wide array of ideas about what PBL is and is not, the school took an inside-out approach to developing a values-based brand of PBL that would best meet the needs

of their specific teachers and students. In collaboration with local university, the school developed the 7 Key Elements of a Problem Based Learning Classroom document. In it, the school identifies seven principles of PBL (expertise, student collaboration, authentic problems, authentic assessment, academic discourse, culturally responsive instruction, professional collaboration) to guide teachers as they worked to redesign the established curriculum into PBL curriculum. The school provided teams of teachers, consisting of between 3-4 teachers, with a one-year release of a shared, common, daily planning period to redesign the curriculum. Teacher involvement design team work was voluntary.

The English 2 and Social Studies 1 team met during the 2011-2012 school year. The Math 2 team met during the 2012-2013 school year. As I will further explain later, based on the data I collected when observing the English 2 and Social Studies 1 teams, I changed my data collection plan for the Math 2 team the next year. In each case, teachers volunteered to work on each design team.

The diversity of teachers within each team varies between teams. The English 2 team consisted of mostly white male, highly experienced teachers who had worked within the same department for almost a decade previous to working in that design team. The Social Studies 1 team had a range of teachers with a range of experiences. The Social Studies 1 team initially consisted of three white females and two white males. However, because of their participation on other design teams or in other projects around the school, two of the teachers did not regularly attend these meetings starting in November. Although there were some veteran teachers within that group, some of the teachers were either novice teachers or they had spent a considerable amount of time teaching at different schools in other districts or states. The Math 2 team was different still. It consisted of a white male veteran teacher who had experience teaching almost

all the math classes offered at the school, and two female novice teachers. One of the novice teachers on this team came to teaching after spending 2-3 years working as an engineer.

Participants. The participants for this study include teachers from the English 2, Math 2, and Social Studies 1 design teams.

English 2. The English 2 design team redesigned the sophomore English course in the 2010-2011 school year. The team consisted of three white male teachers. Gerald was the most senior teacher in the English department and routinely taught the senior level AP class. He has taught at Cielo Vista for approximately 15 years. He was also served as department head for a number of years previous. Gerald holds a bachelors degree in English. Within the English department, Gerald is generally considered to have the most content knowledge expertise among all the English teachers. He generally ascribes to a traditional notion of content and teaching. He sees novels as an integral and necessary component of any English class. The other teachers in the department generally looked to him as a leader within the department. Daniel is also a highly experienced teacher, having approximately 8 years of teaching experience at Cielo Vista and also holds a bachelors degree in English. Daniel ascribes to a traditional notion of English. He sees literature, reading, and writing as central components of English courses. However, Daniel has also shown willingness to center English class on non-fiction pieces and art, in addition to the traditional literary texts. He is the current department head and, as such, is looked to as a leader within the department. He routinely teaches the junior level AP course and has taught most of the other English courses offered at the school. Daniel is also considered to be a content knowledge expert within the department. Roger (who the next year was a member of the English 3 team which is the focus of the single case study) is also a highly experienced teacher, having approximately 8 years of teaching experience at Cielo Vista. (It has become common for

teachers to serve on more than one design team in different years over the course of the project.) Roger holds a bachelors degree in Cultural History of Ideas (CHID) but is not considered a content knowledge expert by his peers within the department. He has a non-traditional notion of what content is for an English class, famously stating that content could be anything that engages students' interests and passions. He does not ascribe to the notion that English class must be centered in the reading of novels or long literary texts. Roger has held leadership positions within the school in the area of student activities and clubs.

Math 2. The Math 2 design team redesigned the sophomore level Math course during the 2011-2012 school year. The team consisted of one experienced white male teacher and two female novice teachers. Matt is a highly experienced teacher, having taught at Cielo Vista for approximately 10 years. He holds a bachelors degree in math. He does not and has not held any formal positions of leadership within the math department although he has taught every math class offered at the school with the exception of Statistics. Matt is typically quiet and not verbose when he contributes in meetings. Dianne is a novice white female teacher, fresh out of her university teacher education program. She holds a bachelors degree in math. Dianne holds a somewhat traditional notion of what math class should look like. She is most comfortable teaching equations, having students practice solving equations in groups, and then assigning them homework. Charlotte is a novice white female teacher, also relatively fresh out of her university teacher education program. The previous year, she taught part time at the school while she completed her masters in teaching while also earning her certificate in career and technical education (CTE). In addition to math, Charlotte taught the engineering classes at the school. She expressed a high comfort level with teaching math in a PBL context. For part of her college experience, she spent six months in Denmark, observing and teaching middle school math.

Social Studies 1. The Social Studies 1 design team redesigned the freshman level Social Studies course during the 2011-2012 school year. This class was a new Advanced Placement offering that year. All freshmen registered for the class the year before. Bill is an experienced, white male teacher, having taught 5 years at Cielo Vista and 5 years in various other schools in other states. He holds a bachelors degree in History and spent the first part of his career as a reading specialist. Bill holds no formal positions of leadership within the department but has, over time, solidified his role as the AP US History teacher at the school. Ben is an experienced, white male teacher, having taught for approximately 10 years at Cielo Vista. He holds a bachelors degree in History and is the department head. Nancy is a white female, novice teacher who holds a bachelors degree in History. She has two years teaching experience at the school. Lisa is an experienced, white female teacher. Another teacher in the department recruited her to come to Cielo Vista to be a part of this particular design team. She has experience teaching students with special needs and holds a masters degree in this specific area of Social Studies. Nancy is considered the content knowledge expert in the team and, in many ways, takes up a leadership role within the team. Design team observations and teacher interviews with this team evidence a group of teachers who generally approach their practice and their subject matter in similar ways. They love their content and generally think every Social Studies class should be content-centric to a degree, but they are equally concerned with making the content accessible and digestible to a wide array of students. They consider it their jobs to strike a good balance between content delivery and engaging student interest in the curriculum.

Methodology

In this study, I take a comparative case study approach to examining the work of three design teams working in the 2011-2012 and 2012-2013 school years. However, I used a different

process of collecting data for the English 2 and Social Studies 1 teams that were working in the 2011-2012 school year than I did for the Math 2 team that worked in the 2012-2013 school year. I video recorded each design team meeting and took extensive field notes guided by a design team meeting protocol that was developed in collaboration with my research team.

For the English 2 and Social Studies 1 team, I observed design team meetings once a week, usually during a day when they met during a block period (90 minutes). My observations started in September and usually extended into March. Based on my observations of these teams during the 2011-2012 school year, I wanted to capture more of the day-to-day interactions between teachers as they were planning PBL units. I was hoping that daily observations would give me a deeper perspective into how teachers structured their work, how they leveraged each others' expertise based on the content of the unit they were planning, and how they navigated the social and interpersonal dimensions of daily planning. Most importantly, I wanted to observe how teachers balanced the concurrent processes of design and implementation of newly designed curriculum.

When I observed the Math 2 team, I changed my data collection approach to conducting a week of daily observations in September, to establish a baseline of collaborative practice, and late May to early June, to see if there were any changes to the team's collaborative practice. In addition, I worked with each team to identify when they were planning new PBL units during which I would conduct daily observations. In some instances, during these observations I would be with design teams every day anywhere between 2-6 weeks. I video recorded each design team meeting I observed and took extensive field notes guided by a design team meeting protocol that was developed in collaboration with my research team. Table 12 shows the ways in which I collected data on each design team studied in this chapter.

Table 12.

Design team data collection: 2011-2013				
	Design team meeting observations	**Interviews**	**Teacher artifacts/notes**	**Classroom observations**
English 2	Weekly (September-March) Video recorded	Semi-structured • Fall • Spring	Throughout the year	T1 (3.5.12, 3.30.12) T2 (3.5.13) T3 (3.14.13)
Social Studies 1	Weekly (Spetember-March) Video recorded	Semi-structured • Fall • Spring	Throughout the year	Not observed
Math 2	Weekly (September, June) Daily (January-beginning of February)	Semi-structured • Fall • Spring Stimulated recall • Winter	Throughout the year	Not observed

It should be noted that the boundary between when teams were planning lessons and materials for specific units and when they worked on other curricula was extremely porous. It was not uncommon for teams to be both planning curriculum for a future unit and be refining lessons they were currently teaching. In fact, their ability to plan and implement at the same time became a key routine for some design teams.

In addition to design team meeting observations, I also conducted interviews with each teacher on each team throughout the year. However, like with the design team meeting observations, my approach to conducting interviews was different in the 2011-2012 school year from the 2012-2013 school year.

For the English 2 and Social Studies 1 teams during the 2011-2012 school year, I interviewed each teacher twice throughout the year. I would typically interview teachers in October or November and then again in March or April. For these interviews I used a semi-structured protocol (Merriam, 2009; Patton, 2003) that focused on questions about how teachers approached issues regarding content and how teachers felt their teams worked together. Each

interview was audio recorded and was member checked with each teacher after I transcribed the interviews.

For the Math 2 team during the 2012-2103 school year, I interviewed each teacher once at the beginning and end of the year. I used a semi-structured protocol for these interviews (Merriam, 2009; Patton, 2003). I also interviewed them in the middle of the year, at the same time I was also observing their design team meetings. For these interviews, I used a stimulated recall approach. Stimulated recall interviews provide ways for teachers to reflect on specific interactions captured on video (Wineburg, 1991; Schepens et al., 2007; Dempsey, 2010). By using stimulated recall interviews, I could ask teachers about specific interactions between them and their colleagues that represented larger patterns in their collaborative work. Each interview was audio recorded and was member checked with each teacher after I transcribed the interviews.

I coded and analyzed the data collaboratively, with the research team, and independently based on the analytical framework grounded in the concept of sharing and joint work (Little, 1990). Research team members included the primary investigator and three other graduate students who also conducted research having to do with PBL implementation at Cielo Vista High School. I routinely shared both video footage and interview transcripts with the research team during bi-weekly research team meetings during which we would examine, re-examine, and analyze specific clips of data. Other members of the research team, who also collected data at Cielo Vista High School, would also share data in research team meetings. Such meetings not only helped me solidify my claims over time, but they also helped me keep my biases in check that result from my extensive experience at the school.

Key terms

There are several key terms I use throughout the analysis of this team's data that demand further clarification.

Instance

In this section, I analyze instances of teachers' collaborative work. These instances come from video recorded design team meetings. An instance is a slice of data, usually between 3-15 minutes, where teachers shared a document, tool, teaching or student artifact, and then engaged in collaborative problem solving around that text characteristic of "joint work" (Little, 1990). Data collected suggest that not every teacher needs to participate, but engaged participation from all present is optimal. Although the data is rife with instances of many different routines the team engaged in, for this study I focus only on those instances that evidence joint work.

Productive collaboration

For the purposes of this dissertation, I define productive collaboration as a process of how design teams structured their collaborative work over time in ways that fostered teacher learning. An integral part of that process was how teams established a culture of responsibility and accountability to each other through a shared commitment to the task of PBL curriculum redesign and through a commitment to genuinely engage the task by leveraging the expertise each teacher brought to the process. I do not define "productive collaboration" by using student learning outcome data. I do briefly describe how much curriculum each team redesigned by the end of their design year. Different design teams dealt with different constraints that somewhat hindered what and how much curriculum they could produce.

Sharing

I take my definition of sharing in a professional learning context directly from Judith Little's (1990) work on collegiality and collaboration. She states:

> Through routine sharing, teaching is presumably made less private, more public. In principle, the pool of ideas and methods is expanded. The coordination of teachers' work and students' careers is made possible in ways that cannot be achieved through other forms of collegial contact. By making the ordinary materials of their work accessible to one another, teachers expose their ideas and intentions to others. (p. 518)

In my study, sharing is an activity among teachers when one teacher shares a document, tool, teacher or student artifact that evidences some problem they need help resolving. Many times teachers share materials they either are thinking about experimenting with in their classroom or have already experimented with in their classroom. The materials the English 3 teachers shared with each other were not necessarily representative of problem-based learning but in many cases those materials were a part of a larger unit or lesson in which teachers attempted to implement PBL strategies into their classroom practice.

Joint work

As with sharing, I take my definition of joint work in a professional learning context directly from Judith Little's (1990) work on collegiality and collaboration. She states:

> I reserve the term *joint work* for encounters among teachers that rest on shared responsibility for the work of teaching (interdependence), collective conceptions of autonomy, support for teachers' initiative and leadership with regard to professional practice, and group

> affiliations grounded in professional work. Joint work is dependent on the structural organization of task, time, and other resources in ways not characteristic of other forms of collegiality, and thus is both responsive to larger institutional purposes and vulnerable to external manipulations. Collegiality as collaboration or as joint work anticipates truly collective action—teachers' decisions to pursue a single course of action in concert or, alternatively, to decide on a set of basic priorities that in turn guide the independent choices of individual teachers. (p. 519)

In my study, joint work is an activity among teachers that many times resulted from an instance of sharing. However, sharing and joint work are different kinds of activities teachers engage in. Teachers may share materials informally over lunch, between classes, or after school. But the act sharing does not imply that collaborative work around what was shared took place. A teacher may even learn something from another teacher's shared tool, document, or artifact without having a conversation with them. However, joint work is different by nature than sharing. Instances of joint work demand in-the-moment, face-to-face, focused interaction between teachers. Wenger (1998) describes this as a process of participation and reification whereby people collaborate to establish agreement and then document those agreements in various ways over time. Joint work involves both participation in the process of negotiation around curriculum redesign and reification of teachers' values and pedagogical stances in the documents and materials they create. Joint work may occur when teachers solve problems of practice or it may occur when teachers redesign some part of the established curriculum to better meet the needs of their students.

Implicit in Little's (1990) descriptions of sharing and joint work is the claim that each provides the potential for teacher learning. As I already described, in the case of sharing, teachers may learn a different way of designing a graphic organizer or a quiz. Although valuable, sharing alone creates more of a potential for technical learning about practice. In the case of joint, teacher learning is more dense. Teachers may also pick up various technical strategies to use in their classroom or planning and they also may shift their pedagogical values and beliefs over time. Both sharing and joint work represent learning opportunities for teachers, but in the context of design team work where teachers redesign curriculum according to different pedagogical principles, engagement in joint work is important if teachers are to shift their instructional practice and beliefs to align with PBL pedagogy.

General Findings

The data show that the ways that design teams structured their collaboration varied widely. Although this study did not focus on how departments functioned beyond design team work, interview data and my informal observations at the school suggest that design teams largely extended the culture and norms established within departments. In the case of English 2, this contributed to their inability to establish productive collaborative routines. In the case of the Social Studies 1 team, this created an expectation that they would set norms in order to establish productive collaborative routines. The data show that the interaction between shared commitments to the work of PBL redesign, setting clear norms to govern that redesign work, and establishing cycles of curriculum redesign and classroom implementation increased the likelihood that teachers would establish routines of "sharing." When design teams teachers shared artifacts of how PBL is working or not working in their classrooms, the data show it increased the likelihood that they would engage in collaborative problem solving and

deliberation characteristic of "joint work" (Little, 1990). For the purposes of this study, I define productive collaboration as that in which teachers routinely engage in "joint work." When engaged in "joint work," teachers work to creatively solve problems of practice in ways that address both the technical issues before them and the pedagogical implications of what they as a team are planning. In the case of the Math 2 team, sharing did not necessarily lead to joint work. In the case of Social Studies 1, sharing many times did develop into joint work as teachers used instances of sharing to dig into both the technical issues regarding PBL implementation and the pedagogical consequences such implementation might create for their practice. The English 2 team rarely shared materials with each other during the design team meetings I observed.

In the sections to follow, I examine how each team structured their collaborative work together and describe the extent to which teachers leveraged routines of sharing and joint work in their design team work.

English 2

Context. I observed the English 2 team 12 times throughout the 2011-2012 school year. Most of the time I observed the English 2 team during a block day when the team would meet for 90 minutes. Table 13 illustrates the extent to which I participated in conversations within the English 2 design teams I observed.

Table 13

Researcher Participation: English 2	
Meeting date	**Researcher participation**
9.8.11	No record of participation.
9.15.11	No record of participation.
9.22.11	No record of participation.
10.6.11	Participated in conversation regarding summer reading.
10.27.11	Participated in conversation around how to plan a PBL unit.
11.3.11	No record of participation.
11.17.11	No record of participation.
1.13.12	No record of participation.
1.27.12	No record of participation.
2.3.12	Participated in conversation regarding the proposed peer review process for PBL

	units.
2.10.12	No record of participation.
3.2.12	No record of participation.

The English 2 team was comprised of three English teachers, all of whom had between 8-15 years teaching experience. Of the 3 teachers, two of them was regarded as having deep content knowledge by other teachers in the department and described that as their area of expertise in interviews. They both graduated with bachelor's degrees in English. Those same two teachers also either served or currently serve as the department head for the English department. Finally, those same two teachers are two of the most highly regarded teachers by their English department colleagues. The combination of deep content knowledge, as well as the official role of being department head, contributed to the high status both those teachers hold within the department. The third teacher on the English 2 team was not considered to have especially deep content knowledge in English. He graduated with a bachelor's degree in an interdisciplinary degree that was a combination of anthropology, psychology, philosophy, and sociology. The third teacher on the team was considered less of a traditional English teacher, in both core knowledge and practice, than his other two colleagues.

Complicating the dynamics among teachers further, over time they made sense of PBL as a pedagogy and a school-wide initiative differently. Daniel, the current department head, was part of the committee of teachers who worked to get the PBL initiative off the ground. He participated in the interviews to hire the teacher leaders for the project and he worked to finalize the language that was in the initial Key Elements document. Throughout the course of the year, Daniel focused his work within the team in trying to develop a better understanding of how authenticity plays out in English classrooms when the focus of English class is literature and how to better integrate student voice in some of the units they were planning. Gerald, the former

department head, was not a part of the PBL planning or implementation process. At the time, he was the sole AP Literature teacher at Cielo Vista. Historically, the teacher who taught that class was the teacher whose content knowledge was most highly regarded. Throughout the year, Gerald made arguments to keep the more traditional components of English class: the essay and literary books. He considered essays the fundamental college prep component of an English class and thought literature to provide the best vehicle to facilitate students' writing of essays. Initially, Roger was against the PBL initiative. At the beginning of the year he was primarily concerned with the extent to which PBL would disrupt his plans for his classes for the year and was concerned about the lack of evidence supporting the effectiveness of PBL and the lack of models to look to as example. Roger was slow to accept the change. However, as the year progressed, he became more and convinced that PBL was an effective way to teach English courses. In interviews, Roger was adamant that literary novels need not be the focus of English class. These philosophical tensions between teachers were routinely on display during team discussions.

Findings

Data from the English 2 team suggest that out of 12 design team meetings observed, the team engaged in 2 instances of focused collaboration on a specific document or artifact of teachers' planning. Out of these 2 instances, one instance could be described as joint work focused on a specific document one of the teachers shared with the team. However, there is little evidence in the data that shows a routine of sharing amongst the English 2 teachers. This team spent much of their design team time discussing the various components of PBL as written in the 7 Key Elements and then planning units. Later in the year, after my formal data collection had ended, they piloted one full redesigned unit. The English 2 team set no norms for how they interacted as a team nor did they establish a shared commitment to redesign curriculum

according to PBL principles. Lastly, instances transcribed from this design team as well as interview data suggest that the team primarily used debate as a form of decision making. In the following section, I will deal with each claim individually.

Claim 1: The English 2 team neither established a shared commitment to the work nor set norms for their collaborative work.

Data from the English 2 team suggest that they did not share a commitment to the task of PBL curriculum redesign and that they developed no new professional norms to govern their collaborative work. The lack of either a shared commitment or norms made redesigning curriculum according to PBL principles difficult. At the time I was collecting data on the English 2 team, they had known each other professionally and personally for approximately 8 years.

The teachers on this team disagreed about some fundamental issues regarding how to teach English. Gerald believed students should "write, write, write, write…essays." Literature should be the thing students write about because "it serves a purpose to writing that nothing else serves" meaning that it has shows students "varied sentence structure…varied vocabulary…and exposes students to a variety of ways of expressing themselves." Roger believed that the book is "not an essential part of the English classroom. A traditional part, yes. An essential part, no." He calls "antiquated" the belief of "reading and writing which means that [they] will read an entire book and [they] will write a five paragraph or five page essay and that will show [their] ability to read and write." To Roger, such practices "lose kids." Daniel fit somewhere in the middle of the two, perhaps closer to Gerald's way of thinking. He said "There is something near and dear in my heart, in the very least, in English to push towards literature being the focus of what we do." However, Daniel also described his role on the team as a kind of "referee between those two tensions" represented by Gerald and Roger's pedagogical beliefs.

When the team was first assembled, they leveraged their personal relationships with each other to serve as the foundation for how they would work professionally. This had consequences for how they collaborated. In an interview, Roger described how the team structured their collaborative work together. He said,

> Well, what we did was we just started arguing a ton. We didn't do any norming. Because, you know, norming would be something that 'Well, that's what people do who don't know each other. You know, that's, that's a bunch of BS that people do that doesn't matter.' Because we know each other so well we don't have to do that kind of crap. We'll just get down to it.

