EXPLORING CAMPUS CONTEXTUAL FACTORS WITHIN THE COGNITIVE AFFECTIVE MODEL OF CONCEPTUAL CHANGE: A QUALITATIVE STUDY

A Dissertation

by

AARON SCOTT MARVEL

Submitted to the Office of Graduate and Professional Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Chair of Committee	Joyce Juntune
Committee Members	Jay Woodward
	Robin Rackley
	Noelle Sweany
Head of Department	Shanna Hagan-Burke

December 2019

Major Subject: Educational Psychology

ABSTRACT

In efforts to improve student achievement, schools often implement new initiatives that teachers are asked or mandated to implement. Teacher beliefs concerning the initiative largely affect the quality of implementation.

The objective of this qualitative study was to identify the behaviors and beliefs of teachers within two different pathways of belief change as defined by the Cognitive Affective Model of Conceptual Change as well as to explore how teachers perceived the campus environmental factors present during a campus reform. The campus was in year two of the new implementation of Professional Learning Communities, an initiative begun in hopes of improving student reading achievement. The researcher observed and interviewed eight teachers selected through a maximum variation sampling method. During interviews the participants answered questions about their response to the campus initiative as well as the different factors they perceived as influencing their ability to implement the campus initiative. In addition, observations revealed teacher reactions to the initiative during Professional Learning Community meetings.

Of the eight participants six made a belief change in favor of Professional Learning Communities. Of these six only two systematically processed the message while four used a heuristic to assimilate the new belief. Of the two participants that rejected Professional Learning Communities one processed the message systematically while the other diverged into both paths. All participants discussed multiple campus environmental factors present during the campus reform.

While the Cognitive Affective Model of Conceptual Change provides only two strict pathways toward belief change, the results from this study suggest that in reality teachers may experience shades of each. All teachers considered their motivation to participate at some level, although some more so than others. In addition, all teachers at some point endeavored to answer questions about the reform message to make their ultimate decision to accept or reject the new belief. The many environmental factors that teachers discussed suggest the importance administrators have in creating environments that influence this belief change process. The four emergent themes reflect these environmental factors: (1) administrative decisions and operations either empower or suppress belief change, (2) the qualities of multi-level relationships determine individual mental engagement and participation in events pertaining to the campus reform, (3) teachers expect an effective and efficient use of time and resources, and (4) results that impact student achievement become a stimulus for the processing of new beliefs.

DEDICATION

To Emma

For her absolute devotion, selflessness and encouragement.

ACKNOWLEDGMENTS

My Ph.D. endeavor was not made alone, nor did it finally come to fruition from my own labor. First, my wife, Emma, and children, Brighton and Emerson, have sacrificed precious time with their husband and father. As this phase in life comes to an end, I wish to return the favor and now give my redeemed time to them; I look forward to more date nights and readings of *Little Blue Truck*.

Doubtless I would ever have even secured an opportunity to begin a doctorate program without the confidence and love and devotion of my parents. My mother has always been my biggest fan, consistently planting visions of greater things in my heart. If my mother spoke to my heart, then my father spoke to my soul. He taught me how to be patient, how to face challenges, and how to humble myself while living my life with confidence, all of which were indispensable characteristics to complete this dissertation.

Completing a dissertation while also working a full-time job in a position where others rely on your presence places a burden on colleagues. Todd Nesloney and Dr. Lindsay Starnes, however, never considered it a burden to grant me needed time away to attend evening classes, oral examinations, a research proposal, and a dissertation defense across the country. I thank them for always encouraging me to stay the course and finish strong.

Lastly, my dissertation committee members, Dr. Rackley, Dr. Sweany, Dr. Woodward, and especially Dr. Juntune walked every step of the way with me. Without their devotion to seeing me through this journey, I surely would not have reached the finish line. Specifically, I would like to thank Dr. Juntune, for being committed to

seeing me through, for scrupulously reading draft after draft of the dissertation, for her faithful guidance, and for her excitement for me at every step. I am a better student, academic, and person because of her.

CONTRIBUTORS AND FUNDING SOURCES

This work was supervised by a dissertation committee consisting of my advisor Professor Joyce Juntune of the Department of Educational Psychology, Professor Jay Woodward of the Department of Educational Psychology, Professor Noelle Sweany of the Department of Educational Psychology, and Professor Robin Rackley of the Department of Teaching, Learning, and Culture.

All work for the dissertation was completed by the student, under the advisement of Professor Joyce Juntune of the Department of Educational Psychology.

There are no outside funding contributions to acknowledge related to the research and compilation of this document.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

The advancement of the national economy largely relies on the education of its citizens and therefore the quality of its educational system. Since teachers are a major contributor to the quality of student education, significant amounts of research have focused on how to best train teachers for sustainable and substantial change toward best practices (Hanushek, 2005; Scott, 2015). The reciprocal relationship between belief and practice has led researchers to understand the intricacies of beliefs such as understanding the qualities of beliefs as opposed to knowledge (Pajares, 1992; Nespor, 1987; Abelson, 1979), the structure of beliefs (Green, 1971; Aguirre & Speer, 2000), factors that affect belief change (Opfer, Pedder, & Lavicza, 2011; Feeney, 2016; Grierson & Gallagher, 2009), the qualities of belief change movement (Lebak, 2015; Bamberger & Krajic, 2012; Aguirre & Speer, 2000; Mouza, 2016) , and understanding the relationship between beliefs and practice (Guskey, 1985; Cross, 2009; Artiles, Barreto, Pena, & McClafferty, 1998).

This study focused on exploring both the explicit and tacit campus contextual factors that exist during campus reforms. By exploring the perspectives of teachers during a campus reform movement, the researcher hopes to understand the different ways that teachers change their beliefs, and the contextual factors that they perceive as influencing their belief change and ultimately their professional development journey.

The study of teacher beliefs began with the recognition that teachers held certain perspectives about their role in the classroom and that their beliefs guided their actions.

At the rise of attention on teacher beliefs as an important aspect of teacher practice, there also rose an emphasis on constructivist classroom practices. Such practices were often contrary to the transmissionist traditions of teaching at the time. Therefore, to remedy this obstacle, attention was given to the teacher as a primary actor in instilling constructivist practices, more specifically to understanding teacher beliefs and how to shift their beliefs (Scott, 2015).

Researchers of teachers' beliefs have encountered several problems: ambiguity in the teacher belief change process (Ashton, 2015), establishing a consistent definition of beliefs (Pajares, 1992), the contrasting opinions on the role of affect and motivation in beliefs (Posner et al., 1992; Ashton, 2015; Pintrich, Marx, & Boyle, 1993), the importance and difficulty of longitudinal studies (Hoffman and Seidel, 2015; Levin, 2015), the reliance on small scale case studies (Levin, 2015), a lack of studies with diverse participants (Levin, 2015), and a lack of well articulated frameworks (Levin, 2015) to name a few. Nevertheless, such obstacles are worth scaling as beliefs have shown to be a strong predictor of teacher change and therefore a key component to consider in professional development (Ashton, 2015; Smylie, 1988).

The role of environment on motivation has been thoroughly argued and included in Pintrich et al.'s (1993) model for student conceptual change, but only moderately in teacher belief change. A few studies have included environmental components in their belief change models (Gregoire, 2003; Fazio, 1986) and only one has explicitly discussed and included the role of environment in a teacher belief change model (Opfer et al., 2011).

Quantitative, qualitative, and mixed methods have been used to study teacher beliefs although qualitative methods may be best suited (Olafson, Grandy, & Owens, 2015). Quantitative methods have relied on questionnaires for domain specific beliefs (Hoffman & Seidel, 2015). Qualitative research has taken many forms including case study, phenomenology, grounded theory, narrative research, action research, self-studies, and a general qualitative methodology (Olafson et al., 2015). This study employed a case study approach to explore the environmental factors that influence teacher belief change.

Statement of the Problem

Since teachers are a key factor for improving student achievement, substantial research has been devoted to identifying key characteristics of effective teacher professional development (Hanushek, 2005). Understanding teachers' beliefs, how they change, how they influence practice, and the environmental contexts by which they change may provide needed insight for professional development coordinators as they strive to enhance teacher training (Pajares, 1992; Nespor, 1987; Ebert & Crippen, 2010).

Teachers' beliefs serve as filters for their goals and practice (Cross, 2009; Torner, Rolska, Rosken, & Sriraman, 2010). For example, studies have shown beliefs to be related to the integration of classroom instructional practices such as inquiry-based learning (Lebak, 2015), technology (Ertmer & Ottenbreit-Leftwich, 2010; Brinkerhoff, 2006), and culturally congruent instruction (Lee, 2004). In addition, according to Smylie (1988) teachers' perceptions and beliefs are "the most significant predictors of individual change" (p. 23). Wheatley (2002) submits that cognitive dissonance spurs

teachers to make changes to their practice. Opfer et al., (2011) define dissonance as the difference between one's values (beliefs important to practice) and practice. As a teacher begins to implement classroom practices that are increasingly different from their values, they begin to experience cognitive dissonance that motivates them to learn. Conversely, as a teacher's values begin to shift away from their practice, they will also begin to experience dissonance, motivating them to learn. Professional development trainers can help teachers make their beliefs more explicit, which are often unconscious (Nespor, 1985; Ebert & Crippen, 2010), further exposing the dissonance between their beliefs and practice.

Nevertheless, some researchers have found that teacher belief change does not always result in change in classroom practice (Brinkerhoff, 2006; Miranda & Damico, 2015; Gamlem, 2015; Patton & Griffin, 2008; Powers, Zippay, & Butler, 2006). Contextual factors may help explain this discrepancy (Powers et al., 2006; Opfer et al., 2011; Feeney, 2016). This finding parallels Pintrich et al.'s (1993) argument that cognitive factors alone do not predict whether students are motivated to engage in learning tasks, but that classroom contextual factors influence student motivation and learning as well.

This study addressed two problems. First, the Cognitive Affective Model of Conceptual Change (CAMCC) describes two potential pathways to teacher belief change--the systematic and heuristic pathway. Within these pathways, teachers progress through checkpoints unique to each pathway to determine their level of engagement, and their motivational and ability levels, all of which regulate the type of information

processing in which the teacher will engage. Only one study (Ebert and Crippen, 2010) has used the CAMCC to describe teachers' belief change processes and the behaviors of teachers within each pathway. Further research is needed to seek validation, modification, or rejection of the CAMCC. Second, although research has identified and elaborated on multiple contextual factors that can influence the teacher belief change process, such factors have never been applied to the CAMCC or any other understanding of multiple belief change pathways. This study explored environmental factors that teachers perceive while progressing within a belief change pathway. Additionally, the results of this exploration produced some evidence that supports the transferability of the CAMCC model, although at times some teacher behaviors diverged from the model.

CHAPTER II

LITERATURE REVIEW

Introduction to the Topic

A systematic review of the literature on campus level teacher belief change and the contextual factors that arise as a result of a teacher belief change environment was conducted. This systematic review provided the context for this study. This review is organized into the following areas: 1) the nature of beliefs, 2) belief change, 3) the conceptual change models influencing the Cognitive-Affective Model of Conceptual Change, 4) the Cognitive-Affective Model of Conceptual Change, 5) Environment, and 6) Sources of Contextual Factors.

Method

The literature search included four criteria used to select the studies for this review. First, studies needed to address teacher belief change in some form. This included the figurative structure and movement of belief change, behavior changes that accompany belief change, and/or professed belief changes. Second, studies needed to include only studies concerning in-service teachers. This included teachers from early childhood through secondary and from public or private schools. Third, the teacher belief change process at some point during the study had to have taken place on a school campus. This excluded studies that focused only on teacher belief change taking place in service centers, summer workshops, conferences, or other external professional development programs. Fourth, studies needed to address the campus contextual factors that influenced the belief change process.

The researcher used three different electronic databases: Academic Search Complete, Education Resources Information Center (ERIC), and Education Full Text. Publication year was not restricted due to the limited number of studies within this topic. The search was limited to scholarly reviewed English language periodicals and journal articles. The search did include dissertations as there were very few studies that included discussions about the Cognitive-Affective Model of Conceptual Change. The researcher used "teacher belief change" as keywords in a boolean search. The study yielded 302 articles. Of these articles 237 were excluded. The researcher excluded articles that discussed teacher belief change with a focus on pre-service teachers, research on single individuals, articles about climate change (as it pertains to the environmental science of global climate patterns), and articles without an emphasis on belief change.

A second search using Academic Search Complete, Education Resources Information Center (ERIC), and Education Full Text with a publication year restriction from 2007-2017, limited to scholarly reviewed English language periodicals and journal articles, with a boolean search of "campus contextual factors" and "teacher beliefs" yielded 32 articles. Of these articles 25 were excluded. Studies were excluded because the participants were student rather than teachers, there was no focus on contextual factors, the study explored student change rather than teacher change, or only explored classroom contextual factors rather than campus contextual factors.

A third search using Academic Search Complete, Education Resources Information Center (ERIC), Education Full Text, PsycInfo, and Education Source with

no publication year limit due to the novelty of the topic, limited to scholarly reviewed English language periodicals, journal articles, and dissertations with a boolean search of "cognitive affective model of conceptual change" yielded six article. One article was excluded due to its focus on clinical therapy rather than teacher conceptual change, and one was a duplicate from a previous search.

The researcher also used two additional search strategies to find additional studies. First, ancestry searches through the reference lists of studies meeting inclusion criteria were completed yielding nine studies. Second, the researcher reviewed the International Handbook of Research on Teachers' Beliefs compiled by Fives and Gregoire Gill (2014) to find seminal studies that met inclusion criteria yielding six studies. The date of the final search was September 27, 2017. A total of 355 articles were found using these methods of which 264 were excluded with one duplicate. The reference list contains a total of 91 remaining studies.

While reviewing the abstracts yielded by the boolean search the researcher screened the search results to find the articles most relevant to our understanding of teacher belief change on school campus. The researcher excluded articles that discussed teacher belief change with a focus on pre-service teachers, research on single individuals, articles about climate change (as it pertains to the environmental science of global climate patterns), and articles without an emphasis on belief change. Many articles mentioned that teacher belief change occurred yet the research focused on other topics such as initiatives for inquiry-based learning, or the outcomes of autonomous learning environments. Such articles were removed. The researcher also removed

articles that did not address how environmental factors influenced conceptual change or beliefs change, articles that focused on how teachers influence classroom environments, and articles that did not clearly link environmental factors to belief change. There were also a few duplicate articles between search terms. After applying such filters through search criteria and physically reviewing the abstracts the researcher ended with 89 articles and 2 books.

Findings

Nature of Belief

The explication and development of a definition for beliefs has been attempted by several philosophers and researchers (Abelson, 1979; Nespor, 1987; Pajares, 1992). The nature of beliefs as such an abstract construct makes defining its bounds difficult and arbitrary. Due to such arbitrariness of the construct, a brief review of belief qualities developed by researchers can help us develop our own definition of beliefs as it differs from other common and similar constructs such as knowledge, attitudes, values, and concepts (Abelson, 1979; Nespor, 1987; Pajares, 1992). The belief qualities to be discussed include nonconsensuality, existential presumption, alternativity, affective and evaluative aspect, and episodic structure.

Nonconsensuality. The first quality of beliefs is nonconsensuality (Abelson, 1979; Nespor, 1987). In other words, the belief systems of one people group will not always align with belief systems of other people groups. In contrast, knowledge systems imply some consensus within and between people groups (Abelson, 1979). For a piece of information to be considered knowledge, consensus, at some undetermined

magnitude, must be achieved. Also, those within the groups may or may not be aware of the alternative belief systems. Those people groups who mutually agree on a belief system, if no other belief system has revealed itself as a potentiality, may actually consider that belief system as a knowledge system. In their world their exists no alternative, therefore what they believe is fact, and not something to be disputed. On the other hand, outside spectators of that particular people group may consider the same knowledge system as a belief system since, for the spectators, alternatives exist (Abelson, 1979; Nespor, 1987). In this respect, the identification of a belief system is rather relative. The Cognitive-Affective Model of Conceptual Change (CAMCC), formulated by Gregoire (2003), used in this study will directly address nonconsensuality as the model initiates with a reform message with the aim to change teacher beliefs. Belief change can only initiate when the beliefs embedded in the reform message engage with the beliefs held by the participant (Dole & Sinatra, 1998). Otherwise, the participant would never have the opportunity for a belief change moment.

Existential Presumption. Existential presumption includes beliefs about the existence of entities such as ghosts, conspiracies, or deities. These beliefs often serve as the central belief by which other beliefs and knowledge are organized (Abelson, 1979). The development of an existential presumption also usually involves the solidification of an ambiguous, transitory characteristic to one that is concrete, permanent, and generalized (Nespor, 1987). An example might be a teacher who believes her students struggle because they are too lazy. A statement such as this becomes a belief that

continues to affect the perspective the teacher has for his or her students as the statement becomes truth for all students and cannot be influenced through teacher efforts.

Alternativity. To envision and believe in the possibility of the development of a different world or reality is to hold a belief that represents the belief characteristic of alternativity (Abelson, 1979). Often people imagine how life "might be" or "could be", contrasting the world as it is. Such beliefs often occur in religious and political contexts such as a politician who believes in a world without abortion or a pastor that believes in a church body that cares for the poor. Often beliefs of alternative realities have a utopian leaning such as a teacher who envisions a classroom where all students arrive to class prepared, with homework complete, without baggage from homelife, and excited to learn from an engaging lesson which the teacher has diligently and lovingly developed. Similarly, Nespor (1987) describes a teacher attempting to create a class environment not based on any prior studies or research but purely from a desire to ensure her students can avoid the "mortifying experiences" she remembers as a student. In this example the teacher envisions an alternative reality that she believes has the potential to exist.

Alternativity is an important belief characteristic to consider when studying teacher belief change as an alternate reality may be the beliefs against which the reform message is advocating. Likewise, the aim of the reform message is to motivate teachers to consider a new alternate reality that may engage teachers toward the belief change process (Dole & Sinatra, 1998; Abelson, 1979).

Affective and Evaluative Aspect. Along the lines of nonconsensuality, beliefs also have an evaluative component, that is entities present multiple paths or poles of

which some are good and some are bad; some effective, some ineffective; some productive, some destructive; some desirable, some objectionable (Abelson, 1979; Nespor 1987). Belief systems also incite affective and therefore motivational forces that urge individuals toward varying degrees of depth of processing of the belief system. "A system that found some input exciting would process it more deeply, or if fearful would avoid it [...]" (Abelson, 1979, p. 358).

Nespor (1987) discusses how the emotions elicited by belief systems interact with knowledge systems. For example, knowledge of the rules of chess do not affect belief systems about the sport, however, the bordeness or excitement an individual feels when playing chess may affect how deeply the knowledge of chess rules is processed. Similarly, the CAMCC includes two pathways of information processing, both of which require a consideration of the affective qualities beliefs have on teachers (Gregoire, 2003). In addition, within the CAMCC teachers must evaluate beliefs about themselves and their environment, which in turn affect the motivation they have to processing information either deeply or superficially, drastically changing the reconstruction of their belief system at the conclusion of belief change.

Episodic Structure. Lastly, belief systems find their roots in episodic memory (or personal experiences) as opposed to semantic memory, in which knowledge systems are rooted (Abelson, 1979; Nespor, 1987). These personal experiences, therefore, are unique to the individual and will be used to initiate new beliefs and confirm existing ones. For example, a teacher who believes students are lazy will find new evidence to support her belief system if her new student refuses to complete assignments and

consistently arrives to class unprepared. Such an anecdotal memory provides 'subjective "proof" for the existing belief system' (Abelson, 1979, p. 359).

The CAMCC also incorporates a model of the relationship between attitude and behavior that demonstrates how initial attitudes toward people and events will help define situations which then guide behaviors. "Interpretations of objects and situations depend to a large extent on the knowledge structures, affect, values, and expectations that the individual holds" (Fazio, 1986, p. 209). The episodic nature of beliefs, as well as affective and evaluative qualities of beliefs, fashion beliefs to act as a filter for all subsequent interactions with new beliefs (Pajares, 1992). Similarly, within the CAMCC, teachers who are within the belief change process must use currently held beliefs to define the situation presented by the reform message (Gregoire, 2003). The resultant definition then guides subsequent behaviors and how they will process new information, including processing new beliefs.

Belief Change

Not only do beliefs have characteristics that help differentiate between beliefs and knowledge, but they also have a way of moving or shifting (Abelson, 1979; Nespor, 1987; Pajares, 1992; Lebak, 2015; Bamberger & Krajic, 2012; Aguirre & Speer, 2000). Essentially, these belief movements could be described as accommodations or assimilations of new information. To understand belief change movement, we must first understand the structure of beliefs.

Structure of Beliefs. First, as illustrated by Green (1971) beliefs do not exist in isolation of one another, but instead exist in belief bundles or systems. "Belief

substructures, such as educational beliefs, must be understood in terms of their connections not only to each other but also to other, perhaps more central, beliefs in the system" (Pajares, 1992, p. 325). Therefore, the study of belief movement cannot be viewed or understood as simply a change in one single belief, but instead as one belief affecting many. Beliefs within a belief system all relate to one another as one belief may hinge on a second belief, which then may actually hinge on a third belief, and so on (Green, 1971; Pajares, 1992). Essentially, beliefs are thought to be true because of the belief in other beliefs. Eventually, if we followed the sequence from belief to belief we would arrive at a primary belief. All other beliefs, stemming from this primary belief would then be derivative beliefs (Green, 1971). Interestingly, however, primary beliefs are not always stable. Derivative beliefs can become primary and vice-versa. Thus, one such belief change movement could be described as the deconstruction and reconstruction of a belief system (i.e. the switching of primary and derivative beliefs) (Green, 1971).

Belief Change Movement. In addition, teacher beliefs about a particular pedagogy or curriculum or assessment approach may phase through several derivative beliefs of the belief system before changes in the primary belief occur. Lebak (2015) explains the belief change movement within a science teacher's belief system about science pedagogy. The science teacher, Jerry, must confront several derivative beliefs that concern the primary belief of science teaching approaches before any true change in the primary belief occurs. For example, Jerry verbally declares a belief describing the teacher's role as a facilitator of learning, however, when he executes a lesson, he

regresses to more traditional teacher practices such as teacher control of information and lecture based approaches. Although Jerry never dismisses his belief that teachers should be facilitators of the learning, his actions and later reflections reveal a derivative belief about student readiness; according to Jerry, his students cannot handle an inquiry-based approach to science instruction. Only when peers challenge Jerry's beliefs and offer suggestions does he again try to implement an inquiry based instructional model. Throughout the implementation stage of inquiry-based instruction Jerry progresses and regresses between beliefs in his belief system until he finally finds success. This study illustrates, first, the necessity to address several derivative beliefs before real change can happen with primary beliefs, and second, that belief change movement can have a progressive and regressive pattern.

A longitudinal study on teachers receiving and implementing strategies to incorporate Nanoscience Technology into the classroom demonstrates again a progression and regression of beliefs, but illuminates the directionality of the beliefs, specifically toward beliefs about extrinsic or intrinsic barriers (Bamberger & Krajic, 2012). Before the Nanoscience Technology workshop, the teachers mostly hold beliefs that serve as intrinsic barriers to practice change such as lack of knowledge and ability to explain nanoscience technology. Immediately after the workshop the beliefs about intrinsic barriers greatly diminish; teachers feel confident in their abilities to implement Nanoscience Technology. Three months after the professional development (PD), however, barriers appear again, but this time in the direction of extrinsic barriers (Bamberger & Krajic, 2012). Essentially, in this example the overall movement of

beliefs is one from intrinsic barriers to extrinsic barriers over time. Each of these barriers, whether intrinsic or extrinsic, represents a derivative belief the teacher must address: "Concepts do not fit well with standards" or "There is a lack of time in the curriculum" (Bamberger & Krajic, 2012, p. 7) Once each of these derivative beliefs which serve as barriers have been removed, either through belief change of the derivative belief or finding resolutions to the perceived barrier, only then does the teacher begin to change classroom practices, in this case incorporating Nanoscience Technology in their instruction (Bamberger & Krajic, 2012).

A second type of belief change occurs as goals shift from one situation to the next. There exists a strong relationship between beliefs and goals as beliefs inform the goals teachers set and goal outcomes influence teacher belief systems (Aguirre & Speer, 2000). There exist two types of beliefs and goals: attributed beliefs and goals and professed beliefs and goals. Attributed beliefs and goals are those that are identified by the researcher. They may or may not be consistent with the "professed" beliefs and goals which are those that the teachers claim to hold (Aguirre & Speer, 2000). Whether attributed or professed, the beliefs and goals will shift depending on the current situation. With each new situation different beliefs connect to create belief bundles (Aguirre & Speer, 2000). Each new situation manifests a new and unique belief bundle which is then used by the teacher to set goals. For example, a student within a classroom could propose a question at which point the teacher must make a decision on how to proceed. This decision will be determined by the belief bundle that forms by the conglomeration of belief components. The teacher will then use this belief bundle to formulate a goal

which will then initiate a response. Just as seen in Torner et. al (2010) a teacher attempts to implement technology in her lesson about slope. Belief components such as discovery-oriented lesson beliefs and reality-related lesson beliefs strengthen her belief about technology use in the classroom. When the computers fail to work 20 minutes into the lesson, however, the teacher reverts to a time tested and experienced based subject-matter belief bundle with the central goal that the term "slope" must be mentioned in the lesson. This goal requires a shift to traditional teaching methods and a breakdown of the belief bundle supporting technology use in the classroom. As this example demonstrates, belief systems can change simply by proposing new challenges, requiring teachers to set new goals which then requires the formulation of new belief bundles with new belief components for each new situation (Torner et. al, 2010; Aguirre & Speer, 2000).

Mouza (2016) can further explicate two possibilities within the idea of belief bundle reconstruction. "Additive" learning involves the assimilation of new knowledge, ideas, and beliefs into existing knowledge. Within Aguirre and Speer's (2000) conception of belief change, additive learning would take the form of assimilating new belief components into existing belief bundles. "Transformative" learning, however, would take the form of dismantling current belief bundles, incorporating new belief components, and restructuring the belief components into a new belief bundle.

Thus, belief movement can take two forms: (1) through a restructuring of existing derivative and primary beliefs, or (2) through the formulation of situation specific belief bundles composed of belief components (Green, 1971; Lebak, 2015;

Bamberger & Krajic, 2012; Torner et. al, 2010; Aguirre & Speer, 2000). Belief movement can many times be temporary based on the situation at hand, however, these moments of new belief bundles can serve as opportunities to confirm or disconfirm new beliefs (Torner et al., 2010; Bamberger & Krajic, 2012).

As seen earlier in Lebak (2015) and Bamberger and Krajic (2012), the process to teacher learning is not linear (as in a direct path from reform message, to change in practice, to change in student outcomes, to belief change) but cyclical (Opfer, Pedder, & Lavicza, 2011; Senger, 1999). With Smylie's (1988) proclamation that "teachers' perceptions and beliefs are the most significant predictors of individual change", some research has focused on belief change as the end game (p. 23; Guskey, 1985). According to Guskey (1985) professional development (PD) should begin with changing classroom practices, which leads to change in student outcomes, and finally belief change. More recent research models, however, propose that belief change exists in a cyclical, three pronged pattern where all three factors interact and intersect with one another (Opfer et al., 2011; Feeney, 2016). In this model any three of the factors may initiate the cycle and the cycle is bidirectional. In other words, the direction of interaction can change at any point during the change process.

A discussion of the intricacies of belief movement serves as a micro explanation of the belief change process, but as we zoom out there exists a broader, more macro process of belief change. Researchers have often named these models using the term "conceptual change" as opposed to "belief change" (Pintrich et al., 1993; Dole & Sinatra, 1998; Pajares, 1992).

Conceptual Change Models

Researchers have postulated many conceptual change models and theories, each of which address different components of conceptual change (Posner, Strike, Hewson, & Gertzog, 1982; Pintrich et al., 1993; Chaiken, 1980; Fazio, 1986; Gregoire, 2003). Some focus on environmental or contextual factors, others affective and motivational factors, others cognitive factors, others the processing of information, and still others the effect of prior beliefs and attitudes on belief change (Pintrich et al., 1993; Posner, Strike, Hewson, & Gertzog, 1982; Chaiken, 1980; Fazio, 1986; Gregoire, 2003). Two models in particular have influenced the Cognitive-Affective Model of Conceptual Change formulated by Gregoire (2003): the Heuristic-Systematic Model of Information Processing, and Fazio's model of the relationship between attitude and behavior, both of which will be discussed next (Chaiken, 1980; Fazio, 1986).

Chaiken's Heuristic-Systematic Model of Information Processing. Pintrich et al. (1993) explains that true conceptual change is preceded by the processing of information. Chaiken (1980) further elaborates this idea explaining that deep conceptual change is characterized by a deep processing of information (i.e., a focus on the details of content and message characteristics such as comprehensibility and validity) while superficial conceptual change is characterized by heuristic processing of information or a focus on heuristics (i.e., source characteristics such as credibility or likeability). Such a dualistic approach to information processing is described in the Heuristic-Systematic Model (HSM) (Chaiken, 1980).

The HSM defines two pathways of information processing, heuristic processing and systematic processing, both of which yield different cognitive results relating to conceptual change (Chaiken, 1980; Chen, Duckworth, & Chaiken, 1990). When exposed to a message, the recipient of the message, assuming they decide to engage with the speaker, must process the information within the message before conceptual change can occur (or fail to occur), however, the method by which the recipient processes the information is not universal.

Individuals that engage in heuristic processing will rely on speaker qualities such as likeability and credibility more so than on message qualities such as plausibility and comprehensibility (Chaiken, 1980). They will use rules or "heuristics" such as attractiveness and expertise of the speaker to decide whether a message is agreeable. Those who process information using such heuristics may develop a conceptual change, however, the change may not endure.

Systematic processing, on the other hand, involves analysis of message characteristics such as the number of arguments and the relation of those arguments to the message's conclusion. Such analysis requires attention to details of the message and processing those details with currently held beliefs and concepts resulting in conceptual change or rejection of conceptual change (Chaiken, 1980; Chen et al., 1990).

The HSM fails to inform the teacher belief change process on two accounts. First, it does not consider how affect influences motivation to processing information (Gregoire, 2003). A teacher's affective state may influence whether she systematically processes information or whether she uses heuristics to process information. Second, the

HSM only considers message characteristics as a factor in relation to personal characteristics to influence depth of processing (Gregoire, 2003). Other factors, such as contextual factors as discussed in the CCM, may also influence depth of processing.