Roger's description of the lack of norm setting by this team should not be taken to mean that he did not see the value in setting norms. He did. His description of what happened within the team and the attitudes that pervaded the team are more a criticism of ignoring the positive role norm setting could play than an opinion that norm setting is useless. Regarding setting norms, Gerald was blunt in an interview saying,

> I don't even know what establishing norms is, right? Is it going to be one of those educational jargon words that I intentional avoid without knowing the definitions of? We, we work well enough together where I think that those tools to make meetings run are unnecessary and, in fact, we would subvert them as often as use them.

To Gerald, norms were not necessary for the English 2 group. He says, "We also know each other so well enough and respect each other enough that we can get away with that because

we also know that when it comes down to it and we need to get to something, we can get to it." Given Gerald's reputation for having deep content knowledge and his experience with being the department head, his opinion on this issue held greater weight than the opinion of the other teachers. His rejection of norm setting and his characterization of norm setting as some made up educational idea had consequences for the team. Without explicit norms that could have ensured equal participation and respectful disagreement, notably between Roger and Gerald, the influence that Gerald leveraged, especially, remained largely intact as an influential characteristic of English 2's collaborative efforts. At no point during my observations of the team or in my interviews with each one of them did they describe an instance where one of them pushed to set norms or pushed to establish a shared commitment to PBL redesign. Furthermore, when shown a video clip of the team engaging in debate to resolve an issue regarding a culminating assessment during a stimulated interview, each teacher described this kind of interaction as typical for the team.

For this team, the norms they worked under were those that existed within the larger department where Gerald, and to a lesser extent Daniel, largely dominated discussions regarding departmental policy. One example of such departmental "policy" is best summed up by Gerald during an interview when he said, "We're going to throw a dress on this pig and make her look all PBL. We're going to put a project on the end of it. People go, 'Oh, that's PBL right? Project-based learning?' Yeah. That's what it is. Um, and in the process we'll try and sneak in some of the actual education, some of the actual problem solving that we've always done."

Claim 2: The English 2 team rarely shared teaching artifacts or tools.

For a number of different reasons, including the failure to order and receive books until later in the year and an inability to resolve philosophical differences among teachers, the English

2 team spent their design year planning, but not implementing newly redesigned curriculum. Their decision to prioritize the planning and forego implementation meant they had fewer opportunities to share common documents and artifacts from their classrooms.

English 2 design team observation data show that out of the 12 meetings I observed, only 2 meetings evidenced conversation between teachers that was grounded in a document, tool, or artifact. During one of those meetings, teachers used a whiteboard to brainstorm ideas for how they would design the scope and sequence of the redesigned year. During the other meeting, Gerald shared a reading log he had developed and Daniel and Roger made suggestions for how it could be improved. Both the brainstorming on the whiteboard and the discussion focused on the reading log were lively and engaged but were rare within the team.

Table 12 below illustrates the meetings (x axis) in which I observed (x axis) teachers sharing documents, tools, teacher or student artifacts (y axis) with the group.

Table 14.

Instances of "sharing" in English 2 design team meetings												
Topics	**9/8**	**9/22**	**10/6**	**10/27**	**11/3**	**11/17**	**1/6**	**1/13**	**1/27**	**2/3**	**2/10**	**3/2**
Scope and sequence											**Y**	
Reading journal										**X**		

Key:
Y = Sharing that did not lead to joint work
X = Sharing that led to joint work

The following is the instance where Gerald shares his draft of the reading log for the unit they are planning and he asks for feedback from the team for what should be changed. This conversation is between Roger and Gerald and evidences an instance of joint work between

teachers. Typically, when teachers work to revise or adapt a handout, the conversation tended to be more technical than pedagogical. However, as we will see in this instance, the reading journal handout propels the team into conversations about rigor and the extent to which the material asks students to make connections between the text and their personal lives. In the text of this interaction, marked turns are bolded and references to team identity through the use of "we" is bolded and underlined.

(1)Gerald:	**Okay**, so the reading journal they are keeping for Unaccustomed Earth. **<u>We</u>** had talked about using the reading strategies, questioning, predicting, connecting, all of those things, right?
Roger:	**I think** if, if they're making, if they're writing questions, making predictions, if they're connecting to some sort of aspect of their life or something that is imprinted already on their brain, and then reflecting on the bottom…
Gerald:	**Yes, so yes**//
(10)Roger:	**I think that sounds fine**.
Gerald:	**So** I was thinking of, so on this side you have question, on this side you have the question so along those lines. Um, and then, reflecting at the end. How do we want to handle the requirements? Is there a number of connections? Is there a length of the number of pages they write on it?
Roger:	**I think** they do that every page. And then we just have to figure out how many pages of reading or a page of notes//
Gerald:	**Right**//
Roger:	How many pages of reading equals a note? Is that kind of what you were thinking? Or, am I off?
(21)Gerald:	I was just thinking for grading purposes you have at least six entries//
Roger:	Oh, **yeah**.
Gerald:	**Or** you have to—I mean we could do it by pages but that would//
Roger:	It's going to and if they're choosing their own//
Gerald:	**And** that, that the other thing. I mean ultimately//
Roger:	**Or** what, what we're holding them accountable for is "Did you engage the reading in a//
(30)Gerald:	**Right**.

Roger:	In a fully functional way. At least this many times.
Gerald:	**Right**.
Roger:	**Right**? Um…
(34)Gerald:	**You know**, one of those things. It's a balance between being onerous and it being rigorous. Um, and then of course, is it authentic-- (sigh) But then, you know, I don't think we can get sidetracked by everything they have to do has to be authentic because sometimes you've just got to do it.

This interaction between Roger and Gerald is the closest example of joint work I recorded from their design team meetings. During this interaction, Daniel appeared to be passively listening to the exchange while he was working on paperwork the group had to submit to the district curriculum coordinator. He engaged in the discussion at some points, just not during this specific interaction. Given the tension that existed within the team between Gerald and Roger throughout the year, it is surprising and ironic that this instance best evidenced joint work.

In this instance they marked their discursive turns with language consistent with validation and elaboration (bolded) and the way referred to themselves as team (bolded and underlined) using the pronoun "we."

Gerald and Roger's interaction is marked by discourse consistent with validation ("right," "you know," "yeah") qualification ("I think," "or") and elaboration ("and") (Schiffrin, 1984). When teachers mark their turns using these discourse markers, they signal to each other that they support the direction of the conversation. When consistently used in interactions such as these, even if it only lasts for a couple of minutes, discourse markers consistent with validation, qualification, and elaboration can create a shared responsibility for the work of teaching, or at least for improving this specific tool, and propel teachers into a space of creative problem solving whereby joint work is possible. In addition, the use of the pronoun "we" (line 2) signals

that Gerald saw he and his colleagues as a team, despite recurring pedagogical disagreements with members of the team.

It is important to note that the other instance of sharing I observed was of a different kind than the instance evidenced above. The instance documented on 2/3, referenced in Table 12, was a conversation focused on work teachers did on a whiteboard and was not instigated by a shared tool, document, or artifact and the conversation was much more conceptual and philosophical than practical. It is also important to note that the instance evidenced above represents a relatively low risk task for all three teachers involved. Reading journals, although important, by themselves do not impact the overall pedagogical trajectory of the course. Although they have contrary pedagogical beliefs, a reading journal represents a teaching tool on which Roger and Gerald could collaborate without the risk of rehashing disagreements about the value or effectiveness of PBL.

Claim 3: The English 2 team primarily leveraged debate to make curricular decisions.

The English 2 design team leveraged debate as a primary collaborative practice. As Parker (2003) writes, "Debate is another way for groups to make decisions without the benefit of discussion" (p. 81). Interactions are marked by debates when participants come to the conversation with the intent to preserve established personal beliefs and values. In this design group, teachers' beliefs shifted little. In keeping with debate practices, many conversations featured teachers arguing from relatively closed perspectives in an effort to preserve practices and beliefs they personally established in their classrooms over time. Teachers from both sides of the PBL spectrum entered conversations and discussions from fairly fixed perspectives. Teachers usually leveraged debate when they discussed issues of pedagogical significance. Although they universally claimed to learn something from the collaborative redesign process,

they shifted little in the roles they assumed and the influence they wielded. Contrary to the collaborative culture established in other teams, the data on this team show teachers using the design team collaborative space as a forum to further entrench and preserve their practices, roles, status, and beliefs, rather than a place where those elements could be transformed.

In many ways, negotiations are dangerous terrain for teachers to tread who have an investment in status quo teaching. Contrary to the win or lose dynamic of a debate, where teachers can leverage their status and roles to win the pedagogically important arguments, negotiations necessitate more rational, data-driven discussions and decisions. In negotiations, all parties have to be willing to lose something to reach a compromise. To those teachers fully invested in not changing, for whatever reason, the use of negotiation to make curricular decisions represents a slow erosion of their the status afforded their knowledge and practice.

The following interaction among teachers on the English 2 team shows them engaged in a debate about how to structure an assessment. In it, Daniel argued for a multi-tiered structure to the end of unit assessment whereby students write an analysis of a text and then create a product that shows they know how to apply their knowledge. Gerald responded to Daniel's argument by claiming that the project part of the assessment is not something students will be asked to do in college and thus, it should be cut from their plans. The interaction starts with Daniel attempting to forge a compromise between Gerald's desire to make the essay the summative assessment for the unit and Roger's desire to make a student project the summative assessment for the unit. Discourse markers are bolded in the text below.

(1)Daniel:	If there's no, okay. So that's step one. Prove to me that you can see a pattern. Then step two is, now put together a proposal for how you would use-- you, you chose shadow, I want you to now prove to me that you know enough about shadow--
Roger:	**Right.**

Daniel:	To be able to use it yourself.
Roger:	**Yes, yes, yes.**
(9)Daniel:	So, step two is put together a proposal of like what all the different meanings of shadow are and then propose to me what you think you, you're, your-- what the *meaning* of shadow would be in your final thing.
Roger:	**Mhmm.**
Daniel:	Then you do your final thing and I'll use the first two to basically look at the idea of like, when I read your graphic novel or saw your film, whatever the fuck it was that you did//
Roger:	**Yeah, yeah--**
Daniel:	Did I see you using shadow and would shadow mean that to me? Would I be able to get there?
(21)Roger:	**Ah,** and that's kind of how you create the rubric.
Daniel:	**Yeah.**
Roger:	**So** you would actually as a teacher create the rubric, sort of based off their initial proposal, which I think is very, you know, student voicey, in that regard, as long as it hit. You would give out some parameters, as well obviously--
Daniel:	**Right.**
(29)Roger:	**But** they, they're not, you know, talking about something irrelevant//

While Gerald listens, Daniel attempts to start a negotiation to find a middle ground between established content (literary analysis) and PBL content (graphic novel as content) and thus, between what Gerald wants and what Roger wants out of the unit under discussion. Roger's turns, marked by language of validation such as "Right," "Yes," "Mhmm," signal his support of Daniel's proposal. The negotiation between Daniel and Roger also includes student and teacher co-constructed rubrics to grade various parts of the project.

(31)Gerald:	**So, here's my one concern.** Is doing that creative final step, right, doing their own graphic novel or whatever//
Roger:	**Or whatever, yeah, yeah**//
Gerald:	It doesn't have to be (inaudible), something that they would *have* to able to do to survive freshmen year in college? (Wagging a pencil, ends question with pounding on table.)

Gerald enters the conversation at this point to question the legitimacy of using graphic novels as assessment by asserting the standard of college preparatory to the idea. Gerald's turn signals his disagreement with Daniel's proposal. Gerald's choice to frontload his turn with the phrase "So here's my one concern," (line 31) sends a clear signal to Daniel that he has concerns about his proposal. This marks the point at which the interaction becomes a debate.

In some ways, Gerald's concern is legitimate and one that educators are encouraged to ask of any task or activity. However, in this case it seems more likely that Gerald attempted to co-opt the rhetoric of college prep as a standard to preserve elements of the curriculum, namely literary analysis, that fall within his expertise.

(36)Roger:	**I think** the thinking process is.
Daniel:	**And** it also depends on what you say//
Gerald:	The first two steps, absolutely strike me as// (Wagging a pencil.)
Roger:	**Well** I, I see it as an abstract thinking.
(41)Gerald:	**Yes, see but see we're the English teachers.** In a freshmen college English. (Talking directed at teacher 1 while wagging/tapping a pencil on the table.)
Daniel:	**It depends** on whether film analysis is part of their freshman college English.
Roger: listening.)	Well I'll see// (Talking but other two teachers not
Gerald:	**No it doesn't**.
Roger:	**Well I see it as** an add-on more than a taking away of something. (Talking but other two teachers not listening.)
(50)Gerald: film.	You can do film analysis without creating your own
Daniel:	**I, I mean, (long pause) okay. You could do English class**-- I mean you could get a degree in English without ever reading a novel. You know if you, you take the course, the track where you go//
Gerald:	**But** would you be, but, but I mean, would you consider a kid you hadn't been given a, written a graphic novel or made a film, uh, insufficiently prepared for freshmen English? If you did, if you haven't read a novel are you insufficiently prepared for freshmen English?

(60)Daniel: Uh...(long pause) **Well okay**, so, two separate questions. So, if you haven't read a novel, are you insufficiently prepared for freshmen English? I, I mean--

Gerald: Yes. Yes. ***No one*** **gets to say** ***no*** **to that answer.**

The discursive moves here are important to note. Despite Daniel's efforts to start a negotiation of content where a middle ground is realized, Gerald moves to control the conversation by using non-compromising language such as "No, it doesn't," (line 47) in reply to one of Daniel's claims and "But" to set up his closed question. Getting wrapped up in an animated discussion, both Gerald and Daniel ignore Roger and his support of Daniel's proposal. In addition, by using rhetorical questions such as "If you haven't read a novel are you sufficiently prepared freshman [college] English?" (lines 57-59) Gerald's intent is to win the argument through rhetorical and logical flourish than to genuinely negotiate a middle ground. Although somewhat unconscious, Gerald's discursive style as evidenced in this interaction, saturated the discussions of the design team and routinely established interactions of debate as the way in which curricular and content questions would be answered and decided.

Gerald's concluding assertion, that no one gets to say no to the question that students should read a novel before they graduate from high school serves multiple purposes: 1) he re-asserts his influence within the group to insist on content that falls within his expertise as a teacher, 2) he forcefully ends the conversation by using absolutist language of "no one" and "no," 3) he subverts the efforts of his colleagues to move the curriculum in the direction of PBL pedagogy and, in doing so, attempts to invalidate PBL pedagogy as well.

Even though teachers' conversations made occasional forays into negotiation, especially when the topic was of small consequence, the choice to use debate as the primary tool for decision-making created animosity among design team teachers. Instead of resulting in evidence-based decisions, debate routinely alienated Roger, whose arguments were not generally

taken seriously. About discussions in design team meetings, Roger says "the people [he's] having the discussion with seemingly couldn't disagree with [him] more on issues of content" resulting in debates where it's "two against one." His perspective of what happened in his design team was evidenced notably in one example where Roger got up to grab an example of a high-level student project and Gerald mumbled to Daniel after Roger left the room that "he *knows* what a student project looks like," implying that seeing one is a waste of his time. Such instances, where Roger attempted to leverage his expertise in futility or where he was ignored in the course of an animated discussion, are common in the data. Over time, such interactions poison the collaborative effort between teachers as the process became primarily focused on winning arguments and decisions and not on creating transformative curriculum. Consequentially, teachers' use of debate typically further cemented their roles, status, and pedagogical beliefs.

This excerpt is an example of how this design team used debate as a preferred method of collaborative decision making when integral issues of pedagogy and instruction were in play. It also evidences the tension in the design team between those hoping to use the collaborative space to further institutionalize established practice and pedagogy and those hoping to use the collaborative space to move the content and curriculum closer to PBL practice. Finally, this example is indicative of how teachers' roles, status, and beliefs were further concretized when issues of deep pedagogical import were discussed.

Conclusion. For a number of reasons, the English 2 team struggled to establish and maintain productive collaborative routines. They did not establish a shared commitment to PBL curriculum redesign. The norms they used to govern their collaborative work were simply those that existed within the English department. Meaning, Gerald, his informal leadership and

influence, and the pedagogical perspective he brought to the work were concentrated and accentuated within the team whereas Roger, his relative lack of influence, and the pedagogical perspective he brought to the work were deemphasized and disempowered. The use of debate to make decisions within the team furthered this dynamic. This ever-present tension within the team made it difficult for them to make any progress towards PBL curriculum redesign and solidified the positions and roles each teacher had throughout the year.

This dynamic seemed to negatively impact the extent to which teachers learned from the collaborative experience. This was especially true for Roger, who described "com[ing] away feeling constrained and frustrated almost everyday after the PBL design group" to the extent that most days he would "just go home and make it PBL" by himself. Interviews with Gerald and Daniel evidenced that both teachers enjoyed working collaboratively with the team but neither teacher could point to anything specific they had learned from the design team experience.

By the end of the year, the English 2 team designed 1 unit of study that approached PBL. That 1 unit of study represented four weeks of instruction in the school year. Based on my observations of this team, the data suggest the amount of curriculum they designed was impacted by their inability to address chronic philosophical and pedagogical disagreements between teachers as to the overall effectiveness of PBL curriculum, especially in the context of English coursework.

Social Studies 1

Context. The Social Studies 1 team consisted of five Social Studies teachers of various levels of teaching experience and expertise regarding the content they were to teach in this specific class. In addition, in Fall of 2011, one of the teachers on the team was new to the school but was recruited to come to Cielo Vista to help design and teach the Social Studies 1 course.

The year before, three of the teachers on the team were given a half-year, common planning period to jumpstart the course design process. Interviews with these three teachers show that in that time, teachers primarily had conversations trying to make sense of the task on hand and not really designing curriculum. In addition, at the time the Social Studies 1 team started designing the course, they benefitted from PBL expertise within the department. Two teachers in the Social Studies department had spent years developing a PBL course in collaboration with teachers from other schools and with university researchers.

I observed the Social Studies 1 team 12 times throughout the 2011-2012 school year. Most of the time I observed the Social Studies 1 team during a block day when the team would meet for 90 minutes. Table 15 illustrates the extent to which I participated in conversations within the design teams I observed.

Table 15

Researcher Participation: Social Studies 1	
Meeting date	**Researcher participation**
9.15.11	Participated in conversation about how to conceptualize PBL planning throughout the year.
9.22.11	No record of participation.
10.6.11	No record of participation.
10.7.11 (release day)	No record of participation.
10.27.11	Participated in conversation around how I intend to collect data on them throughout the year.
11.3.11	No record of participation.
11.17.11	No record of participation.
1.5.12	No record of participation.
1.12.12	No record of participation.
1.26.12	No record of participation.
2.9.12	Participated in conversation about ways to teach race as a social construct.
3.8.12	No record of participation.

The Social Studies 1 team consisted of the following teachers. At the time of this study, Lucy had approximately 10 years of teaching experience at Cielo Vista. She is also one of the central teacher leaders who manages and coordinates the design and implementation of PBL

throughout the school. Lucy's experience and expertise with PBL is deep. Before she became a teacher leader on the project, she was part of a university study that redesigned government classes according to PBL pedagogy. That work took place approximately 3-4 years before the school was awarded its current federal grant. Bill had approximately 10 years teaching experience at Cielo Vista. Previous to working at Cielo Vista, Bill worked in a district in another state as a history teacher and a reading specialist. Ben also had approximately 10 years teaching experience at Cielo Vista. Ben is also the current Social Studies department head. Nancy had 1 year of teaching experience at Cielo Vista. However, previous to working at the school, Nancy spent a year teaching night classes in a credit retrieval class in a local school district. Lisa had 4 years teaching experience, none of them at Cielo Vista. Previous to being recruited to come to the school to help design and teach the Social Studies 1 course, Lisa had taught at another school in the district for 2 years. She also had experience as a para-educator at a school in a local school district. Lisa was also the content expert on the team. She holds a master degree in the specific social studies content area of the class.

The Social Studies department is highly collaborative. "Highly collaborative" is a phrase that came up again and again in my interviews with teachers. Based on my informal observations of the Social Studies department, teachers typically all ate lunch together and in that time they shared their experiences various classes that day and various struggles they encounter with students. When such topics came up, teachers within the department were supportive and attempted to help whoever is experiencing a problem address it constructively. Many of the Social Studies teachers shared deep personal relationships with each other. However, whereas teachers in other departments leveraged those personal relationships in their professional interactions with each other, the Social Studies department operated on a personal and

professional level. Most of their collaborative work together was highly professional and focused on student needs and student learning. Although there is a department head and although many of the same teachers teach the same classes within the department, there is very little hierarchical order or concentrated status within teachers within the department.

The Social Studies 1 course at Cielo Vista High School is an inclusive, required freshman level Advanced Placement course. It is also a PBL class. The tension between those two competing interests, on the one hand of preparing students to take the AP exam for this course by the end of the year and on the other to design the course according to PBL principles, existed in every meeting I attended.

Findings. Data from the Social Studies 1 team evidence a team that approached the curriculum design work with a shared commitment to making the course reflect a PBL approach. They established explicit norms early in their design year to govern how they would work together as a team. In addition, they shared artifacts of their curriculum implementation often. Most times, those instances of "sharing" developed into rich discussions characteristic of "joint work" (Little, 1990). Interview data with Social Studies 1 teachers suggest that routines such as "sharing" and the rich discussions that developed from that "sharing" had as much to do with the culture that existed within the Social Studies department as it did with the relationships among the teachers on this specific team.

Claim 1: The Social Studies 1 team reinforced their shared commitments to the work and developed collaborative norms to govern their work throughout the year.

Teachers in the Social Studies 1 team never established a shared commitment to the work of PBL redesign because they each approached the work of curriculum design for this class with the assumption that it would be a PBL class. Interviews with each teacher in the team are rife

with descriptions of how, at the beginning of their design team work, teachers worked to figure out “What is a PBL class and how is that different from a traditional class and how do you begin to plan for a PBL class and how is that different than planning for a traditional class?” Another teacher talked about how the team approached the planning of the course from a “PBL style,” meaning they look at the suggested units from the College Board and asked “how can we make this PBL?” This question recalled by one of the teachers on the team evidences an assumption, held by other members on the team, that PBL was a worthy goal. Design team observational data supports these data as well. There was no design team meeting I attended where teachers had philosophical conversations or debate about whether PBL was a valid pedagogy in general or for the course they were planning specifically.

Based on what the teachers shared in interviews, it is difficult to discern the level of PBL knowledge they had individually and as a team. One of the teachers originally on the team, but who later could not attend design team meetings, at the time had approximately 3-4 years experience with teaching and planning PBL curriculum. But it is important to note that her experience was in a different context where PBL may have been conceptualized differently. For example, her experience was largely in project, not problem based learning. Although valuable and relevant in its own way for the way this team approached the planning process, her knowledge and experience may not have aligned closely enough with the goals of this specific course to make her an expert. It is also important to note that this design team was one of the first teams to design a course in the PBL initiative. As such, they were not privy to the more sophisticated definitions and descriptions of PBL that developed within the school over the past 2-3 years. The vagueness by which they speak about PBL largely reflects the tools and

knowledge they had at their disposal. Since then, several of these teachers have become in-house experts on various dimensions of PBL pedagogy.

In early October 2011, the Social Studies 1 team received a full release day from the school to meet to do such things as establish norms of interaction and to begin brainstorming scope and sequence for the year. Video from this meeting shows posters hanging from the walls on the Key Elements, ideas for unit plans, etc. The team spent roughly two hours talking about everything from how they think they should sit during meetings to how they as individuals process ideas and information best. The following excerpt shows how teachers navigated the beginning of the norm setting process. One of the teachers started talking about how and why she prefers for the group to sit in a circle when they are meeting.

Lisa:	I have actually graded students before on what I would call positive group formation. That's how I start my collaborative work, or what I call my social skills workshops. And it's something I've noticed we don't do well and I think it's because I'm spatial. Like in my home, everything has to be neat. Like if my partner puts the wrong coffee cup back-- Like, there are places for the coffee cups and that one doesn't go there. Especially since there are glass doors. So, like, I'm very spatial. (Laughter) And, a little OCD. Um, so, when we meet as a group, like, the fact that Ben and Nancy are so far away, and we aren't in a circle like I want//
Ben:	You want me closer to Nancy?
Lisa:	I want you to be closer to us as a group. I don't like it when, to use Ben's words, there are outliers. So the one thing I have noticed we tend to do when we are meeting in Bill's classroom is, sometimes it's a cluster of two of us and then two of us are over here (showing with her hands) and then sometimes Bill is at his desk. I think sometimes when we are going through a lesson it makes sense to have someone up there, showing a PowerPoint and I don't have a problem with people moving around. But I just feel, emotionally I feel better when we're in a circle. And

so one way I would resolve that would be to, when I walk into the room and then we can put it all back, just making a circle and try-- And I understand that maybe some people have needs and we can move to other places but I think that when our shoulders face one another-- Why not model what we would want for our students?

[Nancy gets up and moves from one end of the table to be closer to the other teachers in the group]

Lisa continues: Oh, see, I'm feeling better already. (Laughter)

Nancy: I just dropped all my stuff there…

Lisa: Well and I don't know if it's an issue for anyone else that is just something for me that I feel like I would-- When things are disparate, um… When students are disparate I'm like, hey, look like a group here.

Bill: It's hard to feel like you're an equal member of a group-- It's the whole campfire thing, right? If you sit in a circle at a campfire, everyone gets the same warmth. But if you are sitting in a, even in, like if you're sitting at a meeting table and somebody's all the way at the end and somebody's all the way at the end, there, at a campfire, those people would be cold.//

Lisa: Yeah.

Bill: And those people would probably feel left out.

Lisa: And I feel like I don't hear those people's voices as loudly as when they're on the, like, I don't want the fringes to have developed because-- I don't know why they have. But I'm not getting to hear those people as equally is maybe because they are not as part of the warmth so this would just be something that would make me be like, okay, this is what I want my students to look like. So good. Right now I automatically feel better. [Teachers have moved seats to sit in a better circle. Two teachers moved from where they were originally sitting.] So, that's mine.

Bill: I think that's a decent thing for us to do.

Lisa: Other people?

Lucy: I just want to echo that because although that's not something I think about very often, I tend to be the last one to arrive in our meetings because I teach so far away. And I feel like when I come in, usually the four desks are taken so I feel like I have to sit at another table. And then you have all of your other work stacked up on it so I feel like I'm in Siberia a bit. But not like-- I don't feel like it's intentional but

	I do feel like when it happens that I don't feel like part of the action.
Ben:	So if we're meeting and you're not there yet, and then you come in, we just like-- Who is it we add a desk for? Is it like Isaiah? Maybe not Isaiah. Who is it? There's a chair for, in Passover//
Bill:	Oh.
Ben:	Right? Anyway, there's an empty chair for people who may be arriving. But that idea of, that person, because it's also like that person is a part of our community, even when they don't show up.
Lisa:	Yeah.

In this instance, the specific discursive turns between teachers are not as important as the content of their conversation. Of note are the metaphors they use to substantiate the importance of something as small as the way they should sit when they come into the room to meet. Metaphors like the "campfire" and the tradition of leaving a chair open at Passover convey deep symbolism of community. Through these metaphors, teacher communicate to each other that the exercise of norm setting is important because norms are one way teachers can establish community and membership among teachers in the group.

The norms the team set in the interaction above, such as sitting in a circle and accommodating people who would arrive late to the meeting, were consistent with what I observed throughout the time I spent with this team. This interaction is just one example of how this team not just established, but actively worked to sustain norms throughout the year that would help them work better. These and other norms provided the team with a professional context in which to solve any disagreements that came up in their design work.

Claim 2: The Social Studies 1 team established "sharing" as a collaborative routine that typically evolved into "joint work."

Data collected on the Social Studies 1 team show out of the 11 design team meetings observed, all of them evidenced teachers sharing various documents, tools, and teaching artifacts.

Some meetings evidenced several instances where teachers shared materials. Sharing was an established routine within the group. Out of the 12 instances of sharing over that time, 11 of those instances evidenced collaboration indicative of joint work (Little, 1990).

Table 16 below illustrates the meetings in which I observed teachers sharing documents, tools, teacher or student artifacts (y axis) with the group.

Table 16.

Instances of "sharing" in Social Studies 1 design team meetings											
Topics	**9/15**	**9/22**	**10/6**	**10/27**	**11/3**	**11/17**	**1/5**	**1/12**	**1/26**	**2/9**	**3/8**
PowerPoint lesson plan for the day	**X**			**X**			**X**		**X**		
Student survey		**X**									
Developing a student classroom task or activity			**X**		**X**		**X**				
Developing a student assessment and/or rubric for the assessment				**X**		**X**		**X**			
Teachers discuss various subject matter content										**Y**	

Key:
Y = Sharing that did not lead to joint work
X = Sharing that led to joint work

Table 13 evidences a design team who routinely shared materials, documents, and tools with each other and who spent time deliberating around what was shared. Shared items were not just accepted by each teacher and then adapted to suit the needs of each teacher. Many times sharing sparked prolonged conversations where teachers would discuss not just the pros and cons of the specific item, but how that item fit into their pedagogical approach to the course as a whole. Out of all of the design teams studied over three years of data collection, the Social Studies 1 team evidenced the most productive levels of collaboration. During an especially lively

design team meeting, teachers worked to develop a rubric for grading student presentations. They discussed what topics they wanted to cover in the FRQ section of the exam they were preparing for students, and they worked to problem solve ways they could help students create a map using the GIS technology to use in their presentations.

The following instance is an example of collaboration within the Social Studies 1 team consistent with characteristics of "joint work" (Little, 1990). It illustrates how the Social Studies 1 teachers problem solved how they were going to help students address the needs of redistricting the school district attendance lines as stipulated by an external expert, who students would be presenting to as part of their final assessment for the unit. The external expert suggested that students consider how to redraw the elementary, middle school, and high school attendance lines; a suggestion one of the teachers describes as complex and difficult.

(1)Bill:	You don't think **we** should mess around with the elementary schools?
Lisa:	**I think we could**. I think it would get way too complex. Because that's my initial…that's my thing too, are **we** going to divide up middle school lines? At that point it gets tricky.
Ben:	**I think we could give** them the data and if they want to use it, they could, but not expect them to use it. Because I think it's really important//
(9)Lisa:	**I think it's really important**, and I think it's really complicated to put together a presentation and make these maps in 2-3 days. Even though I feel like **we've** helped them up to this point, adding that is a whole 'nother layer of brain teaser for, unless you're really high.
Ben:	**Yeah**. **I mean** it's complex for a really high kid.
Lisa:	**It boggles my mind**. It's like, when I was trying to figure out the math for all of that, because I was looking at that, how do we account for this. Um, I was left thinking, holy s--t.
Ben:	He asks, **I mean** his (external expert) questions are different from what we would ask. He asks for patterns, patterns of enrollment//

(21)Lisa: He has a myopic bias. That's why.
Ben: How does the enrollment growth impact that? That we could see. School building capacity, special program placement, feeder school enrollment (inaudible). So, really **we're** saying, we can't. That's going to be tough//

At this point in the conversation, teachers were making sense of the scope of the problem of having students consider all levels of schooling when thinking about how to redraw the district attendance boundaries. The content expert in the group described how overwhelming that task would be for anyone, let alone freshmen students saying, "I think it's really complicated to put together a presentation and make these maps in 2-3 days" (line 9-10). Below, the conversation turned on the suggestion that teachers rethink how they structure collaborative teams to achieve the goals set forth by the external expert. By framing the suggestion as "one option," (line 26) this teacher creates space for other teachers to challenge or qualify her idea.

(26)Lucy: **One option we could also pursue**, depending on how many groups we have is, we could, instead of each group going out and doing their own math, we could potentially put the groups together in triads. **So maybe** one group is looking at elementary-- one group is responsible for elementary, one group is responsible for middle school, one group is responsible for high school, instead of just having one group plan for all three and account for all the imbalances. We could make a plan. Go make our maps. And what we'd be looking for in the blocks and charts (inaudible). So we'd have three kind of linked presentations//
(37)Lisa: Here's what it looks like on the high school level and why. Here are the deciding factors for all//
Lucy: For all of us.
Lisa: This mega group//
Lucy: **Right**. **And** then **we'd** have three lead presenters in each group and do that part. **And** then you'd have someone who comes up and shows what it does to the elementary school, someone comes up and shows in the middle school, here's how it happens in the high school. The three lead presenters come back and

do the wrap up. So, you'd have three different ways to differentiate between the three levels. Your strong kid can do that because they're going to want to be lead presenter but that means that they (inaudible). They're going to talk about the overall and then wrap up.

(51)Lisa: **Do you think** they will have as much buy in-- **What I, I really like**, that would be nice. And then cover more of what J wants. **What I'm wondering is**, will there be enough buy in for the kids who are doing middle school and elementary? Like, if you say, alright, you guys are doing the elementary feeder school part, I can see some of my kids say, well, I wanted to do high school. Because I have been thinking of high school this whole time as the challenge.

(59)Nancy: **Yeah, me too**.

Lucy: **Well <u>we</u> can, <u>we</u> can, well, one way <u>we</u> can do it is <u>we</u>** can say it doesn't matter what problem you are being asked to solve. Your client has asked for feeder schools to be taken into account. Is that something that we as a class feel that we can problem solve a way to make that happen. **And** I think that kids will come up with a similar idea. I think you have the kids that want to do high school, from my class I have kids who don't live in the district so they don't really care about the feeder elementary and middle schools, and then there are some who have siblings who get to go to Pacific Middle School and who still care about that. I think there are some kids who still care about that because they're freshmen.

(72)Lisa: **I think the middle school buy in will still totally be there** because I think they're still there. And that's the advantage of having these students be 9th graders.

Lucy: **Right**.

After the "One option" (line 26) comment, teachers try and work through problems of arranging students in groups, assigning tasks to those groups, and trying to make the task, in general, more relevant to students. In this chunk of text, teachers use turns like "And" (line 41, 42, 64), "Do you think" (line 51), "I really like" (52), and "What I'm wondering" (line 53) consistent with elaboration, validation, and active problem solving. Such turns not only add

momentum to the discussion, it creates a safe place for teachers to share ideas and propose possible solutions.

This instance is typical of how the Social Studies 1 team worked throughout the year. The conversation is marked by language of validation, qualification, and elaboration and there is strong use of the pronoun "we" that evidences the extent to which these teachers see themselves as a team and not as a group of individuals. Their discourse is marked by language consistent with negotiation and deliberation such as "I think," "And," "Right," and "Maybe." Their discourse creates a kind of creative problem solving snowball effect on the discussion in that encourages others to interject with ideas and elaborate upon what teachers are already discussing. As with other groups, the use of "we" here is important. In the Social Studies 1 team it connotes a shared investment, team identity, and commitment to the work.

The interview data from each teacher on this team is rife with references to "we" when talking about how they see themselves as a design team, a department, and how they thought about and planned the Social Studies 1 curriculum. Bill describes how the team spent the previous semester "trying to define what Social Studies 1 means as a course and…what is a PBL class and how is that different from a traditional class and how do you begin to plan for [that]." In my interview with her, Nancy described how the department "collaborates a lot" and how "at lunch we [they] talk about how we [they] can work together better as a department." In this group, there was a sense of accountability and responsibility present in the "we" that seems to be an extension of the culture of the department. "I've never been in a department," stated Mackenzie, "that talks so much about history and cares so much about the lessons."

Claim 3: The Social Studies 1 team primarily leveraged deliberation to make curricular decisions.

The instance above shows teachers primarily validating, qualifying, and elaborating on each other's ideas. Their interaction is marked by discursive turns such as "and," "right," "maybe," and "I think," all of which are indicative of a team engaged in creative problem solving and deliberation. Deliberation is a decision making process whereby people work towards new solutions to problems they encounter (Parker, 2004; Gastil and Black, 2007). No one person owns the solution. It can only be arrived out when various team members listen to the ideas of others and make suggestions and qualifications that push whatever idea the team is currently focused. Each teacher is positioned as someone who has valuable contributions to make in the decision making process. This is the kind of pattern I would expect to see from a group of people who are immersed in creative problem solving. This conversation is representative of many conversations I observed between teachers on the Social Studies 1 team throughout the year. Teachers validated each other's ideas but did not hesitate to qualify those ideas with suggestions to make them more workable in the given context.

Much like with the English 2 group, the Social Studies 1 group also carried over established ways of working together from what had existed within the department. As I stated above, informal observations of how the Social Studies department worked together evidenced similar patterns of interaction among teachers. It is entirely possible that Social Studies 1's deliberative approach to solving problems was informed by how the department solved problems over time. That transplanted culture, in addition to the shared commitment to the work, and the constant attention given to the norms that governed their work provided the team with a clear framework to apply to problems of practice and any differences of opinions regarding content or curriculum that might arise.

An important part of the departmental culture that is also evident in this design team's data is the lack of any explicit departmental hierarchy between teachers. Teachers deferred to each other within the team and were careful to provide ample space for everyone to participate, despite the fact that one of the team members was considered, far and away, the content expert for this specific course. Before final decisions were confirmed, it was not uncommon to hear a teacher ask the other teachers, "Can we all live with this?" or "Anything else we need to consider here?"

Conclusion. For a number of reasons, the Social Studies 1 team established and sustained productive collaborative routines throughout their design year. Each teacher approached the task intending to design the course according to PBL principles. They set norms at the beginning of their design year intended to stem any interpersonal issues that might arise in the process of designing curriculum. Explicitly set and agreed to by all teacher sin the group, these norms set the foundation for how the team would deal with differing opinions and beliefs as they set about their work. The team routinely used deliberation as a way to make decisions and creatively address problems that arose in the process of designing curriculum. The combination of these factors created a design team culture that made the complex, complicated, and even contentious work of curriculum design manageable throughout the year.

To some degree, the Social Studies 1 group benefitted from designing course that had not existed before at the school. Because they had to start from scratch, everything they planned was something new. This important factor, combined with their deeply collaborative culture, their decision to commonly implement the curriculum they had planned, and their universal acceptance of PBL created a design team environment fertile for teacher learning. Teachers

could not help but learn from each other as they shared handouts or tools they had developed for common use and problem solved issues one of them noticed as they implemented.

By the end of the year, the Social Studies 1 team had an almost complete scope and sequence of PBL units for the following year. As the year went on, they established cycles of planning and implementation that helped them design all the units they taught throughout the year. Like other teams in this study, the students in the Social Studies 1 class take an end of course high stakes exam. It should also be noted that the Social Studies 1 team spent time collaborating over the summer and into the next year refining, changing, and redesigning the curriculum as they went.

Math 2

Context. The Math 2 team consisted of three teachers with varied levels of teaching experience and areas of expertise. Matt is a white male, experienced Cielo Vista Math teacher who, at the time, had nine years teaching experience at the school. In that time he taught every math class taught at the school with the exception of the Differential Equations class that students take after they have completed AP Calculus BC. Charlotte is a white female novice teacher who, at the time, had been teaching at Cielo Vista for 2 years. For the first couple of years after college, she worked as an engineer on the East Coast and in the Pacific Northwest. She taught the Engineering class at Cielo Vista in which she deployed various PBL strategies. When working on the Math 2 team, Dianne was also in her first year teaching. Dianne is a white female who was fresh out of her teacher education program at a local university.

The data I present from this design team for this study consists of p design team meetings I observed between 1/14/13 and 2/8/13. Besides small talk at the beginning and end of meetings, I did not participate in design team meetings I observed during this time.

Each teacher came to the Math 2 team with deep content knowledge, but Matt's experience teaching almost all the math curriculum at the school meant that Charlotte and Dianne looked to him for advice on a number of different logistical issues that came up throughout the year. However, Matt rarely exerted any leadership within the group. Most of the time Charlotte and Dianne set the agenda and pushed conversations forward.

Findings. The Math 2 team approached their design team work with an openness but not a shared commitment to redesigning curriculum according to PBL curriculum. Their subject matter content and the constraints placed upon them by the district curriculum and the end of course state test weighed heavily on their decision making process. The Math 2 team did not set norms for how they would work together as a group. Both the shared commitment to the work and the norm setting were tacit components of their work. In addition, the Math 2 team established weak routines of sharing with no instances of joint work evidenced in the data. Teachers were observed sharing various resources they found online and the grade distribution of their students in the Math 2 class, for example, but these instances of sharing never reached the depth of collaboration characteristic of joint work. In the following sections I will address each claim individually.

The Math 2 team did not establish a shared commitment to PBL redesign and did not establish norms to govern that work.

Much went unsaid in the Math 2 team. Although the data reveal no explicit agreements or commitments to the task of PBL curriculum redesign, that does not mean that these teachers did not share that belief in common. Design team meeting observations and interview data do not reveal any time when the Math 2 team made explicit statements evidencing they shared a commitment to redesigning the Math 2 curriculum according to PBL principles. However, design

team observations evidence teachers working together to brainstorm challenge cycles, PBL projects, and PBL tasks for students to work within. During one of the design team meeting observation cycles, teachers were in the middle of implementing the “parking lot” challenge whereby students would use their math knowledge to design the new parking lot for the school to fit a certain number of cars.