Fazio's Model of the Relationship Between Attitude and Behavior. Another approach to understanding behavior is by way of individuals' attitudes toward objects, specifically the way by which attitudes initially form. The initial attitude toward an object has shown to influence a person's subsequent behaviors even in encounters with those objects at much future dates (Fazio, 1986). Fazio's (1986) model is important to teacher belief change as teacher attitudes can greatly impact the success or failure of reform movements. Consider a teacher who has failed to implement inquiry-based learning. His past experiences may have established a negative attitude toward inquiry-based learning, thus affecting how he processes future campus initiatives within new inquiry based learning professional development efforts.

In addition, attitudes are essential when trying to make sense out of an event. Attitudes serve as a preparation device to make meaning of objects, and subsequently how to respond (Fazio, 1986). In this respect, attitudes play a major role in how a teacher decides to process information, whether heuristic processing or systematic processing.

The Cognitive-Affective Model of Conceptual Change

The Cognitive-Affective Model of Conceptual Change (CAMCC) outlines a potential model of the teacher belief change process beginning with the presentation of a reform message, spanning the multiple decisions and appraisals teachers must make

throughout the process, and ending with teacher belief change (or rejection of belief change). In an effort to understand and predict teacher belief changes, Gregoire (2003) has utilized findings from several conceptual change models (Pintrich et al.'s (1993) Conceptual Change Model, Chaiken's (1980) Heuristic-Systematic Model of information processing, and Fazio's (1986) Model of the Relationship Between Attitude and Behavior) to create the CAMCC. The CAMCC first considers the dualistic property of the HSM, recognizing two potential paths to belief change--systematic information processing and heuristic information processing; although not equal in quality, each path may result in belief change (Gregoire, 2003; Chaiken, 1980). As will be discussed later, the CAMCC differentiates between belief change in the form of accommodation and belief change in the form of assimilation. Second, the path by which teachers proceed within the CAMCC partly depends on the immediate attitude the reform message elicits as it relates to the situation of the event. Just as Fazio (1986) posits, when a situation presents itself, the existing attitude toward that situation many times guides the subsequent behaviors.

Gregoire's (2003) CAMCC begins with the presentation of a reform message. When teachers are presented with a reform message they immediately make an automatic evaluation of their current teaching identity in relation to the reform message causing the formation of an attitude directed toward the reform message. The questioning of identity leads teachers to consider whether the reform message requires attention while the formulated attitude determines the path the attention will lead, whether the new reform information takes a systematic processing path or heuristic

processing path (Gregoire, 2003; Fazio, 1986; Ebert & Crippen, 2010). A similar study in social psychology concerning confirming information versus disconfirming information yielded similar information processing patterns (Glock & Krolak-Schwerdt, 2013). Individuals who perceived characteristics within an individual of Turkish nationality that confirmed stereotypical expectations subsequently processed all accompanying information using heuristics (i.e. the existing stereotypes accompanying the nationality). On the other hand, individuals who perceived characteristics that disconfirmed stereotypical expectations subsequently systematically processed all accompanying information (Glock & Krolak-Schwerdt, 2013). Likewise, in the CAMCC, messages of high importance, which would include messages that reveal a pedagogical deficit or messages that present a contrary approach to assessment or instruction will likely cause a teacher to experience stress, therefore motivating the teacher to process the message systematically (Gregoire, 2003). A teacher who determines the message offers little new or contrary content will likely use heuristic rules or prior experiences to process the new information. Both the systematic and heuristic processing paths ultimately lead to the question of *Yielding* to the message, but both paths require different levels of information processing and therefore different questions the teacher must answer to come to a conceptual change (Gregoire, 2003).

Teachers whose assessment of the reform message elicits little discomfort will make a *Benign-Positive Appraisal* which immediately leads to heuristic processing of the reform message. Teachers that determine the reform message has little differences than their current approach to teaching may see little reason to process information

systematically and therefore decide to use heuristic rules or prior experiences to process the reform message. The teacher will then subsequently assimilate the reform message (superficially change beliefs) or will decide to maintain prior beliefs (no belief change) (Gregoire, 2003).

Teachers who determine the message requires a detailed analysis of the argumentation will enter a period of experiencing stress (a feeling of anxiety due to an environment that challenges an individual as possibly not possessing enough resources, whether internal or external, and therefore endangering well-being). To release the feeling of stress, teachers must then answer two *Stress Appraisal* questions: "Am I motivated (including an appraisal of self-efficacy and situational beliefs) to successfully accommodate the reform message?" and "Do I have the ability (time, knowledge, and resources) to successfully accommodate the reform message?" Just as in Fazio's (1986) model of the relationship between attitudes and behavior, the teacher uses a definition of the event and the accompanying attitude to guide behavior. If the teacher's definition of the event leads to a perceived positive attitude (i.e. sufficient time, knowledge, and

Diagram of the Cognitive Affective Model of Conceptual Change (reprinted from Gregoire, 2003)

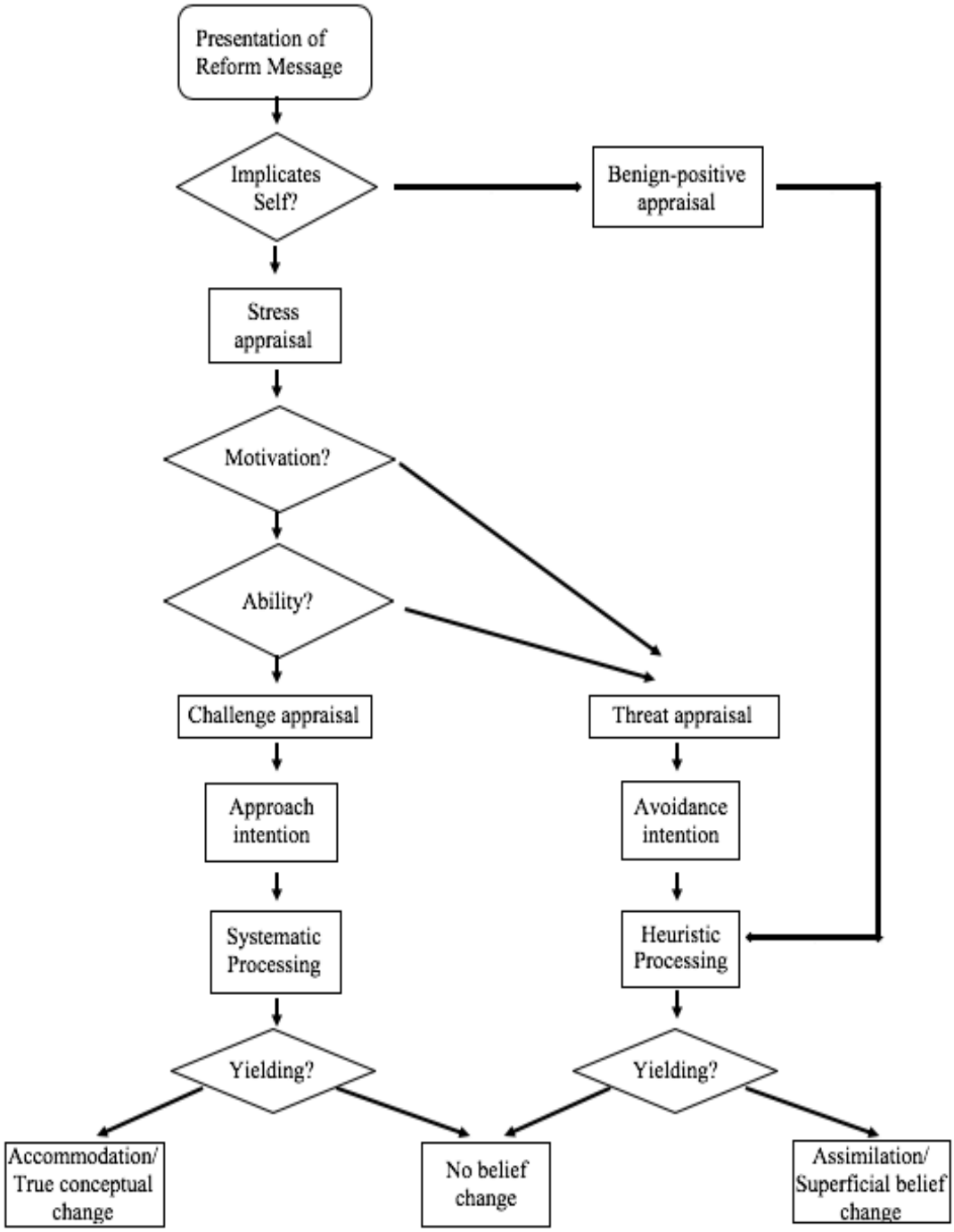

Figure 1: Cognitive Affective Model of Conceptual Change (Gregoire, 2003)

resources, and sufficient self-efficacy beliefs) and perceives that one has the abilities necessary to be successful, the teacher may feel motivated to accept the challenge of reform change (Gregoire, 2003; Fazio, 1986; Grierson, 2009). In this case she deems the reform message as a *Challenge* rather than a *Threat*. If the teacher perceives a negative attitude the teacher may determine that the reform message threatens their well-being and identity and therefore will then process the reform message using heuristics. The teacher that identifies the message as a *Challenge* will instead process the information systematically and subsequently accommodate the reform message (true belief change) or decide to maintain prior beliefs (no belief change) (Gregoire, 2003). A study by Ebert & Crippen (2010) further supports the validity of the CAMCC process. The study (although limited to three participants) found that the model accurately describes the belief change process within the context of PD for inquiry-teaching in science classes. Two of the teachers followed the heuristic pathway to belief change while one followed the systematic pathway to belief change. The researchers, however, do mention the linearity of the model as a weakness since much research supports belief change as recursive or cyclical (Ebert & Crippen, 2010; Opfer et al., 2011; Feeney, 2016; Senger; 1999).

Environment in the CAMCC. The CAMCC relies on the reflection of internal resources as well as environmental factors to determine the belief change process (Gregoire, 2003). During *Stress Appraisal*, the environment and the teacher's perceived internal resources, namely self-efficacy beliefs, mediate whether the teacher perceives a *Challenge* or *Threat*. The level of stress the proposed reform elicits is determined by the

level of perceived self-efficacy beliefs in relation to the level of challenge imposed by the environment. Individuals who believe they can succeed in the face of such an environment will deem a reform as a *Challenge* while an individual with low perceived self-efficacy will deem a reform as a *Threat* (Gregoire, 2003). Bandura (1999) explains this process as an interaction of the environment with cognitive factors. Through forethought, people anticipate whether the presented environment poses a challenge or threat once the information is filtered through cognitive factors (self-efficacy beliefs). In the CAMCC, if the teacher perceives a sufficient degree of self-efficacy, they move on in the sequence to the *Ability* stage (Gregoire, 2003). During the *Ability* stage the teacher asks whether he/she has the capacity to accomplish the proposed reform by assessing the proposed reform in juxtaposition with the resources available (knowledge and time). If sufficient resources exist the reform is seen as a challenge and therefore systematically processed.

While the CAMCC proposes a sequence of self-reflection and decision making that considers both internal resources/factors and environmental factors, the model fails to describe the characteristics of the campus environment that may influence the perceived resources available (or lack thereof) and therefore the belief change process. A study by Hochberg (2014) found that organizational structures and leadership can provide opportunities for teachers to systematically process new practices. As a result, campus and district administration should pay particular attention to the organizational structures they create (Anderson, Dragsted, Evans, & Sorensen, 2004). Ebert & Crippen (2010) suggest that administrators who are cognizant of the environment they create and

at which stage their teachers are within the belief change process as described by the CAMCC can more efficiently help teachers shift to the systematic pathway or continue on to subsequent stages. The research within teacher belief change does not currently offer a model that identifies the possible campus contextual factors or organizational structures that influence teachers' level of processing when presented with new information or reform messages. Other models that focus on student conceptual change within the classroom, however, such as Pintrich et al.'s (1993) Conceptual Change Model and the Cognitive Reconstruction of Knowledge Model elaborated by Sinatra (2005) may give clues as to what these characteristics within the campus context might be.

Environment

In an attempt to understand how best to influence conceptual change, researchers began to identify cognitive factors that influence information processing. Posner, Strike, Hewson, and Gertzog (1982) found that existing cognition such as prior knowledge greatly determines a student's ability to further process new concepts. He also postulated conditions necessary for individuals to consider conceptual change, namely dissatisfaction with current concepts, the level of intelligibility of the new concept, and the level of plausibility of the new concept. Essentially, if a concept held by an individual continuously failed to provide results, then a new, intelligible, and plausible concept would likely be assimilated or accommodated (Posner et al., 1982). Pintrich et al. (1993) built on Posner et al's (1982) research and applied it to students in a classroom context. Pintrich et al. (1993) determined that such a strictly cognitive, or "cold",

explanation of conceptual change neglected important affective and motivational, or "hot", factors that also impact a student's ability to assimilate and accommodate information. Just the cognitive development of a student in the face of a new concept could not predict whether he engaged in a process of conceptual change as many students who possess the requisite knowledge still do not initiate or complete conceptual change. Thus, Pintrich et al. (1993) proposed the idea that motivational beliefs and classroom contextual factors also played a role in conceptual change.

Within the Conceptual Change Model (CCM) the level of information processing depends on three behavioral factors: "choice of a task, engagement in the task, and willingness to persist at the task" (Pintrich et al., 1993, p. 168). These three behavioral factors identify the level of motivation of the student. These factors are influenced by the context, specifically the classroom context, in which the student exists. In other words, motivation is situational or context specific, just as discussed earlier.

Pintrich et al. (1993) identifies six classroom context characteristics that influence whether students set performance or mastery goals, and therefore the level of information processing and ultimately the level of conceptual change a student accomplishes (Pintrich et al., 1993). The six factors and a description of those characteristics that help facilitate mastery goals are as follows:

1. Task structure: The assignment of meaningful and authentic tasks that challenge students to engage in prolonged thinking and are clearly relevant to the students' outside lives
2. Authority structures: The allowance of control and choice over classroom tasks

3. Evaluation structures: The focus of feedback on mastery and understanding of goals
4. Classroom management: The use of authoritarian approaches that create active, self-regulated learners
5. Teacher modeling: The demonstration of strategies that lead to mastery of classroom tasks or of coping mechanisms when faced with frustrational tasks
6. Teacher scaffolding: The assignment of classroom tasks within the zone of proximal development of students, as well as the opportunity for students to witness attainable peer success

Pintrich et. al (1993) focuses primarily on student conceptual change in the classroom context while the present study seeks to understand campus contextual factors that arise as teachers engage in a belief change process. While the CAMCC offers a detailed proposal of the teacher belief change process with the inclusion of a few environmental factors that influence a teacher's stress appraisal and challenge appraisal, the model fails to provide a comprehensive description of the campus environmental factors that arise within a campus reform movement within the presentation of a reform message, the stress appraisal, and the challenge appraisal steps (Gregoire, 2003). Gregoire (2003) limits the exterior/environmental factors to verbal persuasion, vicarious experiences, time, and supportive others. The former two, verbal persuasion and vicarious experiences, influence the motivation of the teacher to initiate information processing, while the latter two, time and supportive others, influence whether a teacher feels he has the ability to implement the reform message.

Beliefs, practices and the experiential context interact to determine teacher learning, therefore a review of the contextual factors influencing beliefs and practices lends clarification to the characteristics of quality professional development (Opfer, Pedder, and Lavicza, 2011). A search of the literature on environmental influences on conceptual change did not yield studies that provide a model or categorization of contextual factors. However, Pintrich et al.'s research on student conceptual change offers some insights into environmental influences on conceptual change. Utilizing a similar list of Pintrich et. al's (1993) classroom context factors may help to further categorize the types of campus contextual factors that influence teacher belief change. Research in teacher belief change has already identified many campus contextual factors that seem to influence the belief change process.

Classification of the environmental factors from the research formulates five categories, four of which come from Pintrich et. al's classroom contextual factors: Task Structure, Authority Structures, Evaluation Structures, and Campus Management. Pintrich et al.'s (1993) model focuses solely on classroom management. Because our focus is on teacher belief change rather than student belief change, the researcher changes Classroom Management to Campus Management. The fifth is derived from the Cognitive Reconstruction of Knowledge Model: Message Characteristics (Sinatra, 2005). "Message characteristics refer to the features of the instructional content or persuasive discourse designed to promote change" (Sinatra, 2005, p. 110). The message characteristics can be further analyzed by the extent the message is comprehensible,

coherent, plausible, and rhetorically compelling, all of which are necessary for conceptual change.

Task Structure. To begin with, teachers must have time to engage in PD and opportunities to implement new concepts to initiate the belief change process (Ertmer, Ottenbreit-Leftwich, Olgun, Sendurur, & Sendurur, 2012; Francis, 2015; Milner, Sondergeld, & Rop, 2014). Just as in classroom contexts, tasks with particular structures will enhance the belief change process. A task structure in the classroom context that facilitates conceptual change includes meaningful, authentic, and relevant tasks that challenge students to engage in prolonged thinking (Pintrich et. al, 1993). Research on teacher belief change also illuminates the importance of authentic and relevant tasks (Brinkerhoff, 2006; Chiu & Churchill, 2016; Ni Chroinin & O'Sullivan, 2014; Ertmer et. al, 2012; Fabela-Cordenas, 2012). Tasks in teacher belief change often manifest not by the assignment of a task, but rather by the creation of an opportunity for a task. For example, teachers should have the opportunity to apply new skills within authentic classroom experiences (Brinkerhoff, 2006; Chiu & Churchill, 2016; Ni Chroinin & O'Sullivan, 2014; Ertmer et. al, 2012; Fabela-Cordenas, 2012). Once teachers apply new skills, positive appraisals of effectiveness can provide mastery experiences, thus improving self-efficacy, and help confirm the usefulness of the new belief (Sahin & Yildirim, 2016). Similarly, assigned projects that require direct implementation of a new concept provide opportunities for mastery experiences and confirmation of the new concept (Brinkerhoff, 2006). Opportunities for leadership roles can also provide mastery

experiences that begin to change a teacher's self concept (belief about themselves as an educator) (Brooks & Adams, 2015).

Beyond classroom experiences, task structures within the context of professional development (PD) workshops can also impact teacher belief change. First, PD and the tasks within a PD workshop should be situated within the actual needs of the teacher and within the context which the teacher exists (Bamberger & Krajic, 2012; Ertmer & Ottenbreit-Leftwich, 2010; Carrington, 2010). PD leaders should ensure that tasks are relevant to the needs of the teacher so they may be directly applied to authentic classroom tasks. For example, elementary teachers should not be assigned a task that only relates to the context of a secondary teacher. During PD workshops on learner-centered instruction teachers need the opportunity to participate in a workshop designed as a learner centered lesson. Doing so allows teachers to experience a learner centered lesson from a student's perspective which makes them more aware of the process of implementation (Fabela-Cordenas, 2012). Such authentic and relevant learning opportunities within PD sessions further facilitates teacher belief change.

Interactions with students inevitably result in the initiation of the belief change process (Cook & Young, 2004). Through the teacher-student relationship, students place certain demands on their teacher such as demands to care, to teach, to discipline, to present worthwhile information, to be competent, and to be well prepared. When new teachers enter the classroom with a lack of knowledge of their pupils and preconceived beliefs, interactions with students make apparent that certain beliefs do not mesh with reality, therefore teachers are forced to respond to their beliefs.

Authority Structure. Conceptual change theory advocates for a transfer of authority at the classroom level from teacher to student (Pintrich et al., 1993). At the campus level authority structures conducive to teacher belief change could be seen as a transfer of authority towards teachers. The authority could originate, however, from two positions: administration and parents/guardians (Artiles, Barreto, Pena, & McClafferty, 1998; Blomeke, Hoth, Dohrmann, Busse, Kaiser, & Konig, 2015; Francis, 2015; Herrington, Senetta, Molly, & Schairer, 2016). First, teachers can be given authority over what, when, and how they teach (Herrington, Senetta, Molly, & Schairer, 2016). Such decisions and policies can build a climate of trust which may affect teacher development of dynamic and constructivist belief systems (Blomeke et al., 2015). Conversely, administrators that create climates of fear or risky environments may as a result diminish teacher willingness to take risks and therefore discourage belief change (Brooks & Adams, 2015). To encourage teacher belief change administrators should be open to suggestions for change (Brooks & Adams, 2015). In addition, teachers should feel free to direct their own learning, resulting in more developed teacher identities through a process of belief challenge (Ni Chroinin & O'Sullivan, 2014).

On the contrary, imposed expectations such as obligatory assignments and holding one another accountable for goals forces teachers to engage in implementation of new strategies, requiring the processing of new information, and therefore a belief change decision (Brinkerhoff, 2006; Brooks & Adams, 2015). In Brooks and Adams (2015), however, accountability originated from within the support group of teachers

rather than external accountability with the threat of externally imposed consequences, possibly resulting in a collective empowerment.

Parents and the community may also impose certain expectations of traditional teaching that limit teacher engagement in the belief change process. Conceding to parent pressures may also drive new teachers toward a particular belief system (Artiles, Barreto, Pena, & McClafferty, 1998; Francis, 2015).

Evaluation Structures. Evaluation, according to Pintrich et al.'s (1993) Conceptual Change Model, should encourage the view of mistakes as positive occurrences in the growth process and on making improvements toward mastery of tasks rather than making social comparisons of task performance. The evaluation process requires goal setting which can then serve as the foundation for future self-reflection to compare reality with mastery oriented goals. The research consistently proposes self-reflection (which includes an evaluation of self) as a key component of the belief change process (Brinkerhoff, 2006; Gamlem, 2015; Grierson & Gallagher, 2009; & Levin & Nevo, 2009). Service (2016) proposes that without reflection beliefs cannot be understood either by the teachers or professional development leaders resulting in teachers simply layering new practices on top of previous practices instead of replacing them. Failing to reflect also leaves beliefs unexplored leading to only partial implementation of a reform message (Wolf & Gearhart, 1997). Several approaches can promote self-reflection (Artiles et al., 1998; Lee Bae, Seitz, O'Connor & DiStefano, 2016; Brinkerhoff, 2006; Gamlem, 2015; Lebak, 2015).

First, knowledgeable or "more capable others" serve as sources of information, feedback, and expertise as well as a person that can drive conversation and expose misconceptions (Artiles et al., 1998; Lee Bae, Seitz, O'Connor, & DiStefano, 2016). Feedback communicates to teachers that administrators perceive them as competent (Chester & Beaudin, 1996). Conversely, teachers that never or rarely receive feedback may experience feelings of neglect, uncertainty, and anxiety, feelings that result in negative stress and threat appraisals within the CAMCC (Chester & Beaudin, 1996; Gregoire, 2003). Knowledgeable or "more capable others" can also include mentor and peer teachers. Mentor teachers can model lessons that then provide vicarious experiences for the observing teacher (Bandura, 1999). Such vicarious experiences increase perceived self-efficacy and serve as a catalyst for change by encouraging teachers to reflect on their own practices in juxtaposition with the observed teacher practices (Grierson & Gallagher, 2009). Mentor teachers should possess the ability to enact the proposed practice of change, build relationships with the observing teachers, and respect the professional decision-making of the observing teachers. Mentor teachers that lack these qualities struggle to initiate belief change (Grierson & Gallagher, 2009). Witnessing "more capable others" or peers implementing the new reform may also influence a teacher's definition of the reform. Teachers that are attitudinally against a reform message may actually act in contrast to their attitudes if they know the norms of the situation are to implement and experiment with the new initiative. In essence, the norms "affect the individual's definition of the event" (Fazio, 1986, p. 211).

Second, for teachers to be able to reflect they must first have the opportunity to implement the new practice, and subsequently collect data reflecting the results of the new practice (Brinkerhoff, 2006). Without such data teachers may resort to past experiences and observations and thus heuristic processing throughout the belief change process rather than systematic processing (Chaiken, 1980; Gregoire, 2003). Teachers must also have sufficient amounts of time over the life of the PD reform efforts to reflect (Miranda & Damico, 2015).

Third, using technology such as video recording devices provide unique opportunities for self-reflection. When using video-stimulated reflective dialogues (VSRDs) teachers are asked to video record a lesson and later watch the lesson to stimulate conversation and reflection with another teacher, a mentor, or an administrator. Such videos help teachers challenge their own practices and beliefs by making the need for change apparent. The dialogues accompanying the videos during the reflective process also help to reconceptualize practice and beliefs (Gamlem, 2015; Lebak, 2015).

Campus Management. Pintrich et al. (1993), in his Conceptual Change Model, focuses on changes in classroom management to develop self-regulated, motivated students to engage in more free tasks. Likewise, to encourage teacher belief change, administrators should consider campus management components that could serve as external barriers to task initiation and therefore hinder belief change. For any belief change to occur an individual must present a reform message, therefore, administrators must first ensure that PD sessions present a compelling message for teachers (the quality of messages will be discussed in the next section) (Becker & Ravitz, 1999; Brinkerhoff,

2006). These sessions also serve the purpose of persuading teachers to enact newly learned skills, helping ensure that the campus reform direction is communicated clearly to all staff, and decreasing divisions among staff (Artiles et al., 1998).

After completing professional development sessions, administrators must ensure that teachers are provided time to enact the newly learned skills and that necessary resources are available. Without time to train and implement newly learned skills teachers cannot test new instructional strategies nor assess their effectiveness (Ertmer et al., 2012; Bamberger & Krajic, 2012; Brinkerhoff, 2006). The lack of resources after PD causes teachers to either neglect the reform message or, for novice teachers, adopt practices of their new environment for which resources are available (Artiles et al., 1998; Bamberger & Krajic, 2012). Conversely, the presence of resources allows teachers to enact their belief systems, further confirming their beliefs (Becker & Ravitz, 1999; Golafshani, 2013). One study done by Chester and Beaudin (1996) makes a connection between the amount of available resources and the self-efficacy of young novice and experienced teachers. Novice teachers, when presented with a plethora of resources, experience a decrease in self-efficacy, possibly due to their lack of experience sifting through possible resources. Experienced teachers, on the other hand, experience an increase in perceived self-efficacy as they have developed coping mechanisms to select resources. In addition, not just a lack of resources, but also the type of resources can affect teacher belief enactment (Mansour, 2013; Lin, Lieu, Chen, Huang, & Chang, 2012). Textbooks written to be used in a traditionalist manner are not consistent nor do they encourage constructivist beliefs (Mansour, 2013). Also, PD sessions that provide

participants with guides enable teachers to continue to learn and implement new classroom practices without continuing face-to-face sessions, and enhance content knowledge and pedagogical content knowledge (Lin et al., 2012).

Administration also need to ensure teachers have access to support groups to help in times of change (Brooks & Adams, 2015). Providing support groups and opportunities for collaboration allow teachers to share stories of failure and success contributing to teacher well-being. Such relationships may encourage the construction of communities and eventually the transformation of beliefs into values (Herrington et al., 2016). Similarly, the implication of interventions based in positive psychology and relationship building can create positive perceptions of campus community and increase self-efficacy beliefs. Critchley and Gibbs (2012) implemented the "Three Good Things" intervention where individuals write down three good things that happened that day and why they went well. This Positive Psychology approach resulted in improved self-efficacy beliefs which then resulted in higher focus on solutions and improved willingness to support others.

Fetters, Czerniak, Fish, and Shawberry (2002) identified incentives as either a catalyst or barrier to belief change, depending on the type of incentive and the duration of the incentive being offered. Short term incentives proved useful in recruiting teachers to enroll in a course that professed a reform message, but lost their motivational effects when teachers were then expected to implement the reform message.

Message Qualities. For a reform message to inspire cognitive engagement it must be comprehensible, plausible, coherent, and rhetorically compelling (Dole & Sinatra, 1998; Sinatra, 2005). All four are necessary to initiate conceptual change.

A message that is comprehensible has a structure that enhances the hearer's ability to understand the intended message (Dole & Sinatra, 1998). The comprehensibility of a message will largely depend on the background knowledge of the hearer to assimilate new knowledge, therefore, the messenger must take the hearer into consideration when preparing the message structure. For example, a study that explored the factors of demonstration classrooms found that a mentor teacher that effectively demonstrates initiatives can improve the comprehensibility of the initiative being promoted and therefore serving as a catalyst for belief change (Grierson & Gallagher, 2009). Conversely, a poor demonstration characterized by deficient planning or ineffective execution may confuse observers, thereby becoming a barrier for belief change.

Plausibility of the message refers to the likelihood that a message is true. A teacher that believes a message does not align with reality will not consider the message "plausible". One strategy that has shown to improve the perceived plausibility of a message is vicarious experiences (Brinkerhoff, 2006; Brooks & Adams, 2015; Grierson & Gallagher, 2009; Bandura, 1999). Vicarious experiences provide teachers the opportunity to witness other teachers try, fail, and succeed in authentic classroom situations. Such observations show teachers the plausibility of reforms as they can witness success with the initiatives themselves.

A message that adequately connects all details into a "conceptual whole" (Dole & Sinatra, 1998, p. 120) by way of effective communication and message structure is said to be coherent. Message coherence was the goal when developers of a PD session using demonstration classrooms ensured that planning guides were available in advance of classroom observations, that observers had multiple opportunities to observe the classroom demonstrations, and that guides focused the debriefing sessions immediately following observations on the initiative at hand (Grierson & Gallagher, 2009).

A message that is rhetorically compelling contains qualities that persuade the hearer such as credible sources of information, an impassioned speaker, or logical facts and statistics (Dole and Sinatra, 1998).

Sources of Contextual Factors

Research discusses many types of contextual factors influencing teachers' beliefs and practices including teachers' past experiences (e.g. pre-service education, and experience as a student within the educational system), school contextual factors (e.g. colleagues, administrators, school culture, on-campus PD, etc.), general educational culture (e.g. local, state, or national trends, and educational policy), and general culture (e.g. local culture, national culture, etc.) (Opfer et al., 2011; Mansour, 2013;Wang, 2016; Zhang, 2013). Here the focus will be on school contextual factors (i.e. located on school campus).

School campus contextual factors originate from many sources all of which affect belief change and/or teacher practice (Mansour, 2013; Wang, 2016; Zhang, 2013;

Wallace & Priestley, 2011; Fitzgerald, 2012; Nishino, 2012; Rubies-Davies, Flint, & McDonald, 2012).