Interviews with teachers revealed a diversity of views toward PBL as an effective pedagogy to teach math. An interview with Matt, a teacher on the team, evidenced his apprehension to how PBL would work in a math class. He said,

> The way I see it most is that we can come up with a project but it's so inherently mathematically complex, that a student won't be able to get all the pieces and I think we're worried about the fact that we have this end of course exam which has all these specific, small, details. And if we bury that in a big project, it might get lost, somehow. So, I think, both lost and they're not enabled to access the true depth of the project. Like, even with this parking lot thing that we're doing, there's so much that's in there, things like scale and we have to talk about dissimilarity before we talk about similarity and the parallel and perpendicular lines is, feels a bit inauthentic still.

Conversely, interviews with Charlotte, a member of the team, revealed a background with co-teaching PBL units in a middle school in Norway through a teacher exchange and her use of Project Lead the Way in her engineering class to facilitate students’ design and construction of calculator holders for the math department.

In addition, the Math 2 team did not establish any explicit norms to guide their curriculum redesign work. When asked about norm setting, teachers referenced the natural and organic way they work together and what they saw as the contrived process of norm setting. In his interview, Matt described how they,

> Didn't really do that norming process thing at all. I know we got a sheet and all at the stuff and it all felt very social studies so we put that off. To be honest. So-- It just kind of natural, I think Becky and I, having worked together the year before, it was sort of our routine already. So it just, kind of, trickles down from the math culture that we have here.

Charlotte shared some of these same sentiments saying "No" they did not do any explicit norming because their collaborative work together "is very natural." Later in his interview, Matt talked about how, in the previous year, he and Charlotte worked together on a project and so they just assumed previous roles and routines from the previous year. Despite not setting explicit norms for their design team work, the completely novice teacher in the group, Dianne, described how they came together as a team saying,

> We had a meeting during [summer professional development] when we talked, like we were supposed to talk about the PBL units, the design teams, and we talked about our strengths and weaknesses and how we felt like we helped each other in the group and stuff but we never made explicit norms but I think we, I think we made it explicit that we expect it to be a good group work situation. And I think by this point in our lives, even me as a new teacher, like I know what

> that means. Like I know that means that I'm contributing. I know that means I'm listening to their ideas and giving my feedback and being honest and I know that means that other people are going to be honest and giving feedback on my ideas and I need to hear that open-mindedly and I know that means that I'm at every meeting, you know? I don't think we made it explicit but I think it's kind of worked. And I kind of think, like, there were some hesitations about this whole idea of PBL, um, but I think but then that was also followed up with but I really am willing to give this a try and I'm gonna put my full effort into it.

Dianne's description of how the team discussed their design team work before they started working as a design team reinforces what her design team colleagues described. This was a team that was wary of putting forth clear ways they would interact and how PBL would work for their content area. Both the tacit norms and the hesitation regarding PBL continued throughout their design team work.

Perceived constraints to PBL redesign. The Math 2 team saw PBL and the demands of preparing students for the end of course exam and for sticking to the district's curriculum as competing interests as they planned curriculum. Interviews reveal complexity and variability in the way teachers identified specific constraints they felt when planning projects. One of the teachers expressed frustration with the extent to which she felt the district limited what they could plan and do with students. Charlotte says,

> It's, it's limiting in creativity in my view. Like, be creative with PBL, take these kids where they haven't been before, make them think in

> ways they haven't before, but you have to do this [district curriculum/assessments]. And you have to do it in this time and you have to give this test by this date and, you know, it's just like, we have to give district assessments. You have to make sure you cover these, this, this topic and you have to make sure you have to hit these things but, do whatever you want. Do whatever you can, you know, have fun with it! Be creative! Go places! And you know, it's just putting a cap on how creative you can be.

Charlotte pointed to the mixed messages he/she perceived from the school and district. On one hand she heard the school encouraging her to be creative and plan something outside the box for their students. On the other hand this teacher felt pressure from the district to cover content in ways that aligned with how other Geometry teachers in the district were teaching and assessing it.

Other members of the team voiced these and other constraints to the redesign work they were trying to do such as mixed messages from the school and district along with perceived subject matter constraints. Matt's previous comments about how "I think we're worried about the fact that we have this end of course exam which has all these specific, small, details. And if we bury that in a big project, it might get lost, somehow" evidence tensions these teachers faced between planning units focused around authentic problems and what these teachers perceived were the limited capacity of students to solve those problems in ways consistent with how professions might working in the math fields. When complicated with what teachers perceived to be pressure from the district to adhere to the established curriculum and pressure they faced to

prepare students to pass the end of course exam, there seemed little room left for out-of-the-box thinking and creative course redesign.

The Math 2 team rarely shared teaching documents and tools.

Data collected on the Math 2 team show that out of the 9 design team meetings observed while they were planning the Habitat for Humanity floor plan unit, only 2 evidenced sharing between teachers and none of the instances of sharing developed into collaboration characteristic of joint work. Table 17 illustrates this finding.

Table 17.

Instances of "sharing" in Math 2 design team meetings									
Topics	**1/14**	**1/15**	**1/16**	**1/18**	**1/23**	**1/25**	**1/29**	**1/30**	**2/8**
Looking at student grades for each Math 2 course					**Y**				
Rubric for student project									**Y**

Key:
Y = Sharing that did not lead to joint work
X = Sharing that led to joint work

In both cases of sharing, teachers' discussions were focused around technical aspects of either their students' grades or the rubric they were going to use for the student project. In the case of sharing their students' grade distribution, teachers merely observed the distribution of grades for each other's classes. Even though the patterns in students' grades evidenced large numbers of Ds and Fs, teachers considered these patterns "typical" and thus, they were no cause for concern. In the case of the rubric teachers developed for student presentations, teachers refined the wording around student expectations but they did not delve into what the rubric was asking students to do. This was striking because there was no conversation regarding the rubric

previous to this meeting and this was the ninth meeting I had observed in a row. This is in contrast to the Social Studies 1 team that discussed and deliberated their student presentation rubric in meetings for days leading up to the time they presented it to students. Both the student grade distribution conversation and the student rubric conversation were short, relatively superficial conversations.

The following chunk of data shows how teachers interacted when they discussed the grade distribution for their Math 2 classes. This discussion took place on 1/23 and is represented in Table 15 above. It illustrates how this team shared materials, in the form of grade distributions, with each other but the "sharing" did not develop into "joint work." In this instance, Charlotte starts the conversation because she is concerned with the high number of students who were receiving Ds and Fs in her Math 2 classes.

(1)Charlotte:	My kids have come a long way since the beginning of the year. A long way. Um, can I take a little tangent for a second?
Dianne:	**Okay.**
Charlotte:	Um, my class grade graphs are ridiculous.
Matt:	Class grade graphs? Whoa. Look at that fancy (inaudible)
Charlotte:	Like, my average in second period is 79 percent. **And** I have…9 As, 6 Bs//
(10)Dianne:	Is that Math 2?
Charlotte:	**Yeah.** This is my second period. And I only have 6 Ds and Fs in my second period and the average is 80 percent.
Dianne:	How do you look at that?

[Charlotte spends the next minute or two helping Matt and Dianne find this data for their classes.]

Charlotte:	**So** that's my second period. Third period, which is my low class, averages 72 percent. But I have//
Dianne:	My kids have an average of 73. Is that bad?//
(20)Charlotte:	…12 Ds and Fs in that class. But the average is 72 percent. What? (Turning to Dianne)
Dianne:	Is a 73 percent bad? That's my low class.

Chrolotte: **Actually**, I think average is 70 percent.
Matt: Better get ready to be amazed pretty soon.
Charlotte: **Oh yeah?**
[Teachers spend a minute not talking and looking at their class grades on their computers.]

(28)Charlotte: I have 11 Ds and Fs in sixth period, 12 Ds and Fs in my third period and 6 in my second period…that's huge.
(31)Dianne: Oh, that might have been an old report. Shoot. Do you have to renew it every single time?
Charlotte: **Yup.** It's just like a PDF print, a snapshot.
[More troubleshooting follows this exchange.]

Charlotte: **Yeah,** I have a handful of kids that— (Says to herself) Man, I have 6 kids in 6th period that are failing? Yeah, what are your numbers for actual failing, not just Ds and Fs?
Matt: Around 10.
(40)Charlotte: Fs?
Matt: Oh, Ds and Fs, um…
Charlotte: **No**, actual Ds and Fs.
Dianne: I do not have a bell curve. That's not good.
[No response is given to Dianne's comment by either Matt or Charlotte. More silence follows as teachers look at their grades on their computers.]

(46)Dianne: **Mhmm.** 11 Ds and Fs in this class.
Charlotte: **Yeah,** I have 12 in one class.
Dianne: (Inaudible)
Charlotte: **Yeah,** that's like my 6th period.
Dianne: That's like my seventh period. (Does a thumbs down gesture to Charlotte.) This class is my so hard to manage class. So hard everyday. I try to be so positive and not irritated.
(54)Charlotte: 11 in my sixth period. And I have 12in my third period.
Dianne: So…what do we want to work on now?

Although an instance of "sharing," this instance does not become "joint work." The discourse markers teachers use to mark their turns shows agreement and validation throughout the exchange. However, because the exchange between teachers deals only with sharing the

grade distribution each teacher has, and not *why* the grade distributions might look like they do, the conversation remains a relatively superficial interaction. Also, Matt's lack of participation in this instance is striking. At different times in this discussion (line 1, 21) Charlotte and Becky seem to be asking for either support or reassurance from each other and Matt. As the more experienced teacher, he might have support to offer or an interesting take on the data. Strangely, Matt offers no words of advice nor uses this conversation as an entry point into a larger a larger examination of why students are performing the way they are. Instead, Dianne and Charlotte seem to understand that this conversation is going nowhere and Dianne closes the discussion by asking, "So…what do we want to work on now" (line 56). Matt's most substantial contribution to the discussion comes a couple of minutes after Dianne changes the conversation. He shares his grade distribution and says, "I have a bunch of good students and a bunch of students who…meh…That's always how it is. You get it or you don't. You try and work hard and kind of struggle a little bit, you work hard or you give up." What could have become an engaging and thought-provoking conversation anchored in student data becomes, in part, a conversation that reinforces the disempowering idea that students will always struggle in math. At no point do any of the Math 2 teachers frame the conversation as a problem of practice worthy of group problem solving. This interaction between Math 2 teachers had great potential to become "joint work" to further inform how they think about student success relative to the math instruction they implement, but because they missed the opportunity to ask deeper questions of possible patterns in student grades and how those patterns may or may be relevant to their PBL redesign effort, this interaction does not go beyond mere sharing between teachers.

The following excerpt from the Math 2 team illustrates the one instance of collaboration among teachers that I observed that came close to "joint work" (Little, 1990). This instance was

recorded during a design team meeting in September, when teachers were discussing an idea for a project where students would solve their own proof. Discourse markers are highlighted in bold and relevant pronoun use is bolded and underlined. Both the discourse markers and the way the team used pronouns evidence how they made decisions as a group and extent to which they identified as individuals with the team.

In this instance, Math 2 teachers discuss whether or not to make the Pythagorean theorem project a unit project or a smaller project within a bigger unit. The conversation shifts midway through to deal with issues related to whether or not students would find it relevant and whether or not it is authentic.

(1)Charlotte:	So, **<u>our</u>** debate is whether or not to do a big project or a little project//
Dianne:	For five.
Matt:	(Inaudible) or mediumish.
Dianne:	For the Pythagorean theorem?
Matt:	**Yeah.** I kind of like that idea of, like, trying to make them do an original proof or something.
Dianne:	**Would that be** an individual thing or partner? Group?
(10)Matt:	Probably in groups.
Dianne:	Groups.
Charlotte:	Like a real (inaudible) puzzle.
Matt:	**Yeah**.
Dianne:	**Um, okay.** What are **<u>we</u>**-- So you're thinking like a little history lesson? Um//
Matt:	**Maybe something** like the President Garfield group or something like that?
(18)Dianne:	**Are <u>you</u> thinking** like, a, like two half days of giving them time to work on it or...? What were **<u>you</u>** thinking? (Inaudible from Matt followed by a long silence as teachers look at their computers.)

In this chunk of text, teachers brainstormed ways in which the Pythagorean Proof project could be designed and the instructional support students may need to engage in the task. This instance is unique in that Charlotte and Dianne seem interested in hashing out both the idea to

have students develop their own proof and how it would work in their classrooms. Matt's turns, marked by polite validation by the use of "Yeah" (line 6, 13) and "Maybe" (line 16) are terse and disinterested. His response of "probably in groups" (line 10) to Dianne's question about whether students would work in groups or not suggests both that he knows the answer and he is unwilling to assert an answer. Later, his muffled or lack of response to Dianne's direct question (line 21) led to an extended silence during which time teachers worked on their computers. This instance evolves into a period of negotiated problem solving where one of the teachers openly questioned the purpose, relevance, and appropriateness of the task for her students. Unwilling to let the conversation die, Dianne restarts the conversation.

(23)Dianne:	**Would <u>we</u>** show them any proofs?
Charlotte:	**Probably**. I think so.
Matt:	Just a couple.
Dianne:	**Yeah**.
(27)Charlotte:	Like, how would, **but** then how would **<u>we</u>** get them started on doing their own (inaudible). Cause **<u>I'm</u>** worried that like, by showing them, it'll get those stuck in their head. Like, how could we, (inaudible).
Matt:	**<u>We</u>** show them a couple. The most famous ones.
Dianne:	**Right**.
(33)Charlotte:	**Yeah**, I mean so, **I like it but** I, how are **<u>we</u>** going to get around them just shutting down and being, like, **<u>I</u>** have no idea how to start to do this?
Matt: (T3 **shrugs**).	Proofs. They're not easy.

In this chunk, Charlotte and Dianne are clearly still engaged and invested in the conversation. As a first year novice teacher, Dianne clearly looks from guidance from Charlotte and Matt by asking them "Would we show them any proofs?" (line 23). Matt continues to participate but only minimally. The shared negotiation ends with Matt's "shrug" (line 36) and response that "Proofs…They're not easy" (line 36). Once again, Matt's turn signals to Dianne

and Charlotte that Matt is disinterested in the conversation. Coming from Matt, the teacher with the most teaching experience and expertise, the shrug and verbal contribution associated with it, signal to Charlotte and Dianne that the pedagogical problem solving needed to plan this unit is left to them. The conversation continued between Charlotte and Dianne.

(37)Dianne:	**Or, what if <u>we</u>**... (long pause)//
Charlotte:	Like **<u>I'm</u>** just//
Dianne:	**What if <u>we</u> gave them**-- What if **<u>we</u>** gave them several different kinds and asked them to make presentations about the reasoning behind each one? **Or** like something like that?
(43)Charlotte:	Like each group is given a different proof and then they have to present their proof to the class//
Dianne:	**Yeah** that's very visual. Give an explanation. Where does it show all the pythagorean theorem formula for it. Um, maybe have them do a little of the historical//
Charlotte:	I was going to say//
Dianne:	Historical research?
(50)Charlotte:	(Inaudible)
Dianne:	Cause **<u>I</u> just** see them, I mean, I see them getting really really hung up and it being, it becoming a lot of work on our part to get them started and//

This discussion has several striking features. First, the most experienced teacher on the team, Matt, seemed disinterested in the conversation and the concerns Charlotte and Dianne expressed regarding student interest, prior knowledge, and motivation. He minimally engaged in the conversation and by shrugging (line 36), he essentially opted himself out of the conversation and left the problem solving task to Charlotte and Dianne. The discourse between Charlotte and Dianne was largely positive, with multiple turns of elaboration and validation.

The discussion ended with frustration as the concern about students' ability to authentically and intellectually engage in the project was not discussed further. More importantly, with Matt "out" of the discussion, it limited this group's ability to equally and

equitably spread the burden of problem solving and to reach a genuine consensus on a plan to move forward. Such interactions are difficult to classify as either negotiations or deliberations if the participation from one of the teachers signals to the team his/her disinterest in the creative problem solving process. This is especially true if the disinterested teacher is the most senior and experienced member on a team with two novice teachers. If Matt is counted as part of the conversation, his curt turns throughout the discussion are difficult to classify. His turns impacted the conversation and the enthusiasm by which Charlotte and Dianne tried and resolve the issue. However, it is unclear if Charlotte or Dianne had enough experience teaching proofs to be able to create a new solution to the potential problems of student engagement and motivation. Matt's experience and expertise were critical in not only solving the problem but in modeling for Charlotte and Dianne various strategies they could use in the future to address these issues. His unwillingness to do that left the team in limbo. They eventually dropped the conversation.

Although I recorded this instance at the beginning of the year, it could just as easily been from any meeting throughout the year. Charlotte and Dianne would struggle to creatively problem solve issues with PBL design in a math classroom. Matt would offer suggestions here and there but, more times than not, he would opt himself out of the intellectual heavy lifting needed to make PBL work for this course.

Conclusion. The data show the Math 2 team did not establish sharing as a routine in their group. I observed no instances of joint work in the time I observed this team. In addition, although the individual teachers on the team spoke positively about the social dynamics within the team, the data suggest that Matt's contribution, or lack thereof, within the team made it difficult for the team to gain any traction with PBL design. Whether he liked it or not, Charlotte and Dianne looked to Matt to leverage his deep experience teaching in the Cielo Vista Math

department and the expertise that comes with that experience to help them forge new solutions to the problems they encountered. For whatever reason, his unwillingness to do that meant that Dianne and Charlotte were left spinning their wheels.

Although there is little evidence in the data to suggest the extent to which the Math 2 teachers learned more about their practice or math content from design team meetings, the data do suggest that the Math 2 team struggled to take advantage of learning opportunities that arose in meetings. Given the specific membership of this team, it was even more important for Matt, as the teacher with the most experience, to use the design team settings as a place to model collaborative problem solving and help Charlotte and Dianne think through the pedagogical and technical implications of the ideas they had for units and lessons.

According to the Math 2 teachers, by the end of the year the Math 2 team had planned three solid units and a few smaller tasks within units. That roughly equaled half the curriculum they would teach the next year. In interviews all three teachers pointed to the constraints having to do with preparing students for the end of course high stakes tests as the reason why they could not plan more curriculum. While it is true that the Math 2 team dealt with more strict constraints having to do with the end of course exam, it may also be true that the philosophical stance Matt took regarding PBL impacted how the group approached the task of planning PBL curriculum.

Comparative Analysis and Discussion

Varied collaborative practice

Table 18 shows how the teams compared by the extent to which they shared teaching artifacts and tools and the extent to which they engaged in joint work.

Table 18.

Comparison by routines of "sharing" and "joint work" (Little, 1990)			
Design team	**Little evidence of "sharing"**	**"Sharing"**	**"Joint work"**
Math 2	X		
English 2	X	X	
Social Studies 1		X	X

Although the Math 2 and English 2 teams established weak routines of sharing, that does not mean that teachers did not share ideas and did not have relevant and engaging conversations about the work they were doing. Those conversations may have also been important to teachers' learning as they struggled to make sense of what PBL is and what it could look like for their content area. However, physical objects whether they are artifacts, tools, documents, or materials serve to anchor teachers' discussions in concrete, relevant ways that help them adapt and refine their practice. This was especially clear in the back and forth exchange between teachers on the Social Studies 1 team that showed them working through the presentation rubric and what they could and should expect students to be able to do. The conversation was anchored in the rubric but it dealt with topics such as academic rigor ("I think it's really complicated to put together a presentation and make maps in 2-3 days") and student relevance ("I think you have the kids who don't live in the district so they don't really care about the feeder elementary and middle schools"). Although much can be learned from philosophical conversations, the data from these teams strongly suggests that when teachers focus their discussions on physical tools of their practice, they walk away from those conversations with concrete ways to improve their practice that philosophical conversations alone cannot provide. It is the "joint work" of multiple heads

focused on how to improve a single artifact that seemed to provide the richest examples of teacher learning in collaborative work within Cielo Vista design teams.

In the teams where "joint work" was a routine for how teams collaborated, "joint work" was anchored in an artifact, document, or tool one of the teachers shared with the group (Little, 1990). In every case, the artifacts teachers shared represented some issue they had trouble solving on their own. This pattern was especially strong in the Social Studies 1 team where sharing was an almost daily routine the group used to refine documents or tools they intended to use later that day. Data from the Social Studies 1 team shows teachers who leveraged shared artifacts to deal with technical issues that came up in their classroom and also to hash out whatever pedagogical differences they had. In this way, "joint work" that developed out of sharing made the process of teacher learning highly relevant and authentic for the day to day work teachers were doing and provided them with rich instances of pedagogical learning.

In the teams where "joint work" was rare or even non-existent, so too was evidence of sharing between teachers. One of the reasons for this pattern could be the Math 2 and English 2 teams rarely implemented redesigned curriculum. This pattern was especially strong in the English 2 team, where teachers claimed to be held up by their inability to order new books in a timely manner. In the case of the Math 2 team, they felt constrained both by the existing district curriculum and the pressure they felt to prepare students for the end of course exam. The Social Studies 1 team was under no such constraints.