Campus Leaders: PD Leaders, Administrators, and Coaches. One such source is PD leaders and campus administrators. PD leaders and campus administrators have the ability to inhibit or support belief change (Turner, Warzon, & Christensen, 2011; Herrington et al., 2016; Ertmer et al., 2012; Brooks & Adams, 2015). PD leaders and administrators that provide teachers with the autonomy to apply new reform messages in their own way positively influence the belief change process (Wallace & Priestley, 2011). Also, campus administration that allow teachers to apply and interpret their new beliefs into classroom practices encourage the belief change process. The autonomy provided by PD leaders and administrators also allows teachers to become teacher leaders that then espouse the new beliefs, therefore interpreting beliefs into policy as well. Such teachers take on an active role in affecting campus reform.

PD trainers as external authority figures can establish trust and rapport with teachers (Johnson & Marx, 2009). For example, teachers may feel more comfortable sharing information with PD leaders as opposed to campus administrators. Rosenfeld and Rosenfeld (2004) used a PD leader in the role of a "mediator" when helping teachers identify their learning styles. The mediator ensured teachers knew the intrinsic value of all types of learning styles and guided them through the learning process. In other words, the mediator helped teachers "legitimize both themselves and other learners" (p. 481). PD leaders also have the ability to create PD models that help teacher participants

feel safe by valuing questions, honoring teacher voices, and fostering experimentation (Mouza, 2006).

A study by Sailors, Hoffman, and Pearson (2014) shows coaches can influence teachers' beliefs about what makes successful teachers. PD leaders took a coaching role in Thomas & McRobbie (2002) by providing model lessons to help a teacher understand the new teaching practice. As a result the teacher formed a clearer understanding of how to implement the new strategy into her own classroom.

Colleagues. PD leaders can help build trust between teachers by creating opportunities for collaboration, relationship building within the PD sessions, and peer observations, all in an effort to build community (Johnson & Marx, 2009). Colleagues can also serve as inhibitors or catalysts for change for one another (Magos, 2006; Patton & Griffin, 2008; Wallace & Priestley, 2011). Through social pressures or "subjective norms" the messages that colleagues send provide perceived prescriptions to others as to what is accepted or unaccepted. For example, a teacher that gives a presentation over a new classroom practice and receives positive feedback will feel reaffirmed, and therefore the subjective norm beliefs will be reinforced (Vaino, 2009; Vaino, Holbrook, & Raanikmae, 2013). Conversely, colleagues with negative attitudes toward the new classroom practice will discourage change (Magos, 2006).

Colleagues that teach in manners opposite of the reform message serve as inhibitors to belief change, while participants that teach in manners congruent with the reform message serve as catalysts for belief change toward the reform message. The level of congruence between teachers and others within the environment affects belief

change. When teacher beliefs are congruent, then belief change moves in the direction of the congruent beliefs (Wallace & Priestley, 2011).

Classroom. Teacher beliefs about best practices are affected by classroom contexts such as the perceived needs of the students based on interactions between the teacher and the students, and classroom management factors (Fitzgerald, 2012; Nishino, 2012; Powers, Zippay, & Butler, 2006). Nishino (2012) found that teachers would rather teach in a way contrary to their communicative belief systems for language acquisition due to their co-existing belief that teachers should develop students' whole persons. The demographic makeup of a classroom has also shown to affect the self-efficacy beliefs of female teachers in "instructional strategies, student engagement, and classroom management" (Rubie-Davies, Flint, & McDonald, 2012, p. 284).

Experiencing success with new practices within the classroom also affects teacher self-efficacy beliefs, beliefs about teaching and learning, value beliefs, student expectation beliefs, pedagogical beliefs, and beliefs about the applicability of new knowledge and skills (Sahim & Yildirim, 2016; Meirink, Meijer, Verloop, & Bergen, 2009; Mouza, 2006; Patton & Griffin, 2008; Thomas & McRobbie, 2002).

PD Factors. Some form of PD is required in order to present a reform message that incites belief change. Several types of PD exist including workshops (summer and during school year), PLCs, study groups, action research teams, and online seminars (Blonder & Mamlock-Naaman, 2013; Brinkerhoff, 2006; Miranda & Domico, 2015; Tam, 2015; Hung, 2013; Vaino et al., 2013; Russell, Carey, Kleiman, & Venable, 2009). In general, collaborative forms of PD can lead to changes in student-oriented beliefs,

beliefs about teaching and learning, and role beliefs (Lakshmanan, Heath, Perlmutter, & Elder, 2011; Meirink et al., 2009; Rosenfeld & Rosenfeld, 2004; Wood, Cobb, & Yackel, 1991). Collaboration can also maximize collective learning, promote experimentation with new classroom practices, provoke critical reflection and deep conversation, establish and incorporate a common vision for PD, discourage isolation, and discover new subjective norms that align with the reform message (Meirink et al., 2009; Peter, Markham, & Frey, 2012; Rosenfeld & Rosenfeld, 2004; Tam, 2015; Theriot & Tice, 2009).

The PD instructional approach affects the way teachers process information of the reform message. Ideally teachers need to process information systematically in order to reach true and substantial belief change (Chaiken, 1980; Gregoire, 2003). For example, Teng (2016) concludes that changing classroom practices requires a systematic professional training approach as well opportunities for critical reflection.

Belief change PD efforts also take time to affect belief change (Polly, Wang, & McGee, 2012; Milner & Sondergeld, 2014;). A study by Roberts, Henson, Tharp, and Moreno (2001) concluded that the most optimal duration of PD to influence self-efficacy beliefs is four weeks, although there are no significant differences between a four week session and a five week session. There also exists no significant difference on change in teacher self-efficacy between a two week session and a three week session. One to two years of PD is required to see significant implementation in the classroom according to Polly et al. (2012) and three to five years according to Levin & Wadmany (2005). Over this lengthy time of PD implementation, classroom enactment takes the shape of an S-

curve; a slow start followed by a mass of implementation which then begins to level off (Markee, 1997).

Contextual Factors Quantified. While the earlier studies have discussed the presence of contextual factors and their effects on practice and belief change, Feeney (2016) has quantified their effects by finding the factors that produce the optimum dissonance for learning. As described earlier, teacher learning change is characterized by a cyclical pattern consisting of beliefs, practice, and student outcomes (Opfer et al., 2011). Teacher learning change is impacted by the orientation to learning, also cyclical but consisting of three variables: experiential context (or school context), learning practice, and beliefs about learning. In order to understand the impact of particular experiential contexts, Feeney (2016) categorized workplace factors by the measure that teachers' valued (beliefs) particular learning activities and the degree by which the activities were practiced. Expansive environments create opportunities for learning and are characterized by high value and high practice. Restrictive environments present barriers to learning. Restrictive environments with opportunities are characterized by high value and low practice, and restrictive environments with barriers are characterized by low value and low practice. The Feeney (2016) study yielded several expansive learning activities including (1) reflecting on practices to identify professional development needs, (2) consciously experimenting with their practice as a learning and teaching opportunity, and (3) offering support to others.

Discussion

The current review sought to understand the intricacies of the belief change process and how campus contextual factors influence this process.

Defining "Belief"

A review of the literature revealed seven articles that attempt to develop a definition and a figurative structure of beliefs (Green, 1971; Abelson, 1979; Nespor, 1987; Pajares, 1992; Vaino, 2009; Torner et al., 2010). Conceptualizing the belief construct is required in any study concerning beliefs in an effort to develop an operationalized definition (Pajares, 1992). The complexities of beliefs along with the lack of an agreed upon definition of beliefs has caused an inconsistency of terms used within the research, all of which attempt to represent the construct of beliefs. Words such as perceptions, values, views, attitudes, preconceptions, and opinions have all been used to define constructs similar to beliefs (Pajares, 1992). As a result, researchers have attempted to define beliefs by first identifying at which point knowledge ends and beliefs begin, leading to philosophical questions that prompt some to parse out the qualities of beliefs as they differ from knowledge (Green, 1971; Abelson, 1979; Nespor, 1987; Pajares, 1992).

Belief-Practice Correlation

The correlation between teacher beliefs and teacher classroom practices is well documented in the literature. A total of 28 studies found a relationship between teacher beliefs and classroom practices, highlighting the importance of considering teacher beliefs when developing teacher PD (Smylie, 1988). Whether changes in beliefs cause

changes in practice or changes in practice cause change in beliefs is still unclear, although more current research points toward a more recursive or cyclical relationship (Guskey, 1985; Opfer et al., 2011; Levin & Wadmany, 2005; Lebak, 2015; Aguirre & Speer, 2000). Beliefs serve as filters that influence practice indicating that beliefs affect practice (Aguirre & Speer, 2000; Cross, 2009; Yerrick & Nugent, 1997; Pajares, 1992). Such changes in practice followed by reflection, however, can result in belief change indicating that practice also affects beliefs (Guskey, 1985; Fetters, 2002; Levin & Nevo, 2009; Gamlem, 2015; Patton & Griffin, 2008; Brinkerhoff, 2006).

Models of Belief Change

Fourteen studies contributed to an understanding of the events and situations that best encourage belief change. Situations and events such as self-reflection, knowledgeable others, modeling, coaching, peer feedback, collaboration, and experimenting with practices serve as catalysts for belief change (Artiles & Barreto, 1998; Lee Bae et al., 2016; Carrington et al, 2010; Ebert & Crippen, 2010; Grierson, 2009; Lebak, 2015; Mouza, 2006; Patton & Griffin, 2008; Rosenfeld & Rosenfeld, 2004; Wood et al., 1991). Twenty-four studies also confirm and add to this list of catalysts for belief change, but nest the factors within various PD programs (Brooks & Adams, 2015; Fabela-Cordenas, 2012; Miranda & Damico, 2015). Eleven articles provide insight into how beliefs move--how belief structures reorganize, the direction of belief change in relation to belief strength, and the path taken to belief change (Torner et al., 2010; Senger, 1999; Patton & Griffin, 2008; Mouza, 2006; Lebak, 2015).

While the above studies identify various factors that influence the belief change process, seven offer models for the belief change process and one study that explores a theory of teacher belief change based on grounded theory methodology. The Heuristic-Systematic Model (HSM) of information processing advanced by Chaiken (1980) explains two different pathways (a heuristic and systematic pathway) that lead to conceptual change. Fazio (1986) develops a model focusing on attitudes, initial responses, and subjective norms. Neither of these models generalize specifically to any specific demographic.

Posner et al. (1982), Pintrich et al. (1993), and Dole and Sinatra (1998) develop models for student conceptual change. Posner et al.'s (1992) model of conceptual change explains a "cold" (a cognitively laden) model of conceptual change that largely disregards affectual and contextual factors. Pintrich et al. (1993) develops the Conceptual Change Model (CCM) that introduces motivational factors and contextual factors and how they mediate the conceptual change process. Dole and Sinatra's (1998) Cognitive Reconstruction of Knowledge Model (CRKM) further develops a "warm" model of conceptual change similar to that of Pintrich et al. (1993). The CRKM elaborates on the interaction effects of learner characteristics (the learner's current conceptualization of the reform message, and his motivation to change) and message characteristics (level that the message is comprehensible, coherent, plausible, and rhetorically compelling). Posner et al.'s (1982) model of conceptual change, the CCM, and the CRKM, however, apply specifically to students, not teachers.

Gregoire (2003) has developed the Cognitive-Affective Model of Conceptual Change (CAMCC), one of two models found that specifically addresses teachers' change in beliefs. The CAMCC is largely influenced by Chaiken (1980), Posner et al. (1982), Fazio (1986), Pintrich et al. (1993), and Dole and Sinatra (1998). It explains a two-pathway approach to teacher belief change. The presence of contextual and teacher internal factors influence the direction and strength of belief change as teachers unconsciously answer questions at various checkpoints throughout the belief change process. Nevertheless, which contextual factors actually interact with teacher internal factors are not earnestly elaborated in the CAMCC.

Opfer et al. (2011) presents a model that first defines teacher "orientation to learning" which is influenced by learning practices, beliefs about learning, and the experiential context. This learning orientation then influences teacher change (belief change, practice change, and student change). Opfer et al. (2011) states that "Whether or not a teacher learns and then engages in a form of professional change is influenced by their beliefs, practices and experiential context," but what this experiential context consists of remains unexplored (p. 451). One study explores specifically campus professional development methods that expand learning as opposed to those that restrict learning, however, more tacit campus contextual factors that exist outside of the professional development setting are not addressed (Feeney, 2016).

Contextual Factors

Throughout the research 16 studies discover contextual factors that influence the belief change process (Johnson & Marx, 2009; Levin & Wadmany, 2005; Mouza, 2006).

These factors, however, have rarely been the focus of the research, but rather arise as secondary findings. Campus contextual influences come from many sources and each seems to influence different aspects of the belief change process (e.g. opportunity to apply new skills in the classroom context gives teachers the opportunities to validate the new practice, and the lack of trust hinders risk taking and trying of new practices) (Brinkerhoff, 2006; Chiu & Churchill, 2016; Johnson & Marx, 200; Blomeke et al., 2015). None have focused on an exploration of the explicit and tacit contextual factors that arise during campus interventions. In addition, none elaborate on the contextual factors that specifically influence the phases of the CAMCC.

An understanding of what contextual factors, both explicit and tacit, arise that influence the teacher belief change process during a reform environment could direct campus administrators, and creators and facilitators of professional development to establish ideal campus environments for teacher belief change.

CHAPTER III

METHODOLOGY

Statement of the Purpose

The purpose of this study was to understand the behaviors and beliefs of teachers during a belief change moment, specifically when within a pathway toward belief change. The researcher also sought to identify the contextual factors perceived by teachers within each pathway of belief change. The purpose of the study only minimally (if at all) related to the external reality of the campus, i.e. professional development opportunities, the busyness of the day, the daily schedule, PLC times, campus climate, etc. Rather, it was important to understand the *perceived* reality of the teachers of interest. Hochberg (2014) found that administrators have the ability to create organizational structures that can increase engagement during professional development opportunities. Knowing what contextual factors teachers *perceive*d during belief change moments can help future researchers determine what environmental characteristics mediate belief change and how, subsequently providing guidance to school administrators, instructional coaches, and professional development trainers in best practices to create ideal teacher learning environments.

Overall this study was an instrumental case study as defined by Stake (1995). Ultimately, the goal was not to understand just the case of interest, but to understand an overall general problem which can hopefully be more illuminated through an exploration, description, and interpretation of the case of interest.

Research Questions

The following research questions guided this study:

1. Using the CAMCC as an initial framework, which behaviors and thought processes characterize teachers within different pathways to belief change?
2. Which campus contextual factors do teachers within each pathway of belief change regard as pertinent to the implementation of professional learning communities?

Method

In Stake's (1995) exposition of case study as a qualitative approach to research, he defines two types of case study: intrinsic and instrumental study. This research took the latter approach. Instrumental studies utilize bounded systems, which consist of well-defined and integrated parts, to understand problems of interest (Creswell, 2013). The interest does not lie in the system itself (an intrinsic study) but rather in some curiosity that might be exposed through the selected case. Through the case study research process certain particularities within the case were discovered which were used to modify or strengthen pre-existing generalizations. Stake (1995) explains that new generalizations are typically not discovered through case study but rather modified or strengthened. Generalizations, however, are not the primary focus of case study; instead, the researcher seeks "particularization"--the process of coming to know the case of interest well and its uniqueness (p. 8).

Lincoln and Guba (1985) distinguishes this definition of generalization as idiographic in contrast to the definition of generalization in the nomothetic sense.

Idiographic approaches to knowledge search for the specific and unique. It takes into account the uniqueness of each new situation first and how these uniquenesses impact the primary effects, concluding with "working hypotheses," or hypotheses that shape and shift with time and with each proceeding situation (p. 124). In contrast, nomothetic approaches to knowledge attempt to establish generalizations that stand under defined conditions and endure beyond time and context. Case study does not seek the nomothetic generalization, but instead the idiographic generalization.

Through a process of establishing research questions, gathering, analyzing, triangulating, interpreting data, and reporting findings the researcher developed a generalization of the case (Stake, 1995; Creswell, 2013; Lincoln and Guba, 1985). Thick description and interpretation of the happenings within the bounded system and the interrelationship of these happenings will lead the reader to experience an empathic, "experiential understanding of the case" and correspondingly a modification or strengthening of pre-existing generalizations (Stake, 1995, p. 40).

A qualitatively driven case study approach was the inquiry frame for this study. Case study was chosen due to certain axioms assumed in naturalistic research, namely ontological, epistemological, and axiological assumptions (Lincoln & Guba, 1985; Creswell, 2013).

Ontological assumptions concern the nature of reality (Lincoln & Guba, 1985; Creswell, 2013). For this study, the researcher assumed three types of realities as defined by Stake (1995). The first is the external reality which we can only interpret based on the interaction between the external reality and our modes of stimulation.

These interpretations formulate our experiential reality, a reality that serves as a representation of the external reality. The integration of all these interpretations forms the third reality, our rational reality. Such an assumption of reality suggests there exists a unique experiential and rational reality within each individual. In other words, there are multiple realities. Lincoln and Guba (1985) call this level of reality "Constructed Reality" (i.e. constructions of reality in the minds of individuals). The external reality can never be fully known, but instead we can only know the constructed realities of multiple individuals, and therefore multiple realities. The researcher captured the realities within individuals that would best help develop an understanding of the case, and would attempt to represent "the multiple constructions of individuals" through thick description (Lincoln and Guba, 1985, p. 84).

Epistemological assumptions concern what constitutes and justifies knowledge (Lincoln & Guba, 1985; Creswell, 2013). For the constructivist, knowledge comes from modifying previous generalizations as the researcher forms understandings by interacting with respondents through observation, interviews, and/or the review of documents, approaching as strongly as possible to a sense of empathy for the case. (Stake, 1995). For the naturalist, the "knower and known are inseparable" (Lincoln & Guba, 1985, p. 37).

Researchers also bring values to a study which affect their decisions, interpretations, and presentation of a case (Lincoln & Guba, 1985; Creswell, 2013). This axiological assumption requires the researcher to be open and honest about their values and biases from the onset of a study. The researcher as human instrument must be self-

aware throughout the study to understand their values and biases and how they may be affecting researcher decisions, interpretations, and presentation of the case.

Participants

The researcher sought participants that would best help him understand the case and subsequently answer the two questions of interest: a) using the CAMCC as an initial framework, which behaviors and thought processes characterize teachers within different pathways to belief change, and b) Which campus contextual factors do teachers within each pathway of belief change regard as pertinent to the implementation of professional learning communities? Participants in this study consisted of the teachers from an elementary school in a Georgia school district. Teacher participants must a) have been employed with the district for the duration of the school year, and b) have been directly affected by the campus reform message including training and implementation. The researcher strove for diversity of gender, experience, and ethnicity when selecting participants for this study. Participant demographics can be found in Table 1.

Within the metaphor writing stage thirty-one teachers responded to each of the sentence stems. From these thirty-one teachers the researcher narrowed the pool of potential participants to 20 using the following criteria: years experience, years experience in Title 1, and years experience at campus site. The researcher examined the metaphors to look for evidence of meaningful beliefs concerning the campus' professional development efforts. These 20 were sent an invitation to participate in this study. Eight accepted the invitation. These eight were chosen through maximum variation sampling for further interviews and observation.

Table 1

Participant Demographics

Teacher	Gender	Content	Years Experience	Years Experience in Title 1	Years Experience at Campus Site
Amber	Female	Self Contained Autism Classroom	7	7	4
Donna	Female	ESOL	18	1	18
Beverly	Female	Speech and Language, and Self Contained Multiple-handicapped	39	15	4
Taylor	Female	4th Grade ELA	15	15	14
Lauren	Female	5th Grade ELA	32	25	20
Shirley	Female	5th Grade ELA	23	23	1
Leslie	Female	Instructional Lead Teacher	29	25	25
Karen	Female	5th Grade ExEd: Pull Out and Inclusion	11	9	1

All participants attend PLCs, and all but three lead an intervention group. The PLCs of the self-contained teacher focus on planning effective Community Based Instruction outings which she attends. The speech pathologist attends a grade level PLC in year one of PLC implementation, but does not have an intervention group. In year two of PLC implementation the speech pathologist attends district wide PLCs that help to ensure special education paperwork is complete. The resource special education teacher attends a grade level PLC, but does not have an intervention block other than typical special education interventions. Of the participants, one is a self-contained speech language pathologist, one teaches a self-contained autism class, one teaches

English for Speakers of Other Languages (ESOL), one teaches 4th grade ELA (English Language Arts), one teaches 5th Grade pull-out and inclusion special education, one is an instructional lead teacher, and two teach 5th Grade ELA.

The Human Instrument

The characteristics of naturalistic inquiry require an instrument that can (1) interact and respond to a complex environment, (2) adapt quickly to multiple realities and factors that it will encounter, (3) absorb all the complexities and details of a case and understand them as a whole, (4) utilize both tacit and propositional knowledge to understand, interpret, and explain a case, (5) process data, generate hypotheses, and test hypotheses immediately as data is absorbed, (6) summarize and seek clarification with respondents immediately, and (7) notice and explore the particularities of a case (Lincoln & Guba, 1985). The human instrument is the only instrument that can accomplish each of these requirements. The current study used the researcher (the human instrument) as the primary instrument.

The researcher within this case study had multiple responsibilities: understanding, describing, and responding to data gathered through observations and interviews; analyzing the data for the purpose of formulating interpretations; explaining these interpretations to help readers shape their existing generalizations; investigating the particularities of the case; and seeking trustworthiness through a variety of methods.

The researcher is a former middle school and high school English Language Arts and Foreign Language teacher, instructional coach, and elementary assistant principal. The researcher's experience as a teacher, instructional coach, and administrator has

provided three unique perspectives within school contexts concerning professional development and teacher belief change. As a result, the researcher was cognizant of his own beliefs about belief change and campus contextual factors, and intentionally tamed this "experiential reality" to avoid imposing his own agenda.

The researcher continually developed reflexivity by maintaining a reflexive journal throughout the study. This journal helped the researcher identify ways in which his own values, beliefs, attitudes and experiences may be affecting the interpretations and understandings of the case (Lincoln & Guba, 1985).

Data Collection

In an effort to accomplish an in-depth understanding of the bounded case the researcher used several sources of data, namely reflexive responses, semi-structured interviews, and observations (Creswell, 2013). Gathering data from several sources also aided in triangulation to help establish credibility (Lincoln & Guba, 1995), as well as developed in the researcher a stronger sense of empathy for the case which was then transferred into thick description in an effort to create a vicarious experience for the reader (Stake, 1995).

Lincoln and Guba (1985) advise that purposive sampling, specifically maximum variation sampling, allows the researcher to choose the samples that provide the maximum amount of variation, focusing the inquiry on the uniquenesses of the case rather than the similarities. Beginning data collection with a reflexive response provided the researcher with a broader understanding of the participants as a whole, assisting him in a pursuit of variation in future respondents. The reflexive response consisted of two

sentence stems: first, a sentence that petitioned participants to create a metaphor for their beliefs about the campus's approach to professional development, and second a sentence stem that petitioned teachers to create a metaphor for their response to professional development.

Metaphors have helped researchers uncover the tacit beliefs of teachers and preservice teachers about teaching and learning, science teaching and learning, teacher roles, instruction, and knowledge (Tannehill & MacPhail, 2014; Kasoutas & Malamitsa, 2009; Seung, Park, & Narayan, 2011; Levin & Nevo, 2009). Beginning with a metaphor served two purposes. First, researchers have postulated that metaphors can help researchers understand how individuals construct their world (Munby, 1990; Munby & Russell, 1990). The researcher assumes that the respondent's linguistic choices are "not accidental, but represent something of the professional's thinking" (Munby, 1990). Second, the use of metaphors attempts to avoid disturbance of teacher thinking (Munby, 1990). Lincoln and Guba (1985) discusses that the insertion of a researcher causes the object of interest to react differently than it would with an absent researcher; as the researcher observes, the position and/or direction of the object will inevitably change, making the original status of the object impossible to know. The request for an initial metaphor only minimally disrupted respondent thinking while providing access to the teachers' tacit beliefs.

The researcher was privy to both formal and casual observations while on the case study site (Yin, 2014). Through the observations the researcher aimed to gather enough data in order to provide an "incontestable description" of the case (Stake, 1995,

p. 62). The researcher observed episodes that provided the best information to understand the case: professional learning communities and classroom intervention.

Interviews served the purpose of extending the observation of the case through time and space, albeit filtered through the memory and perspective of respondents (Stake, 1995). This study used a face to face, semi-structured approach to interviewing which maintained a "consistent line of inquiry" while allowing for a flexible and fluid conversation (Yin, 2014, p. 110). The researcher used an interview protocol (see Appendix A) to help ensure focus on the research questions and to provide guidance through the interview process. Follow-up interviews took place for two of the participants to further clarify and elaborate on their experiences with professional learning communities. All participants were also emailed to gather professional experience information for each participant. Ultimately, data was gathered until the researcher experienced a redundancy of information. At this point, no new information was gathered, indicating saturation.

Procedures

The study progressed through three phases as described by Lincoln and Guba (1985): orientation and overview, focused exploration, and member checks. Orientation and overview, and focused exploration consumed the data collection process. Member checks will be discussed further in the *Trustworthiness* section below.

Reflexive Response

When initially entering into a case study, researchers know little about what they do not know. Understanding the context of the case and finding salient points requires

the researcher to begin data collection with the purpose of discovery, otherwise known as "orientation and overview" (Lincoln & Guba, 1985, p. 265). The reflexive responses provided the researcher an opportunity to begin to see patterns or consistencies that guided further inquiry from subsequent data sources. The reflexive responses from all participating teachers also guided the researcher in choosing future interviewees to develop a maximum variation of samples from which focused exploration was conducted. Focused exploration included observations and semi-structured interviews discussed in the following sections.

The participants wrote their metaphors at the same time and in the same location to avoid collaboration and the use of external resources when formulating their metaphors in an effort to ensure a variety of responses true to their individual tacit beliefs. To establish expectations and to eliminate participant confusion, the participants initially were given the task of creating a metaphor for their city and state. The researcher also gave a metaphor for his city and state as an example. Executing a preliminary round of metaphors allowed the researcher to clarify expectations without leading participants toward any particular metaphor construction. The remainder of the procedures for metaphor writing mirrored those presented by Tannehill & MacPhail (2014). After the preliminary round of metaphors, the researcher primed the participants for their response by asking them to remember their campus professional development experiences over the school year. They visualized themselves within a professional development scenario, took notes over their visualization, and wrote their metaphors based on these notes. They proceeded through the visualization, note-taking, and

metaphor writing phase twice. The first time they focused on their own approaches to professional development, and the second time on their campus' approach to professional development. No other examples or clarifications were given to avoid leading the participants.

Observations

Observations gave the researcher a better understanding of the case of interest. Since there exists within every case an overabundance of episodes that can be observed, the researcher decided on what observations would provide the best evidence for understanding the case and specifically the issues of the study.

The researcher gathered evidence to understand the case by observing teacher classrooms and professional learning communities. Each participant was observed two times for 30 minutes during their intervention block. In the classroom the researcher looked for teacher behavior that aligned (or was contrary to) to the expectations outlined through the professional learning community meetings. The researcher observed two professional learning communities. During these meetings the researcher observed tacit contextual factors that may or may not influence the teacher belief change process. All observations provided contextual understanding for the researcher to formulate casual follow-up interview questions as well.

Observations allowed the researcher to focus on research question one. The first research question required the researcher to accomplish two goals: first, to determine the beliefs and behaviors of teachers in relation to professional learning communities, and second to discover in which pathways to belief change the behaviors and beliefs

categorize. Pajares (1992) states that beliefs "can only be inferred from a collective understanding of what human beings say, intend, and do" (p. 316). Belief change inducing scenarios compelled teachers to respond in speech, action, and intentions. These responses presented themselves in the classroom and professional learning communities.

The researcher took the role of passive participant, not interacting during meetings or classroom lessons. Observations also were overt. The duration of observations depended on the scenario: professional learning communities were observed in their entirety and classroom interventions for 30 minutes. The researcher described the context before and after each observation, and kept running notes during each observation. The running notes documented primarily the target participant's behavior (i.e. dialogue and nonverbal cues such as kinesics and proxemics) throughout the observation experience. The researcher also wrote field notes immediately after the observation to record additional commentaries and interpretations.

Semi-structured Interviews

Semi-structured interviews allowed the researcher to focus on research question one and two. The researcher sought to accomplish both goals within research question one: first, to determine the beliefs and behaviors of teachers in relation to a reform environment, and second to discover in which pathways to belief change the behaviors and beliefs categorize. The participants' beliefs and behaviors in relation to the reform message were revealed through what the participants said within the interviews. The second research question required the researcher to understand the perceived campus

contextual factors that each teacher deemed relevant to their professional development. Again, the optimal scenarios to observe teacher beliefs will likely compel a teacher to respond in speech, action, and intentions. Beliefs about campus contextual factors influencing belief change will likely be expressed in the semi-structured interview with each participant, and in spontaneous casual interviews following the scenarios listed above.

Interviews sought to understand teachers' beliefs and behaviors within the context of a campus reform and their constructions of the campus contextual factors present during their professional development. The interviews were semi-structured, meaning preplanned questions guided the interview. Interviewees were free to respond to each question with information they deem relevant. The researcher had the freedom to probe salient material and to seek clarification during the interview. Within the interview protocol each question was aligned to a research question to ensure all questions efficiently address the issues of the case. In addition the researcher formulated and detailed a purpose for each interview question. The interviewee also was asked to explain their previously written metaphors to verify, emend, or extend the researcher's understanding of the metaphors.

The interviewees were completely aware of the existence of an interview, the purpose of the interview, and how the information was to be used. In other words, the interview was "fully overt" (Lincoln & Guba, 1985, p. 269). The interviewer and interviewee had a peer relationship with the purpose of encouraging full cooperation

from the respondents and avoiding a perception of the researcher as the authority on the case.

The initial interviews were conducted at central office of the employing school campus and lasted from 30 to 75 minutes. A recording device was used to record interviewer and interviewee dialogue for future transcription. During the interview the researcher took observational notes in order to capture the visual, nonverbal cues such as kinesics, proxemics, and haptics. Immediately following each interview, the researcher wrote field notes to formulate initial interpretations of the interview content as well as to note salient points. Each interview also was transcribed for future unitizing.

After initial analyses, further interviews were needed in order to clarify and extend understandings of emerging themes for two of the participants. These follow up interviews took place on the participants' school campus. All digital recordings of interviews were transcribed and checked for errors.