Setting norms and the social dynamics of design team work

Disentangling the interactions within specific design teams from the dynamics of specific departments is problematic. When asked about norm setting, the teachers in teams that did not establish explicit norms for their design teams talked about the strength of their existing personal

and professional relationships with each other as sufficient. Although this may be true, the collaborative redesign work teachers were asked to do was new work for these teachers. The Math 2 and Social Studies 1 teachers spoke passionately about the collaborative nature of their departments and how the design team work was just an extension of how collaboration worked in their department. It is ironic that in the most productive team, the Social Studies 1 team, despite the highly collaborative nature of the Social Studies department, the team took release time to establish norms for how they would work as a team. Both the Math 2 and English 2 teams saw the process of setting norms to be either superfluous or contrived yet both teams struggled to navigate the pedagogical and philosophical differences among teachers to establish productive routines of collaborative work.

Limitations

There are several ways in which the findings presented here are limited. First, the difference in data collection agendas for the Social Studies 1 and English 2 teams studied in 2010-2011 and the Math 2 team studied in 2011-2012 may have complicated the extent to which I can claim that the design team meeting observations and interviews represent a comprehensive enough sample to establish patterns of collaborative practice. However, the number of video recorded design team meetings cited from each team should help offset the varied way in which I collected data from each team. Additionally, I am confident that more design team meeting observations would not have garnered me dramatically different data or findings based on that data. In the case of the Social Studies 1 and English 2 teams, I observed them throughout the year and there was no appreciable difference in their data when I observed them in September or March. The same held true for the math team. In all cases, it was my experience that as teams

approached the end of the year, the patterns or routines they established to do their work further solidified rather than evolved.

Second, my bias as a former English teacher at Cielo Vista High School may have shaded my interpretations of the data to the extent that my findings would be flawed. Although this is always a concern, even more so with someone in my position, I am confident that the extensive sharing of data I did with the research team throughout the three years I was collecting data for this dissertation helped limit the extent to which I made interpretations based on my personal experience with teachers at Cielo Vista. However, I would also strongly argue that my experiences teaching at the school actually aided in my ability to collect better data than I would have otherwise been able to collect. My interviews with teachers was one such example where my past history and experiences with people at Cielo Vista helped them feel more comfortable sharing their stories with me. My interview transcripts reveal teachers responding in extremely candid and straightforward ways about the project, the school administrators, and the colleagues with whom they worked. Such insights from teachers, although many times a bit far afield from the scope of my study, helped complicate my thinking and helped me look more deeply at the social dynamics within design teams.

Third, in this study I set out to map how teachers navigated the social dynamics of design team work. In some respects, I was successful. I found discourse analysis to be a powerful tool in better understanding how teachers unconsciously and consciously manipulated specific discussions to get their way. But as I continued to work with discourse analysis, I realized that the discourse teachers used in their design teams was just the tip of the iceberg of years of experience working together. If anything, this study highlights the need for deeper research in how departments and departmental leadership can influence the trajectory of school

improvement projects. In most cases, it was possible to make connections between the culture within departments and how teachers behaved in design teams. But because I did not collect any data on departments, making substantial claims in this area would have been unethical.

Another limitation of this study has to do with the relationship between data collection and data analysis. Although rich, data collected for these teams did not always match with what I later came to understand about what was happening in the group in terms of joint work. An example of this was the questions I asked during interviews. Although I saw them as pertinent and important at the time, I sometimes failed to ask teachers to comment on specific aspects of either how they saw norms operating within the group, the extent to which they felt the team shared a commitment to the work, or why and how they developed the collaborative routines evidenced in their design team meetings.

In retrospect, it would have been helpful to have either individual teachers or the team watch a specific instance of joint work and then talk about how they interpreted the process and then ask them to comment on the interactional patterns and the norms *they* saw operating within the group. This is just one example where I either missed an opportunity to ask teachers specific questions about their process or where what I asked teachers on interviews may not represent what I really wanted to know once I started analyzing the data years later.

Conclusion

Data from all three design teams suggest that teacher learning in collaborative settings is highly situational and highly complex. Although teachers can learn from day to day conversations about the pedagogical import of their work, the routine of sharing artifacts that represent problems of practice, especially that which leads to joint work, seems to hold greater promise for teacher learning in collaborative groups. Although this study did not deal with the

impact of departmental culture on design team work, data from these teams suggest that this area remains a rich space for future research.

The way design teams structured their work seemed strongly influenced by the norms governing how teachers collaborate within departments. Despite the struggles some teams experienced, the varied levels of collaboration among teams should not be interpreted as a failing of teacher driven or led collaboration. The data suggests that the struggles English 2 and Math 2 experienced seemed to be influenced by three factors. First, the extent to which teachers bought in to the larger PBL project. Second, the extent to which teams established norms to overcome philosophical and pedagogical differences. Third, constraints, either perceived or real, related to subject matter and/or standardized testing.

Where teachers did buy in to the PBL approach, however, the decision by the school to allow them to structure their collaborative work seemed to add to the relevance and authenticity they saw in the work. Data from this study points to the importance for administrators and school leaders to anticipate the struggles teams might encounter and establish systems to support them better. It would also be wise for administrators and school leaders to establish and sustain buy in, amongst teachers, for any school-wide improvement project previous to implementing policies that depend on teacher buy in for success.

In the end it is also important to remember that the setting for this study is a public, comprehensive high school. Administrators cannot just fire or replace teachers who choose to not to buy in to the PBL initiative. Nor should they. However, the process of selling teachers on a vision, especially in the case of the more veteran teachers who will willingly tell you that they have seen every kind of reform there is to see, is a steep and muddy road to climb for school administrators. To be sure, some teachers have left Cielo Vista in the past three years because

their pedagogical and philosophical values conflicted with what they saw happening at the school. It is my belief that albeit massively challenging, the work of constructing a vision for school improvement, articulating it to a staff of 60 teachers, and persisting in that vein is the work of school leadership. Schools are better places when those kinds of conversations and debates are had out in the open, in transparent ways. Of all the teachers I interviewed for this study, to a teacher they welcomed that ongoing conversation, even if they did not currently buy the vision.

The findings from this study extend some of the best research on productive teacher collaboration that argues for routines that help teachers examine problems of practice and norms that help teachers debate, negotiate, and deliberate through their differences. Although this study evidences two teams out of the three that struggled, the teams that struggled may have established better routines had they been given more support. Despite those two cases, I strongly argue that the best examples of teacher collaborative learning come from examples where teachers have been sold on a vision and have been provided the space and time and autonomy to leverage their collective expertise to make curriculum work better for students. In this study, these examples come from the work done in the Social Studies 1 team. This team was situated in a highly collaborative department.

CHAPTER 6
CONCLUSION

The purpose of this dissertation is to describe how teachers, when working with relative autonomy and freedom, structure their collaborative curriculum redesign work. In so doing, I describe the specific collaborative routines teams have established that help them work more productively. This study is situated in a highly dynamic school setting in which teachers have worked to transform the curriculum in every discipline to PBL curriculum. Although not the focus of this dissertation, PBL as a contextual factor is important, because the school's approach to PBL and PBL implementation have impacted how I frame my description and interpretation of how teachers have structured their course redesign work.

Cielo Vista High School's description of PBL is documented in their Key Elements of Problem Based Learning. That document is the result of an ongoing collaboration between university researchers, teachers, administrators, and other partners working with the school on the project. That group gleaned the principles described in that document from various research studies that suggest that student motivation and engagement increase when students engage in school work that is relevant to their lives, especially in the STEM disciplines (Blumenfeld et al., 1991; Barron and Darling-Hammond, 2008; Baoler and Staples, 2008; Belland, Glazewski and Ertmer, 2009; Conley, 2010). Resulting from an ongoing collaboration primarily between teachers, administrators, and university researchers, the Key Elements extrapolate and expand upon this research literature to more clearly and precisely describe what high levels of PBL can look like in practice.

As described in the introduction, Cielo Vista High School takes a transformation approach to school improvement consistent with the principles of renewal (Sirotnik, 1999). The

bottom up, inside out approach the school has taken to almost every aspect of the renewal process has meant that how they define PBL, how they hold each other accountable to designing and implementing a high level of PBL curriculum, varies by department and teacher throughout the school. Differences of opinion, among teachers and teachers and administrators, about what PBL looks like and how it is conceptualized, make it difficult for the school to judge whether or not a specific class is PBL or not. To this day, the school struggles to answer questions like: Who decides what makes a particular lesson or unit or course authentic? What is the relationship between authenticity, relevance, and culturally responsive instruction? Whose expertise counts and in what context? In addition, once each design team has redesigned a course, that marks the beginning, not the end, of PBL development for that course. Courses change, sometimes dramatically so, from the first year of implementation to the second iteration and the third and even the fourth. All of these variables make an assessment of the relative PBL-ness of each course problematic.

If assessed according to what the research literature asserts are hallmarks of PBL: student collaboration, creative problem solving, a deep dive into specific content driven by authentic and relevant problems (Blumenfeld et al., 1991; Barron and Darling-Hammond, 2008; Baoler and Staples, 2008; Belland, Glazewski and Ertmer, 2009; Conley, 2010), the coursework most groups initially designed did not achieve a high level of PBL pedagogy after the initial design year.

In terms of school-wide PBL implementation, Cielo Vista High School has wrestled with two major obstacles since they started the work. First, after five years there exists little consensus amongst teachers, beyond what is written in the Key Elements document, about what PBL means and what it looks like in practice. Second, there exists no internal process of peer review or

critique teachers can access to get feedback on redesigned PBL lessons, units, or courses. The school continues to struggle with these issues as they search for ways to sustain the work of PBL curriculum redesign and refinement. It is entirely possible that because teachers have been given the flexibility and autonomy to make sense of issues related to authenticity, relevance, and expertise, they come to value the collaboration process and the product of the process more than if they were just told what those words were to mean to them.

The constant tension at Cielo Vista around PBL implementation is between consistency in what PBL pedagogy and practice is and should be and flexibility for teachers to further innovate what PBL principles look like from classroom to classroom. Complicating matters further, implementation of PBL curriculum is a constant iterative process. As students change from year to year, so might their beliefs around what is relevant and authentic. Cielo Vista teachers are constantly searching for 1) foundational components in courses that do not shift much from year to year and 2) novel ways to present the curriculum to students in ways they find authentic and relevant. To some teachers, this tension remains one of the most problematic as they strive to implement higher levels of PBL within their classrooms.

Assessing and describing the extent to which a design team works productively in a context of transformation is difficult. Transformation, like renewal, is not a specific point in time. It is an ongoing process. To be sure, what a team produces, especially given the resources allocated to facilitate their collaborative efforts, is important. Teams should be held accountable to producing *something*. In the case of Cielo Vista design teams, the school hopes that what they produce is more PBL than not. In this dissertation, I describe both how productively teams collaborated and how much each team produced. I would argue, however, that more important than what they produce, especially after the initial design year, is not as important as the process

of collaboration they establish. If a team does not establish a productive process for collaborating, moving forward they will find it very difficult to do the work necessary to transform and renew the curriculum year after year.

What each team develops in that first design year depends on the current thinking within the school and design team around what PBL is and should be for any specific course or discipline. Each team in this study designed something that represents what they knew and believed at the time. For the teams that redesigned courses early on in the process, like Social Studies 1 and English 2, they were attempting to redesign courses using a somewhat impoverished working definition of PBL. For the teams that redesigned courses after the first couple of years, such as English 3 and Math 2, they had the distinct advantage of a more fully articulated working definition of PBL, as evidenced in the Key Elements document, and the experiences of colleagues who had designed courses before them.

Using an analytical framework anchored in principles of "joint work" (Little, 1990), as well as specific components of discourse analysis (Schiffrin, 1984), and democratic decision making (Parker, 2003; Gastil and Black, 2007) I examine the routines design teams used as they worked to redesign curriculum. Findings from both the single case study and the comparative case study evidence teachers working in generous, thoughtful, and productive collaborative groups of their own design. In the most productive groups, teachers routinely shared documents, tools, and other teaching artifacts. For some groups, instances of sharing evolved into rich instances of joint work (Little, 1990) in which teachers solved immediate, technical problems of practice, and where they hashed out the pedagogical implications of their decisions. This pattern is most noticeable in the English 3 team (single case study) and the Social Studies 1 team (comparative case study). Both teams took steps to set clear norms for their redesign work that

both reinforced their shared commitment to PBL redesign and that established egalitarian ways of interacting and making decisions.

Findings from the comparative case study also evidence teams of teachers that struggled to establish consistently engaging levels of collaborative course redesign. Teachers on the English 2 team approached the task with varied levels of commitment and buy in to PBL redesign. This lack of commitment to PBL and the lack of clear norms for how the team would interact exacerbated the tension between teachers; notably, between the teacher with high status within the department and the teacher with relatively low status within the department. This tension evidenced itself in unresolved debates regarding fundamental aspects of course redesign, such as the development of PBL assessments and assignments. The Math 2 team flirted with settings norms at the beginning of the year but then quickly rejected the exercise as superfluous to the work at hand. Interview data from this team show varied levels of acceptance regarding PBL and its effectiveness in math classrooms. Unlike the English 2 team, these differences rarely evidenced themselves in design team meetings. Instead of forcing debates within the team, the experienced teacher on the team many times opted out of the decision making process, choosing instead to let the two novice teachers in the group make curricular decisions.

For both the Math 2 and the English 2 team, the constraints of the subject matter content in relation to the district curriculum and high stakes state tests, seemed to be an obstacle to the extent to which teachers felt free to plan full PBL courses. In the case of the Math 2 team, the state end of course exam, which is a graduation requirement for students, also limited the extent to which teachers felt they could plan PBL coursework. The goals of PBL pedagogy and the end of course exam felt contradictory to some teachers on the Math 2 team. In the case of the English 2 team, the constraint was not so much the district curriculum, but the speed by which they could

order books through the district process. However, the issue with ordering books seemed to highlight deeper, more unresolved issues within the team regarding what is and is not appropriate content for an English class. Interview data from an individual teacher on the English 2 team indicates a deep distrust and animosity against PBL in general and the PBL initiative at the school specifically. In all likelihood, the attitude of this specific teacher within the team influenced the extent to which the team embraced PBL as a legitimate pedagogy and thus, the extent to which they planned PBL curriculum.

As I write this, both the Math department and English department remain suspicious of how effective PBL is for their respective disciplines. This would seem to be an issue the school's leadership will have to deal with as they work to sustain the progress they have made within the project. Evidence from parallel studies conducted at the school suggest that teachers see release time, either for teacher leaders or for design teams to redesign courses, as a kind of currency within the school. Those data suggest teachers equate release time with the extent to which the school's leadership values the work of specific teachers (Knuth Research, in process). As with many school improvement projects, this effort has become deeply political and emotional for some teachers. Moving forward, the school would be wise to continue their policy of differentiating systems of support to various groups throughout the school. The obstacles that the Math department face are different than the concerns of the English department. Both require support from school leaders. Based on this study, the school would also be wise to reassess the way they support design teams in general to ensure that those teams that struggle early on can access collaboration mentors who can help them navigate some of the interpersonal dynamics that interfere with the work of the teams.

We would be remiss, however, if we did not recognize the considerable progress Cielo Vista High School has made since the beginning of the PBL initiative. The choice to empower teachers and to leverage their expertise to redesign the curriculum was both risky and courageous. The school's decision to afford design teams great autonomy in how they structured their work and what the products of that work would look like may not have worked exactly as planned for every team, but that does not mean it was not the ethical decision to make at the time. In interviews, teacher after teacher discussed how the release time they were given to work on design teams made them feel valued as professionals. Furthermore, some of the problems that teams such as English 2 and Math 2 experienced have more to do with the lack of support some teams were provided, than with the design team policy itself. Given the current political climate around school reform, we can sometimes fall victim to the idea that every policy has to evidence great success the first time around or it is not worth the investment. The choice to provide teachers with both the space and time to redesign curriculum evidenced a deep faith and trust school leaders had in the knowledge and skill of Cielo Vista teachers. Because of these key decisions the school made, I believe the school will have a particular style of PBL that may not adhere to the strictest definitions of PBL but it will be one that teachers own throughout the school and will work together to sustain as they move forward.

REFERENCES

Allen, D. S. (2004). *Talking to strangers: Anxieties of citizenship since Brown v. Board of Education.* Chicago, IL: University of Chicago Press.

Ball, D. L. & Cohen, D. K. (1999). Developing practice, developing practitioners: Toward a practice-based theory of professional education. In L. Darling-Hammond & G. Sykes (Eds.) *Teaching as the learning profession* (pp. 3-32). San Francisco, CA: Jossey Bass.

Barron, B., & Darling-Hammond, L. (2008). Teaching for Meaningful Learning: A Review of Research on Inquiry-Based and Cooperative Learning. In J. L. T. G. N. Cervetti, L. Darling-Hammond, B. Barron, D. Pearson, A. H. Schoenfeld, E. K. Stage, T. D. Zimmerman (Ed.), *Powerful Learning: What We Know About Teaching for Understanding*. San Francisco: Jossey-Bass.

Belland, B. R., Glazewski, K. D., & Ertmer, P. A. (2009). Inclusion and Problem-Based Learning: Roles of Students in a Mixed-Ability Group. *RMLE Online: Research in Middle Level Education, 32*(9), 1-19.

Bereiter, C., Scardamalia, M. (1993). *Surpassing ourselves: An inquiry into the nature and implications of expertise.* Chicago, IL: Open Court Press.

Blumenfeld, P. C., Soloway, E., & Marx, R. W. (1991). Motivating project-based learning: sustaining the doing, supporting the learning. *Educ Psychol Educational Psychologist, 26*, 369-398.

Boaler, J. O., & Staples, M. (2008). Creating Mathematical Futures through an Equitable Teaching Approach: The Case of Railside School. *Teachers College Record, 110*(3).

Bransford J., Derry, S., Berliner, D., Hammerness, K., & Beckett, K.L. (2005). Theories of learning and their roles in teaching. In L. Darling-Hammond & J. Bransford (Eds.), *Preparing teachers for a changing world: What teachers should learn and be able to do (pp. 40-87).* San Francisco, CA: Jossey-Bass.

Clark, D., Hollingsworth, H. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education, 18,* 947-967.

Cochran Smith, M., Lytle, S. (1999). Relationships of knowledge and practice: Teacher learning in communities. Chapter 8 in *Review of Research in Education, 24,* 249-305.

Conley (2010) College and Career Ready? [PBL]

Darling Hammond, L., Bransford, J. (2005). *Preparing teachers for a changing world: What teachers should know and be able to do.* San Francisco, CA: Jossey-Bass.

Darling Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future.* New York, NY: Teachers College Press.

Dempsey, N., P. (2010). Stimulated recall interviews in ethnography. *Qualitative Sociology, 33,* 349-367.

DuFour, R. (2004). What is a professional learning community? *Educational Leadership, 61,* 1-6.

DuFour, R., Eaker, R., and DuFour, R. (2005). Recurring themes of professional learning communities and the assumptions they challenge. In R. DuFour, R. Eaker, R. DuFour (Eds.) *On common ground: The power of professional learning communities.* (pp. 7-29). Bloomington, IN: National Education Service.

Emerson, R.M., Fretz, R.I., & Shaw, L.L. (1995). Processing fieldnotes: Coding and memoing (Chapter 6, pp. 142-168). In Author, *Writing ethnographic fieldnotes*. Chicago: University of Chicago Press.

Erickson, F. (1986). Qualitative methods in research, pp. 145-161. In M. Wittrock (Ed.), *Handbook of research on teaching. 3rd edition.* New York: MacMillan.

Gastil, J., Black, L., W. (2007). Public deliberation as the organizing principle of political communication research. *Journal of Public Deliberation, 4,* 1-47.

Gee, J. (2011). *An introduction to discourse analysis: Theory and method.* New York, NY: Routledge.

Geertz, C. (1973). Thick description: Toward an interpretive theory of culture. In Clifford Geertz, *The interpretation of cultures* (4-30). New York, NY: Basic Books.

Grossman, P., Wineburg, S., Woolworth, S. (2001). Toward a theory of teacher community. *Teachers College Record, 103,* 942-1012.

Guskey, T., R. (1986). Staff development and the process of teacher change. *Educational Researcher, 15,* 5-12.

Hammerness, K., Darling-Hammond, L., Bransford, J., Berliner, D., Cochran-Smith, M., McDonald, M., Zeichner, K. (2005). How teachers learn and develop. In L. Darling-Hammond and J. Bransford (Eds.), *Preparing Teachers for a Changing World,* Washington D.C.: The National Academy of Education.

Hargreaves, A., Fullan, M. (2012). *Professional capital: Transforming teaching in every school.* New York, NY: Teachers College Press.

Harre, R., Langenhove, L. (1999). *Positioning theory*. Malden, MA: Blackwell.

Hatano, G., Inagaki, K. (1986) Two courses of expertise. In H. Stevenson, H. Azuma, and K. Hakuta (Eds.). *Child development and education in Japan.* (pp. 262-272). New York, NY: Freeman.