Trustworthiness

The issue of trustworthiness is a matter of establishing enough confidence in an audience to pay attention and to take account of the findings of an inquiry (Lincoln & Guba, 1985). The researcher employed several strategies to develop trustworthiness throughout the study, the first of which was triangulation. Triangulation has especially been advised by Schraw and Olafson (2015) as a necessary component of studies on teachers' beliefs. The triangulation of data established patterns between different sources and different methods (Lincoln & Guba, 1985). The researcher sought consistency of information within different sources such as different classrooms or

multiple professional learning committee meetings. Also different methods, including interviews and observations, were used throughout the inquiry to seek consistency of information regardless of the method.

The researcher used a reflexive journal to remain cognizant of personal biases and expectations that arose throughout the inquiry. Maintaining a reflexive journal helped the researcher maintain a focus on how his own experiences and beliefs were affecting interpretations (Lincoln & Guba, 1985). These reflections were taken into consideration throughout the data collection, analysis, and interpretation phases of the inquiry.

Since the data solely originated from interviews and observations of the participants, providing them an opportunity to review data and react to interpretations provided an extra layer of credibility to the study (Lincoln & Guba, 1985). A member check was conducted once initial categories were developed from coding of data units. All participants were emailed a list of the tiles and rules of each category and were asked if they believed the categories accurately reflected the environmental factors present during their reform message experience. In other words, they were given an opportunity to verify, emend, or extend their thinking based on the findings.

Providing thick description allows readers to make a judgement of transferability, or "the degree to which the findings of an inquiry may have applicability to other contexts or with other respondents" (Lincoln & Guba, 1985, p. 218). As interpreter, the case researcher becomes an "agent" of knowledge and of interpretation (Stake, 1995). The researcher's goal is to help the reader come to a more complex and complete

understanding of the case, but this can only come through the researcher's lens. From a constructivist perspective, understanding comes through experience, to which the researcher is privy through access to interviews and observations. In an effort to create in the reader an empathy for the experience of the case, the researcher provided thick description, sometimes offering his own interpretations, but ultimately allowing the reader to form their own construction and understanding of the case by making available a substantial amount of raw data (Lincoln & Guba, 1985; Stake, 1995).

Data Analysis

The analysis of the metaphor statements preceded any other data collection to develop a preliminary understanding of the case as well as to provide information about the participants from which the researcher conducted a purposive sampling (maximum variation sampling). The metaphor statements first were listed and given equal worth. The researcher then attempted to categorize the statements by their tendency to reflect a teacher within the heuristic or systematic pathway of processing the reform message. Such categorization proved to be difficult as the metaphor statements alone did not provide strong justification for sorting each individual as in the heuristic or systematic belief change pathway. Instead the first round of categorization deciphered negative vs positive attitudes toward the implementation of professional learning communities. From these two categories participants were selected to diversify by total years of experience, years of experience in Title I schools, and years of experience within the campus of interest. Twenty potential participants were selected from the thirty-one

metaphors. Of these twenty potential participants eight accepted the invitation to participate in this study.

All analysis of the observations and interviews followed the prescriptions of constant comparative analysis as outlined by Lincoln & Guba (1985). The first step is the search for units of meaning. While processing observations and interviews the researcher searched for the smallest units of information that could be understood apart from the context of the data. The researcher wrote the unit on an index card which then was coded with the source of the data (e.g. interviewee code, page number, paragraph number, observation page number and paragraph number, etc.), and the site of the unit such as classroom or office.

The researcher then proceeded to open coding. Once the researcher had coded and written each unit on an index card, he read the first unit and placed it in category 1. The second index card was read and placed in category 1 if it contained similar content. If not, the second index card formed category 2. The researcher continued this process until a sufficient number of cards had formed several categories. Irrelevant cards were placed in a "Miscellaneous Pile" which was processed later. As the categories grew to a substantial size, the researcher wrote several properties that described each pile. These properties were then used to formulate a rule and a title to subsume the rule. The researcher reviewed the cards in the pile once more, forming new categories or adding to the miscellaneous pile with any card that did not fit the rule. Once all cards had been exhausted and each category given a rule and title, the researcher returned to the miscellaneous pile to search for units that might sort into one of the categories. The

researcher then checked for overlap between categories, categories that subsumed other categories, and categories that needed to be further divided. These categories revealed patterns that were used to make sense of episodes from the case and of the case as a whole.

The researcher conducted the data analysis in parallel with data collection, i.e. each affected the other in an alternating fashion. Information that emerged from the data guided inquiry in the field followed by new data that reactivated further data analysis.

Limitations of the Study

This study had several limitations. Firstly, Lincoln and Guba (1985) and Stake (1995) suggest prolonged engagement and immersion in the field to understand the case at an empathic level. Also, Hoffman and Seidel (2015) suggest the necessity of longitudinal studies in order to better understand belief change and trajectory of belief change. Unfortunately, time limited the researcher to a short duration of data analysis and field immersion.

In addition, because the study began in year two of the reform, teachers were forced to recall their thoughts and feelings from over a year ago. Since the teachers' attitudes toward the reform shifted over time, their rendition of events may now be presented differently than if asked at the beginning of the reform. In addition, the observed professional learning communities were well into the initiative and may not have demonstrated the same behaviors as when teachers were first heavily processing their beliefs.

Lastly, two of the participants' PLCs were always scheduled on days other than those the researcher visited the school. The interpretations of these two participants, therefore, relied on their own professed beliefs rather than any beliefs the researcher could ascribe based on actions through observation of PLCs or interventions. As documented by Aguirre and Speer (2000) teachers' professed beliefs do not always align with their ascribed beliefs.

CHAPTER IV

RESULTS

The following descriptions of the case study originates from the researchers' observations, interviews, and review of documents. Three areas of importance are discussed in detail in an attempt to develop for the reader an empathic understanding of the case.

1. Professional Learning Communities (PLCs): collaborative, data focused meetings that result in instructional decisions for students. PLCs are also the reform message of interest that initiates the belief change process that will be analyzed in more depth in Chapter V.
2. Interventions: a targeted instructional approach for homogeneously grouped students based on reading proficiency.
3. Participants: the teachers that serve as PLC team members and interventionists

Professional Learning Communities

Since the research questions focus on teacher belief change, a campus in the midst of enacting reform message that challenges teachers' current belief systems was a prerequisite for choosing a case study site. Professional Learning Communities (PLCs) serve as that reform message. The following description arises from the researcher's observations of the PLCs rather than the perspectives of the participants. In-depth descriptions and perceptions of the participants follow the researcher's observations.

PLCs consist of all teachers within a grade level and subject, e.g. 5th Grade ELA or 4th Grade Math. All of the researcher's observations of PLCs are of 4th Grade ELA

and 5th Grade ELA, although two of the participants attended special education PLCs that the researcher could not observe due to scheduling. While all general education, grade level PLCs occurred every Wednesday on campus, the special education PLCs either did not meet on campus or did not meet weekly. Therefore, descriptions here of PLCs focus on 4th and 5th Grade ELA PLCs. The special education PLCs will be described in more depth when discussing participant perceptions.

Before walking in the PLC room, the first item to notice is a calendar posted on the door with every Wednesday marked as "PLC". Upon entering the PLC room, there is no doubt that this space has been structured specifically for the needs of PLCs. An oval table sits in the middle of the room surrounded by about eight chairs. At the head of the table lies a lonely keyboard and mouse, seemingly missing their computer monitor and tower. The technology arrangement, though, illustrates the campus' prowess and propensity for efficient technology usage; the keyboard and mouse actually control a large TV screen positioned on the wall at the opposite end of the oval table. The insightful and intentional placement of the large screen foreshadows the focus on student data that will be displayed later in the meeting. Behind the head of the table is a small bookcase with professional learning books that seem to be rarely used.

As participants file in teachers joke and laugh about various events, usually that involve students or they immediately begin problem solving issues that have arisen with schedules, interventions, curriculum, etc. Even as the administration enters, the atmosphere remains informal. The teachers continue to have a light, boisterous, and

playful mood in which the principal joins. Once the meeting officially begins, teachers focus their attention on the tasks at hand, however, still in a familiar tone.

The principal facilitates the meeting, clearly with a planned agenda in her mind; these agendas sometimes are emailed in advance of the meeting. The discussion sometimes begins with giving attendance awards to teachers, providing a quick training on a new resource, or just by asking teachers what pressing issues they need to discuss. She will then begin the discussion of student reading data that usually results in students being shifted between interventions. "How are interventions going? Do we need to change anybody?" Of all these topics discussed within PLCs, this is the one that always makes the agenda. This is followed by teachers
sharing information about the student that always leads to a student either staying in the current intervention or moving to one they feel is more appropriate.

The principal will often provide input on students. She has developed an understanding with teachers that her thoughts are valued just as much as theirs. Only occasionally does the principal structure her response in a way that exercises her authority, and typically only when teachers propose a solution that fails to follow PLC protocol, i.e. moving a student to an intervention when the data does not support such a movement.

Other topics of conversation include assigning teachers to inform his or her team of the information learned in a training, making scheduling changes, sharing resources, discussing curriculum and standards, deciding how to vertically align with the primary school, sharing instructional strategies, and the administration receiving teacher input for

upcoming decisions. Overall, the meetings demonstrate several characteristics of the PLC atmosphere: a willingness to learn, an openness to sharing struggles, a focus on solutions, a flattened hierarchy between teachers and administration, a value on respect and confidentiality, and a value on recognizing and sharing expertise.

Interventions

Interventions served as the actionable step that followed PLCs, thereby the vehicle that made PLCs useful. When decisions were made concerning student intervention placement, the teachers immediately made the necessary changes in their intervention groups which were recorded on a shared spreadsheet that automatically updates all copies. The teachers within PLCs had several choices of student placement as defined by the purpose of each intervention. The programs used within the interventions spanned the reading spectrum from phonological awareness to reading comprehension. Several purchased intervention systems were used (System 44, Read 180, SRA Reading Interventions, and Corrective Reading) and each ELA teacher was assigned to one of these interventions. The teacher assigned to a particular intervention program became the campus expert on that program.

Ultimately the success of PLCs largely depends on interventions and the successful gathering of data on student reading progress. During the first month of school, teachers administer screeners and diagnostic tests to gather data on all students. This data is then used to make initial placement of students within each intervention program. As the year progresses, student progress is monitored according to the targeted

goals within the intervention. The progress monitoring data is then used in the PLC meetings throughout the year to make decisions from week to week.

Participants

The following two sections are discussed for each participant:

1. A description of the behaviors that indicate belief change movement concerning PLCs.
2. A description of the campus environmental factors each participant discusses in respect to their beliefs about PLCs

Amber

As the researcher peeks in for his second interview with Amber, she works in tandem with her paraprofessionals as her students work independently throughout the room on different types of technology. Today's master schedule has been rewritten to accommodate a new reward block, throwing Amber's self-contained severe autism class into a "blender", a metaphor she often uses to describe moments of disarray in her classroom. Amber is a young, passionate, and energetic teacher that does not hold back her opinions. She does not hesitate to share her criticisms, which she often precedes with a breathy chuckle or exasperated sigh. With each criticism, however, she demonstrates her resourcefulness by offering possible solutions.

Behaviors and Beliefs Within a Belief Change Pathway. For Amber, relevance is key. From trainings to meetings to PLCs she often views many of the mandated events as irrelevant to her professional needs within an autism classroom. When the administration announced their intentions of implementing PLCs, her first

reaction was a mix of frustration and excitement. First, frustration arose as she feared the meetings would be irrelevant.

> Um, honestly, sometimes it's a little frustrating because, I, we already feel stretched really really thin, and most of the time they're not very relevant to us, or meetings in general are not very relevant to us. So, at first my initial reaction was probably, you know, "Ugh, one more thing I have to find time for."

Along with this frustration, however, was a sense of excitement that she might learn something new from her peers. "But then I, I like to learn, so it is pretty exciting when I feel like I have an opportunity to learn from other people." In addition, as she entered the first PLC meeting, she felt appreciative that she would have a common planning time with her peers. In the previous year, the schedule did not include a common planning with the other self-contained teachers, meaning after school was their only available time to collaborate. Amber has humorously told of planning with her paraprofessionals in the middle of class or lunch with students. "It's really hard to plan when you have eight autistic kids screaming and making the noises that they make, you know." Good naturedly, Amber laughs such a difficult predicament off.

Amber's PLC team consisted of herself and other self-contained special education teachers. Amber, however, was the only teacher of a severe and profound group of students. Because Amber's colleagues taught students of mild to moderate intellectual disabilities, their students' functional goals did not always coincide with Amber's, diminishing the group's ability to collaborate and support one another like the grade level PLCs. While grade level ELA PLCs were able to share students by forming

differentiated reading groups based on student data, Amber's PLC was limited to verbal advice within the PLC meetings as student IEPs were so individual to the student needs.

In addition, Amber's PLC realized that monitoring special education IEP goals was unsustainable for weekly meetings. Expectedly, students within self-contained classrooms did not progress in their goals as rapidly as would be necessary to analyze on a weekly basis. For this reason, the principal suggested that Amber's PLC begin using their meetings as a time to plan their community-based instruction (CBI) outings--an opportunity for self-contained students to practice life skills in a community setting. Unfortunately, planning CBIs with the other self-contained teachers also became frustrating for Amber. First, the CBIs were difficult to make purposeful for the wide spectrum of needs presented by the students in the very discrepant self-contained classrooms, and, second, two of the teachers were new to self-contained classrooms, compelling Amber to do the majority of planning. Due to incongruent IEPs between the different self-contained classrooms, the nature of growth for students of mild to severe disabilities, and the frustrations that accompanied planning CBIs, Amber and her colleagues reduced the frequency of PLC meetings to once per month.

Amber dreams of PLCs consisting of herself and her two paraprofessionals that teach with her on a daily basis. "I wish sometimes that one of our PLCs a month could be a time that the three of us could collaborate because we're the ones in there, all day, every day." Nevertheless, Amber laments that meeting with her paraprofessionals is "unrealistic because who's gonna be with our students, unless the other teachers

volunteer." She adds, in a surprising matter-of-fact tone, that she must bring one particular student with her to every PLC meeting.

When asked how her feelings toward PLCs changed over the year, Amber discloses that they "tried to be purposeful with it, but it sort of lost its luster towards the end." Ultimately, the PLC meetings transformed into something hardly resembling a true PLC meeting. Rather, it became just a time to plan. "So, I would say last year probably we lost a good bit of our, I mean we ended up just sitting and planning together towards the end."

Perceived Campus Contextual Factors Pertinent to PLCs. As Amber was a self-contained teacher for students with autism, she still participated in a PLC with other self-contained teachers. Initially, the PLCs were envisioned to have a similar structure and purpose; they met weekly to discuss student Individualized Education Plan (IEP) data which subsequently led to next step decisions to affect student achievement. Several factors, however, affected the actual implementation of the PLC plan, consequently influencing Amber's beliefs toward PLCs.

Scheduled Time to Collaborate. One of Amber's main complaints is the paltry amount of time she has to collaborate with others in order to plan. Certain students within the autism class require that a staff member familiar with the students' behaviors accompany the students at all times, to the point that Amber rarely, if ever, has a planning time free from students. Amber shares amusingly, "It was like, we're hollering at each other, you know, 'Okay, yeah, that's like a great idea.' You know, we're like

restraining a kid." Consequently, she is pleased with the common planning time built into the schedule and the expectation that the time be utilized.

> I mean, we do have PLCs. That has helped this year. Um, because it has kind of forced our Special Ed team, the three lead teachers in our Special Ed department at [our school]...We do have one day a week that we have to sit and talk about stuff, um. Which is great.

Unfortunately, even the PLC time does not completely allow Amber to plan free from students. She haphazardly states that she "had to take a kid with [her] to PLCs." The nonchalant tone of her comment demonstrates just how commonplace such behavior has become for Amber.

Incompatibility of Self-Contained Teacher Goals. Unlike general education teachers who had several pieces of common data, the self-contained teachers only had student IEPs, which contained specific academic goals for each student. Because of the individualized nature of IEP goals, the data were not always comparable. The incompatibility of the PLC members' goals becomes a point of frustration for Amber. "I teach students with autism. The other two teach mild to moderate special education intellectual disabilities." She then laughs at her frustration with the PLCs. "We're not even on the same page."

Wishfully, Amber discusses the potential benefits of collaborating with other autism teachers across the district. Observations of autism teachers at other schools have provided Amber with valuable tools that she could modify for her own students.

> We started doing like a hygiene box and stuff where they learn how to brush their teeth, and I learned that from going to [the high school], and those kids were higher, and they do it on a completely different scale, but I did. I could look at it and go, 'Oh, I could make that work for us.' And we really don't have that opportunity, if that makes sense.

Unsustainable Conversation Topics. According to Amber the students of the self-contained classroom do not experience rapid growth in their IEP goals, hence providing less content to discuss on a weekly basis. "But there is only so much you can talk about. I mean, it's not gonna change very much." Because of the incongruity of the IEP goals and the nominal growth within these goals, the administration redirects the self-contained PLC to instead plan Community Based Instruction (CBI) trips. Once these trips were planned, however, the team again had little to discuss. Consequently, they rescheduled their PLCs to monthly meetings.

Support From Administration. When Amber's PLC team realized that the PLC meetings were quickly becoming unproductive, the administration suggested a restructuring of the PLC time. Since all of the self-contained special education teachers participated in CBIs, the principal suggested that they focus instead on planning for these trips. The principal's guidance temporarily revived the PLC meetings until, once again, the teachers had little to discuss after the trip was planned.

> I think for us after a certain point there is only so much you can say and do, and once you've planned the CBI for the month, and you...I mean, we tried to be

purposeful with it, but it sort of lost its luster toward the end. And now we do PLCs like once a month.

Amber even seems to allude to lost time due to PLCs. "So, I would say last year probably we lost a good bit of our, I mean we ended up just sitting and planning together towards the end."

Donna

Donna evokes a southern charm in her speech, often reminiscent of an oral story teller, drawing in her listeners with dramatic pauses, rapid changes of inflection and mood, and frequent quotes from her stories' characters. She is a teacher that experiences life with intense emotions, sometimes directing her passion toward advocating for her students, and other times irritated with her colleagues' actions. Donna seems to use her sense of self as a pedestal to criticize others, especially those in authority, and often becomes the victim in her own stories. She also is focused on doing what is best for students, works hard, and fervently pursues being a great educator.

Behaviors and Beliefs Within a Belief Change Pathway. At the onset, the PLCs become a source of frustration for Donna. She is an itinerant teacher with multiple campuses throughout the county, causing her to have a tight schedule in order to serve all her students. The addition of weekly PLC meetings disrupts her schedule, leaving her to wonder how she will compensate for lost time. "It took a whole time frame away from my traveling to other schools, cause it's like a, so I kinda was frustrated. Not because of meeting, but because of my other portion of my job is [that] I have to go." In an attempt to repair the schedule, Donna visits the campus principal to explain that she

was originally told she would have certain blocks to teach her ESOL students. Donna reports that the principal responded by throwing the schedule at her and saying, "Either make it work or you can't teach, uh, teach 'em." Donna also goes to her department supervisor for possible solutions who responded with incredulity and then resigned to the campus principal's wishes, leaving her without options.

> When I went to my big boss and told her it was gonna take one whole day that I couldn't travel she, "What!". I said, "Well, it's at 10:25. I have a class at 8:15. There's no way I can go to a school, because you know how far out we are." Um, I said, and then my next class is at 12:25. [...] And see, I've always been told I have to make the principal wherever I'm at happy. "Um, well, just do whatever you have to do." So, you know, that's what I was doing.

The compact schedule required by the campus principal becomes a reason for poor performance for Donna, a reason the campus principal refuses to accept. "Last year I didn't do a very good job at [traveling between schools], and when I try to explain at my summative evaluation, she didn't want to hear it." Contentious interactions between Donna and the principal such as this become a theme throughout the interview, demonstrating their strained relationship. Later, Donna's frustration with the schedule subsides. At the time of the interview she explains that her feelings toward the schedule have changed. "I am glad that they're doing it on teacher time, because some of the schools are not. [...] Now, am I glad it's in the middle of whatever? No. But, you know, I've gotten used to it." When asked why PLCs during teacher time is a good thing she responds, "Well, because I don't want to stay every day after school."

The frustration due to an inconvenient and contentious PLC schedule only intensifies when Donna is not accepted into the PLC group as a valuable member. "Every time that I would try to put my insight in I don't feel like they felt I had anything to...worth putting in." She attributes this to the teachers' perception that she is "just the ESOL teacher." When she has attempted to mention ESOL accommodations or standards she has been "cut off" by the other teachers within the PLC. Donna believes teachers discount her comments because her "numbers aren't big." From the first to second year of PLC meetings, however, Donna perceives that the principal has finally come to see her as an important member of the staff but has not translated that view to the rest of the staff.

Eventually Donna begins to disengage from the PLC meetings, spending her time, "just sittin' there." Donna begins to see PLC meetings as a waste of time, lamenting that she's "not getting to do something worthwhile." Observations of Donna's PLCs confirm that she has disengaged due to not being included. She remains silent throughout the 45 minute meeting other than responding to one question. A conversation prior to the PLC reveals that her ESOL data in her Lexia program has never been used as a way to make decisions for students despite Donna believing that it would be useful. During the following PLC the principal asked Donna how Lexia is going, a question the researcher suspects arises because he is present and the principal knows that Donna is a study participant. Immediately following the meeting Donna turns to me and whispers, "That is the first time I've ever been asked about Lexia."

When asked to write a metaphor (found in Table 2) for her own approach to professional development Donna wrote, "Professional development recently has been a stream running sideways with no borders to help corral the water." She explained that the stream running sideways represented PLC action steps that were not executed well.

> They started stuff but really didn't finish, cause that's kind of, whenever I said, um, "a stream running sideways with no borders to help corral the water," like, they started some stuff. I mean, they really did. Cause some of that stuff was really good. But it, but then also it didn't, I mean, they didn't really go anywhere with it.

She also noted that the PLC meetings did not result in improvements to student achievement. "But I didn't see anything. They were talkin' about stuff, but I didn't see anything that was enriching anybody." Despite the lack of results Donna still maintained that the PLCs were a positive change. "Well, I am glad that they are involved in [the PLCs]. You know, because it is needed."

When asked what the solution would be to address these issues she responds that the teachers, "would have really had to get down and dirty with what they were teaching, because some of those kids had no reading skills at all." She also mentions that System 44, a campus purchased reading intervention program, is a good system, but the System 44 interventionist needs more support due to student behavior issues.

Perceived Campus Contextual Factors Pertinent to PLCs. Donna attends the 3rd Grade ELA PLC, but often struggles to find her place as she is the only ESOL teacher within the team. Much of her opinions about PLCs are filtered through her

Table 2

Participant Metaphors

Pseudonym	Metaphor 1	Metaphor 2
Amber	I am like a key that fits in the wrong hole in professional development.	My campus' role in professional development should be like going to the creative discovery museum, where I can learn things I need in a hands-on way without deterring others from their learning purposes.
Donna	Professional development recently has been a stream running sideways with no borders to help corral the water.	Professional development is intended to further the needs of the child, but doesn't qualitate what I need for my class.
Beverly	My approach to professional development is give and take. Professionals come together to share ideas, strategies, struggles and solutions to problem. PD is like a pizza- many toppings (ideas) and full of flavor.	PES PD is an exploding nucleus- ever changing and growing.
Taylor	When involved in professional development where I have been given choices, I am a rocket with a strong forward trajectory.	My campus provides a buffet of professional development, allowing participants to make their own best choices.
Lauren	My approach to professional development is like a lion sizing up the prey to see if it's what he really wants.	Our campus' role in professional development is like a parent providing what a child needs even if the child doesn't want it.
Shirley	My approach to professional development is like sitting on I75 in traffic.	My campus' approach to professional development is like an empty wind often changing directions.
Leslie	My approach to professional development is like the cycle of life. Everyone is connected. Most folks are sharing & learning. The beginning we discover nerds. During life you/we grow/diet/share/build get stuck and help each other. End of the year celebrate successes & see where life could improve.	PES's approach to professional development is a well oiled machine - Every part (person) must be primed to work- prepared-filled w/ oil/clean - Folks need to know their standards- students level of each student in every area- as well as socially - Need to be able to plug in solutions for every child.
Karen	My approach to PD is having fun participating, and what can I take from it to use in my classroom.	My campus' approach to PD is teamwork and "Better Together".

ESOL perspective and her relationship with others. Of all the participants, Donna seems to have the most intense and mixed feelings about PLCs and the accompanying interventions.

The Disgruntled Itinerant ESOL Teacher. Because the English Language Learners with the district are few in number and attend multiple campuses, Donna cannot schedule her day completely on one campus. The case study site is Donna's home campus, meaning there is an unspoken rule that the campus' administration has some authority over Donna and her teacher duties. Donna's perception of the abuse of this authority becomes a point of frustration when she is unexpectedly required to perform duties that she had never performed with other administrations. Successful functioning of the PLCs required an efficient system of gathering and organizing data for all general education students on campus. Donna became a part of this efficient plan. Specifically, Donna was asked to assess her students' reading levels and to progress monitor to track growth. Upon hearing these requirements, Donna objects, "Well," she begins, drawing out the word, "I had never been officially trained to Dibel, so I said, 'I cannot Dibel.' You know, the ESOL, I've never had to Dibel." After complaining to the principal that she would need training it "kind of fell by the wayside." Instead, she will be required to receive training before the next school year. Grudgingly Donna adds, "So, I guess I'll be spending a lot of time doing those things instead of teaching, cause that's all I, you know. But I'll do what I'm told to do."

Donna, according to her, has also never been required to serve an extra duty such as having an arrival or dismissal station. "I've never had to do any of these things anywhere I've taught, and I've taught all over." Initially, Donna was not placed on the duty schedule, but then her name is added unexpectedly. "But then all of a sudden I got, they started adding them to me, and didn't really say a lot to me about it. Just started

adding them." Later, Donna complains to her principal that the duty schedule conflicted with her instructional schedule, impeding her from providing ESOL services to students at other campuses, an explanation her principal rejects.

Scheduling. Donna was given a schedule that allowed her to teach at her home campus in the afternoon, freeing her mornings to travel to other schools. With the addition of PLCs, however, Donna was required to teach partly in the morning, attend PLC meetings, and then teach additionally in the afternoon, in effect allowing a small window for instruction at her other campuses. When she approached the principal about the scheduling issue, Donna recounts, "And this is what she said to me. She said, 'Either make it work or you can't teach, uh, teach 'em.' And she threw the schedule at me. Very short." Consequently, the PLC meeting requirement initially incites frustration for Donna.

Strained Relationship with Campus Administration. A common theme throughout Donna's interview is disgruntlement with the campus administration, which often stems from a lack of communication. Donna complains that she "couldn't get the principal to talk to [her]." As a new teacher on campus she had many questions about school protocols and norms, leaving her to feel lost and often surprised by changes in schedules. "Every time I would try to talk to her to find out how things worked at school I got her hand, or 'I don't have time.' I didn't even know her protocols." Donna reports that she was not informed that she would be moving from her portable nor that she would be attending PLCs. "Well, then I saw my name on this thing. She still hadn't

spoken to me. I mean, we're talking nothing." Donna is so distressed about being required to attend PLCs that she visits her ESOL supervisor for an unsuccessful appeal.

A similar incident with scheduling occurs on field day when Donna is added to the field day schedule after she had printed a previous draft of the schedule that did not include her name. She is approached by both the assistant principal and principal about not being present at her station. Despite not being prepared, Donna works at her station resulting in an episode of vertigo. Sharply, Donna recounts the day.

> Principal said get out there. I was not prepared. Hot day. All day long. I have four types of vertigo. Diagnosed. Not suppose to be out in the heat and sun that long. But I went out there. Wasn't dressed for it. Didn't have the proper anything. No sunscreen. No nothing.

In general, Donna perceives her principal as unapproachable, aloof, and childish. According to Donna, in informal settings the principal will sometimes not acknowledge Donna or others and ignore their greetings. Finally, Donna ridicules her principal, relating her to "a big baby."

Donna's Value to Others. Many of Donna's recollections disclose moments that communicate to Donna that she is not valued as an ESOL teacher on her campus. In addition to many of the above examples--being required to complete duties outside of her ESOL responsibilities, a lack of consideration for her ESOL schedule, failing to inform her of schedule changes, a lack of communication and being aloof toward her--actions from her peers and her administrators directly reveal their perception of Donna's value.

First, while Donna enjoys that she can see her English Language Learners' (ELL) scores in PLCs, she complains that she has not been given access to this data, even upon request. "And it was just, uh, we were going over their scores, which I don't have any access to except for when we're in their together, which is very sad for me, but I keep asking for it, but I don't seem to be getting it." Similarly, teachers fail to invite Donna to Student Support Team (SST) meetings for her students, "which they should be sharing with [her], but they can't seem to grasp that." Other staff also fail to inform her to IEP meeting dates for her students, meetings for which she would at least like to send data. Donna reports that sometimes the IEP meeting committee sometimes even place students in special education without informing her.

Even though Donna purposefully chooses to attend 3rd grade PLC meetings because 3rd grade has the largest ELL population, her PLC team also refuses to listen to her. She believes this is because she's "just the ESOL teacher." Because the ELL population is so low on her campus, others rarely include Donna or consider how their choices affect the ELL students. "I would like for them to include, and I know it's hard to include ESOL because there's not enough of us." Eventually, Donna decides to stop participating altogether in the PLC meetings. "I don't speak up much anymore because they don't really want to hear what I have to say." A 45 minute PLC observation verifies Donna's lack of participation. She only spoke once the last few minutes of the PLC when the principal asks her about the Lexia program data.

The actions from the campus administration also cause Donna to feel that she is not being afforded the same liberties as other teachers. For example, the principal

informs Donna that she must text, email, or make an appointment in order to speak with her. Donna, however, has "witnessed other people just dropping in and getting to close the door and talk to her." In addition, the first two classrooms that Donna is shown do not meet her expectations as a functional space for learning. The first room was barely big enough for her one table and did not have space for her supplies. The principal then shows Donna a second classroom, a "half trailer" outside of the main building. While the room was more spacious, it was still "jam packed". Also, one of her student's feet fell through the floor of the trailer on the first day of school. There was also little internet connection, diminishing the usefulness of student instructional technology.

Lexia. As an ESOL teacher Donna as a specific program called Lexia that she uses as an adaptive assessment and personalized instructional tool for her ELLs. Lexia becomes Donna's strongest link to the PLC meetings by providing her data that she can compare with the data presented by the general education teachers. As she attends PLC meetings, she begins to notice that the general education teacher data corroborate her Lexia data. "My Lexia program shows me where they are struggling so I can work with them, [...] and so their teachers are seeing it, some of the same stuff too." The Lexia program also provides a sense of unity with the other teachers for Donna. "But at least we're on the same page. So it kind of reinforces that I chose the right program to use on top of what I already was doing."

Donna feels that the Lexia program has a place in PLCs, however, they have never included or asked about the program data, at least not until the researcher observed one of Donna's PLCs. Donna sat silently as the other teachers discussed data, shifted

students between interventions, shared resources, and discussed upcoming events. Once all topics had been exhausted and the clock sped ever more closely to the end of the meeting, the principal shifts her focus for the first time toward Donna and asks how Lexia is going. Donna responds that the program is going well and that she is sharing student results with parents. Another teacher then adds that a new shelf of books in Spanish have been added to the library. The PLC meeting ends soon afterward, and as the teachers are gathering their materials, Donna turns to me and says that this was the first time she had ever been asked about the Lexia program. The researcher suspects the question was asked because he was present in the meeting.

Beverly

Beverly's demeanor can be characterized by a soft-spoken nature that evokes respect and showcases wisdom. The composed and professional mood of the conversation remains largely constant as she emotes a hopefulness for the next school year and nostalgia for the previous one. Beverly speaks candidly that communicates a trust that her thoughts will be kept in confidence. She functions in two spheres--Speech Therapy and General Education--on multiple campuses where she attempts to find a connection with the staff and fit within the campus' culture, an objective she sets as a priority for herself. Ironically her room sits at the end of a long hallway nestled between other Special Education classrooms, a section of the hallway General Education teachers rarely traverse.

Beverly has been a Speech/Language Pathologist for over 40 years in multiple settings: schools, hospitals, home health agencies, a private practice, nursing homes,

rehab hospitals, rehab clinics, and at a federal prison. During that time she has worked with individuals from a week old to 114 years old. She specializes in working with special education students hence her placement in the self-contained severe and profound and multiply handicapped classroom for eleven years. She has worked in her current county school district for five years and at the current campus for four years.

Behaviors and Beliefs Within a Belief Change Pathway. When asked about her reaction to the PLC initiative Beverly readily shares her apprehension. "The initial thought was, 'Oh no, something else to do.' Something else that we're gonna be re-, needed to do that does not apply to us." When the administration presented the PLC initiative to the staff Beverly also shared her concerns with her fellow Speech Therapist. "Well, if I remember right, I probably turned to my, uh, my fellow speech pathologist and said, 'Oh no. Another thing we're gonna have to sit through that's not gonna apply to us.' And she agreed." Beverly also comments that it was just another one of those "one more things," referencing the many initiatives that teachers often face. The excitement of her administrators, however, served as an initial impetus to faithfully consider the viability of PLCs. Beverly describes the staff's excitement as a result of the administrator's excitement and later explains that, "If the head is excited about something, they can get the body to get excited too, and to participate."

Beverly continued her apprehension toward the PLC's leading up to the first PLC meetings. "And, then over the course of the year, that's when I changed, as you know as the first, I would say probably the first couple of weeks, it's like, 'Okay.' You're trying to figure out, Mmm, I don't know if this is gonna be good or not." Over several weeks

of PLC meetings Beverly noticed a slow "mindshift." She cannot identify exactly the process of the mindshift. However, she does pinpoint acceptance into her PLC group as an important mediator of this process.

> Being seen as a valuable member of the group, not an outsider, or a side liner. Being accepted and, uh, valuing your ideas, and uh, realizing that you can, even though I am a Speech Therapist, I do have things that I can offer. I have a wealth of information and experience.

Being a part of the English Language Arts (ELA) PLC group also influenced Beverly's ability to engage in the PLC as she perceived ELA as more cohesive with Speech Therapy.

> Well, especially in the, being part of an ELA team, if I had been part of a math time it would of been a little bit harder for me to come up with, uh, things that would be, uh, that would, uh, apply [...] But being part of the English, English and Language, Speech Therapy all kind of meld together.

Beverly considered how PLC meetings affected students and ultimately decided that PLCs did help improve student achievement, even the achievement of her own students in Special Education.

> I was very pleasantly surprised to see how over the course of the year that I could see how, "Yes, this does apply to what I do with my kids." And I can see how this can affect the, um, outcomes for all of our students, and helping that all of our kids can be high learners. Even my multiple handicapped kids can be high learners.

Specifically, Beverly's involvement in the PLCs affected her practice. She reports that the PLCs affected the way she saw her kids, raised her expectations, and gave her direction in how to modify her instruction for her self-contained students. "Seeing how things operate on the other side of the house gives me a new perspective on how to deal with my children."

During year two of the PLC initiative district administrators introduced county wide Speech Therapy PLCs. To Beverly's chagrin she no longer attends PLCs at her home campus, but instead attends PLC meetings with speech therapists from around the county. These "PLCs" were really instituted as a way to ensure the novice speech therapists were completing their Individualized Education Plan (IEP) paperwork, not as a time to look at data. "To older therapists it's almost like a slap to the wrist. We know when the deadlines are. Those who were doing what they were supposes to now have to participate even though the younger ones were the ones not keeping up with data and timelines." Beverly now feels more detached from her home campus because her schedule and the district PLC meetings do not allow her to attend campus PLC meetings. "Here I still feel welcome. Still feel apart. But not as much because of the lack of PLCs on campus."

Perceived Campus Contextual Factors Pertinent to PLCs. Beverly attends the 5th Grade ELA PLC as a speech pathologist. Like Donna, she discusses her relationship with others and how that influences her thoughts on PLCs, however, with some different conclusions. Unfortunately for Beverly, in year two she attends district wide meetings for only speech pathologists, which she hesitantly calls "PLCs."

Connection to Others. "As a speech therapist, we often are kind of like the red-headed step children." Beverly has perceived a division on her past campuses as speech therapists are "kind of a different creature." While the majority of the school teaches the four core subjects to general education students, Beverly spends most of her time focused on language instruction and life skills for the small self-contained population. "You do your thing. We're doing our thing, and never the twain shall meet." Interestingly, PLCs built a bridge between speech therapy and the rest of the school. PLCs became for a Beverly a place of cohesion. While before she felt isolated, now PLCs offered an opportunity to learn of campus data and discover and share new ideas that would impact student achievement.

Being considered separate from the general school staff and being under two administrations (one at an elementary school and one at a middle school) created a disconnect between the speech therapists' student goals and general education student goals. PLCs, however, merged the two worlds so all staff had the same focus. "I just think as a group we, we just come together, and we understand that the purpose, what our purpose is." In fact, when asked what factors helped her be successful in the PLCs, she cites common goals. "The common goal for seeing that all of our students could advance to their abilities, and those that were having trouble, we could come together and brainstorm how, what could we as teachers do to help."

Beverly also felt valued as an important member of her PLC group; although, she wasn't part of the 5th grade ELA team. Being accepted into her PLC team became a requisite condition for Beverly to eventually accommodate PLCs as a new belief.

Initially, she resisted the idea of PLCs, believing them to be just "another thing to do that's not gonna apply to us." However, once the 5th grade ELA team welcomed Beverly's contributions to the PLC discussions, her views began to shift. When asked what factors contributed to her belief change over time, she responds,

> Acceptance into the group helped. When being seen as a valuable member of the group, not an outsider or a sideliner. Being accepted, and, uh, valuing your ideas, and, uh, realizing that you can, even though I am a speech therapist, I do have things that I can offer. I have a wealth of information and experience.

Attending ELA PLC meetings as opposed to math PLC meetings also contributed to Beverly finding her place. Because ELA and speech and language have common threads, she was able to connect her knowledge and experience more easily. "If I had been part of a math time it would have been a little bit harder for me to come up with, uh, things that would be, uh, that would, uh, apply."

Unfortunately for Beverly, in the following year, the district began speech and language PLCs for all speech therapists in the county. Beverly no longer attends PLC meetings on her elementary campus, and, as a result, feels disconnected once again. Although she still feels welcome, there has been a distancing between herself and the goals of the campus.

Synergy of Collaboration. Because Beverly's PLC focused on the 5th grade ELA students, the data did not directly reveal growth in her students. However, Beverly did experience change in her own instruction due to attending PLCs. "But over the course of the year, I saw that it may not have affected them, but it affected me, and by

affecting me then I could brainstorm and figure out ways to help them that I hadn't thought about." Collaborating with other teachers pulled Beverly out of her "rutts," sparking new ideas and motivating her to try new approaches to teaching her students.

Beverly's metaphor also reveals that she perceives PLCs as a generator of ideas. "PD is an exploding nucleus, ever changing and growing." She explains that "we started out kind of like a little baby nucleus and as our ideas came and we got a little more focused we would just, ideas would explode and it just grew and grew to become a really awesome thing." Beverly sees the mixture of general education teachers and speech therapists as a recipe for ideas that complement and build off of one another. "The teachers all had great ideas of how they could do it and then, and we had some contributing ideas from what, looking at it from a language standpoint, you know, because reading and language kind of go hand and hand." Ultimately, "seeing how the other side of the house works" raised Beverly's expectations for her own students. "I can see how [PLCs] can affect the, um, outcomes for all of our students, and helping that all of our kids can be high learners. Even my multiply handicapped kids can be high learners."

Supportive Administration. Beverly believes in a top down approach to implementing new initiatives. Several times she mentions that "it's got to come from the top." Throughout Beverly's description of PLCs, the administration took an active role in ensuring effective and faithful implementation. First, when announcing that the school would begin PLCs, the administration displayed excitement and anticipation for the student gains that they expected. "I think the PLC works is because the

administration, or our principal and assistant principal had both bought into the process of PLCs. And they were all excited about it, and they got us excited about it." She goes on to explain that the administration's initial display of emotions toward an initiative has the capacity to sway teachers toward anticipation and excitement for the initiative.

At the onset of establishing PLCs as a routine event, the administration communicated their priority for PLCs by creating an alternate schedule just for PLC days. No other meetings were allowed to be scheduled those days. Every instructional staff on campus would be assigned a PLC team. Beverly explains that "it's important that the administration says, 'This is our PLC day, and nothing else is going to take precedence over PLCs,' which puts high value on the PLC from the administration when you do it that way."

To further ensure the quality of PLCs, the administration implemented a gradual release model to demonstrate the PLC protocol. In addition, Beverly perceived this approach as an important factor in her process of belief change and experiencing successful PLCs.

> I think to have a successful PLC, it's got to start from the top [...]. And when they're on board and when they understand it and when they say the direction they want to go, then they can kind of start us off and then they let go and let us, um, run it from there.

The administration started by guiding each PLC team to establish roles and norms. Some of the roles included chairman, notetaker, and data gatherer. At the first PLC meeting, the team also developed norms such as arriving and ending on time and

keeping conversations focused on the agenda of the meeting. To help focus attention, the group even created a code word--"squirrel"--that would indicate that the conversation had veered. The administration also led the meeting initially to model the structure of each meeting. Once the the PLC members "got their feet wet," the administration slowly released responsibility, attending the PLCs eventually more as a monitor. At times, the administration did not attend PLCs, but this not diminish the quality of the meetings. "I think because we saw the value of the PLC and what it was doing, it kept us on track, so even when the boss was away the cats did not play...the mice did not play, however you want to look at it."

Finally, the administration provided resources to enable testing of student reading levels that could then be used as a base for student decisions. During the meetings, the PLC team analyzed the reading data from these tests to place students in the most appropriate reading groups.

> We looked at all the data and saw, alright, if the kids are doing well in this area of reading and say, um, they're doing well in decoding, but they're not doing well in comprehension, then it's like, "Okay, what can we do to bring that comprehension level up?"

Taylor

Taylor, with her short stature, curly shoulder-length hair, glasses, and loquaciousness, may strike you as a reader--and you would be right. Taylor teaches 4th grade ELA and certainly enjoys her job. When first meeting Taylor she immediately draws you into natural and jovial conversation. Once the discussion turns to serious

topics, however, she quickly switches to a sincere tone. Back and forth she makes these transitions seamlessly throughout the conversation, emphatic and structured in her responses yet jovial when appropriate. While Taylor is flexible during times of change in her job she also considerately expresses her frustrations, sometimes whispering her objections that may be incongruent with common opinion.

Taylor has worked in education for 16 years, 15 of which have been at the current elementary school. All 16 years have been in Title I schools in either 4th or 5th grade. She has taught all subjects at some point, but has focused solely on ELA for several years now. She also has her Gifted and Reading endorsements.

Behaviors and Beliefs Within a Belief Change Pathway. Taylor's initial perception of the PLC reform message takes her on a different path than Donna and Beverly. When the campus administration announces that they will begin weekly PLC meetings Taylor is "thrilled." In years past Taylor and some of her colleagues have formed English Language Arts planning teams whenever they stumble upon challenges in their classrooms. One particular year her campus moved from basal readers to a reading workshop model, a switch that prompted a teacher led book study over *Mosaic of Thought*. Taylor and several other teachers met periodically to discuss the book and how the principles could be implemented in their classroom. This collective learning experience becomes, for Taylor, the filter by which she judges the PLC reform message presented to the staff. "This wasn't new for us. We would, ever since the days of workshop, and even once workshop was over we didn't stop. [...] So, for there to be dedicated time on a weekly basis for me to talk to those people was amazing."

Once PLCs began Taylor became irritated because the PLC meetings did not happen as she envisioned. Instead, the time was used for administrative updates and sharing campus logistics. Taylor's irritation was short lived, though, as the administration easily assuaged her by explaining that sharing campus logistics is part of the purpose of PLCs. As an added bonus, using the PLCs for sharing information typically shared during faculty meetings saved the teachers from after school meetings. Eventually, to Taylor's satisfaction, PLC meetings were more consistently used for analyzing data and making instructional decisions.

Taylor prides herself on being prepared for PLCs. So prepared, that she anticipates administrator requests in order to have material ready well before it's requested. Knowing that well organized data helps make decisions within a PLC, Taylor and her team began to gather and organize data within a Google Spreadsheet, a story she tells with delight.

> We would eventually receive a spreadsheet where we were supposed to put our kids' reading data...We already had one. [...] We had that spreadsheet right there. I could pull it up right now. And so we just started entering all that data from the get go knowing that eventually it was gonna reach a point where we were sitting in PLC and Teri would say, "Now what we need to do is put this data somewhere." And Teri, and Teri loved us because we were always the ones that were like, "Yeah, we know. It's right here. Do you want us to send it to you?"

On the other hand Taylor expresses her concerns for the upcoming year's PLCs because her grade level team has completely changed. She will now be working with

three teachers new to the school. "So, I'm feeling some stress walking in just feeling like (sigh). And everybody's gonna be looking at me and I still don't feel, you know, I don't know everything."

When asked about her own appraisal of her ability to participate in PLC meetings, Taylor struggles to answer. After a moment of silence, she sheepishly responds, "Great I guess." She then begins to explain several aspects of her PLC that affected their ability to execute PLCs: a chaotic Wednesday schedule, a scheduled time to reflect and decompress, a lack of negative discussions among her team, a team player attitude, and members with relevant content knowledge.

Perceived Campus Contextual Factors Pertinent to PLCs. Taylor attends the 4th Grade ELA PLCs for two years in a row, however, she is the only 4th Grade ELA teacher that stay in 4th Grade for year two. This causes some reservations for her when entering the second year of PLCs, partly because she is unsure of her ability to lead the group, and also because she had such close relationships with the ELA teachers in year one.

Schedule. Prior to formal PLC meetings, Taylor and her colleagues participated in teacher-initiated meetings similar to PLCs to collaborate and learn together, limiting them to meeting after school due to an inability to schedule a dedicated time during the school day. With the formal implementation of PLCs, the administration created a Wednesday schedule specifically to accommodate PLC meetings, enabling Taylor and her colleagues to meet weekly to plan and look at student data. "For there to be dedicated time on a weekly basis for me to talk to those people was amazing." Taylor

also appreciates the opportunity to collaborate with her ELA team as "ELA is hard in the upper grades because there's, there's just so much, and you can never ever ever get it all in." Before PLCs, meeting with her ELA team proved difficult because they were spread out across the hallway. Now, collaborating with her colleagues during PLCs helps Taylor prioritize "what you're teaching the students and when."

Taylor praises the administration for making the commitment to have PLCs and guarding that time, indicating the consistency as one factor for successful PLCs. "The consistency of it helped a lot, and knowing that they weren't gonna yank it. You know? Cause there were times they could have." She estimates that PLCs were only canceled twice throughout the year, once during testing and once at the end of the year. "Other than that, we had PLCs."

The Administration's Role. From Taylor's perspective, the administration had much command over teacher perceptions of the PLCs. First, the administration provided the flexibility for teachers to make decisions that reflected the nuances of their individual classes. "Thankfully we have administration that have not pushed that complete, some schools are really about any door you open better be on page 72 or whatever. We're not at that point, which I'm very thankful for." This freedom empowered them to vocalize these differences and support one another through their individual strengths. The PLC meetings became an amalgam of different expertises that as a group could address the distinct needs of each class.

> I'm a fast typer, and I can just get it done and put a cute header on it and put it in the team drive. [Teacher 1] was doing lesson plans. [Teacher 2] was coming in

more with ideas from a primary background, and how we can help strugglers and things like that.

At times teacher discussions within PLC revealed weaknesses in their instructional approaches, leading the teachers to make recommendations to the administration. For example, Taylor and her team realized that the writing prompts that she and her team were using during the fall semester were not aligned to the state test, convincing them to suggest to the principal that they use prompts from a different curriculum. The principal listened and welcomed their feedback and allowed them to make the needed changes, even asking if she should inform other grade levels to do the same. The administration's openness to feedback and teacher instigated change transformed the PLCs into a platform for teachers to vocalize their concerns and influence school level processes.

The principal often led the PLC meetings. During Taylor's PLC the principal engaged in many behaviors that built team cohesion, ensured a productive environment, and guided next steps. Such behaviors in Taylor's PLC include:

1. Giving perfect attendance awards to three of the four ELA teachers
2. Guided teachers to set meeting norms
3. Redirecting teacher thinking when making suggestions not based off of student data
4. Developing a loose agenda
5. Delivering questions to prompt teacher discussions aligned to the agenda
6. Providing suggestions for next steps

The influence of the administration's presence during the PLC meetings becomes clear when the principal steps out of the PLC meeting for a short time. During her absence, the teachers engage in conversation about topics unrelated to work. There are times, however, that the administration does not lead the PLC meetings, at which time the principal will send an email informing teachers they can discuss topics that they deem necessary. Taylor enjoys these opportunities.

> There would be times when she sends out a Monday memo every Monday and she would say, "PLCs led by team leaders." And so we would know going in that Janey was gonna run it. And that's, it's nice to have that sometimes just to know that nobody was gonna be babysitting, you know, that it was just gonna be us in there.

In the beginning of PLCs, the administration led the meetings but in a way contrary to the characteristics of PLCs. "Now, as [the PLCs] got started we were kind of irritated because it wasn't being that. It was being more, um, administrative and faculty meeting-ish." When the teachers mention their frustration to the principal, she responds that using that time for administrative information saved the teachers from after school meetings. The teachers relented. "And we kind of went, 'Okay, so that is part of the purpose of a PLC.'"

Structured PLCs Build Trust, Reliability, and Efficiency. The administration also instituted a common structure among all of the PLCs, encouraging fidelity and consistency of quality, whether an administrator was present or not. First, the administration led teachers to set norms: no cell phones, be on time, stay on topic,

respect one another, etc. Taylor speaks specifically about creating a nonjudgmental and confidential environment.

> This isn't, you know, go to your friend on 4th grade hall and be like, "Oh my goodness. Y'all will never believe what [teacher's name] did with her kids in reading." We, nobody was doing that, and we knew that nobody was doing that, so that makes you more open to share what, what's going on in your classroom.

Taylor comments that just the opportunity to share struggles and others corroborate those struggles assuaged her feelings of being alone during stressful moments. "Writing is such a struggle and our time is so limited, and, but it's nice to sit at a table and have everybody go, 'Yes'. It's nice to know you're not alone when you're pulling your hair out."

Roles were also established within PLC teams, one of which was Taylor's role, the notetaker. Taylor would record each person's responsibilities at the end of the PLC meeting and set a time frame by which the responsibilities needed to be accomplished. She then shared these notes with all involved in the PLCs. Recording responsibilities and deadlines, according to Taylor, helped them complete tasks on time. "So, I think that helped give us a focus." The notes also helped Taylor stay "on track for assessments of student data."

Taylor also assumed the role of technology expert within her PLC team by maintaining the spreadsheet that defined teacher intervention groups and assigned students to interventions. The intervention spreadsheet was the teams "big structure," helping them "get through the year." During PLC observations, the intervention

spreadsheet consistently became the focus of conversation. The team member would announce a student name, discuss their progress or lack thereof, and a discussion would ensue that always ended with a decision for that student, usually meaning the student would be moving to another intervention group. This change was immediately made on the spreadsheet, updating everyone's own copy of the spreadsheet immediately. Later the teachers would reference the intervention spreadsheet to ensure the each students attended their assigned reading intervention. For Taylor, the intervention spreadsheet was a pivotal resource for PLC success. "How are you gonna make decisions if you don't have the data right there?"

Lastly, data became an integral part of the PLC conversation. Taylor mentions that they spend much of their PLC time "data digging." Observations of Taylor's PLC meetings also demonstrate a commitment to making student decisions based on data. For example, during one PLC, Taylor makes a suggestion that 4th grade ELA move the persuasive writing unit to before Christmas break due to a schedule change and student data they received from the benchmark. Taylor also contributes consistently throughout the PLC meeting when discussing the appropriate placement of students based on the most recent reading data. The principal further establishes data as an essential component of the PLC structure by sometimes denying teacher suggestions for student movement, explaining that the data does not support such a move. Such denials communicated to teachers that using data for making student decisions is the norm and the expectation for PLC conversations.

PLC Team Dynamics. Taylor believes part of the success of the PLCs could be attributed to the makeup of the individuals in the PLC. "I think all of us in our PLC had a really good attitude and a team player attitude. [...] It very much depends on who's in there." She often mentions her team as an indispensable part of the success of PLCs, even to the point of being nervous for the following year's PLCs as she will have a completely new 4th grade ELA team. "This year it's gonna be very different for me, because I lost literally my entire PLC. [...] So, I'm feeling some stress walking in just feeling like--." Taylor releases a sigh. "And everybody's gonna be looking at me and I still don't feel, you know. I don't know everything." Taylor speaks of her previous ELA team fondly, calling them by first name with such familiarity, and sharing each of their strengths with specificity. She also mentions that they all "liked each other," making the PLCs "an easy buy in." Taylor looked forward to weekly PLCs. She laments that they were all spread throughout the hallway and that "it was nice to know that I would see all of them on Wednesday afternoon."

Taylor's PLC team also, "we're very similar in focus and data and how [they] look at things." For example, when PLCs began they all immediately decided that they needed to begin recording student data in a central location. Taylor speaks proudly of having the data spreadsheet ahead of time as the principal later requested that they create something similar. Taylor and her team gleefully responded, "Yeah, we know. It's right here. Do you want us to send it to you?"

Taylor's PLC took on a team mentality, realizing they were "better together", the slogan for the year. "We didn't have anybody in our PLC who was coming in thinking

that they had everything figured out." Instead they were "open minded, open to suggestions, and open to new ideas." The team shared resources and lesson plans, only making modifications due to the needs of their own students. Taylor's own team mentality becomes clear through her consistent use of the first person, plural when speaking about PLCs, assuming a collective identity with most of her opinions about PLCs.

1. "It was a great time for us, you know."
2. "It helped us know specifically from week to week, 'cause we had a Google Form to fill out."
3. "This wasn't new for us."
4. "Yeah, I would say we did. I did. Fabulous teammates. And a motivation. We really wanted to do the best we could for these kids."

Taylor attributes their close connection partly to the fact that they shared common goals as 4th grade ELA teachers. In the beginning a teacher of the gifted joined their group, however, "it was just hard to pull her in." She struggled to contribute to the group, especially when they discussed struggling readers or special education students.

Lauren

When meeting Lauren, you likely would first notice her smile and wide eyes, as if eager and confident in her ability to be present within any context. Lauren enjoys laughing often and even sometimes finishes her sentences with a laugh threatening to interrupt. She also speaks honestly in a hospitable tone about her past self, even if the

picture she paints may not be flattering. Such vulnerability and reflexiveness illuminates Lauren's focus on improving her practice as an educator.

Lauren has been in education for more than 30 years, all of which were in Title I schools, and says, "I intend to keep on going." She has taught every grade in elementary except for 3rd grade, although, she currently teaches 5th grade ELA. She has her gifted endorsement and Teacher Support Specialist endorsement. She is also a mentor teacher and has been award Teacher of the Year at her campus and her county.

Behaviors and Beliefs Within a Belief Change Pathway. "Oh, I didn't like it." Lauren did not hesitate to express her opinion for PLCs when they were first announced as a new campus reform. "And I'll tell you why. I think it's so valuable for teachers to share, but it's because I thought, 'That's a planning day gone.'" Lauren made it clear that she wasn't against PLCs. "It wasn't we were opposed to PLCs. It was [we were] opposed to losing that extra time." She goes on to list the many tasks she would be unable to complete with 45 minutes taken away due to PLCs. "We're thinking, gosh, parent conferences, [...] IEP conferences, and [...] this is when I run off papers, and this is when I grade, and this is when I pull kids in." The administration's excitement for PLCs, however, instilled a dose of excitement in Lauren. "Their attitude toward it, for me, colored my attitude toward it."

Lauren's distaste for losing her planning time caused her to be hesitant to engage in the PLC meetings. "Well, I walked, I went to the first one like a, I don't know, reluctant child." Even after the first meeting, she was not convinced PLCs would be beneficial, partly due to the meeting's unexpected focus on data. Lauren had formulated

a mental image of the process of the PLCs based on her experiences in previous years' ELA meetings. This mental image, however, did not match the PLC meetings' structure and focus.

> "I thought we were gonna sit and say, you know, 'Mr. Johnson, how are you getting through to this child with this?' or Mrs. Smith say, um, 'I'm doing this right now with this unit in Wonders,' but it was more of a data driven team thing [...]."

Interestingly, the very aspect of the PLCs that surprised her and became a point of resistance became the bedrock from which she found value. "[...] and it was all data. You know, and, and I, it was, at first it was just, "Why is this valuable?" "But it was more of a data driven team thing, which is how my brain switched." The data itself were not the stimulant for her change in beliefs; instead, it was the change in focus that the data forged. "It wasn't about Darla and the reading classroom. It was about the 5th grade as a team. And that, that changed my whole perspective." Analyzing data as a grade level reframed Lauren's focus from "How can I improve my own instruction," to, "How can we improve our instruction as a team?" She no longer felt alone in her endeavor to instruct students.

> "Well, not just the data, but looking at the data, and seeing one of the delightful parts was to realize I wasn't alone. You know, we teachers tend to be islands. [...] I can say for 5th grade level I could feel more of a cohesive, cooperative group. [...] I think that definitely changed how I was feeling.'

After three or four meetings, Lauren began to experience a shift in her beliefs. "It took about three or four meetings, three or four weeks before I started seeing the value in it. [...] After that I was like, 'Yay, PLC.'"

The transparency that accompanied sharing data sometimes became uncomfortable for Lauren. She tells of a time when the administration displayed her state assessment data for her PLC team to see and discuss. While Lauren was proud because her scores surpassed the county's goal for ELA, she also felt embarrassed. "[My principal] would say, 'Lauren, what do you do?' And so I would share it, but I, you know how we teachers tend to be, so, I was embarrassed. I mean, I really was, but she put it up there." These uncomfortable moments, however, brought the team together by exposing commonalities within the team. "It just brought it all together. That as reading teachers we all had the same struggles and successes. And it was, it just really made it a family."

Perceived Campus Contextual Factors Pertinent to PLCs. Lauren attends the 5th Grade PLC along with Shirley. She is a consistent presence in the PLC meetings in contrast to Shirley who takes a more reserved approach. When discussing her thoughts on PLCs, she often mentions the administration's role in PLCs and the move away from teacher isolation.

The Administration's Role. In addition to the factors discussed above--losing planning time and sharing data--Lauren perceives the administrative role as a large factor in her beliefs toward PLCs. "I would say that [the principal's] role was super. It really allowed it to develop and grow." The administration did not provide PLC training

for instructional staff, but instead plunged into the work, learning as they went. For Lauren, training was not necessary. "We just jumped in feet first. We just trusted [our principal]." The administration, however, had been building this trust over time. Lauren viewed them as active learners and researchers. "[Our principal] and [assistant principal] are voracious readers of, and as you know, tweet, and, and, and PLC communities, and twitter and all that." When the administration announced the new PLC initiative, they shared this research with the staff, providing evidence from previous cases that PLCs positively affected both teachers and students. For Lauren, the evidence further convinced her of the importance of PLCs.

Lauren mentions that she even trusts her administration to discontinue the PLCs if they are being ineffective. The teachers had expressed a previous concern with the principal that math interventions were taking so much time that they were unable to teach science and social studies. The principal listened to the teachers and made the necessary changes. This past experience gives Lauren confidence that she would react similarly with PLCs. "She is open. If this wasn't working, I truly believe she would have stopped doing it. [...] And I think having that out is a sense of comfort."

Lauren jokes that the role the principal took "tricked us right into liking it." At the beginning of the year the principal assumed an "administrator directed" role to ensure that roles and norms were set. As the year progressed the principal took on more of a "facilitator" role.

She would establish the topics of Lauren's PLC meetings, ask the PLC team questions to lead them toward planned tasks, provide ideas, and direct discussions

around data. While the principal provided the structure and the guidance of the meetings, the teachers were able to complete the actual tasks and make many of the decisions. My PLC observations also coincide with Lauren's description of the administrator-teacher relationship. The conversation between the teachers and the administrator demonstrates more of a flattened hierarchy. While the principal asks guiding questions and occasionally provides input, the teachers make the majority of decisions. When the principal was not able to attend, she would provide details of how to proceed with the PLC meetings. Lauren characterized this approach as "a good balance," believing that it allowed the PLCs to "develop and grow." She expects an even more teacher directed approach the next year.