Horn, I., S. (2005). Learning on the job: A situated account of teacher learning in high school mathematics departments. *Cognition and Instruction, 23,* 207-236.

Horn, I., S. (2007). Fast kids, slow kids, lazy kids: Framing the mismatch problem in mathematics teachers' conversations. *The Journal of Learning Sciences, 16,* 37-79.

Horn, I., Little, J. (2009). Attending to problems of practice: Routines and resources for professional learning in teachers' workplace interactions. *American Journal of Educational Research, 47,* 181-217.

Ingersol, R. M. (2003). *Who controls teachers' work? Power and accountability in America's schools.* Cambridge, MA: Harvard University Press.

Kazemi, E., Hubbard, A. (2008). New directions for the design and study of professional development: Attending to the coevolution of teachers' participation across contexts. *Journal of Teacher Education, 59,* 428-441.

Little, J. W. (1982) Norms of collegiality and experimentation: Workplace conditions for school success. *American Educational Research Journal, 19,* 325-340.

Little, J. W. (1990). The persistence of privacy: Autonomy and initiative in teachers' professional relations. *Teachers College Record, 91,* 509-536.

Little, J. W. (2002). Professional community and the problem of high school reform. *International Journal of Educational Research, 37,* 693-714.

Little, J. W. (2001). Locating learning in teachers' communities of practice: Opening up problems of analysis in records of everyday work. *Teaching and Teacher Education, 18,* 917-946.

Little, J. (2003). Inside teacher community: Representations of classroom practice. *Teachers College Record, 105,* 913-945.

Lortie, D. C. (1975). *Schoolteacher.* Chicago: The University of Chicago Press.

McLaughlin, M., W., Talbert, J., E. (2006). *Building school-based teacher learning communities*. New York City, NY: Teachers College Press.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco: Jossey-Bass.
National Research Council. (2011). *Successful K-12 STEM Education: Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics.* Washington D.C.: National Academies Press.

Patton, M. Q. (2003). Qualitative Interviewing. In Michael Q. Patton. *Qualitative Research and Evaluation Methods,* (pp. 339-384). 3rd edition. Thousand Oaks, CA: SAGE.

Powell, A. B., Francisco, J. M., Maher, C.A. (2003). An analytical model for studying the development of learners' mathematical ideas and reasoning using videotape data. *Journal of Mathematical Behavior, 22,* 405-435.

Sahlberg, P. (2010). *Finnish lessons: What can the world learn from educational change in Finland?* New York, NY: Teachers College Press.Van Maanen, J., Barley, S. R. (1984). Occupational communities: Culture and control in Organizations. *Research in Occupational Behavior, 6,* 287-365.

Schepens, A., Aelterman, A., Van Keer, H. (2007). Studying the processes of student teachers with stimulated recall interviews through changes in interactive cognitions. *Teaching and Teacher Education, 23,* 457-472.

Schiffrin, D. (1987). *Discourse markers.* Cambridge, UK: Cambridge University Press.

Sirotnik, K., A. (1999). Making sense of educational renewal. *The Phi Delta Kappan, 80,* 606-610.

Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks: Sage Publications.

Van Maanen, J., Barley, S. R. (1984). Occupational communities: Culture and control in Organizations. *Research in Occupational Behavior, 6,* 287-365.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Ed. Michael Cole, Vera John-Steiner, Sylvia Scribner, Ellen Souberman. Cambridge, MA: Harvard University Press.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity.* Cambridge, United Kingdom: Cambridge University Press.

Wilson, S. M., Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: An examination of research on contemporary professional development. Chapter 6, *Review of Research in Education, 24,* 173-209.

Wineburg, S. (1991). Historical problem solving: A study of the cognitive processes used in the evaluation of documentary and pictorial evidence. *Journal of Educational Psychology, 83,* 73-87.

APPENDIX A: DISCOURSE MARKERS

Discourse Markers			
Marker	**Grammatical meaning**	**Discursive meaning**	**Meaning in usage**
Oh	Exclamation or interjection	"When used alone, without grammatical support of a sentence, *oh* is said to indicate strong emotional states, e.g., surprise, fear, or pain" (Schiffrin, 1987).	Initiate utterances/sentences where surprise or acceptance of new/interesting knowledge has been shared. Use to show that some kind of change has happened in the speaker's knowledge, information, orientation.
Well	Can be used as an adverb, noun, or degree word. However, in discourse it is labeled as an interjection, filler, particle, hesitator, and initiator	*Well* often begins turns and can preface disagreements. It is also used to suggest an rejection or revision of an idea is to come (Schiffrin, 1987).	*Well* may be used to signal a challenge or disagreement between two people regarding a common topic or idea. This challenge may be significant or it could represent a minor revision or reframing of an idea currently on the table.
And	"It coordinates idea units and it continues a speaker's action" (Schiffrin, p. 128).	Serves as a means to elaborate on one's idea or the idea of others. Can signal at least superficial agreement between two or more people.	Can be used to hold the floor of the conversation by furthering one's thoughts on a given topic. "*And* can be used in repeated attempts to continue an interactional unit when it has been threatened by alternative talk" (Schiffrin, p. 143).
But	"Is a discourse coordinator (like *and*) but is has a different pragmatic effect: *but* marks an upcoming unit as a contrasting action" (Schiffrin,	*But* can signal strong disagreement, or more likely, disagreement by a matter of degrees regarding a common topic. However, *but* seems to mostly communicate an uncooperative response to	*But* can be used to frame disagreement and/or support a previous position, especially if made by the speaker, but that function is not as pervasive as the contrastive meaning of the word.

	p. 152)	a speaker/listener.	
Or	"Used as an option marker in discourse" (Schiffrin, p. 177).	"*Or* marks a speaker's provision of options to a hearer. More specifically, *or* offers inclusive [or exclusive] options to a hearer" (Schiffrin, p. 177).	*Or* can either mark "inclusive" or "exclusive" options for a hearer and generally implies a response is needed. By exclusive, we hold that hearers see only one option as possible. By inclusive we hold that hearers see both options as possible, given the tone of the speaker.
So	No real inherent grammatical meaning but has functional grammatical meaning.	"*So* is a complimentary marker of a main clause to follow" (Schiffrin, p. 191). "*So* [can also] mark the speaker's willingness to allow the hearer to take the floor" (Schiffrin, p. 223).	People use *so* in discourse to start a main idea or topic that may or may not be on the table amidst a discussion or offer a concluding thought. People can also use *so* to offer an uncooperative contribution to a conversation. "*So*, what you're saying is…."
Because	No real inherent grammatical meaning but has a functional grammatical meaning.	"*Because* is a marker of a subordinate idea" (Schiffrin, p. 191).	People use *because* to offer more information or evidence to support a point or claim they've previously made. Use of *because* implies that supportive information is forthcoming in conversation.
Now	Has grammatical meaning, in terms of time such as in the present, and can have a grammatical function within a sentence.	"*Now* marks a speaker's progression through discourse time by displaying attention to an upcoming idea unit, orientation, and/or participation framework" (Schiffrin, p. 230).	*Now* can be used to emphatically draw someone's attention to a point they are about to make. This can occur in context of disagreement, arguments, or debate.

Then	*Then* typically refers to moments in discourse time and not temporal time.	"*Then* indicates temporal succession between prior and upcoming talk…*now* points forward in discourse time and *then* points backward" (Schiffrin, p. 246).	In contexts of argument, people can use *then* to push someone to provide more information. "So is that what you're saying, then?"
Y'know	Carries grammatical and functional meaning. It assumes participation of two people in an interaction through the use of "you."	"*Y'know* marks the general consensual truths which speakers assume their hearers to share through their co-membership in the same culture, society, or group…" (Schiffrin, p. 275).	By using *y'know*, people try and establish tacit agreement around either general principles currently bring discussed or specific points that will lead up to a more substantial statement of truth.
I mean	Has grammatical meaning, in terms of time such as in the present, and can have a grammatical function within a sentence.	"*I mean* marks a speaker's upcoming modification of the meaning of his/her own prior talk" (Schiffrin, p. 296).	*I mean* represents a kind of repair, what Schiffrin calls a "replacement repair" (p. 300), that speakers engage in to get more specific about an observation or claim they want to make.

APPENDIX B: DESIGN TEAM MEETING OBSERVATION PROTOCOL 2011-2012

Teacher Collaboration Observation Form: 2011-2012

Date:

Observer:

Participants present:

Content area(s):

Summarize what happened in the last meeting:

Summarize what happened in this meeting (narrative):

Participation/roles: Who is participating? How are they participating? What roles do they take up? What voices are included but not present?	**Decision-making/agenda setting:** How is the agenda set? What decisions are made? How? How are ideas developed, taken up, and by whom? What key ideas emerged as a result of their decision-making?	**Content:** How is content discussed and defined? How are dilemmas that arise from content navigated? Constraints? Affordances?	**Student voice/equity:** In what way is student voice accounted for in the discussion? How and why did it emerge? What issues of equity are broached? To what end? By whom? To what extent is student learning the focus?	**Learning tools:** What materials are used by teachers in the discussion to further their learning? How are they used?
Which 7 Key Elements were dealt with (authentic problems, authentic assessment, student voice, collaborative groups, classroom discourse, culturally responsive teaching, expertise) in the meeting? To what				

extent?

Reflection:
In the meeting…

- How were issues of content dealt with?
- What did this group's collaboration look like today?
- How was expertise leveraged in the dialogue?
- To what extent was student learning and student voice a focus of the meeting?
- What patterns or work flow, content negotiation and/or definition, etc., are developing as these teachers continue to work together?
- In what ways did my presence change the tone, tenor, and/or substance of the meeting?

Observations NOT covered by the protocol:

APPENDIX C: DESIGN TEAM MEETING OBSERVATION PROTOCOL 2012-2013

Design Team Meeting Observation Protocol: 2012-2013

Notes during the meeting

Date:

Participants:

Context for meeting:

Detailed account of action (What happened?):

General description of interaction (How did it happen? How did they work together?):

How was content defined/discussed in this meeting?

Notes after the meeting

Teacher	Participation patterns, roles, collaborative practice (Who said what, when?/What role did each teacher play?) **Time-stamp relevant interactions
Teacher 1:	
Teacher 2:	
Teacher 3:	
Teacher 4:	
Teacher 5:	

General reflection:
In this meeting…

- In what ways did content complicate the work teachers were doing?
- In what ways was status revealed/leveraged in this meeting? How? Why?
- What tensions and differences were evident? How were those negotiated?
- What is the dominant collaborative practice these teachers used in this meeting? Why? What larger patterns are emerging in their collaborative practice?
- What contributions, if any, did I make in the meeting? How did my participation affect the outcome

of the meeting?

APPENDIX D: SEMI-STRUCTURED TEACHER INTERVIEW PROTOCOL 2011-2012

Teacher Interview Questions

The purpose of this interview is to ask you some questions about how you and your design groups are thinking about the PBL redesign work you are doing. Your answers to these questions will me think differently about what I'm seeing in the design team meetings. As always, I will use a pseudonym when using this transcript for research purposes. I appreciate your candid responses to the following questions.

Background:

1. How many years have you been teaching at SHS? How about before that?

Role/Department:

2. How would you describe the ways in which the teachers in the department work together?
    - What is usually the focus of that work?
    - Has that work changed generally as a result of the PBL design team work?

3. How do you think you contribute to and/or compliment the department?
    - What do you think your colleagues would say about what your contributions are?
    - What things do you think they're missing?

4. In what ways do you think your role within the department has changed as a result of the PBL work?

Content:

5. How do you define what "content" is for an English course?

6. How about the "content" of an English PBL course?
    - Do you have an example of what you just described?
    - Do you see that change as a good thing?

7. As an English teacher, what would you describe as the central problem in redesigning English courses to the PBL model?
    - Do you have an example of that?

Design teams work:

7. How would you describe a normal meeting with your design group?

8. When in the past two months have you been most frustrated or inspired with the design process?
    - Do you have an example to illustrate that?

9. Could you describe for me a time in the past couple of months when you felt like you had some kind of expertise to offer the group?

- What did that look like?
- Did it happen in other meetings too?

11. How has your teaching and/or thinking about teaching changed as a result of your work in the PBL design teams?

- Has that process been easy, difficult? Why?
- What more do you hope to learn from that work as the year progresses?

APPENDIX E: SEMI-STRUCTURED TEACHER INTERVIEW PROTOCOL 2012-2013

Interview Protocol: (Winter/Spring 2012-2013)

Design team involvement and interaction:

How much PBL curriculum would you say your group planned up to this point in the year?

- What do you like about it?
- What do you think could be further improved?

Describe for me what roles each member of the team typically assumes in design team meetings.

- At the beginning of the year you described the expertise you bring to the group as ___ and your role as ____, do you think that has changed much from September to now? How so?

What does it look like when someone voices disagreement within the group?

- Are there any "hot topic" issues that you all avoid talking about? If so, what are they?

Tell me about a time when the group was particularly productive.

- What was the topic of discussion?
- What progress was made?
- Describe for me what it was like to be in the room.
- What role did you play in that specific situation?

Tell me about a time you think your design team didn't function as well as it could have.

- How did you guys work through it?
- What role did you play in that specific situation?

When thinking about this past year, what would you say you learned most about yourself as a collaborator and about how to work best in a team?

- Is there a specific example that you think best illustrates that?
- About yourself as a teacher?

** (Maybe just for the English design team) Have you contributed more to the departmental thinking during lunch or departmental meetings as a result of your work in the design team? If so, what was it? Did it cause any kind of change within the department?

What would you say are the most important lessons you've learned about planning PBL coursework or teaching in a PBL classroom in the past year?

APPENDIX F: STIMULATED RECALL TEACHER INTERVIEW PROTOCOL 2012-2013

Stimulated Recall Interview: Unit Planning

The interview we're doing today is called a stimulated recall interview. During the interview I will show you a video clip of your design team at work. The purpose of this interview format is to anchor my questions in specifics evidenced in the interview to get specific information from you regarding how your design team works and what role you play in that effort. Typically, the responses people give in the stimulated recall format are far more specific and, as a result, insightful, than they are during a more traditional interview format.

Today, during the interview I will show you a video clip from a design team meeting on January 8, 2013. You will also have a transcript of the video you can annotate in whatever ways you find useful. You will see the video at least twice. The first time I'll show you the video, I'll ask you to pay attention to general ways your design team works. The second time I'll show you the video, I'll ask you to watch for more specific ways your group interacts and your role within that dynamic.

Watch the video thinking about how your design team works and what things stand out to you that you find interesting.

Show video.

1. Describe for me what your group was discussing on this day and how you think this fits into the larger picture of the unit you've been planning.
2. As you watched the video clip, what were some things that you found interesting about the way the group interacted in this specific example? Is that typical for a design team meeting?

Now let's watch the video for a second time. This time, I'd like you to watch the video for specific ways your team collaborates and the specific ways you interact with the other people in your team.

Show video a 2nd time.

3. Did you notice anything different the second time through? If so, what?
4. What specific parts of this video are representative of how you think the group typically works?
5. What specific parts of the video are more unusual or outlier practices of how the group typically works?
6. How would you classify, in general, the kind of decision-making you see in this video?
7. Based on your experience of working within this group since September, describe for me what content expertise each member brings to the group during interactions like this.
8. In addition to those specific areas of expertise, what roles do people typically play in the group? Is that consistent with what's evidenced in the video? Do you feel that anyone in the group has a kind of "veto" vote when the group is making decisions?

9. Describe for me what you see yourself doing in the video. In what ways is your behavior typical and atypical of how you behave in your group?
10. Has your behavior or role(s) changed at all since the beginning of the year? If so, how?

Last question: After all of that, do you have any questions for me that you'd like to ask or anything you'd like to add or stress further?

APPENDIX G: THE KEY ELEMENTS OF PROBLEM-BASED LEARNING

Authentic Problems

What: Authentic problems are relevant to the lives of students, teachers, and/or to a professional field or discipline. They should be relevant to the problem-solving efforts of recognizable professionals in the community. They should also be multi-faceted and multi-layered, demanding the cognitive capacity of groups of people to reach a solution. As with real-world problems, there will often be more than one possible solution or solution strategy. As students become more proficient in solving problems, teachers should work collaboratively with students and professionals to identify problems that are increasingly complex and less structured, allowing students to build their skills at identifying, describing, and deconstructing complex, authentic problems.

Why: Authentic, relevant problems increase students' engagement in learning. Students feel that their work is meaningful and connected to their own lives and to real professional challenges. Research and experience also tell us that content knowledge is dormant unless we are asked to apply it in complex ways. Engaging in creative problem-solving with peers, around truly confounding and complex problems, necessitates high levels of critical thinking, collaborative practice, and creativity. Preparing students to creatively and innovatively solve authentic problems will prepare them to be successful learners in whatever career path they choose.

How: How do we establish authenticity in classroom assignments? There are several ways to build authenticity into student projects and assignments. Here are three prominent approaches. In all three cases, professionals in a given field may visit the classroom and/or collaborate with teachers to provide additional expertise and perspective.

1. *Teachers know the questions and the answers; students devise the processes of investigation.* Teachers assess the process for accuracy related to the discipline. They understand how well student answers align with disciplinary knowledge and can help redirect when students' ideas are incorrect or under-specified.
2. *Teachers know the question, students devise the process and the answer is open-ended and allows for multiple perspectives.* Teachers help students assess whether or not they have broken the problem down into the correct component parts; that they have used a process that is consistent with disciplinary best practices, and their answer fits the expected range for the problem presented.
3. *Teachers know little; students create the question, create the process, and devise an answer.* Teachers help students assess whether their answer and their process adequately address the question they have posed. In this case the role of experts and novel resources may be extensive.

Further Reading:

Barron, B., Schwartz, D., Vye, N., Moore, A., Petrosino, A., Zech, L., Bransford, J. (1998). Doing with understanding: Lessons from research on problem and project-based learning. *The Journal of Learning Sciences, 7,* 271-311.

Blumenfeld, P., Soloway, E., Marx, R., Krajcik, Guzdial, M., Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist, 26,* 369-398.

Larmer, J., Mergendoller, J. (2010). 7 essentials for project-based learning. *Educational Leadership, 68,* 1-4

Savery, J. (2006). Overview of problem-based learning: Definitions and distinctions. *The Interdisciplinary Journal of Problem-based Learning, 1,* 9-20

Savery, J & Duffy, T. (2001) Problem-Based Learning: An instructional model and its constructivist framework. *CLRT Report, No. 16-01.*

Torp, L., & Sage, S. M. (1998). *Problems as possibilities*. Alexandria, VA: Association for Supervision and Curriculum Development.

The Buck Institute. *Introduction to project based learning.* 1-10

Implementation Continuum – Authentic Problems			
Inclusion	**Integration**	**Transformation**	**Empowerment**
Teachers develop and implement problems that seek to engage student thinking across a wide variety of content goals in their class. The problems may be based on student interest. They have one correct process and answer and may or may not reflect the work of professionals in the field. Teachers intentionally point students to the links between the problem and the content, creating both a need to know for the content and highlighting the relevance of the problem in the course. **Students** demand significantly supported learning from both the teacher and expert to complete the problem task. In order to create their solution, students are integrating two or more concepts from a particular unit of study. Students present their work to classmates, their teacher and/or	**Teachers** devise problems that reflect challenges in the field or discipline. Problems have multiple possible solutions or solution strategies. Teachers may work with outside experts to develop ideas and give students feedback on their work. Teachers may develop a long-term relationship with outside experts, allowing them to interact in the course each year to benefit student learning. Experts serve as mentors and as links to careers related to course content and skills. **Students** see ways in which the problem is authentic and relevant to them. They begin developing research and collaboration skills that help them understand the complexity of the problem and how it relates to them. Students are expected to complete the task to a professional standard and are given opportunities to display their work	Based on their understanding of their subject and their discipline, **students, teachers** and experts work collaboratively to identify and solve problems. The teacher serves to align the problem with the content and skill goals of the class, ensures that students receive regular feedback and guidance, but does not direct the outcome of the problem. Because the problems are naturally broad, there is no single correct answer and the problems can be tackled from several perspectives and points of entry. Students are able to solve increasingly ill-defined and ill-structured problems. They actively and consciously develop research and collaboration skills that help them understand the complexity of the problem and how it relates to them. Students are drawing on what they have learned either within or	Based on their understanding of their studies, their community and their resources, **students** develop a problem to solve that currently challenges them. They work in teams to ensure a range of voices and perspectives are represented in the task. They utilize a variety of resources to find and implement a solution. Problems frequently require students to draw on multidisciplinary skills.. In addition, students inherently learn the process of failure and innovation as they encounter more sophisticated problems. The problem necessitates community action with students serving as leaders of that process. **Teachers** help to illustrate the link between problem work and the content and skills required by state and national standards

outside expert.	to a wider audience.	between disciplines to most effectively solve the problem.	

Developing Expertise

What: Expertise is a process of constant reinvestment of specific knowledge and skill to develop increasingly higher levels of knowledge and problem solving skills. Expertise in learning encompasses content knowledge and skill, pedagogical, instructional, and learning practice, and accessing the social and cultural capital that exists within a community. Expertise is inherently social and involves seeking out others to learn as questions arise, sharing one's own knowledge, and knowing who to seek out for varied kinds of questions. Expertise can be formal, such as in the practice of the English teacher or surgeon, who have fairly defined bodies of knowledge and who are publicly recognized as experts. It can also be informal, such as in the adolescent who bakes, plays chess, or skateboards at a high level. Timely and intelligible feedback from peers and more expert others is critical to the development of expertise.

Why: Continual improvement of skills requires (1) persistent effort and (2) the capacity to both identify needs and seek out appropriate resources. These abilities (perseverance, metacognition, and effective search strategies) are essential to success in college and career fields. Students who have opportunities to reflect on and take responsibility for their own learning, as well as to build social and informational resource networks, will be prepared to enter and successfully persist in college and career pathways. Engaging with professionals in a variety of fields also holds instruction to a high standard of authenticity and accuracy, relating key content to real disciplinary practices and current questions.

How: Expertise exists in teachers, students, parents, industry professionals, and local community organizations. Each group has an important role to play. *Students* work independently and collaboratively to reflect on and refine their content knowledge and skill. They also work to develop human and technological networks within and external to the school, drawing on their networks strategically to advance their knowledge. Feedback from peers, teachers, and others may come from formal processes (e.g., assessments, adjudicated presentations) or be sought out in less formal contexts. *Teachers* further their knowledge and skills through individual and collaborative efforts, engaging outside expertise when practical. Consistent and iterative work with other teachers, students, and in diverse contexts leads to high levels of innovative practice. Like students, teachers need timely and accurate feedback from a range of sources, both formal and informal, to advance their expertise. Colleagues, students, subject matter experts and others can provide useful input to further develop teacher expertise. *Community members and industry professionals* work with the school community to make learning and instruction authentic and relevant to the discipline, the classroom, and the student. They help direct student learning and creativity through exposure to innovative problem solving in their own fields.

Further Reading:

Bereiter, C. & Scardamalia, M. (1993). *Surpassing ourselves: An inquiry into the nature and implications of expertise*. Chicago, IL: Open Court Press.

Bransford, J., Brown, A. L., & Cocking, R. (1999). *How people learn: Brain, mind, experience, and school.* Washington DC: National Academy Press.
Charness, N., Feltovich, P.J. & Hoffman, R.R. (2006). *The Cambridge handbook of expertise and expert performance.* New York, NY: Cambridge University Press.
Engeström, Y. (2008). *From teams to knots: Activity-theoretical studies of collaboration and learning at work.* New York, NY: Cambridge University Press.
Wenger, E. (1998). *Communities of practice: Learning, meaning, identity.* New York, NY: Cambridge University Press.

Implementation Continuum – Expertise			
Inclusion	**Integration**	**Transformation**	**Empowerment**
Teachers are the experts in the classroom. They work with students to build their precision and accuracy in using the concepts and vocabulary of the discipline, and may consult with community members/outside experts on the design of course curriculum Through the use of tools such as knowledge inventories or KWL charts, **students** are encouraged to reflect on their understanding and to be purposeful in gaining knowledge. Students are expected to develop some expertise in particular aspects of a problem, but the teacher ultimately directs the inquiry and the content.	**Teachers** are the experts in the classroom but find ways to move students toward taking on that role at various points of the unit. Teachers begin to build a network of support (fellow teachers, outside experts) in the professional practice of their discipline. They consult with members of this network to inspire students towards college and career opportunities and help them make connections between a discipline and its real world applications. **Students** are empowered to use their developing expertise to guide parts of the instruction and to support their peers. Students are also encouraged to monitor and reflect on their own understandings. They work with their teacher, their peers and other experts to close gaps in their	**Teachers** frequently position students as experts by drawing on students' outside experiences and giving them opportunities to research and teach concepts to their peers. Teachers also regularly collaborate with colleagues and people engaged in professional practice to broaden shared expertise. This collaboration is reflected in the authenticity of course problems and projects, which represent open questions in professional practice. Teachers also work with colleagues and professionals to find new ways to incorporate career readiness into student experiences. While teachers model how to build, maintain and use networks of expertise, **students** build networks of their own through membership in extracurricular activities,	**Teachers** coach students in building their networks, leadership skills, and communication skills as they work together to build the capacity of the community of learners in each class. Teachers routinely work with other teachers and outside experts to gain deeper content knowledge, broaden their inter-disciplinary knowledge, and perfect teaching practice. They make their classroom practices transparent to colleagues and visitors through practices such as peer observation and Instructional Rounds. **Student** reflection regarding experiences, engagement and knowledge results in a clear idea of their strengths and their areas for growth. Students share their strengths with peers and seek out resources (people, information, activities) to help them improve areas of weakness. Students use their social and

	understanding and seek out additional supports.	digital/electronic contacts, and exposure to professionals. Collaborations with professionals may lead to internship, mentorship, and shadow opportunities. Students also engage in reflection on their knowledge and skills, allowing them to identify areas of strength and need for improvement. Students form study groups or engage in other collaborations to raise their collective level of achievement.	information networks to investigate areas of interest and seek out opportunities to increase college and career readiness. **Teachers, students, and community members** interact within the school as expert learners to further deepen and broaden the knowledge base of the community and hold each other accountable to high standards of intellectual engagement.
Expertise is uni-dimensional and consolidated and distributed			Expertise is multi-dimensional

Culturally responsive instruction

What: Culturally responsive instruction (CRI) incorporates the student and his/her background, knowledge, experience, and expertise into the curriculum. "Culture" in this sense refers to more than a student's race or ethnicity; it encompasses family, religious, socioeconomic, and other groups to which students belong and in whose norms they participate and value. CRI is *validating* to students in that it incorporates their cultural and social background and knowledge into the content and curriculum of the class. It is *comprehensive* and *multidimensional* in its approach to curriculum because teachers use the community as a teaching resource, sometimes in inter-disciplinary ways that create relevant and sustained connections for students. It is *empowering* and *transformative* for students in that it meets them where they are and gives them the necessary skills to shape democratic discourse and processes locally, nationally, and globally.

Why: All students need educational experiences that prepare them to participate in an ever more diverse global community. Research strongly suggests that when teachers take intentional steps to incorporate students' experiences and expertise into the classroom, they 1) help students close gaps between the values of school and home, 2) make learning more authentic and relevant to them, and 3) create more opportunities for students from all backgrounds to authentically engage in coursework. Over time, students see themselves as valued participants in the learning community, value the varied backgrounds and experiences of their peers, and learn to leverage their social and intellectual capital to succeed in the classroom, school, and larger community.

How: CRI is not an add-on to the curriculum, but a perspective that permeates classroom practice. It involves such things as 1) viewing students' language skills and cultural memberships as assets to learning, 2) taking time to learn about students and their interests outside of school, 3) connecting curriculum content to local issues and/or issues relevant to students' lives, and 4) teachers, students and community members bring in examples and experiences from a variety of cultures and life experiences to illustrate the power of their discipline and content. Inclusive practice capitalizes on students' native language and values, but also informs students of the ways in which these may differ from the language and values of the workplace and higher education. It gives students from all backgrounds an awareness and respect for diverse social, ethnic, and religious cultures.

Further reading:

Banks, J.A., Au, K.H., Ball, A.F., Bell, P., Gordon, E.W., Gutierrez, K.D., Heath, S.B., Lee, C.D., Lee, Y., Mahiri, J., Nasir, N.S., Valdes, G. & Zhou, M. (2007). *Learning in and out of school in diverse environments: Life-long, life-wide, life-deep*. Seattle, WA: The LIFE Center (The Learning in Informal and Formal Environments Center) and the Center for Multicultural Education, University of Washington, Seattle.

Delpit, L.D. (1988). The silenced dialogue: Power and pedagogy in educating other people's children. *Harvard Educational Review, 58*(3), 280-298.

Gay, G. (2000). The power of caring. In *Culturally responsive teaching: Theory, research, and practice*. New York: Teachers College Press, pp. 45-76.

INTIME: Integrating new technologies into methods of teaching. (2002). *Culturally responsive teaching.* http://www.intime.uni.edu/multiculture/curriculum/Culture/Teaching.htm. Accessed 22 Aug 2012.

Implementation Continuum – Culturally Responsive Instruction			
Inclusion	**Integration**	**Transformation**	**Empowerment**
Teachers reference students' cultural background in class texts when it parallels required content of the class. Teachers make attempts to establish relationships with students' families and support networks outside of school. **Students** act independently to make meaningful connections between the content of their class and their prior knowledge.	**Teachers** make meaningful connections between the content, concepts, themes, and perspectives in the curriculum and students' prior knowledge and experiences. Teachers teach explicit school or workplace norms and help students know and practice appropriate behaviors. Teachers establish relationships with students' families and support networks outside of school to better tailor instruction to students' interests and needs. Teachers discuss students and student learning in ways that evidence sensitivity to students' experiences. **Students** suggest ways assignments and assessments could be modified to capitalize on students' interests and experiences. Students are encouraged to share ways their cultural and social experiences connect to the content of class with their peers and teacher.	**Teachers** make changes in the curriculum to enable students to view concepts, events, issues, problems, and themes from the perspectives of diverse groups. Teachers have deep knowledge of the lives of individual students and how those students associate with various racial, ethnic, and cultural groups outside of school. Teachers use that knowledge to 1) modify their curriculum and instruction and 2) problem solve with other teachers and students' families and outside networks. **Students** are prepared intellectually, socially, and emotionally to work with complex and important problems that ask them to navigate social, cultural, and historical differences. Students are empowered to create meaningful connections between their lives and the content and curriculum of the class. Students	**Teachers** work closely with each other and with key community members to develop curriculum and content that spans disciplines and communities within and without the school. Teachers talk about students in ways that evidence deep knowledge of many aspects of students' lives. Teachers use students' experience and background as the starting point of learning for all coursework. **Students** respectfully engage each other's historical, social, and cultural backgrounds as a source of their own learning. Students apply and synthesize their understandings to challenge prejudicial beliefs and to engage in dialogue with diverse local, national, and global communities. Students identify important social problems and issues, gather pertinent data, clarify their values on the issues, make

	Students understand specific ways in which norms and practices may differ between school, peer, work, and home contexts and clear expectations within each.	participate successfully in the norms of school and workplace settings, as well as in home, peer, and other communities.	decisions, and take reflective actions to help resolve the issue or problem.

Student voice

What: Student voice is, literally, the extent to which students are invited and feel welcomed giving their input to what happens within the school and classroom. Students can provide valuable input in classroom conversations, in design of curriculum and behavior norms, in creating norms for peer-peer interaction, and in conversations about school policy and governance.

Why: When schools and teachers engage students' voices and opinions, they also evidence a belief that 1) what students have to say matters to how classrooms and schools are run, 2) as life-long students, youth have expertise and knowledge that teachers can leverage to make their instruction more authentic and relevant, 3) students, as a group, can serve as partners in school renewal efforts and initiatives, and 4) students benefit from the kind of leadership, creative problem-solving, and critical thinking skills expected of them when they become citizens of their school community and partners in school governance. Students represent a massive untapped resource of knowledge and expertise schools can use to engage more students in the learning process. Research overwhelmingly shows that student achievement and overall engagement increases when students assume ownership over their school community.

How: In the classroom, teachers can engage student voice through formative assessment strategies, surveys, informal conversations, and other means of collecting feedback on curriculum and instructional strategies. Many teachers and school leaders already leverage student voice to inform how students perceive a curriculum, course, or school/classroom environment. In addition, as teachers learn more about students' experiences, communities, and abilities outside of school, they can better connect course material to relevant and meaningful topics. As teachers become more comfortable with using students' feedback to make changes in their classrooms, eliciting students' opinions and involving students in the change process should become more intentional, formal, and routine so it becomes an institutionalized tool of good instructional practice. Teachers should be explicit with students about how their feedback has influenced changes they have made to their instruction, to specific units and lessons, and to how they think about the content they teach. School leaders, too, should increasingly empower students to take an active role in setting or changing school policies and acting on issues that are meaningful to them and their communities.

Further reading:

Cook-Sather, A. (2002). Authorizing students' perspectives: Toward trust, dialogue, and change in education. *Educational Researcher, 31*(4), 3-14.

Elias, M. J. (2010). School climate that promotes student voice. *Principal Leadership, 11*(1), 22-27.

Griffith, A. S., & Gill, P. B. (2006). Including student voice in the design process. *Journal of At-Risk Issues, 12*(2), 1-6.

Mitra, D. L. (2003). Student voice in school reform: Reframing student-teacher relationships. *McGill Journal of Education, 38*, 289-304.

Shultz, J. J., & Cook-Sather, A. (2001). *In our own words: Students' perspectives on school.* Lanham, Md.: Rowman & Littlefield.

Implementation Continuum – Student Voice			
Inclusion	**Integration**	**Transformation**	**Empowerment**
Teachers seek student input on course curriculum and design, and on creating classroom norms. Teachers make decisions about how or whether to implement student suggestions. Formative assessment strategies are used during instruction to elicit feedback from students and assess student learning. **Students** provide feedback on course curriculum and classroom norms. Students participate actively in class discussions.	**Teachers** offer students a variety of ways to make contributions (orally, in writing, in small groups, whole class, etc.). Results of student surveys and focus groups are shared with students. **Students** can see how their feedback changes the trajectory of the course and curriculum design process. Student prior knowledge and backgrounds are a source of expertise in matters of classroom decision-making.	**Teachers** actively draw on student leadership to advance the curricular goals of the class (including peer coaching and peer assessment). **Students** co-construct course content. All students feel confident sharing their opinions in multi-generational environments. Students take responsibility for their own learning and, as a result, are situated as experts within the classroom in matters of curriculum design, change, implementation, and assessment.	**Teachers** facilitate student navigation of school and community resources. **Students** use their background, prior experience and knowledge to substantially affect the trajectory of their own learning within courses and the school. Students take responsibility for the learning of the community as a whole, and actively seek out opportunities to assist peers outside the classroom environment.

Collaborative groups (Students):

What: Collaboration is the collective action of groups to solve problems. High-quality collaboration is characterized by a set of both *interpersonal* and *project management* behaviors. *Interpersonal* behaviors supporting successful collaboration include active listening to all fellow members; responding to and building on others' ideas; and an ability to resolve conflict. *Project management* behaviors include displaying responsibility to the group (following through on assignments, going beyond simply completing one's individual assignment to see how the assignment adds to the quality of the product as a whole); and awareness of group goals and timelines, including frequent check-ins and adjustments as needed. Additionally, in order for students to see the effectiveness of and need for collaboration, the tasks they address should be "groupworthy" – that is, tasks that require multiple members' skills and inputs to be successfully completed.

Why: Collaboration is a critical skill for college and workplace environments. Problems confronted by professionals are often too complex, complicated, and multi-dimensional for individuals to solve in isolation. For students to be college and career ready, they must develop skills and gain practice with working in teams to solve complex problems.

How: Students collaborate over a period of weeks and/or months to develop ideas and advance creative solutions to ill-defined problems. Teachers emphasize the need for different types of skills in order to solve assigned tasks. They help students think in advance about possible challenges, and may require students to create contracts or agreements clarifying group expectations. Teachers also provide vocabulary and other supports to ensure that English Language Learners and students with disabilities can access the tasks. Teachers arrange group membership so that all students have maximum opportunity to contribute, and scaffold students as needed in project management skills such as breaking projects down into sub-tasks and creating timelines. As student skills develop, students take responsibility for leading the collaborative work. Teachers facilitate, offering support and intervening in response to student request. Throughout the process, students, teachers, and other adults provide feedback on teams and team member accomplishments to improve effectiveness and to track achievement of learning goals.

Further Reading:

Barron, B. (2000). Achieving coordination in collaborative problem-solving groups. *The Journal of the Learning Sciences, 9,* 403-436.

Barron, B. (2003). When smart groups fail. *The Journal of the Learning Sciences*, *12*(3), 307–359.

Barron, B. & Darling-Hammond, L. (2008). Teaching for meaningful learning: A review of research of inquiry-based and cooperative learning. Excerpted from Darling-Hammond, L., Barron, B., Pearson, P.D., Schoenfeld, A.H., Stage, E.K., Zimmerman, T.D.,

Cervetti, G.N., & Tilson, J. *Powerful learning: What we know about teaching for understanding.* San Francisco: Jossey-Bass. PDF retrieved from http://www.edutopia.org/pdfs/edutopia-teaching-for-meaningful-learning.pdf.

Cohen, E.G. (1994). Restructuring the classroom: Conditions for productive small groups. *Review of Educational Research, 64*, 1-35.

Cohen, E.G. (1994). *Designing groupwork: Strategies for heterogeneous classrooms.* Revised Edition. New York, NY: Teachers College Press.

Lotan, R. A. (2003). Group-worthy tasks. *Educational Leadership*, *60,* 72-75.

Wenger, E. (1998). *Communities of practice: Learning, meaning, identity.* New York, NY: Cambridge University Press.

Implementation Continuum—Collaborative Groups (Students)			
Inclusion	**Integration**	**Transformation**	**Empowerment**
Teacher adds group work strategies to the lesson or unit as evidenced in strategies like think/pair/share processing practices. Teacher sets clear expectations for group work, stressing cooperation between students. Teachers hold students accountable as individuals to the explicit goal of the group work activity and are the primary driver of the management of the project. Students work in groups to complete a task or assignment. Students are held individually accountable to the task. Students are engaged in activities that require them to listen actively and build on each other's ideas in order to complete a task or a product. They develop the capacity to evaluate themselves in terms of the communication skills.	Norms and roles are explicitly taught and occasionally reinforced throughout the unit and course of study. Teacher integrates accountability for group work for both individual students and the group and works with students to begin to own the management of their project. Teachers utilize a variety of ways to support student interaction that is focused on communication and relationship building and provides multiple opportunities for reflection and re-engagement in the work. Students use those norms and roles to guide their work. Students are held accountable as individuals and occasionally as a group to the work they complete in groups. Students are directed to operate according to pre-determined roles and norms. In addition to listening and building	Teacher reinforces collaboration as a central component of class membership. It is a taught and practiced skill, goal-driven and concerned with outcomes, and routinely used throughout each unit of study. Teachers promote project management including the group setting their own timelines and objectives to complete and assigned task and supports students in holding each other accountable. In addition to continuing to improve their interpersonal skills, students also begin to engage in more self-directed project management. Students choose collaboration as the primary tool by which they solve problems as a result of the course content and in their work in groups. Students are accountable as individuals and to each other as group members in	Students pre-establish roles and norms to guide their work with no prompting or further instruction. Students use norms to navigate differences and obstacles within the group. Students hold each other accountable for learning within the group and to completion of a task or challenge cycle as individuals and as a group. Students are able to effectively monitor the group's progress toward their goals and can readjust their plan as needed to ensure full participation by all members. Students' ability to engage in communication that validates and honors the work of each person in the group incentivizes participation and creates a safe, productive group. Students exhibit the ability to integrate group reflection and processing after the task is

	off each other's ideas, students are also expected to build relationships and manage conflict within their groups. They develop the capacity to evaluate themselves and other students in their interpersonal skills.	ways they deem authentic and relevant. Students work together to establish goals for their work and utilize each other's expertise to continually make their product better.	complete. Teachers reinforce and review expectations for collaborative work. Teachers are the final arbiter of the quality of student work, but students are the final arbiter of the way in which that work was completed.
Teacher-directed collaboration  **Student-directed collaboration**			

ACADEMIC DISCOURSE

What: Academic discourse includes general and discipline-specific vocabulary, as well as diverse forms of oral and written communication. Key functions of academic discourse include seeking information, informing, analyzing, comparing, classifying, predicting, hypothesizing, justifying, persuading, solving problems, synthesizing, and evaluating. Students are given explicit opportunities in classrooms to practice each of these language functions in the context of academic content areas. Students also practice diverse forms of communication, including peer-to-peer discussion, whole class presentation, writing of creative or technical materials, and other methods authentic to a discipline's academic or professional practice. By the end of their four years at Sammamish, students are becoming independent practitioners who are able to communicate as mentors to younger students and colleagues to industry professionals.

Why: Students regularly use various kinds of formal and informal communication – with teachers, peers, family members, teammates, and others. They also communicate through a variety of means, including telephone, text, e-mail, spoken and written words. Many speak multiple languages throughout a given day. Students who use English competently in everyday conversational settings – both native and non-native English speakers - may nevertheless experience significant challenge in using academic language (e.g., Basic Interpersonal Conversational Skills (BICS) versus cognitive academic language proficiency (CALP)). To help students become colleagues within high school, college, or career communities, they need to understand and purposefully practice appropriate uses of language in academic situations.