The administration also provided the needed resources for the decisions in the PLCs to be actionable. For example, Lauren tells of a special education teacher that notified the PLC team about a reading intervention program. "Our administration went out and found what needed to be, needed to be done with that. They got the materials. They called other schools. They bought for this upcoming year, you know, filled in the holes with the materials that we needed."

Lastly, although the administration mandated PLC attendance, they also displayed an infectious excitement, further influencing Lauren's perception of PLCs. "It was their excitement. They had to really, um, round up a bunch of reluctant cows and get them all going the same way." When asked why the administrations excitement was important, Lauren relates back to her classroom, explaining that, "If I'm a teacher standing up their talking about characters, and I'm really bored by it, well what are my

children gonna be? So their, their attitude toward it, for me, colored my attitude toward it."

Adult Cohesion. Lauren laments the position of isolation that teaching has forced her in. As a result, the time with adults within the PLCs became something she looked forward to. "And it was nice, you know, to be with other adults." No longer was Lauren striving alone to impact her students. The PLCs forced her off her "island" to coalesce "together like Pangea." Lauren also links part of the PLCs success to the positive relationships with the 5th grade ELA team. "And our 5th grade group of people, we get along really well. So that, that was, that's always good." She only complains that at times the PLC team would talk about unrelated topics, to which the combated with a code word, "squirrel."

Shirley

When Shirley speaks, she is deliberate and concise, never straying from the focus of the question, and often allowing an unexpected and abrupt silence once she has decided that she has reached the end of her thought. Her voice ushers in a tranquility to the conversation which mirrors her pleasant and composed expression, an expression that is seldom broken even during her unexpected laughter.

Shirley has been teaching a total of 24 years, all in Title 1 schools, 18 of which have been in kindergarten six years in 5th grade. She also has a Master's degree with a reading and ESOL endorsement.

Behaviors and Beliefs Within a Belief Change Pathway. Shirley's explanation of how she responded to the institution of PLCs is inconsistent and tempered throughout

the interview. When first asked about her feelings toward the announcement that the campus would begin weekly PLC meetings, she chuckles and expresses her dislike for losing planning time, but immediately explains that she found the PLC meetings beneficial. I press her more about her reaction immediately following the announcement and she seems to struggle to answer. "Oh, um, probably made a nice face." She then explains her openness to new initiatives.

> But, um, nah, I'm pretty much a team player, so, you know. And I will try, I'm pretty open to trying new things and seeing how it goes before I make a final judgement on it, I guess, so to speak. So, I was pretty open minded about attending and, and seeing how it went and what we were going to be addressing.

She also expresses her feelings toward the beginning of the year training for PLCs in a casual, uncontroversial manner.

> I felt it was kind of broad and vague, but I also felt like with the two of them we had good leadership that I could trust. So, and I knew, they were excited about it, and, um, not pushy, but encouraging it. So, um, I didn't feel negatively about it.

This administration that Shirley "could trust" communicated that the PLCs would make an impact on student achievement, further influencing Shirley's initial perception. "You know, I guess, kind of, I mean I was on board with doing it, especially if it benefited the students and [the administration] really seemed to feel like it was going to."

When asked to speak specifically about factors that contributed to her ability to engage in the PLCs effectively, Shirley immediately appeared confounded by the

question. She sighs and says, "Oh, I don't know." After a bit more prompting she still struggles to think of examples. "Yeah, I mean, I can't really think of any. Twenty years of experience I guess would probably lend a little bit to that." Shirley's extensive training and experience has doubtlessly contributed to Shirley's appraisal of her ability to participate within the PLCs. She has at least 23 years of teaching experience, three of which were as a team leader. She also has been trained in several of the intervention programs pertinent to the PLC meetings: System 44, Dibels, Corrective Reading, and Read 180. When asked to appraise herself in her ability to engage in the PLCs, she mentions the leadership roles the administration asked her to perform such as presenting a new writing program to the grade level.

Perceived Campus Contextual Factors Pertinent to PLCs. Shirley also attends the 5th Grade ELA PLC. While Shirley is very experienced with reading interventions and looking at student data, she has never participated in PLC meetings. She appreciates the scheduled time to collaborate with colleagues, her administration's support, and the whole group approach in the PLCs.

Scheduled PLCs Evokes Action. Multiple tasks compete for a teacher's attention, however, not all receive it. Data analysis, for Shirley, sometimes fell within the neglected category, at least until PLCs established data analysis as one of its priorities. PLCs provided the setting and the process for Shirley and her team to analyze data from the reading interventions. Although Shirley is "not a huge data person," she appreciated the depth at which she and her team studied both quantitative and qualitative data to determine student growth. Before PLCs, data existed, but the press of work

duties caused Shirley to divert her attention to more immediate responsibilities. "A lot of times, you know, when you look at [the data] on your own, you just kind of glance over it, cause you're so busy trying to get to something else." PLCs, on the other hand, forced Shirley to not only evaluate her students' data, but to analyze multiple metrics to gain a more thorough understanding of student strengths and weaknesses. Shirley judges an initiative by its impact on student achievement, therefore, PLCs became a method by which she could more confidently determine the work of an initiative. "Is it going to benefit myself as a teacher in order to help them, the students more? If I see it's beneficial, and even if I'm not excited about it, I will, I will suck it up and do what I've got to do."

PLC meetings also provided time for Shirley and her colleagues to collaborate, specifically to discuss solutions to problems related to ELA, and to share strategies. "We addressed ELA issues we had, whether it was in writing or reading or reading intervention. We shared strategies that worked, and strategies that did not seem to be working." Because the members of the PLC team all served similar roles in the same subject, they were able to offer relevant suggestions coming from a credible background.

> I liked it because we were a grade level sitting down and we were addressing needs for my classroom. Um, I had sat through other meetings similar to PLCs, and, you know, they would talk about math, and not being a math teacher, that really didn't benefit me as well.

As a result, PLC meetings addressed Shirley's specific classroom needs as a 5th grade ELA teacher.

The Administration's Role. PLCs began as a top down initiative on Shirley's campus. The administration had previously attended a training for PLCs, and subsequently presented the idea to the staff during an in-service day before the school year began. Shirley reports that the training was broad and vague, however, the principal and assistant principal were encouraging rather than pushy. Shirley's perception of the leadership influenced her view of the message. "I also felt like, with the two of them, we had good leadership that I could trust." Her trust extended to her belief that the PLCs would affect student achievement since the administration suggested that it would. "I mean I was on board with doing it, especially if it benefited the students and they really seemed to feel like it was going to." The administration's excitement during the announcement also influenced Shirley's initial perception of PLCs. Shirley explains that "it's kind of hard to get excited about something if others around you are not excited about it."

For Shirley teachers "don't always feel like they're heard." Although people in authority may request teacher input, they don't always use it. Shirley's principal, however, actively sought teacher input and responded with action--a behavior Shirley feels complements PLCs.

> For example, in math PLCs the teachers addressed the fact that they did not feel like the math interventions were benefitting the students, and so that, they decided to stop the math intervention. Um, so I feel like she was open and willing to listen to the teachers.

Shirley lists several ways the principal requests teacher input. "Sometimes it'll be person to person. Um, I've had over spring break, she texts me and asks me what I felt about being on a three-man team for this coming school year. Sometimes she'll do it in a Google form." In addition, the administration encouraged teacher input by providing opportunities to present on practices the teachers believed would benefit their colleagues and students. "[WriQ] was one thing that I presented that I felt like the ELA staff could benefit from on the writing end. [...] She wanted our honest opinions on things."

A Flattened Hierarchy Within PLCs. Shirley characterizes the leadership of the PLCs as a "whole group" approach. "Most of the time, even though we had leadership there, and I know that, I really felt like it was more whole group leading each other than it was one person leading. Even with [the principal] involved." During PLCs the conversations demonstrate a flattened hierarchy among the teachers and administration. The principal serves as a facilitator by prompting teacher discussion. Shirley states that "really the leadership more or less tried to keep us on task than anything." The source of information and expertise rarely comes from the principal, but rather the teachers. Also, an emphasis on data establishes the idea that decisions are based on the group's interpretation of the data rather than simply a single person's opinion. At times, the administration could not attend PLCs, and a team leader with facilitate the PLC meetings instead.

Lastly, Shirley mentions that setting norms helped the PLC team take on a whole group approach to leadership. The team decided on start and end time, set an expectation that everyone would arrive on time and the meeting would end on time, and

identified a code word to signal the conversation had veered off topic. Establishing norms and expectations created a structure within which the team could lead.

An Inexperienced PLC Team. Unlike the rest of Shirley's ELA team, she previously worked at a campus that ran a reading intervention schedule similar to that of her current campus. Her knowledge and experience propelled her into a pseudo-leadership role within her PLC.

> I was able to answer a lot of their questions that they had. You know, and there, I could address some of their concerns. [...] I just kind of jumped in and said, "Okay, this is what we need to do. This is what we need to be looking for." Um, I tried to really encourage because sometimes you get so involved in learning the intervention you're teaching, you forget that kids need to move around.

In essence, PLCs provided the setting in which Shirley could become a guide to her team through the intervention and PLC process.

Leslie

After only a couple visits, Leslie embraces you as lifelong friend, hugging you at every new encounter, liberally sharing information about herself and her school, and often inviting feedback with comments like "Isn't that funny," or "Isn't that awful?". Leslie sits from a bird's eye perspective of the school, partly due to her many years of experience, but also due to her role as an academic coach. Accordingly, her responses often veer into sharing others' opinions rather than her own, possibly because of her intimate understanding of the teacher perspective as she sees herself as a sounding board for the staff. She is also a self-proclaimed "talkaholic," however, a self-aware one,

monitoring herself by sometimes asking, “Am I going for it?” Nonetheless, it is clear Leslie is knowledgeable in her field, talking extensively about intervention programs, classroom curriculum, parent involvement programs, and school climate.

Leslie started in education in 1988 followed by 11 years of self-contained teaching. Once departmentalized she taught 5th Grade Math and Social Studies for 13 years. Finally she moved into an instructional Lead Teacher role which she has served for six years. Her duties as an Instructional Lead Teacher include teaching reading interventions, assisting teachers with curriculum and intervention needs, developing campus schedules, creating class rosters for curriculum and intervention programs, keeping inventory of technology, and testing newly enrolled students for class placement. In all she has taught in Title I schools for 26 years. Leslie also has her coaching endorsement and Student Support Teams Coordinator endorsement.

Behaviors and Beliefs Within a Belief Change Pathway. When Leslie first hears of the addition of PLC meetings, she immediately filters her thoughts through her experiences with PLCs under a different administration at the same school. These first PLCs focused on student data much like the current PLCs, but for a different purpose. Instead, PLC teams used multiple sources of data--“social, academic, home, and health”--to develop a holistic understanding of “emergency kids” in an effort to determine effective interventions. These first PLCs became a source of frustration for teachers due to meetings that would go beyond the allotted time, poor enforcement of meeting norms, a lack of meeting structure/agenda, and a scarcity of results. Despite these sentiments, Leslie still welcomed the return of PLCs. “I was excited about it because it was going to

be during the day, and it was going to be specific. It was going to be 45 minutes. Period." In Leslie's case, her comments on the schedule of the PLCs and a narrowed focus reveals that she is filtering the current reform message through her previous experiences with PLCs. While the previous PLCs were disorderly and inefficient, her understanding of the current administration inspires hope that a reboot of PLCs may prove to be valuable.

> When [my previous principal] did it I thought, "This is a great idea," because I'd done the coaching endorsement. I'd done other SST endorsements. And this is what we need to do, but it just wasn't in control. So, when [my current principal] came and we started 'em, we still had 'em, but they were not like this. You know. So seeing how [my current principal] was more efficient. And I would never tell that to [my previous principal]. That she wasn't efficient.

Once the new PLCs began, Leslie noticed the positive changes: the use and commitment to an agenda, enforcement of meeting norms, efficient use of technology to organize and share information, a consistent focus and utilization of data, an increase of instruction aligned to standards, an increase in student reading achievement, and strengthened unity within teacher teams. In year two of the PLC initiative, Leslie has become "even more excited" as she has witnessed teachers that previously objected to PLCs become more engaged in sharing data, more consistently offer their opinions for grouping students in interventions, and deepen their knowledge of the intervention curriculums.

Leslie appears to think highly of her ability to participate in the PLCs. When asked to judge her own ability to engage in the PLCs, she mentions several personal qualities.

> I think it's good because I used to teach math. And now I'm doing this reading intervention. And then I'm helping coach too. But I have past experience with classrooms, and I did QCCs. That was different. So the standards, and I've done. So I've done all these. So I feel like I have a good perspective of where the teachers are and the vocabulary I can use with the teachers.

The teachers' deeper knowledge of PLCs on her campus also strengthens Leslie's confidence in her ability to coach them. "And I feel even stronger because the teachers understand. I don't have to figure out how to tell them about it, because they've figured it out." Teachers are also "more open to listening to what people have to say."

Perceived Campus Contextual Factors Pertinent to PLCs. Of all the participants, Leslie had the flexibility to attend different PLCs depending on what was most pertinent at the time. As a previous math teacher she often attended the math PLCs. As one of the reading interventionists she could not avoid also attending ELA PLCs. Leslie also perceives PLCs from a slightly different perspective as she takes on a more of an authoritative role as the instructional lead teacher. Leslie also participated in PLCs under a previous administration on the same campus, however, with different outcomes.

An Efficient Use of Time. Time is a precious commodity for teachers as evident in Leslie's recurring focus on the topic. Nine times in two interviews Leslie discusses

time and how the management of it affects the perception of PLCs. When PLCs were announced, Leslie mentions that teachers struggled to give away their planning time. For Leslie, previous PLCs with a different administration used their time poorly and was scheduled at an inconvenient time of the day. "We did the PLCs similar to what we're doing, but they were after school from like 3:30 to 4:30. They were supposed to end at 4:30, but a lot of times they would stay till 5:00, 5:30. So it was, the time wasn't managed properly." Meetings prolonged partly because team members did not always stay focused on the topic of conversation. For example, the norm was set that individuals should avoid extraneous conversation, however, when teachers were redirected, they feigned compliance and continued speaking anyway. Even the principal at the time fell into the trap of extraneous conversation. Leslie attributes the lack of focus to "frazzled" minds after a day of work, denouncing the scheduling of such intensive meetings after school.

In contrast, PLC meetings with the current administration stayed within a 45-minute timeframe. First, the PLCs were scheduled during the day, forcing teachers to stay focused as they would be forced to stop at 45 minutes in order to pick up students from their activity time. Second, the current administration enforced the norms that teacher conversation would remain on topic, and that meetings with begin and end on time. Leslie reports the principal redirecting teachers to refocus their conversations. "She's very focused and, 'You might have an idea, but we're not gonna talk about that right now. We're gonna talk about this.' You know, so, I think people were like, 'Uh, how rude.' But then they appreciated it."

The current PLCs also were more efficient due to the administration's presence in the meetings, intentional planning for each meeting, and an organization of needed resources. The administration was present in the majority of PLC meetings, helping to ensure teachers learned the PLC process, reinforcing norms, and establishing a focus of the meetings. The principal also set agendas that she shared with teachers in advance of the meetings. Within this agenda there was a clear beginning, middle, and end to the meetings. Lastly, the administration utilized Google Classroom to ensure all participants within the PLC had access to needed documentation.

Broad Vs. Specific Goals in PLCs. Lacking a clear vision with specific goals also contributed to lengthy meetings in the previous PLCs according to Leslie. "She had this vision, but she, she wasn't clear with us." The goals of PLCs under Leslie's previous principal focused on identifying at risk students and the factors that contributed to being at risk, and developing a plan to address the adverse factors. Such goals required that the team look at a broad range of data to understand the child's "social, academic, home, and health" characteristics. According to Leslie such a vision was "too much" and the reason the meetings often surpassed the allotted time. "That's why it went on for like an hour and a half."

The current principal, however, is "very centered". She narrowed the focus to only identifying struggling readers and their deficits, and developing an intervention plan. Such focus improved the efficiency of the meetings according to Leslie. "I think you have to be efficient with PLCs because there are so many things you could talk

about with our kids, you know, and you could get bogged down like the other one was. So, I love the specificity of it."

Data. Data becomes the stimulant for conversation and the impetus for change in practice on Leslie's campus, facilitated by the PLC meetings. Leslie explains that, "They were seeing that [the gap] was closing or it wasn't closing, and, um, they were seeing this, and talking about it in the PLCs." Teachers would then make in the moment decisions about student intervention placement or adjust instructional practices based on what the data suggested worked. Leslie personally changed her approach and philosophy to teaching reading due to analyzing data. When she was in the classroom, she spent part of her time doing shared reading with kids which consisted of nothing more than the teacher reading to students. "I for years," she whispers as if ashamed of her actions, "for years I would teach, but I was just reading that book, you know? But, which is good to teach the love of reading, but I wasn't honing in on what I should have been honing in on, you know?" She continues to explain that teachers are understanding the need to focus on reading skills "because they see this data, and they waste, they're not wasting time with their standards anymore."

Initially the goal of PLCs was to build trust in individuals to share their data with one another, a task completed by building a community within PLCs. For example, Leslie tells of a teacher--who she characterizes as presumptuous--that was unexpectedly invited into the 5th grade ELA team. The invitation surprised Leslie, but the team explained, "Look at her scores and look at the relationship she builds with her kids." Leslie attributes this unification of teachers to sharing data and transparency.

> I think if we hadn't had this PLC, and revealing the data, and keeping it open, um, and seeing that it's not, people aren't going, 'I'm better than you. I told you I'm better than you." You know, it hasn't been like that. So, I think that has changed that big huge culture.

Leslie contrasts the current administration's expectations with data to those of the previous administration, explaining that previous administrations "didn't have us own any of the data" because she "never saw the data." The current administration, however, included a "why." When before there was not a clear follow up to data, now a systematic and campus wide intervention plan ensured data was actionable. In other words, teachers could immediately implement decisions made in PLC meetings because the structure of reading interventions already existed.

Lastly, the data has instilled hope in teachers that they can impact student achievement. Before, they would blame poor student achievement on families or student ability or motivation. The data, however, has revealed to the teachers that the students can indeed make growth. "I mean, they're really relating the growth data, cause they used to say, 'Well, I'm doing the best I can. Look at these kids. They come from retarded parents.' [...] [Now] they're not blaming, 'cause everybody's got what you got. So, I feel like they're taking ownership, you know?"

From Isolation to Community. Sharing and collaborating within the PLCs eventually transformed the PLC teams into "more like a family." Before, PLCs teachers preferred to not listen to one another; "they were just very isolated." Leslie comments that even she never would have approached another teacher for help. Instead, she

"would have been doing [her] own thing." In contrast, teachers--even those that were originally resistant to PLCs--now seek out opportunities to learn from other teachers and to share effective practices. "I think our professional development has turned our culture into a community instead of just an isolated teacher."

The administration made several decisions that served to help teachers "see beyond their room". First, PLCs enhanced teacher planning time. Before, planning was more or less arbitrary, but with the implementation of PLCs, planning consisted of analyzing team data to determine best practices. "You know, they've learned, and this is what's been wonderful, is that they've learned that, um, 'Oh, you do that for ELA, and it's working? You're doing this reading blah, blah, blah. And how do you do that?'" By being transparent with their own data they were able to make instructional decisions by determining which teacher's approach impacted students the best. Collaboration was further encouraged by the administration by setting an expectation that "everybody take ownership of our kids." This expectation was manifested by structuring the reading intervention block in a way that required teachers to share students. Each teacher was a assigned a type of reading intervention tailored for students with certain deficits. All students from across the grade level with those specific deficits would attend that teacher's intervention, regardless of whether the teacher was the student's teacher of record. Lastly, the administration further constructed a mindshift toward collaboration and unification by instituting the motto "We are Better Together."

Karen

"Stoic" would be the one word used to describe a first impression of Karen. Her placid presence and contralto voice may be slightly intimidating initially, but then her deadpan humor reveals her comical side. Karen is a 5th grade special education resource teacher who enjoys trying innovative practices evidenced by her desire to gamify her room. She is also a team member of the Positive Behavioral Interventions and Supports (PBIS) team as her passion is student behavior intervention. Lastly, while cordial, Karen is not afraid to speak honestly about her experiences and her opinions.

Karen has been teacher for 12 years in four different school. Eleven of those years were in Title I schools. She taught Kindergarten through 2nd grade for the first 11 years and recently moved to 5th grade which she has come to enjoy. Karen says, "I enjoy working in Title I schools because I have a passion for behavior [...]. I love to be the person in their lives who believes in them."

Behaviors and Beliefs Within a Belief Change Pathway. Karen is the second teacher that had previously participated in PLC meetings. Her previous campus scheduled weekly PLC meetings after school until 5:00. Karen describes this time as "more of, like, their faculty meeting time each, each week." Instead of collaboration focused on student progress, her previous administration used that time to share information that "could be sent, like, in an email." Nevertheless, Karen's previous experience with PLCs influenced her reaction to the announcement that her current school would be beginning PLCs. "I was fine with PLCs. I came from a county that already did 'em." The only challenge for Karen was the consistency of which the

meetings took place during her planning. Eventually, though, the consistency helped Karen effectively create her schedule for the week.

> As a Special Education teacher, I couldn't schedule meetings on Wednesdays. Like, you know, so I knew every Wednesday was PLC time. So, that was good to have the consistency, so it wasn't here or there, or whatever. [...] So I appreciated the fact that it was during my planning.

In fact, Karen wished that she could have attended more PLCs. "With my schedule it worked out for me to go to the ELA PLC, which was great because it kept me on track with what was happening in regular ed." Being limited to one PLC allowed her to have regular and convenient access to the classroom curriculum and instruction for only ELA. To learn the same information for Math Karen's colleague that attended the Math PLCs had to periodically update her.

Participating in PLCs proved to be difficult for Karen as the PLCs focused primarily on general education instruction and interventions. "From a Special Ed point of view, it was harder. Like, I had less input and everything." Despite this challenge, Karen was able to engage in the PLCs in different ways such as ascertaining the next academic standards and lessons within the general education classroom to help in her planning, determining benchmark logistics, and educating the classroom teachers in the PLC on special education students and their progress. During the PLC observation, Karen goes beyond providing input on her students by offering to train the PLC staff on the workshop that she will soon attend. In addition, she shares a social media resource that can help with planning with the PLC team.

Perceived Campus Contextual Factors Pertinent to PLCs. Karen has participated in PLCs at a different campus, which she perceived as less beneficial than the current PLCs. Her appraisal of the current PLCs is sometimes filtered through her previous experiences, but also from her perspective as a special education teacher participating in a general education PLC. Ultimately, the administration has a large influence on Karen's perspective of PLCs.

An Outsider In a General Education PLC. Karen, in contrast to most other participants, was given the choice of PLCs to attend. As a Special Education teacher, she did not immediately belong to a team. Since she taught both 5th Grade ELA and Math, these PLCs were the obvious options. Ultimately, she decided to attend the 5th Grade ELA PLC since her schedule and the 5th Grade ELA PLC coincided best.

Attending a General Education PLC was a double-edged sword for Karen. On the one hand, being present during PLC planning helped her stay aligned with the General Education classroom with her own planning. Although she was able to stay aligned to the General Education classroom before, PLC meetings provided a scheduled time to do so rather than attempting to manufacture a time to meet with teachers. She still, however, had to learn of 5th Grade Math planning from a friend that attended the 5th Grade PLC Math meeting. In addition, Karen enjoyed being included in General Education PLCs because she was able to provide a Special Education point of view. Sometimes general education teachers would approach Karen, frustrated that a special education student was not making growth. PLCs gave her the opportunity to temper teachers' expectations for special education students. "Like, you know, if they're

frustrated because their kid's not making progress, I'm like, 'Well, you know, I have two [beginning readers] right now in 5th grade, and, um, you know, one of my [beginning readers], she's been stuck on [beginning reader] since 1st grade.'" On the other hand, being an outsider made participating in PLCs difficult at times. Because she provided interventions for just the small number of Special Education students, her input for other students was limited.

PLC Member Dynamics. When asking Karen what factors helped her take ownership of the PLCs she references the personalities and attidudes of members of the PLC team.

> And I don't even know if it's people's personalities or just where they're at in education or how fed up they are or how burnt out they are or how close to retirement they are. You know what I mean? But, you know, there was definitely, like, sitting around a table like this, there were definitely 8 different attitudes walking through that door as far as their feelings on PLCs.

For the most part, though, Karen felt ther PLC team worked well together, to the point that she requested to stay with two of the PLC members for next school year because "they are really good for my behavior kids." At times, though, "that one headstrong teacher" would frustrate Karen during PLCs. She would at times boast about her data and lead conversations toward inconsequential topics, wasting part of the precious 50-minute PLC.

Structure of PLC. As discussed above, Karen worked previously at a campus that "didn't do [PLCs] right." In contrast, she discusses multiple aspects of the PLCs at

her current campus that she feels contributed positively. First, consistent Wednesday PLCs helped Karen know when she could schedule IEP meetings, i.e. not on Wednesdays. Second, Karen appreciated the teacher led approach that the current administration allowed. While the administration led meetings in the beginning, they gradually relinquished control to the teachers. The administration simply provided guidance in the form of objectives, and then gave teachers the power to make decisions and action steps toward that objective.

> She would give us, like, something to have ready to bring to the PLC. [...] Our last four or five PLCs, well, it's about essential standards. So we had to go through all the 5th grade ELA standards and pick five that we thought were essential, that we had to get to. And so there was a lot of like teamwork and discussion and collaboration as far as that went.

Eventually, the teachers led the meetings, and administration would "just kind of come in and check on [them]."

The Administration's Role. For Karen, collaboration was "key". "That's what I love about this school. You know, for the most part, like, everybody works together and does stuff together, except for a couple of people, you know. When asked what contributed to the climate of collaboration on her campus, she simply answers in a word, the name of her principal. The administration took several measures, according to Karen, to help encourage collaboration on campus. First, they established the "Better Together" theme and made shirts with the phrase to accomplish a more pervasive message across campus. Second, they ensured PLCs had the information and resources

necessary to have impactful conversations. Data given to the teachers and displayed on a large screen in the PLC room, and a scheduled time to meet created an opportunity for teachers to have conversations about student achievement and to make decisions that directly affected students. When asked if their was anything the current campus has done to make PLCs more beneficial, Karen responds, "I feel like, yes, because we were given data, and we were given stuff, and we were given work time to work together, you know, whereas in the other county it was more like our faculty meeting."

A Credible Principal. Throughout the interview Karen evokes a reverence and admiration for her principal. "She leads by example. She, I mean, sometimes I'm like, 'Dang.' Like, this whole summer, like, she's been working, working, working. Emails, and she went on vacation this week, but it was to a conference." Her passion and dedication to learning inspires Karen to be a better educator. She also states that her principal has high expectations, to some possibly even too high. "And it was my first year there, but a lot of people, you know the older people that were ready to retire have jumped ship because, like, I think they feel like her expectations are too high [...]." For Karen, though, she expresses her expectations "in a passive-aggressive kind of approach, like, um, an inspiring kind of way."

CHAPTER V

SUMMARY AND CONCLUSIONS

Emergent Themes from the Study

While the eight participants all demonstrated different opinions about PLCs and proceeded through different pathways to reach these conclusions, many of the details of their stories disclosed similarities, producing twenty-one categories that coalesced into four emergent themes.

1. Administrative decisions and operations open the door to opportunities for teachers to process beliefs.
2. The qualities of multi-level relationships influences individual mental engagement and participation in events pertaining to the campus reform.
3. Teachers expect an effective and efficient use of time and resources.
4. Results that impact student achievement become a stimulus for the processing of new beliefs.

Emergent Theme 1 - Administrative Decisions and Operations Open the Door to Opportunities for Teachers to Process Beliefs

The administrative role throughout the reform message served many functions that influenced teachers in a variety of ways concerning PLCs. Table 4 in Appendix B provides a summary of the subsuming categories of this theme. Overall, the administration influenced teachers' initial appraisals concerning the reform message, whether they took ownership, and how they felt about their success within the reform. Conversely, a perceived lack of support from the administration forged resistance and a

lack of perceived success. For example, Donna's perception of her administration contributed to her choice to reject the new imposing schedule that accommodated the PLC meeting times. Beverly, on the other hand, felt supported by her administration. Correspondingly, she viewed the schedule's rigidness as a way to demonstrate the priority staff should place on PLCs. Both of these reactions, while contrary, illuminate the power of administrators to influence teacher perceptions on campus reforms and the complexity of teacher belief change.

On day one of the initiative the administration excitedly announced their plans to begin school wide PLCs. Even during this incipient presentation, the administration's influence on teacher beliefs concerning PLCs was evident. The administration's passion suggested to the audience that the presenters had already come to trust PLCs to produce results. This very notion also suggested that they too might be able to put their trust in PLCs, in effect proposing a belief change. Interestingly, the administration's excitement seems to have differing effects on teachers, directing some toward a *Benign-Positive Appraisal* and influencing how others perceive their *Motivation* and *Ability* to engage in the new reform. *Benign-Positive Appraisals* may be due to high levels of trust in the administration, i.e. I trust my administration, therefore if they believe in PLCs, so do I. On the other hand, the excitement the administration exhibited may have instilled confidence in some teachers influencing whether they made a *Challenge* or *Threat Appraisal*.

Administrative support was cited as an important factor by several teachers that helped them navigate the mandated changes. One such support were the organizational

structures within which to work in the PLCs. These structures were intentional, often teacher created, and agreed upon by all members within the PLCs. For example, all groups set team norms such as starting and ending on time, staying on topic, committing to confidentiality, and refraining from cell phone usage during meetings. Other structures included a semi-structured agenda to ensure certain tasks were accomplished, an online spreadsheet accessible by all PLC members that organized each student within intervention groups, action plans with member responsibilities and timelines for task completion, and clearly delineated academic criteria to place students in each intervention group. Such structures promoted efficient use of time during PLC meetings, and fidelity of program implementation once decisions had been made.

Many of the participants did not initially appreciate changes to the campus master schedule and the mandated weekly meetings that robbed them of time to plan. Nonetheless, the very obligatory nature of the changes communicated the value and confidence the administration projected on the PLCs. One participant likened the nature of the changes to parents doing what's best for their child, even when the child resists. "Just like a parent. Just like you'll do with your babies. Um, when you provide the broccoli and they don't want it, you know they need it, and that's exactly what happened with me." In actuality, the regularly scheduled meetings enabled teachers to engage in the behaviors necessary to make PLCs successful. For example, the special education teacher always knew in advance that she had to schedule her individualized education plan (IEP) meetings around the PLC meetings. The PLCs also provided her easy access to the general education plan from week to week. In addition, several teachers

appreciated that there was a scheduled time to collaborate and plan with their colleagues. "We had never had that before." Lastly, the success of reading interventions partly depended on the fluidity of the members of the group; weekly PLCs facilitated these decisions.

While certain aspects of the PLC reform were mandated, the administration often sought, considered, and utilized input from teachers. A common example throughout several interviews of the administration's openness to listen and act on teacher perspectives concerns the implementation of math interventions during year one of PLCs. The campus provided both reading and math interventions, in effect repurposing part of a block of time previously meant for science and social studies. Teachers began to fear that students were being deprived of quality instruction in the two subjects. Although the concerns bewildered the principal, she listened and eventually abandoned math interventions. The willingness to listen to her teachers brought the staff "a sense of comfort" that if the PLCs and interventions were not working, she would listen and make the needed changes. The principal continued to demonstrate her trust in her teachers throughout the PLC reform by frequently asking for teacher feedback in PLCs, through surveys, and informal conversations.

The administration also communicated trust in its teachers by gradually releasing responsibility for leading PLCs. In the beginning, while the teachers were "getting their feet wet" the administration guided each team through PLC meetings, eventually establishing a consistent process and structure. With time the administration gradually released control. "I really felt like it was more whole group leading each other than it

was one person leading. Even with [the principal] involved." According to one teacher by gradually releasing responsibility, the principal "tricked us into liking it."

Emergent Theme 2 - The Quality of Relationships Influences Individual Mental Engagement and Participation in Events Pertaining to the Campus Reform

"Better Together," the school motto, encapsulates an influential environmental factor during the belief change for PLCs. Being together, however, took many forms and generated various results. Table 5 in Appendix B provides a summary of the subsuming categories of this theme. The common thread, though, is the cultivation of a collective of teachers, unified in their professional and instructional goals, facilitated by a collaborative environment.

At its most conventional level, being together involved forming professional relationships which led to openness, acceptance, and mutual learning. According to Leslie, teachers under a previous administration were isolated, resulting in an unwillingness to listen to one another, but with weekly PLCs began to facilitate regular opportunities for collaboration. Through sharing of ideas, teachers began to value one another as sources of learning. Beverly, the speech therapist, especially appreciated time to collaborate; through PLC conversations she and her colleagues discovered commonalities between speech therapy and ELA, thereby fortifying Beverly's worthwhile position within the PLC.

Accordingly, the teacher goals within a PLC must have a degree of commonality so teachers can mutually contribute to each person's professional goals. Several participants struggled to establish commonalities, consequently affecting their

engagement within the PLCs. For example, Donna, the ESOL teacher, attempted to share her thoughts on student achievement from a language learner perspective, but never felt that her points were received. Language was rarely, if ever, discussed in PLCs, and while data was a vital component throughout all PLCs, her Lexia data was never discussed. As a result, Donna withdrew from PLCs, rarely participating. Similarly, Karen initially struggled to connect with the general education teachers, but eventually found that the PLC members often lacked the special education perspective. Contrary to Donna's experience, the general education teachers accepted Karen's point of view. Amber's metaphor for her approach to professional development further illustrates the discontentment that accompanies incompatibility between colleagues. "I'm like a key that fits the wrong hole in professional development. [...] It's like, 'Look! I have this cool key, but I can't open this door, because this is not my door. This isn't relevant to me.'" One important and recurring commonality was teachers' values. Teachers seemed to embody the values that accompanied their position as a teacher of ESOL, SPED, ELA, or speech therapy. When the teacher's values were contrary to those of the majority, their connection deteriorated and frustration increased. Conversely, shared values created a connection between the individual and the group.

While relationships among teachers affected participation within PLCs, they also translated into action and results in the classroom. Active sharing and listening based on results reduced variability in knowledge and practice within PLC teams. Often such conversations began due to student deficits recognized in the data. As a response teachers shared pertinent information about students and strategies to address their

academic deficits. Such student focused collaboration developed a collective understanding of students and less variability of instruction from classroom to classroom. Specifically, teachers described alignment of knowledge and practices at two levels. First, teachers within the same grade level and content area discussed student growth using a variety of metrics to determine student needs and the instructional practices they found to make the largest impact. Second, special education teachers described a bidirectional alignment. General education teachers did not always consider a student's disability when setting growth expectations. Karen often provided the special education perspective to remind teachers that even small growth deserved celebration for these students. Conversely, both Karen and Beverly adopted strategies from the general education teachers and aligned their instruction to the general education curriculum. As a result, teachers reduced variability of practice both within content areas and across departments.

As PLCS progressed, the teachers experienced a shift from being an isolated member of the school to a unified collective of educators. Active listening and sharing of practices based on student results drove this shift. Before PLCs several participants described their position on campus as isolated. Teacher practices were sometimes shared between team members that planned together, but data and classroom challenges were rarely shared. With the implementation of data focused PLCs, transparency and vulnerability became the norm, facilitating the development of a collective effort to educating their students. Lauren was very nervous and uncomfortable with sharing her data with her team initially, but eventually found the transparency and vulnerability to be

a catalyst for uniting her team.

> The data. Looking at the data. Well, not just the data, but looking at the data and seeing one of the delightful parts was to realize I wasn't alone. You know, we teachers tend to be islands. Absolutely, and to realize that I'm not an island anymore. [...] But I think that so aptly describes how over the years teachers have, I think it's changed at our school. [...] I can say for 5th grade level, I could feel more of a cohesive, cooperative group.

Ultimately, the sharing of data among team members resulted in a culture shift, instilling group characteristics such as a willingness to learn, openness to sharing struggles, focusing on solutions, flattening of the school hierarchy, respecting others and maintaining confidentiality, and sharing and recognizing expertise.

Emergent Theme 3 - Teachers Expect an Effective and Efficient Use of Time and Resources.

Time was a precious resource in the minds of each participant due to the many responsibilities that fight for attention during any given day: various meetings, grading, parent conferences, planning, gathering materials, etc. PLCs only added to the list, therefore, the aim of PLCs was to compete as just as useful if not more useful as other teacher responsibilities. Most teachers measured usefulness as relevance to their jobs. In other words, would PLCs impact student achievement? Table 6 in Appendix B provides a summary of the subsuming categories of this theme.

Unsurprisingly, teachers want to spend their time on relevant tasks. Even teachers that were normally engaged were frustrated when PLC meetings seemed

inconsequential. Shirley, as an ELA teacher who found PLCs effective, did not appreciate them when the focus was math. Beverly initially doubted the relevancy of PLCs to her own practice as a speech therapist even though she saw the excitement and hopefulness in her administration. Only when the PLC team accepted her as a valuable member did she begin to realize that her experiences as a speech therapist could contribute to improving reading instruction for the low performing students. In another example, the general education PLC structure did not apply to Amber and her team in the beginning. Once they shifted its focus to planning the community-based instruction (CBI) trips, she became more engaged. Donna, the ESOL teacher, never perceived any relevance in the PLCs. Instead, she saw PLCs as a burden, as a hindrance from serving her students on other campuses.

The magnitude of time well spent in the minds of teachers illuminates the importance of instituting PLCs that are structured, focused, and well planned. For example, norms such as staying on topic, beginning and ending meetings on time, and prohibiting cell phone use helped ensure the PLC meetings would be productive. Teachers also expected the meeting agenda to align with how PLCs were originally defined. When meetings initially were more logistical and administrative, Taylor became frustrated.

Lastly, resources enabled teachers and students to engage in the necessary learning activities in order to be successful, first in PLCs and then during interventions. First, teachers needed a dedicated space and time to meet for PLCs. As discussed in Emergent Theme One, having a scheduled time and place helped ensure teachers

consistently attended PLC meetings. A spreadsheet also helped organize the large amount of data that teachers collected on students and the intervention groups that changed often. Teachers could easily access this spreadsheet that immediately synchronized all teacher copies when changes were made. The administration also provided the resources and training needed for teachers to administer screeners and diagnostic assessments to students, ensuring a systematic and uniform approach to student assessment. Lastly, participants often mentioned their colleagues as important resources. As a body of teachers, they were able to make decisions with confidence, utilizing the collective knowledge and expertise of all PLC members. Similarly, teachers implemented interventions with fidelity, partly due to the resources available: intervention schedule, purchased intervention curriculums, the PLC/intervention spreadsheet, and a dedicated space and time.

Emergent Theme 4 - Results that Impact Student Achievement Become a Stimulus for the Processing of New Beliefs.

As might be expected, all participants filtered decisions about curriculum through their belief that any changes must result in improvement of student achievement. Table 7 in Appendix B provides a summary of the subsuming categories of this theme. In other words, student achievement became the litmus test by which teachers made decisions. According to Karen she would at times implement new curriculum if she believed it would help students, even if she believed the curriculum to be dull. "If I see it's beneficial, and even if I'm not excited about it I will, I will suck it up and do what I've got to do."

The question, then, becomes, "How do I know a new initiative produces results?" Within the context of the present study, data gathered by assessments aligned to the reading interventions quantified student growth. The PLCs facilitated discussions about student growth and compelled teachers to analyze the data at a deeper level than if teachers had been allowed to analyze data alone. Through these discussions, teachers made shifts in instruction within the interventions and moved students between interventions. The administration helped to ensure the focus on quantifiable data by directing teachers away from using anecdotes when teachers began to rely too heavily on their observations or perceptions. In essence, interventions endeavored to "fill gaps" measured by diagnostic assessments that were then analyzed in the PLCs. The PLC members subsequently made adjustments based on how the students responded. Beverly summarized the process:

> We talked about interventions. We talked about the students, the ones that were struggling, the ones that were succeeding. We looked at all the data and saw, alright, if the kids are doing well in this area of reading and say, um, they're doing well in decoding, but they're not doing well in comprehension, then it's like, okay, what can we do to help bring that comprehension level up.

For the PLC members the data served as "proof" of student achievement and evidence that their interventions were effective. When asked what factors contributed to her ability to implement the interventions, Leslie simply answers, "Understanding where our, all of our kids are and what they need." The data became the tool teachers used to ensure growth and the motivation to continue interventions. The data also began to

convince teachers that certain curriculums were effective; by Christmas Karen noticed an urgency in teachers to understand how to help their students grow, demonstrated by teachers checking out all of her Corrective Reading material.

Environmental Factors Within Each Pathway

There are two research questions within this study. (1) Using the CAMCC as an initial framework, which behaviors and thought processes characterize teachers within different pathways to belief change? (2) Which campus contextual factors do teachers within each pathway of belief change regard as pertinent to the implementation of professional learning communities? To begin to identify pertinent campus contextual factors for teachers within each belief change pathway (Research Question #2) teachers must first be classified into the different belief change pathways. Using Gregoire's (2003) Cognitive-Affective Model of Conceptual Change as a framework the researcher identified teacher beliefs and behaviors that followed one of two pathways that lead to either systematic or heuristic processing of belief change. Specifically, the researcher asks how each participant:

1. *Implicates Self* in regards to the reform message (i.e. Do they make a *Stress Appraisal* or *Benign-Positive Appraisal* concerning implementation of PLCs?),
2. Whether each participant was *Motivated* or perceived themselves to have the *Ability* to be successful in regards to the reform message, and (i.e. Do they decide the reform is a *Challenge* or *Threat* to self based on the appraisal of their motivation and ability within the context of the reform message?)

3. How they *Yielded* to the reform message (i.e. Do they assimilate/accommodate the new belief or make no belief change?).

Although an outcome of the belief change process is suggested for each participant, the researcher is less interested in whether each participant ultimately changed their beliefs concerning the reform message. Rather, the findings of highest interest are the campus contextual factors teachers within each pathway of belief change regard as pertinent to their professional development (Research Question #2). Such findings may provide insight into how to best support teacher professional development that leads to sustainable rather than fleeting change. The following analysis presents, first, the classification of each teacher into either the systematic or heuristic pathway of belief change followed by an analysis of the environmental factors present during their belief change process. The heuristics and stress appraisals of each participant can be found in Table 3 on page 174.

Successful Belief Change

The six participants that experienced a successful belief change processed the reform message in two different pathways: systematic and heuristic. Beverly and Lauren both systematically processed the reform message resulting in accommodation of the belief that PLCs are a viable educational practice, and Taylor, Shirley, Karen, and Leslie assimilated the new belief using a heuristic. The following section will explicate the belief change process for each pathway and the environmental factors that accompanied each group of participants.

Systematic Processing with Accommodation of New Belief: Beverly and Lauren

Implicates Self. The first phase of the CAMCC is the *Presentation of Reform Message* (Gregoire, 2003) followed by a decision to implicate oneself or not. Teachers that respond with positive or neutral moods do not see themselves at stake and, therefore, do not have the motivation necessary to systematically process the reform message. On the other hand, teachers that perceive the reform message as a risk to their identity experience stress, launching them toward systematic processing. For both Beverly and Lauren, the announcement of PLCs immediately induces a stress response. Beverly characterizes her initial reaction to the PLC announcement as "dread". She also is concerned that the PLCs will add undue and irrelevant responsibility to her as a Speech Therapist. For Lauren, she is not initially against the idea of PLCs but, rather, the consistent loss of time that accompanied PLC meetings--i.e., not having the time to grade papers, prepare for lessons, meet with parents, etc. because of weekly PLC obligations. The initial PLC meetings themselves eventually induce stress as well, as Lauren does not immediately see the benefit of sharing data.

Motivation and Ability. To continue on the systematic pathway, Beverly and Lauren would need to determine that they are motivated and have the ability to successfully engage in the PLCs. Initial motivation takes the form of persuasion for both. Bandura (1997) describes verbal persuasion as the expression of faith from a trusted other in an effort to build the perception that success is possible. Both teachers appreciate and are encouraged by the excitement the campus administration emotes about the PLCs, suggesting the administration believes in the prospect of success.

Beverly and Lauren assume this excitement as well, provoking them to engage in the PLCs to some level. Lauren comments that, "Their attitude toward it, for me, colored my attitude toward it." Lauren also sees herself as someone competent to participate in the PLC meetings. "I'm a good listener, and I'll share my opinion, or my thoughts also. But I didn't go in there and do that 'body there, mind not'. My body and my mind were in the room."

Both Lauren and Beverly also found reassurance from their connection with the PLC team members. Beverly, unlike Lauren, works in a different capacity with the students as a speech therapist, and, therefore, lacks the connection of directly congruous academic goals with the grade level teachers. Nonetheless, Beverly experiences acceptance into the group. By accepting Beverly into the PLC group, the other members expressed that Beverly is a valuable member and can contribute to their ultimate goal of improved reading achievement. Beverly internalizes this message and continues to engage in the PLC and, therefore, approaches intention to systematically process the reform message. "Even though I am a Speech Therapist, I do have things that I can offer. I have a wealth of information and experiences."

Lauren also finds unity within her group, spurred by the transparency required from sharing teacher classroom data. "I was looking forward to 'em. And it was nice to, you know, be with other adults, and off my other islands. We became a country. We all joined together like Pangea." The presence of supportive others signals to Lauren that she has a resource that ensures her ability to engage in the PLCs. Since she is both

motivated and perceives that she has the ability to participate in the PLC, Lauren also approaches intention to systematically process the reform message.

Yielding. Both teachers systematically process the reform message and ultimately decide to accommodate the new belief. Although Beverly initially feared the loss of planning time and the addition of irrelevant work tasks, she ultimately perceived that her students had an improved educational experience due to her improved instruction she forged during the PLCs. "And I can see how this can affect the, um, outcomes for all of our students, and helping that all of our kids can be high learners. Even my multiple handicapped kids can be high learners." Lauren was resistant to PLCs because of the loss of planning time and anxiety from displaying teacher data. As she begins to see the benefits of using data to make student instructional decisions, and as her team unifies from the transparency of teacher classroom scores, however, her beliefs toward PLCs begin to shift, finally accommodating the new belief.

Beverly's Second Year Experience. Interestingly, the second year of the PLC initiative took a different form for Beverly. Instead of attending campus PLC meetings, she was required to attend district PLC meetings for just speech therapists. The speech therapy PLC meetings did not analyze data with the goal of making instructional decisions for students like her previous campus PLC meetings. In addition, the speech therapy PLC meetings were instituted for bureaucratic reasons since novice speech therapists were not completing necessary IEP paperwork on time. These experiences constitute a second belief change moment for Beverly concerning PLCs. Both reform messages required Beverly to attend PLC meetings, but the differing circumstances,

reasonings for the reform, and execution of the reform resulted in two different belief change experiences for Beverly. This finding strengthens the argument that environmental factors impact whether teachers take a systematic or heuristic approach to processing reform messages and whether a change occurs within the belief system.

Campus Contextual Factors. Of the four participants that make a *Stress Appraisal* after the reform message, Beverly and Lauren are the only two that accommodate a new belief. Also, while six teachers in all make a belief change favoring PLCs, Lauren and Beverly are the only two teachers of the six that clearly wrestle with PLCs as a viable option for themselves. Since Beverly and Lauren both deeply process the reform message, their belief change is more substantial. In other words, their new belief change will likely be more sustainable and resilient when faced with struggles and doubts concerning PLCs. Understanding the environmental factors present during their belief change may suggest ways for administrators to encourage such processing in their teachers during reform movements. Beverly and Lauren discuss several campus environmental factors that occurred throughout the belief change process that may have influenced their processing of PLCs.

The idea of PLCs immediately produced reservations in Beverly and Lauren. For Beverly, she feared the PLCs would be irrelevant. Similarly, Lauren did not wish to lose planning time due to meeting requirements. Their trust in the administration and the enthusiasm the administration maintained throughout implementation, however, kept them hooked enough to engage in processing of the PLCs' effectiveness. The administration also offered support in the form of openness to teacher input, providing

needed resources, a consistent schedule, a structure to PLCs that helped ensure productive meetings, and a gradual release of PLC responsibilities.

For Beverly, being accepted as a valuable member partly addressed her fear that the PLC meetings would be irrelevant. PLCs also became more relevant as she learned general education strategies for reading instruction from her colleagues and implemented them with her own special education students. Seeing improved student reading achievement through analyzing data further convinced both Beverly's and Lauren's of the usefulness of the interventions and the PLCs power in identifying student weaknesses in order to plan targeted instruction. For Lauren, using data revealed information that she had never known about her students. She labeled this as the "meaningfulness" that caused her to eventually accommodate the belief that PLCs were a useful educational practice.

In summary, Lauren and Beverly discussed several campus environmental factors that they saw as pertinent to processing their beliefs about PLCs:

- An reform message that poses a challenge to current behaviors or beliefs
- The presence of administrative support
- Organizational structures the remove barriers
- The administration's attitude toward the reform
- An administration willing to listen to teacher input
- Being accepted by colleagues as a valuable team member
- The use of data to illustrate student gaps and growth
- Connecting the practice to individual professional goals

- Connecting individual professional goals to the professional goals of other team members, and
- Having the needed resources.

Heuristic Processing with Assimilation of New Belief: Taylor, Shirley, Karen, and Leslie

Implicates Self. Gregoire's (2003) CAMCC suggests that teachers are only prompted to process reform messages systematically when they experience stress concerning their own identity in response to the reform message. Taylor, Shirley, Karen, and Leslie, on the other hand, do not respond to the PLC reform message with stress, but with either excitement or at the very least a mild approval. Taylor, Karen, and Leslie all had experienced initiatives similar to "PLCs". According to Pajares (1992) episodic structures (memories of previous experiences) serve as a source for current beliefs and the filter through which new messages are processed. Interestingly these three still developed a sense of anticipation for the new PLC initiative.

Taylor fondly speaks of teacher initiated collaborative learning communities of the past, inducing a positive appraisal toward the new PLCs. "Thrilled, literally. So excited." Since Taylor does not experience discomfort in regards to the reform message, she is not motivated to process the reform message systematically. Taylor does experience some stress when administrators begin using PLC meetings as a way to share campus logistical information rather than data based planning. Nonetheless, the administration's explanation that PLCs sometimes take the form of faculty meetings easily satisfies Taylor, possibly because she has not previously been prompted to process

the reform message in a systematic way and, therefore, relies on her heuristic--i.e., past collaborative learning experiences have proven that PLC type meetings are effective.

Karen and Leslie reminisce about the ineffectiveness of their previous PLCs. Karen criticizes her previous campus for not using PLC meetings as a time to collaborate. Instead, they are used as weekly mini faculty meetings that require them to stay late after school. Despite these criticisms, Karen still makes a positive appraisal when the administration at her new campus announces that they will begin PLCs. "I was fine with PLCs. I came from a county that already did 'em." The weekly meetings during planning do pose a challenge for Karen, potentially causing her stress. However, she reframes the schedule change by saying the weekly meetings help her schedule tasks for the week around her PLC obligations. This reframing may be an attempt to avoid dissonance, thereby allowing her to maintain her heuristic stance-- i.e., these PLCs are teacher led and scheduled during the school day making for better PLCs than my previous campus. Leslie's previous PLCs took on many qualities of a typical PLC, but with poor efficiency and minimal results due to a failure of following norms and a lack of structure. Nevertheless, she, too, welcomes PLCs, partly due to her faith in the current administration, thereby provoking heuristic processing.

Unlike Taylor, Karen, and Leslie, Shirley does not evoke excitement toward PLCs, but rather temperance. Her explanations of her opinions and feelings concerning the PLC neither have conviction, excitement, or even resistance toward the PLC message. When asked how she reacted to the announcement that PLCs would be a new initiative, she says, "Oh, um, probably made a nice face." She then goes on to explain

that she's "pretty open to trying new things and seeing how it goes before I make a final judgement on it." Never throughout the interview does she speak of her own excitement or resistance to PLCs other than a single comment about losing her planning time immediately followed by a disclaimer. "I did find them beneficial." Shirley, therefore, makes a benign appraisal toward the reform message leading her to use a heuristic to process the reform message: my administration believes PLCs will work, and I trust my administration, therefore, I believe in PLCs.

Motivation and Ability. According to Gregoire's (2003) model of conceptual change teachers who make a *benign-positive appraisal* follow directly to heuristic processing. Within this pathway to belief change, the recipient of the reform message does not experience discomfort and, therefore, is never prompted to question their motivation or ability in regards to the reform message. Nevertheless, each participant was prompted within the interview to discuss both.

Interestingly, Taylor and Shirley struggled to answer questions about their motivation and ability to engage in PLCs. Within the CAMCC, a benign-positive appraisal leads directly to heuristic processing, bypassing any need to appraise their motivation or ability to be successful in a reform message. It is plausible, therefore, to suggest that neither Taylor nor Shirley explored their motivation and ability in regards to PLCs. Both eventually discuss environmental factors that affected PLCs which will be discussed in the next section. With some prompting, Shirley eventually mentions her years of experience in education. "Twenty years of experience, I guess, would probably

lend a little bit to that. Um, being a team leader before. I've been a team leader three times at a different school."

On the other hand, Karen and Leslie readily discuss their motivation and ability to participate in PLCs. Karen's desire to attend additional PLCs demonstrates her motivation and perceived self-efficacy to engage in PLC settings. "The only thing is, I wish I could have been in more than one of 'em, because I had to choose ELA or math." Also, despite the PLCs sometimes being irrelevant to Karen because the focus was on general education, she discovered her role as the advocate for special education students.

> I like to give 'em a special ed point of view. Like, you know, if they're frustrated because their kid's not making any progress I'm like, "Well, you know, I have to [beginning readers] right now in 5th grade and, um, you know, one of my [beginning readers], she's been stuck on beginning reader since 1st grade."

Leslie also readily talks about several personal qualities that lend to her ability to engage in PLCs indicating she may have considered her own self-efficacy to perform in PLCs.--e.g., teaching experience, knowledge of interventions, her roles as a coach, etc.

Yielding. A benign-positive appraisal does not create internal stress that would require a teacher to make either a challenge appraisal or a threat appraisal that leads to approach or avoidance intention to process the message. The heuristic used to process the new message would naturally influence the ultimate decision to assimilate or reject a new belief change as no other processing of the message takes place according to the CAMCC. Therefore, Taylor, Shirley, Leslie, and Karen do not approach or avoid

intention to systematically process the idea of PLCs as would an individual that originally experiences stress. Instead, they immediately use the heuristic to make their final belief change decision.

Both Shirley and Leslie use similar heuristics. For Shirley, her confidence in her administration to choose an initiative that will positively affect student achievement becomes the foundation and her heuristic for a superficial belief change.

> "[...] I also felt like with the two of them we had good leadership that I could trust. So, and I knew they were excited about it, and, um, not pushy, but encouraging it. So, um, I didn't feel negatively about it. [...] You know, I guess, kind of, I mean I was on board with doing it, especially if it benefited the students, and [the administration] really seemed to feel like it was going to."

Instead of critically and systematically considering all the details of the PLC initiative in relation to the needs of the campus, Shirley assimilates the belief that the PLCs will be effective solely based on her trust in the administration. Similarly, despite Leslie's less than positive experience with PLCs in the past, she relies on her new administration's focus and discipline to be the missing piece for successful PLCs, therefore becoming her heuristic for accepting the PLC reform. "When [my current principal] came and we started 'em, we still had 'em, but they were not like this. You know. So seeing how [my current principal] was more efficient."

As mentioned above, Taylor's heuristic originates from her previous experiences in collaborative settings similar to PLCs. In her words, "This wasn't new for us." Her heuristic--that past collaborative learning experiences have proven that PLC type

meetings are effective--encourage her to assimilate the belief that PLCs will effectively impact students.

Similarly to Leslie, Karen also drew her heuristic from her previous experiences with PLCs. She filtered her perception of the PLCs through her experiences from a previous campus who had administrative led PLC meetings at inconvenient times. These two flaws from her previous campus become the embodiment of a failing PLC and, therefore, the heuristics she uses to process the current PLCs. First, just like her previous campus, the PLCs at her current campus consistently interrupted her schedule every Wednesday. Later, she reframes the consistency of the meetings; instead, the consistency allowed her to easily schedule her own special education meetings for the rest of the week. Second, Karen perceives her new PLC time as more collaborative than her previous PLC time.

> Um, we collaborated in this one, and so it was more teacher led. It was more collaboration. What are we gonna do for the students? Whereas my previous county used that timeframe as more of, like, their faculty meeting time each, each week. Where we went over, like, faculty meeting stuff. It could be sent, like, in an email or whatever. You know what I mean? It wasn't like a collaborative professional development. It was just like, uh, "Oh, they're telling us we have to do these PLCs, so we're gonna sit in here and have a meeting," kind of thing.

In other words, the two characteristics that Karen deemed as the stumbling blocks of her previous PLC, therefore, became the barometer by which she measured the current

PLCs. Her beliefs hinged on these two rules. Consequently, when the PLCs were more teacher led and scheduled during the day, Karen assimilated the new belief.

Campus Contextual Factors. As may be expected, Taylor, Shirley, Karen, and Leslie hold an overall positive and sometimes benign opinion about PLCs, reflecting the initial positive/benign appraisal each made when presented with PLCs as a campus reform. In most cases, when other participants reacted negatively toward a particular administrative decision or circumstance of PLCs, Taylor, Shirley, Karen, and Leslie either reacted in favor of the change or quickly reframed the change to avoid experiencing stress. For example, Lauren's aversion to losing planning time causes her to experience stress concerning PLCs. Conversely, while Shirley and Karen also consider the downside of losing planning time due to PLCs, they quickly reframe the tax on their time, minimizing their initial stress from the PLC reform. Their consistent view of PLCs through rose colored glasses may be in an effort to maintain the heuristics they have used to assimilate their new found belief.

Only in a few instances do any of the four mention any environmental factors negatively. Taylor briefly became irritated with PLCs in the beginning because the meeting agenda did not reflect the way the PLCs were presented. She quickly is assuaged, however, when the principal says that is "part of the purpose of a PLC." Taylor also noticed that the GT teacher struggled to participate in PLCs as the meetings were not always relevant to her. This problem was quickly solved, however, when the GT teacher was removed from the team. Karen mentions that the PLC training was broad and vague, but immediately excuses the flaws by instead putting her trust in her

administration. "[...] but I also felt like with the two of them we had good leadership that I could trust. So, and I knew, they were excited about it, and, um, not pushy, but encouraging it. So, um, I didn't feel negatively about it." Karen, by far, shares more critiques about PLCs than Taylor, Shirley, or Leslie. First she felt limited by the PLC schedule since she wanted to attend both a reading and math PLC. Such a complaint, however, better reflects her earnestness to attend PLCs rather than a factor that negatively impacted her beliefs about PLCs. Second, Karen sometimes felt PLCs were irrelevant to her as a special education teacher. Nevertheless, Karen mentions that she enjoyed ensuring that the general education teachers were considering the special education perspective. Lastly, Karen noticed the PLC team would sometimes lose focus when a teacher would begin boasting about her scores, in effect curtailing the teams productivity. After this single comment, she did not further elaborate on this frustration.

The remaining discussion throughout all four interviews favorably portrayed the environmental factors present during the PLC reform. The environmental factors mentioned by Taylor, Shirley, Karen, and Leslie included:

- The institution of semi-structured PLC meetings
- A gradual release toward teacher led meetings
- An openness from the administration to listen and act
- Excitement from the administration
- Predetermined structures within PLs such as a set meeting time and place, cut scores to help assign students to intervention groups, meeting norms, and a spreadsheet to organize intervention groups

- A dedicated, weekly time for PLC meetings
- A collaborative environment
- An administrative led focus on being "Better Together"
- Analyzing data as a group to make student based decisions, and
- Sharing effective strategies among PLC team members

Unsuccessful Belief Change

Of the eight participants Amber and Donna did not successfully accommodate or assimilate a new belief about PLCs as a viable educational practice. Nonetheless, while they both experienced similar outcomes, their paths to reach their conclusions were not identical. Both processed the message deeply as PLCs related to their own professional practice, however, Donna also processed PLCs as a viable option for her peer. Donna's second processing experience used a heuristic that resulted in assimilation of the new belief. The following sections will describe both Amber's and Donna's path toward a belief change moment followed by an analysis of the environmental factors present during their belief processing.

Systematic Processing with No Belief Change: Amber

Implicates Self. Amber's initial frustration with being required to engage in meetings that she perceived would be potentially irrelevant generates a *Stress Appraisal*. Amber's previous experience with meetings and professional development has developed a pattern of irrelevancy, to the extent that relevance becomes a central theme throughout all of our conversations. Within 65 minutes of interview time, Amber mentions relevancy a total of twenty-one times in regards to professional development.