How: Language is taught best within a context, as it surfaces in discipline-specific situations. Teachers draw on students' existing language abilities, including everyday forms of talk (e.g., persuading, informing, questioning, predicting) and foreign language skills, to develop academic communication. Vocabulary and forms of expression are taught using visual and written representations, with multiple opportunities for students to practice, receive feedback, and improve their performance. Teachers help students make explicit distinctions

between academic and other communication styles, as well as contexts in which different styles are most appropriately used. As students' skills develop, teachers move increasingly into a facilitator role. They also provide increasing opportunities for students to communicate with practitioners of various disciplines in authentic professional contexts.

Further Reading:

Solomon, J. & Rhodes, N.C. (1995). *Conceptualizing academic language*. National Center for Research on Cultural Diversity and Second Language Learning Research Reports. Center for Research on Education, Diversity and Excellence, UC Berkeley. http://escholarship.org/uc/item/9802j9tg Accessed 11 January 2013.

Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In *Schooling and language minority students: A theoretical framework*. Los Angeles: California State University; Evaluation, Dissemination, and Assessment Center.

Echevarria, J., Vogt, M., & Short, D.J. (2010). *Making content comprehensible for secondary English learners: The SIOP model*. New York City: Allyn & Bacon.

Implementation Continuum			
Inclusion	**Integration**	**Transformation**	**Empowerment**
Teachers purposefully teach vocabulary that is aligned with the content of the course and embedded in problem contexts. Teaching is supported through various kinds of text and is regularly assessed. **Students** are responsible for learning and correctly using vocabulary aligned to course content.	**Teachers** make purposeful use of course vocabulary in class activities and discussions. Teachers introduce students to multiple forms of communication appropriate to a discipline and to the specific problem at hand. **Students** hold each other accountable through discussion norms that prioritize accurate and appropriate use of vocabulary. Students practice skills in presentation, argumentation, listening, analysis, discussion,	**Teachers** explicitly illustrate the intersection of conceptual vocabulary and habits of mind that will support students in successful learning. Teachers provide opportunities for students to practice and receive feedback on various types of communication within each challenge cycle, and hold students accountable to increasingly professional standards of expression. **Students** are assessed on their learning, retention, and application	**Teachers** engage students in making their own meaning from words and ways of speaking and support students in further independent exploration. Teachers, students, and expert community members have a comfort level with terms and forms of discourse that allow them to address each other as peers. **Students** help each other learn vocabulary through regular, correct usage. They are able to identify and utilize habits of mind that are

	and/or peer critique as these types of communication become necessary in the course of solving problems.	of appropriate terms. They also receive feedback and opportunities for practice in multiple modes of communication appropriate to the discipline. Students plan with teachers the forms of communication that are most appropriate for their solutions to a given problem and are assessed on their ability to carry out those plans.	taught throughout the course in order to describe what they see and to define problems and communicate their solutions. Students become aware of gaps in their knowledge and skills, and take steps to strengthen these areas.

Authentic Assessment

What: Teachers continually use both formative and summative assessment to achieve student learning objectives and to collect data for improving their practice. Good assessment is timely, transparent, thoughtful, and specific and is meaningful to students and teachers. Authentic assessment measures student capacities in a variety of ways. Assessment methods are chosen to match the standards and skills being measured, as well as to reflect performances of professionals in a given discipline. Students are given multiple opportunities over time to demonstrate mastery in the content and skill objectives of the course with an emphasis on growth over time. Authentic assessment is based on articulated standards drawn from the Common Core, College Board, and other state and national standards.

Why: Assessment that clearly connects to the community, to external standards of content and practice, and to how professionals solve problems, will require collaborative and creative problem solving and critical thinking which prepares students for career and college. When these connections are made explicit, students also see meaning in their course assignments and are able to reflect on their areas of strength and needs for improvement. Using a variety of assessment methods, matched to desired content and skills, also provides more valid measures of student capacity than traditional testing alone.

How: By fully understanding the standards associated with the course, teachers seek new ways to measure how students meet content and skill standards with a focus on growth over time. Teachers look for increasingly rigorous ways of measuring student achievement including presentations, portfolios, writing samples, research experiences, and other similar formats. While these types of assessment provide valuable feedback, they will need to be used in concert with traditional tests to provide a complete picture of students' content knowledge and skills. As the emphasis shifts in the classroom to more student driven products, teachers will also be assessing *how* students are accomplishing those tasks in addition to *what* they are producing. The how may include assessment of collaboration, communication, creativity, precision, and problem solving skills and should involve the students in reflection and goal setting around their growth in those areas.

Further Reading:

Darling-Hammond, L., Ancess, J. & Falk, B. (1995). *Authentic assessment in action: Studies of schools and students at work*. New York, NY: Columbia University Press.

Mueller, J. (2012). What is authentic assessment? Retrieved September 11, 2012 from http://jfmueller.faculty.noctrl.edu/toolbox/whatisit.htm.

Scriffiny, P.L. (2008). Seven reasons for standards-based grading. *Educational Leadership, 66*(2), 70-74.

Wiggins, Grant (1990). The case for authentic assessment. *Practical Assessment, Research & Evaluation*, 2(2). Retrieved September 11, 2012 from http://PAREonline.net/getvn.asp?v=2&n=2.

Implementation Continuum – Authentic Assessment			
Inclusion	**Integration**	**Transformation**	**Empowerment**
Teachers assess the quality of students' projects or performance through both formative and summative assessment. Assessments match valued course objectives and are used to inform the instruction. While creative assessments are used, the bulk of a students' grade comes from more traditional assessments or completion of classwork. **Students** receive rubrics and standards in advance and are aware of what knowledge and skills will be assessed. Students are primarily assessed individually, on the content knowledge of the course.	**Teachers** create assessments that are coherent, utilizing qualitative and quantitative measures of student performance to ensure connections among the short and long-term learning objectives, the instruction, and the tasks students are asked to do. These assessments (formative and summative, paper-based or less traditional) assess students' ability to not only understand, but also apply the content knowledge of the class. Assessments are used as artifacts and evidence of student learning to inform instructional and collaborative practice. **Students** receive detailed rubrics and standards in advance. They are assessed individually and in groups on their ability to understand and apply their knowledge and skills.	**Teachers** and **students** (sometimes in conjunction with expert community members) co-construct appropriate criteria for student solutions to ill-defined, complex problems. Teachers serve as coaches, providing frequent formative assessment and revision opportunities to help scaffold learning. Expert community members may also provide feedback on student work and the quality of final products. Teachers hold final responsibility for student grades. Teachers, students, and/or expert community members hold students accountable for both group and individual student learning. All three groups use assessment as a focus of reflection to inform future instruction.	**Students** consult with **teachers** and experts to devise plans for solving course problems. Students hold themselves accountable to standards of cooperative learning, understanding, and application of content knowledge, using teachers and experts as coaches advising them along the way. Authentic assessments, with a focus on sustained, collaborative inquiry and multiple opportunities to show mastery of specific content and skills, are the bulk of students' grades and students are able to articulate their growth over time in the course. Their self-reflection and metacognition around what they know also plays a substantive role in their final grade for the course.

Inclusion Level of PBL

Authentic Problems	**Teachers** develop and implement problems that seek to engage student thinking across a wide variety of content goals in their class. The problems may be based on student interest. They have one correct process and answer and may or may not reflect the work of professionals in the field. **Students** demand significantly supported learning from both the teacher and expert to complete the problem task. Students present their work to classmates, their teacher and/or outside expert.
Expertise	**Teachers** are the experts in the classroom. They work with students to build their precision and accuracy in using the concepts and vocabulary of the discipline, and may consult with community members/outside experts on the design of course curriculum Through the use of tools such as knowledge inventories or KWL charts, **students** are encouraged to reflect on their understanding and to be purposeful in gaining knowledge. Students are expected to develop some expertise in particular aspects of a problem, but the teacher ultimately directs the inquiry and the content.
Culturally Responsive Instruction	**Teachers** reference students' cultural background in class texts when it parallels required content of the class. Teachers make attempts to establish relationships with students' families and support networks outside of school. **Students** act independently to make meaningful connections between the content of their class and their prior knowledge.
Authentic Assessment	**Teachers** assess the quality of students' projects or performance through both formative and summative assessment. Assessments match valued course objectives and are used to inform the instruction. While creative assessments are used, the bulk of a students' grade comes from more traditional assessments or completion of classwork. **Students** receive rubrics and standards in advance and are aware of what knowledge and skills will be assessed. Students are primarily assessed individually, on the content knowledge of the course
Student Voice	**Teachers** seek student input on course curriculum and design, and on creating classroom norms. Teachers make decisions about how or whether to implement student suggestions. Formative assessment strategies are used during instruction to elicit feedback from students and assess student learning. **Students** provide feedback on course curriculum and classroom norms. Students participate actively in class discussions.
Collaboration	Teacher adds group work strategies to the lesson or unit as evidenced in strategies like think/pair/share processing practices. Teacher sets clear expectations for group work, stressing cooperation between students. Teacher holds students accountable as individuals to the explicit goal of the group work activity. Students work in groups to complete a task or assignment. Students are held individually accountable to the task.
Academic Discourse	**Teachers** assess the quality of students' projects or performance through both formative and summative

	assessment. Assessments match valued course objectives and are used to inform the instruction. While creative assessments are used, the bulk of a students' grade comes from more traditional assessments or completion of classwork. **Students** receive rubrics and standards in advance and are aware of what knowledge and skills will be assessed. Students are primarily assessed individually, on the content knowledge of the course.

Integration Level of PBL

Authentic Problems	**Teachers** devise problems that reflect challenges in the field or discipline. Problems have multiple possible solutions or solution strategies. Teachers may work with outside experts to develop ideas and give students feedback on their work. Teachers may develop a long-term relationship with outside experts, allowing them to interact in the course each year to benefit student learning. Experts serve as mentors and as links to careers related to course content and skills. **Students** see ways in which the problem is authentic and relevant to them. They begin developing research and collaboration skills that help them understand the complexity of the problem and how it relates to them. Students are expected to complete the task to a professional standard and are given opportunities to display their work to a wider audience.
Expertise	**Teachers** are the experts in the classroom but find ways to move students toward taking on that role at various points of the unit. Teachers begin to build a network of support (fellow teachers, outside experts) in the professional practice of their discipline. They consult with members of this network to inspire students towards college and career opportunities and help them make connections between a discipline and its real world applications. **Students** are empowered to use their developing expertise to guide parts of the instruction and to support their peers. Students are also encouraged to monitor and reflect on their own understandings. They work with their teacher, their peers and other experts to close gaps in their understanding and seek out additional supports.
Culturally Responsive Instruction	**Teachers** make meaningful connections between the content, concepts, themes, and perspectives in the curriculum and students' prior knowledge and experiences. Teachers teach explicit school or workplace norms and help students know and practice appropriate behaviors. Teachers use established relationships with students' families and support networks outside of school to better tailor instruction to students' interests and needs. Teachers discuss students and student learning in ways that evidence sensitivity to students' experiences. **Students** suggest ways assignments and assessments could be modified to capitalize on students' interests and experiences. Students are encouraged to share ways their cultural and social experiences connect to the content of class with their peers and teacher. Students understand specific ways in which norms and practices may differ between school, peer, work, and home contexts and clear expectations within each.
Authentic Assessment	**Teachers** create assessments that are coherent, utilizing qualitative and quantitative measures of student performance to ensure connections among the short and long-term learning objectives, the instruction, and the tasks students are asked to do. These assessments (formative and summative, paper-based or less traditional) assess students' ability to not only understand, but also apply the content knowledge of the class. Assessments are used as artifacts and evidence of student learning to inform instructional and collaborative practice. **Students** receive detailed rubrics and standards in advance. They are assessed individually and in groups on their ability to understand and apply their knowledge and skills.
Student Voice	**Teachers** offer students a variety of ways to make contributions (orally, in writing, in small groups, whole class, etc.). Results of student surveys and focus groups are shared with students. **Students** can see how their feedback changes the trajectory of the course and curriculum design process. Student prior knowledge and

	backgrounds are a source of expertise in matters of classroom decision-making.
Collaboration	Teacher teaches collaboration as a classroom routine. Norms and roles are explicitly taught and occasionally reinforced throughout the unit and course of study. Teacher integrates accountability for group work for both individual students and the group. Students use those norms and roles to guide their work. Students are held accountable as individuals and occasionally as a group to the work they complete in groups. Students are directed to operate according to pre-determined roles and norms.
Academic Discourse	**Teachers** make purposeful use of course vocabulary in class activities and discussions. Teachers introduce students to multiple forms of communication appropriate to a discipline and to the specific problem at hand. **Students** hold each other accountable through discussion norms that prioritize accurate and appropriate use of vocabulary. Students practice skills in presentation, argumentation, listening, analysis, discussion, and/or peer critique as these types of communication become necessary in the course of solving problems.

Transformation Level of PBL

Authentic Problems	Based on their understanding of their subject and their discipline, **students, teachers** and experts work collaboratively to identify and solve problems. The teacher serves to align the problem with the content and skill goals of the class, ensures that students receive regular feedback and guidance, but does not direct the outcome of the problem. Because the problems are naturally broad, there is no single correct answer and the problems can be tackled from several perspectives and points of entry. Students are able to solve increasingly ill-defined and ill-structured problems. They actively and consciously develop research and collaboration skills that help them understand the complexity of the problem and how it relates to them.
Expertise	**Teachers** frequently position students as experts by drawing on students' outside experiences and giving them opportunities to research and teach concepts to their peers. Teachers also regularly collaborate with colleagues and people engaged in professional practice to broaden shared expertise. This collaboration is reflected in the authenticity of course problems and projects, which represent open questions in professional practice. Teachers also work with colleagues and professionals to find new ways to incorporate career readiness into student experiences. While teachers model how to build, maintain and use networks of expertise, **students** build networks of their own through membership in extracurricular activities, digital/electronic contacts, and exposure to professionals. Collaborations with professionals may lead to internship, mentorship, and shadow opportunities. Students also engage in reflection on their knowledge and skills, allowing them to identify areas of strength and need for improvement. Students form study groups or engage in other collaborations to raise their collective level of achievement.
Culturally Responsive Instruction	**Teachers** make changes in the curriculum to enable students to view concepts, events, issues, problems, and themes from the perspectives of diverse groups. Teachers have deep knowledge of the lives of individual students and how those students associate with various racial, ethnic, and cultural groups outside of school. Teachers use that knowledge to 1) modify their curriculum and instruction and 2) problem solve with other teachers and students' families and outside networks. **Students** are prepared intellectually, socially, and emotionally to work with complex and important problems that ask them to navigate social, cultural, and historical differences. Students are empowered to create meaningful connections between their lives and the content and curriculum of the class. Students participate successfully in the norms of school and workplace settings, as well as in home, peer, and other communities.
Authentic Assessment	**Teachers** and **students** (sometimes in conjunction with expert community members) co-construct appropriate criteria for student solutions to ill-defined, complex problems. Teachers serve as coaches, providing frequent formative assessment and revision opportunities to help scaffold learning. Expert community members may also provide feedback on student work and the quality of final products. Teachers hold final responsibility for student grades. Teachers, students, and/or expert community members hold students accountable for both group and individual student learning. All three groups use assessment as a focus of reflection to inform future instruction.
Student Voice	**Teachers** actively draw on student leadership to advance the curricular goals of the class (including peer coaching and peer assessment). **Students** co-construct course content. All students feel confident sharing their opinions in multi-generational environments. Students take responsibility for their own learning and, as a result, are situated as experts within the classroom in matters of curriculum design, change, implementation, and assessment.
Collaboration	Teacher reinforces collaboration as a central component of class membership. It is a taught and practiced skill, goal-driven and concerned with outcomes, and routinely used throughout each unit of study. Students understand the roles and norms of collaborative work and see those skills as purposeful and necessary. Students choose collaboration as the primary tool by which they solve problems as a result of the course content and in their work in groups. Students are accountable as individuals and to each other as group members in ways they deem authentic and relevant.
Academic Discourse	**Teachers** explicitly illustrate the intersection of conceptual vocabulary and habits of mind that will support students in successful learning. Teachers provide opportunities for students to practice and receive feedback on various types of communication within each challenge cycle, and hold students accountable to increasingly professional standards of expression.

	Students are assessed on their learning, retention, and application of appropriate terms. They also receive feedback and opportunities for practice in multiple modes of communication appropriate to the discipline. Students plan with teachers the forms of communication that are most appropriate for their solutions to a given problem and are assessed on their ability to carry out those plans.

Empowerment Level of PBL

Authentic Problems	Based on their understanding of their studies, their community and their resources, **students** develop a problem to solve that currently challenges them. They work in teams to ensure a range of voices and perspectives are represented in the task. They utilize a variety of resources to find and implement a solution. Problems frequently require students to draw on multidisciplinary skills. **Teachers** help to illustrate the link between problem work and the content and skills required by state and national standards. In addition, students inherently learn the process of failure and innovation as they encounter more sophisticated problems. The problem necessitates community action with students serving as leaders of that process. They stay engaged in the solution long after the school day, school year, and/or high school experience are over.
Expertise	**Teachers** coach students in building their networks, leadership skills, and communication skills as they work together to build the capacity of the community of learners in each class. Teachers routinely work with other teachers and outside experts to gain deeper content knowledge, broaden their inter-disciplinary knowledge, and perfect teaching practice. They make their classroom practices transparent to colleagues and visitors through practices such as peer observation and Instructional Rounds. **Student** reflection regarding experiences, engagement and knowledge results in a clear idea of their strengths and their areas for growth. Students share their strengths with peers and seek out resources (people, information, activities) to help them improve areas of weakness. Students use their social and information networks to investigate areas of interest and seek out opportunities to increase college and career readiness. **Teachers, students, and community members** interact within the school as expert learners to further deepen and broaden the knowledge base of the community and hold each other accountable to high standards of intellectual engagement.
Culturally Responsive Instruction	**Teachers** work closely with each other and with key community members to develop curriculum and content that spans disciplines and communities within and without the school. Teachers talk about students in ways that evidence deep knowledge of many aspects of students' lives. Teachers use students' experience and background as the starting point of learning for all coursework. **Students** respectfully engage each other's historical, social, and cultural backgrounds as a source of their own learning. Students apply and synthesize their understandings to challenge prejudicial beliefs and to engage in dialogue with diverse local, national, and global communities. Students identify important social problems and issues, gather pertinent data, clarify their values on the issues, make decisions, and take reflective actions to help resolve the issue or problem.
Authentic Assessment	**Students** consult with **teachers** and experts to devise plans for solving course problems. Students hold themselves accountable to standards of cooperative learning, understanding, and application of content knowledge, using teachers and experts as coaches advising them along the way. Authentic assessments, with a focus on sustained, collaborative inquiry and multiple opportunities to show mastery of specific content and skills, are the bulk of students' grades and students are able to articulate their growth over time in the course. Their self-reflection and metacognition around what they know also plays a substantive role in their final grade for the course.
Student Voice	**Teachers** facilitate student navigation of school and community resources. **Students** use their background, prior experience and knowledge to substantially affect the trajectory of their own learning within courses and the school. Students take responsibility for the learning of the community as a whole, and actively seek out opportunities to assist peers outside the classroom environment.
Collaboration	Teachers reinforce and review expectations for collaborative work. **Students** choose collaboration as the way they could complete a task because the task is complicated, complex, authentic, and/or ill-defined and because they see the value in seeking contributions from their classmates. Students are motivated by creatively and equally co-constructing knowledge as they work. Students pre-establish roles and norms to guide their work with no prompting or further instruction. Students use norms to navigate differences and obstacles within the group. Students hold each other accountable for learning within the group and students are held accountable to completion of a task or challenge cycle as individuals and as a group. Students

	exhibit the ability to integrate group reflection and processing after the task is complete.
Academic Discourse	**Teachers** engage students in making their own meaning from words and ways of speaking and support students in further independent exploration. Teachers, students, and expert community members have a comfort level with terms and forms of discourse that allow them to address each other as peers. **Students** help each other learn vocabulary through regular, correct usage. They are able to identify and utilize habits of mind that are taught throughout the course in order to describe what they see and to define problems and communicate their solutions. Students become aware of gaps in their knowledge and skills, and take steps to strengthen these areas.

VITA

Paul S. Sutton spent his childhood in Arcadia, a small suburb of Los Angeles, CA. Both his parents were teachers. His father worked as a teacher of foreign language students and his mother was a teacher and counselor for at-risk youth. Paul enjoyed reading and writing and graduated from Portland State University as an English major. From there he went on to graduate from York University in the UK with a Masters degree in English and spent a year teaching English at a language school in Istanbul, Turkey. Upon return to the US, he earned his Masters in Teaching from Seattle University and taught high school English for 8 years before returning to graduate school to pursue a doctorate in Curriculum and Instruction from the University of Washington. There he worked as a teaching assistant and teacher candidate coach in the teacher education program and later worked with Andrew Shouse at the Institute of Science and Math Education. He is currently a Post Doc research associate at the Institute of Science and Math Education, furthering his research into teacher collaborative learning.