Amber's stress that the PLCs would not meet her expectations of relevancy send her down the path toward assessing her motivation and ability in regards to PLCs.

Motivation and Ability. Ambers sense of self-efficacy concerning her participation in PLCs appears to be sufficient for processing the message systematically. She comments at least twice on the leadership role she took within PLCs. In one instance Amber mentions that she assumed the leader role of planning CBIs--their main goal of PLCs--since she had the most experience in self-contained classrooms. Amber also perceives her administration as supportive in her endeavors to participate successfully in PLCs. For example, Amber explains that her principal provided useful solutions for making their PLCs more relevant. "[Our principal] kind of helped us restructure, and we made our PLCs relevant to what we were doing, which we focused this year on community-based instruction, cause that's something we all three do, cause that's another difficulty." Since Amber is both motivated and perceives she has the ability to process the reform message, she identifies the reform as a challenge and approaches intention to process the reform message systematically.

Yielding. Discussions with Amber demonstrate that she has dedicated effortful time and mental space to the many elements of PLCs and how they affect her and her students. For example, Amber explains that although she experiences excitement at the prospect of learning from her peers, her enthusiasm soon fades when she realizes the members of her PLC group have less in common with her than expected. For this reason, the teachers of the classrooms with students of mild to moderate intellectual disabilities had little to offer Amber. In addition, the IEPs of students within the self-

contained classes had individual IEP goals, a reality in contrast to that of the general education PLCs, which analyzed and made decisions from common data that all students shared. The combination of these factors validated Amber's fears that the PLCs would be irrelevant. After systematically processing the reform message, she ultimately does not accommodate PLCs as a viable educational practice, at least as they are currently structured. Amber clearly still envisions PLCs that could benefit her and her students. "And as far as collaboration with my team, as far as my parapros [paraprofessionals], I wish sometimes that one of our PLCs a month could be time that the three of us could collaborate, because we're the ones in there, all day, every day."

Divergent Paths with No Belief Change: Donna

Implicates Self. When presented with the idea of PLCs, Donna immediately becomes frustrated because the meetings will require that she change her schedule and forego traveling to some of her other schools. Donna's actions also demonstrate an attempt to reduce her stress when she visits her department supervisor and the campus principal in hopes of finding a solution. Both attempts fail and Donna is required to shift her schedule. The stress appraisal of the situation initiates her path toward the pathway of processing the message systematically.

Motivation and Ability. Donna's attempt to contribute to the PLCs by discussing ESOL accommodations and standards demonstrates her motivation to engage in the PLCs. However, she is often interrupted by her peers and ESOL data are never discussed. She also perceives a lack of support from her campus and district

administration. The lack of supportive others instills in Donna the belief that she does not have the ability to participate.

Yielding. Unexpectedly, Donna seems to bifurcate the processing of PLCs, on the one hand considering PLCs as a viable option for herself, and on the other hand as a viable option for her peers. Because her ability to participate in the PLCs is insufficient, she appraises the reform message as a threat, directing her to avoid the threat by processing the reform message heuristically as it relates to herself. Interestingly, Donna seems to approach intention of systematically processing the reform message as a viable option for her peers. Donna provides specific critiques toward the PLC's ability to affect student achievement but only in regards to her colleagues by consistently using the pronoun "they."

- *They* started stuff but really didn't finish.
- And *they* were trying to help 'em, but I don't know that, when I got to listening to what some of *those* teachers were doing, I'm not sure *they* did a lot with some of it.
- I mean, *they* didn't really go anywhere with it.
- But I didn't see anything. *They* were talkin' about stuff, but I didn't see anything that was enriching anybody.
- Well, I am glad that *they* are involved in [the PLCs]. You know, because it is needed.
- I think *they* would have really had to get down and dirty with what *they* were teaching [...].

- I told you that System 44, it must be a really good system, but *they* had one person doing it.

Donna has thought systematically about the viability of PLCs as a professional behavior for her colleagues, but has not thought systematically about PLCs as a viable option for herself. Donna's opinion about the PLC as it relates to *her* identity only arises when describing the PLC's affect on her schedule, suggesting that Donna has avoided intention of processing the reform message systematically. "Now, I am glad that they're doing it on teacher time. [...] because I don't want to stay everyday after school." Therefore, Donna has processed the reform message in two ways: (1) systematic processing of PLCs as a professional behavior for her colleagues, and (2) heuristic processing as a professional behavior for herself. Both of these pathways of belief processing resulted in a rejection of the reform message. Donna uses the heuristic that staff members on her campus are not ready to consider ESOL input in PLCs to reject PLCs as an option for herself.

Campus Contextual Factors. Both Amber and Donna processed the PLCs systematically, although Amber considered PLCs as a professional practice for herself and Donna only for her colleagues. When contemplating PLCs as a viable option for herself, Donna uses the heuristic that her time should be spent with students rather than in PLC meetings. While neither Amber or Donna made a belief change concerning PLCs, their experiences and thought processes have less in common than not.

Neither Donna nor Amber experienced benefits from the PLCs and for similar reasons. Donna joined a 3rd grade ELA PLC that did not consider or appreciate

Donna's ESOL perspective or data. Even Donna's Lexia program, which she thought aligned with the reading data discussed within the PLC meetings, never was used. Similarly, the IEP data from Amber's mild to moderate special education classroom did not experience changes rapidly enough to analyze on a weekly basis. In addition, the data within the special education data were not standardized and therefore difficult to compare. In the context of PLCs, data serves as a type of resource necessary to participate fully in the meetings. Donna's data were not perceived as beneficial from the PLC members and therefore rejected. Likewise, Amber's data did not lend well to the purposes of PLCs and therefore were useless.

The administration restructured Amber's PLC to planning CBIs, something all of the mild to moderate special education teachers had in common. Donna rarely experienced such support from the administration. On the contrary, Donna often felt thwarted and neglected by the administration. According to Donna, they denied her appeal to be exempt from PLCs, failed to provide a comfortable working environment during field day, and did not offer help when asked to move to a new room. Donna also reports that the administration is unapproachable and often unavailable. Similarly, Donna says that her colleagues would interrupt her within PLC meetings and failed to provide her with information about her students. The lack of support from her administration and colleagues ultimately communicates to Donna that she does not have the *Ability* in the form of supportive others in order to process PLCs as a potential belief.

Amber and Donna have different perspectives on the obligatory schedule the administration provides. Amber comments that previously the special education

teachers struggled to plan together because there never was a time when all the teachers were available. Nonetheless, even with the common planning time for PLCs, Amber would prefer that time with her paraprofessionals who all have common instructional goals in the autism class; this realization causes her to reject PLCs as a potential belief change. Donna immediately rejected the schedule because it impeded her ability to serve all her students on PLC days.

When considering PLCs as an educational practice for her colleagues, Donna perceives little change in teacher practice and improvement in student achievement. According to Donna the ELA teachers did not adhere to the changes they discussed in the PLCs, and the changes she did see were unsubstantial. With her own English Learner students, she noticed very little improvement in their reading abilities.

In summary, multiple environmental factors affected both Amber's and Donna's belief change process, not all of which Amber and Donna have in common:

- Presence or lack of administrative support
- Unsuitable/Incongruous student data
- Unsupportive colleagues
- A schedule that facilitates consistent collaboration
- A schedule that disrupts student instruction
- The analysis of student results

Main Findings

The two research questions of the study will guide the elaboration of the main findings.

1. Using the CAMCC as an initial framework, which behaviors and thought processes characterize teachers within different pathways to belief change?
2. Which campus contextual factors do teachers within each pathway of belief change regard as pertinent to the implementation of professional learning communities?

Research Question One: Using the CAMCC as an Initial Framework, Which Behaviors and Thought Processes Characterize Teachers Within Different Pathways to Belief Change

Few studies have used the CAMCC to analyze a teacher's belief change journey from initial reform message to their final judgement on the reform (Ebert & Crippen, 2010; Hochberg, 2014). From these studies, researchers have marginally elaborated on the behaviors and beliefs that arise within each pathway. This study identifies the observed behaviors of eight teachers that took two different paths toward an ultimate belief determination.

Table 3 on page 174 details the type of processing in which each teacher engaged, whether a belief change occurred, and the heuristic and/or stress appraisal each teacher made. Of the eight participants six changed their beliefs in favor of PLCs. Of these six only two processed the reform message systematically. Of the two teachers that rejected a belief change in favor of PLCs, one processed the message systematically, and the other took a more complex, divergent path. According to the CAMCC, teachers that process the reform message systematically would be expected to consider their motivation and ability to engage in the reform. Conversely, teachers using a heuristic to

process the reform message would not be expected to consider their motivation and ability to engage in the reform.

The CAMCC seems inadequate in that while it includes an appraisal of motivation and ability within the systematic pathway, it does not detail the questions that teachers may ask when making these appraisals. The teachers that made a *Stress Appraisal* within the current study asked many questions once confronted with the reform message:

- How will PLCs impact my students?
- Is it relevant to my role?
- Do I have time to devote to PLCs?
- Are the required PLC tasks feasible?
- Do PLCs prevent me from doing other important duties?
- Will my colleagues be supportive and value my opinions?
- Are my values and goals compatible with those of my PLC team members?

Many of these questions that arose through the current study align well with the Cognitive Reconstruction of Knowledge Model (CRKM), particularly those pertaining to characteristics of the learner (Dole & Sinatra, 1998). Dole and Sinatra (1998) define learner characteristics as an individual's existing conception of the reform and motivation to process the new information. Within the CRKM motivation is determined by the individual's level of dissatisfaction with his or her current belief system compared with new evidence, the level of personal relevance to the new information, the current

social context, and/or simply a need for cognition. While the CAMCC does not allow for teachers within the heuristic pathway to consider their motivation, such considerations were witnessed during the current study from all participants, although at different degrees suggesting that shades of the systematic and heuristic pathways may exist. The current study witnessed three of the four types of motivation: dissatisfaction, personal relevance, and social context.

One of the questions teachers asked was, "Will PLCs positively impact my students," specifically within reading. The innate focus on data within PLCs required teachers to reconsider their understanding of the reading levels of their students, often creating an internal dissatisfaction with their current quality of instruction. Unexpectedly, teachers within both the systematic and heuristic pathway to belief change mentioned how data would reveal their misconceptions on student reading ability and their deficiencies in instruction. The PLC-intervention connection implemented a feedback loop of implementation, data gathering and data analysis that consistently challenged teacher thinking. The intense focus on student data may explain why teachers within the heuristic pathway considered the impact of PLCs on student achievement. Plausibly, teachers within the heuristic pathway who participated in a reform that did not rely heavily on data analysis may not engage in such a consideration since they rely solely on their heuristic. Only Amber and Donna, the two teachers that did not make a belief change, failed to witness the impact of data analysis and interventions. Amber's special education PLCs did not incorporate data, and Donna perceived little student growth due to PLCs.

Table 3

Summary of Participant Belief Decisions

Name	Type of Processing	Belief Change?	Heuristic (if applicable)	Stress Appraisal (if applicable)
Amber	Systematic	No		It is likely that PLCs will be irrelevant to me as a teacher of students with mild to moderate autism.
Donna	Both	No	Staff members on her campus are not ready to consider ESOL input in PLCs	The PLC meetings will interfere with ESOL instruction of the students at my other campuses.
Beverly	Systematic	Yes		It is likely that PLCs will be irrelevant to me as a speech therapist.
Taylor	Heuristic	Yes	Past collaborative learning experiences have proven that PLC type meetings are effective.	
Lauren	Systematic	Yes		The weekly PLC meetings will require me to give precious time that I use to complete other important duties.
Shirley	Heuristic	Yes	My administration believes PLCs will work and I trust my administration, therefore, I believe in PLCs.	
Leslie	Heuristic	Yes	My administration believes PLCs will work and I trust my administration, therefore, I believe in PLCs.	
Karen	Heuristic	Yes	These PLCs are teacher led and scheduled during the school day making for better PLCs than my previous campus.	

The question of personal relevance appears most frequently within Amber, Donna, Beverly, and Karen, none of which are general education teachers; general education teachers struggled little to see the relevance of PLCs. Each of the mentioned participants negotiated the perceived lack of relevance in different ways. Amber and Donna, both of whom systematically processed the reform message, failed to engage in PLCs as they were originally structured. Amber and her PLC team completely restructured their meetings to make them more relevant to special education. Donna eventually disengages from PLCs, rarely participating unless asked directly. Beverly and Karen (the former processed PLCs systematically and the latter used a heuristic) find components of the PLCs that connect with their roles. Both conclude that their background knowledge in special education can enhance the discussions within PLCs which lead to more informed decisions. They also decide to learn from their general education colleagues to improve their own instruction. The consideration of personal relevance, therefore, may be more of a function of the lack of a clear connection between the individual's role and the role of the reform rather than a function of systematic vs. heuristic processing.

The social context aspect of motivation manifested in the participant's perception of the beliefs and values of the administration. Lauren, Beverly, Karen and Shirley all mention the excitement of the administration as an influence on their engagement in PLCs. Conceivably, the administration's perceived excitement for PLCs functioned in different ways, depending on the needs of the individual. For Lauren and Beverly, both of whom processed the reform message systematically, the

administration's excitement may have persuaded them of the possibility that PLCs could be an effective educational practice. Their excitement may have also communicated the prospect of having much needed commitment and support from powerful campus leaders (i.e. enhanced ability to succeed due to having needed resources). Karen and Shirley, both of whom used a heuristic to process the reform message, may have placed their faith completely on their administration due to their deep trust that they will choose what is best for kids. Their trust in their administration thereby becomes the heuristic they use to process the reform message.

A teacher's existing conception of the reform, another learner characteristic within the CRKM, can influence how a teacher processes a reform message (Dole & Sinatra, 1998). Interestingly, all three of the eight participants that had existing conceptions of PLCs made *benign-positive appraisals* concerning the reform message and, therefore, used a heuristic to make their final belief determination. For example, Taylor's nostalgia for the days she could plan and learn with a group of committed colleagues causes her to be "thrilled" about the new PLC initiative, therefore making a positive appraisal. Both Karen and Leslie also filter much of their beliefs about PLCs through their previous experiences with different campuses and/or administrators. Although both experienced subpar PLCs, their commitment to their existing conception of PLCs is sufficient to be optimistic about the new PLC initiative. Doubtless these teachers' existing conception of PLCs influenced the decisions they made during the belief change process, although sometimes in unexpected ways. Further research in the relationship between a teacher's existing conception of the reform message and how

they *Implicate Self* is needed to clarify how these components interact. As for now it appears that previous experience with a reform message may influence a teacher toward making a *Benign-Positive Appraisal* as did these three teachers.

The behavior and thought process that more stringently seem to differentiate the participants that systematically processed the reform message from those that used a heuristic is the presence or absence of criticism. For all participants that systematically processed the reform, there were moments when they sought to satisfy the dissonance they experienced from their *Stress Appraisal*. For example, Amber and her PLC team restructured their meetings to make them more relevant. Beverly and Lauren entered their first PLCs with doubts yet still with an intention of participating. As they saw glimpses of usefulness from the PLCs, their engagement and excitement for PLCs slowly increased. Taylor, Shirley, Leslie, and Karen, on the other hand, avoid any mentioning of criticisms. Even when critiques arise during interviews, they are immediately squelched by disclaimers or a change of subject toward the benefits of PLC. Seemingly, their heuristics, at least for now, are the anchor to their acceptance to PLCs. Since their belief change is superficial, however, future challenges may cause them to reconsider their beliefs about PLCs, thereby reinitiating the belief change process beginning with *Implicates Self*.

Research Question Two: Which Campus Contextual Factors Do Teachers Within Each Pathway of Belief Change Regard as Pertinent to the Implementation of Professional Learning Communities

The second question that must be answered to make a *Challenge* or *Threat Appraisal* is that of *Ability*. Gregoire (2003) lists supportive others, time, and knowledge as some factors that

determine whether teachers make a *Challenge* or *Threat Appraisal*. The CAMCC does not, however, elaborate on what other campus contextual factors may be present during belief change, and therefore the reason for research question two. The CAMCC also does not allow for a teacher within the heuristic processing pathway to reflect on their ability to perform the reform. Nevertheless, all participants have much to say about the campus contextual factors that may influence their ability to implement PLCs.

The four emergent themes reflect conditions within the case site that the participants viewed as pertinent to the implementation of PLCs. Appendix B lists each emergent theme and the categories that consolidated to form each theme. No categories clearly arose solely within the systematic or heuristic pathway. Instead, the perception of the nature of the environmental factors fluctuates from participant to participant, particularly between those who successfully made a belief change and those who did not.

Through the perspective of Lauren, Beverly, Taylor, Shirley, Leslie, and Karen the administrative decisions and operations such as established norms, weekly scheduled meetings, the gradual release of responsibility, and the willingness to utilize teacher input established conditions that facilitated successful PLCs. In essence, the administration set the stage for teachers to flourish within the PLCs. The teachers enjoyed their support and subsequently were empowered to engage more fully in the

reform. On the other hand, Donna perceived the same administrative decisions and operations as hindrances to her personal goals as an ESOL teacher; weekly meetings invaded her time with her students and she found the administration unapproachable and inaccessible. In response, she suppressed any processing of new beliefs concerning PLCs.

Similarly, where Beverly, Lauren, Taylor, Leslie, and Karen found camaraderie, a culture of sharing and learning, and shared values, Donna found rejection, a dismissal of the ESOL perspective, and incongruous values with her peers. Such relationships and commonalities in values allowed the former to make a collective effort to engaging in PLCs. Because Donna felt excluded and undervalued within her PLC team she mentally withdrew and rarely participated. At least for these participants, the quality and nature of the relationships they formed with their colleagues and administrators impacted their ability to participate in the PLCs.

Nearly every participant discussed some aspect of the effective use of time or resources. For some PLCs contended for precious time to complete important teacher duties. For others irrelevant conversation during PLCs caused irritation due to an inefficient use of time. At some level the argument for PLCs was won or defeated by how well teacher time was used during meetings compared to how the time could have been used, hence the importance of setting team norms and meeting expectations, having available resources, developing meeting agendas, matching teachers to relevant PLCs, developing tools that easily manage student data, and training teachers in PLC procedures.

Lastly, teachers essentially wish to see student results. Indeed, witnessing student improvement as a result of a new practice challenges current belief systems (Patton & Griffin, 2008; Opfer et al., 2011; Sahin & Yildirim, 2016). The persistent analysis of student data followed by strategic placement of students within interventions became a fundamental aspect of PLC meetings. Teachers often observed student growth within these meetings and attributed the growth to the collaboration and strategic planning that transpired within the PLCs. The cyclical process of intervention, data analysis, decision making, and more interventions created a feedback loop that some teachers eventually began to relish. In fact, every participant, other than Donna and Amber who did not make a belief change, spoke fondly of the data aspect of PLCs.

Beverly's experience with PLCs in the second year of implementation further highlights the value of understanding campus contextual factors within campus reform settings. Beverly's enthusiasm and anticipation for the second year of implementation clearly demonstrated her belief change for PLCs, however, her second year did not occur as she had imagined; instead she would be attending district PLCs rather than her campus level PLCs.. The district PLCs lacked many of the campus contextual factors that were originally presence during Beverly's first encounter with PLCs. As a result, Beverly commenced a second belief change experience contrary to her initial belief change experience, suggesting that the processing of a reform message is not specific to the reform itself but to the situation within which the message is presented.

While this study observed a multitude of campus contextual factors, in many ways they were specific to the PLC reform. Reasonably, there are countless potential

environmental factors that could influence a teacher's belief change process. Understanding what these factors are and how they influence teachers during reform climates may guide administrators and professional development trainers in developing environments that positively impact the belief change process.

Conclusions

During any reform movement there is a reform message to which teachers will respond. Contrary to what might be expected, the response endures beyond the initial reaction. It endures into the classroom, into staff meetings, and into the mind of the teacher. In this study the CAMCC guides the response of eight teachers to a PLC reform message. For those whose path leads down systematic processing, they commit to a more arduous journey with more substantial belief results. The path of the rest proves to be simpler yet not necessarily easier. For most taking the heuristic pathway is an effort to make decisions in an economical fashion. Chaiken (1980) explains this decision as the outcome of determining that economic concerns outweigh concerns for reliability. The heuristic pathway for one participant, however, is the result of disgruntlement and exclusion.

Within this study the main focus was to understand the environmental characteristics, specifically those occurring on campus, that were present during the belief change process of the eight participants. Advantageously, most of the campus contextual factors identified were either directly or indirectly affected by the campus administration, meaning whether a teacher rejects or accepts a reform is not fully determined by the message characteristics or the learner characteristics teachers bring

with them. Instead, administrators have more work to be done after a reform has been presented. Some of the work explicitly connects with the reform, but some is more tacit in nature.

The administration's more explicit influences, including the decision to release PLCs to teachers gradually, managing logistics such as scheduling, location, and time, assigning teachers to PLC teams, and providing the needed resources, shaped the way teachers perceived the PLC initiative. Such a realization can bring hope to educational leaders that promoting fidelity of implementation can take forms less restrictive and harsh than clear mandates. Of these eight participants none described the PLC initiative as an unrelenting mandate. Instead seven of the eight felt heard and supported.

Some of the more tacit campus contextual factors included the administration's approach to leadership--i.e. shared leadership, collaboration, and relationship building. Such qualities translated into behaviors within the PLCs such as transparency, a focus on student results, and a unified endeavor to student achievement, all of which were important characteristics for Lauren and Beverly as they systematically processed the reform message, eventually leading to accommodating a new belief.

It is interesting to note that years of experience as a teacher and years of experience on the campus did not impact teacher's belief change. However, those who had previous experience with PLCs and other similar settings all chose the heuristic path for processing belief change. Not all felt that their PLC experience were positive, yet the outcomes were similar.

Moving forward with these findings, administrators hoping to begin new initiatives on their own campuses can be advised to identify the unique environmental factors present before, during, and after the reform message, remembering that the processing of a new belief is an enduring event. While the campus contextual factors discovered within the current study may serve as a starting point for evaluating their own environments, administrators should also consider the factors unique to their own campus. Doing so may enhance the professional development experiences for participating teachers, allowing them to deeply reflect on their beliefs and to make professional decisions, ideally leading to fidelity of implementation and improved student achievement.

Future Research

The Cognitive-Affective Model of Conceptual Change may be an important first step in reconceptualizing teacher professional development, however, little research has been conducted to validate or expand upon the current model. First, studies on the long-term effects of the systematic and heuristic pathways could clarify what teacher behaviors may accompany each. To what degree are teachers engaged in the actions of the reform within each type of processing? How sustainable are the new beliefs as a result of each type of processing? Is the CAMCC a one-time process or do teachers ever return to *Implicates Self*?

The current study also revealed gaps within the CAMCC. As for now, the CAMCC proposes that teachers that make a *Benign-Positive Appraisal* do not consider their own motivation or ability to perform the reform. In contrast, all four participants

that make a *Benign-Positive Appraisal* within the current study considered the many ways their environment has supported their PLC journey. When do these considerations happen? Do they serve to validate the teacher's heuristic? Similarly, Chaiken (1980) explains that there are degrees of systematic and heuristic processing, suggesting that some mix of the two pathways may exist. Further research would need to explain these variations and their implications.

Lastly, the CAMCC does not clarify if the reform message may be processed as a function of individual implementation or just implementation in general. For example, Donna appears to have considered PLCs in two ways, each within different pathways. She uses a heuristic when she determines that her goals and values are not compatible with those of her colleagues and her administrator in her PLC. As a result, she determines she is unable to perform PLCs. Nonetheless, she reveals through her critiques of her colleagues' implementation of PLCs that she has thought deeply about PLCs as an educational process for others. The answers to these questions may help researchers develop a model that most accurately reflects teachers' professional development experiences.

REFERENCES

Abelson, R. P. (1979). Differences between belief and knowledge systems. *Cognitive Science, 3*, 355-366. http://dx.doi.org/10.1207/s15516709cog0304_4

Aguirre, J., & Speer, N. M. (2000). Examining the relationship between beliefs and goals in teacher practice. *Journal of Mathematical Behavior*, 18(3), 327-356. 6http://dx.doi.org/10.1016/S0732-3123(99)00034-6

Anderson, A. M., Dragsted, S., Evans, R. H., & Sorensen, H. (2004). The relationship between changes in teachers' self-efficacy beliefs and the science teaching environment of danish first-year elementary teachers. *Journal of Science Teacher Education*, 15(1), 25-38. http://dx.doi.org/10.1023/B:JSTE.0000031461.68912.3d

Artiles, A. J., Barreto, R. M., Pena, L., & McClafferty, K. (1998). Pathways to teacher learning in multicultural contexts: A longitudinal case study of two novice bilingual teachers in urban schools. *Remedial and Special Education, 19*(2), 70-90. http://dx.doi.org/10.1177/074193259801900203

Ashton, P. T. (2015). Historical overview and theoretical perspectives of research on teachers' beliefs. In H. Fives & M. Gregoire Gill (Eds.), International handbook of research on teachers' beliefs (31-47). New York: Routledge.

Bamberger, Y. M., & Krajic, J. (2012). Teacher belief and change about integrating nanoscale science and technology into a secondary science curriculum. *Electronic Journal of Science Education, 12*(1), 1-20.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman

and Company.

Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian Journal of Social Psychology, 2*, 21-41. http://dx.doi.org/10.1111/1467-839X.00024

Becker, H. J., & Ravitz, J. (1999). The influence of computer and internet use on teachers'' pedagogical practices and perceptions. *Journal of Research on Computing in Education, 31*(4), 356-384.

Blomeke, S., Hoth, J., Dohrmann, M., Busse, A., Kaiser, G., & Konig, J. (2015). Teacher change during induction: Development of beginning primary teachers' knowledge, beliefs, and performance. *International Journal of Science and Mathematics Education, 13*, 287-308. http://dx.doi.org/10.1007/s10763-015-9619-4

Blonder, R. & Mamlok-Naaman, R. (2013). Learning about teaching the extracurricular topic of nanotechnology as a vehicle for achieving a sustainable change in science education. *International Journal of Science and Mathematics Education, 14*, 345-372. http://dx.doi.org/10.1007/s10763-014-9579-0

Brinkerhoff, J. (2006). Effects of a long-duration, professional development academy on technology skills, computer self-efficacy, and technology integration beliefs and practices. *International Society for Technology in Education, 39*(1), 22-43. http://dx.doi.org/10.1080/15391523.2006.10782471

Brooks, K. & Adams, S. R. (2015). Developing agency for advocacy: Collaborative

inquiry-focused school-change projects as transformative learning for practicing teachers. *The New Educator, 11*, 292-308. http://dx.doi.org/10.1080/1547688X.2015.1087758

Carrington, S., Deppeler, J., & Moss, J. (2010). Cultivating teachers' beliefs, knowledge and skills for leading change in schools. *Australian Journal of Teacher Education, 35*(1), 1-13.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology, 39*(5), 752-766. http://dx.doi.org/10.1037/0022-3514.39.5.752

Chen, S., Duckworth, K., Chaiken, S. (1990). Motivated heuristic and systematic processing. *Psychological Inquiry, 10*(1), 44-49. http://dx.doi.org/10.1207/s15327965pli1001_6

Chester, M. D., & Beaudin, B. Q. (1996). Efficacy beliefs of newly hired teacher in urban schools. *American Educational Research Journal, 33*(1), 233-257. http://dx.doi.org/10.3102/00028312033001233

Chiu, T. K. F. & Churchill, D. (2016). Adoption of mobile devices in teaching: changes in teacher beliefs, attitudes and anxiety. *Interactive Learning Environments, 24*(2), 317-327. http://dx.doi.org/10.1080/10494820.2015.1113709

Cook, P. F, & Young, J. R. (2004). Face-to-face with children. *Journal of Curriculum Studies, 36(3)*, 341-360. http://dx.doi.org/10.1080/0022027032000124636

Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches*. Thousand Oaks, CA: Sage Publications, Inc..

Critchley, H., & Gibbs, S. (2012). The effects of positive psychology on the efficacy beliefs of school staff. *Educational & Child Psychology, 29*(4). 64-76.

Cross, D. I. (2009). Alignment, cohesion, and change: Examining mathematics teachers' belief structures and their influence on instructional practices. *Journal of Mathematics Teacher Education, 12*, 325-346. http://dx.doi.org/10.1007/s10857-009-9120-5

Dole, J. A., & Sinatra, G. M. (1998). Reconceptualizing Change in the Cognitive Construction of Knowledge. *Educational Psychologist, 33*(⅔), 109-128.

Ebert, K. E., & Crippen, K. J. (2010). Applying a cognitive-affective model of conceptual change to professional development. *Journal of Science Teacher Education, 21*, 371-388. http://dx.doi.org/10.1007/s10972-009-9183-2

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research and Technology in Education, 42(3)*, 255-284. http://dx.doi.org/10.1080/15391523.2010.10782551

Ertmer, P. A., Ottenbreit-Leftwich, A. T., Olgun, S., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers and Education, 59*, 423-435. http://dx.doi.org/10.1016/j.compedu.2012.02.001

Fabela-Córdenas, M. A. (2012). The Impact of Teacher Training for Autonomous Learning. *Studies In Self-Access Learning Journal, 3*(3), 215-236.

Fazio, R. H. (1986). How do attitudes guide behavior? In: Sorrentino, R. M., and

Higgins, E. T. (eds.), *Handbook of Motivation and Cognition: Foundations of Social Behavior*, Guilford Press, New York, pp. 204-243.

Feeney, E.J. (2016). How an orientation to learning influences the expansive-restrictive nature of teacher learning and change. *Teacher Development, 20*(4), 458-481. http://dx.doi.org/10.1080/13664530.2016.1161659

Fetters, M. K.,Czerniak, C. M., Fish, L., & Shawberry, J. (2002). Confronting, challenging, and changing teachers' beliefs: Implications from a local systemic change professional development program. *Journal of Science Teacher Education, 13*(2), 101-130.

Fitzgerald, A., Dawson, V., & Hackling, M. (2013). Examining the beliefs and practices of four effective Australian primary science teachers. *Research in Science Education, 43*, 981-1003. http://dx.doi.org/10.1007/s11165-012-9297-y

Francis, D. I. C. (2015). Dispelling the notion of inconsistencies in teachers' mathematics beliefs and practices: A 3-year case study. *Journal of Mathematics Teacher Education, 18*, 173-201.

Gamlem, S. M. (2015). Feedback to support learning: changes in teachers' practice and beliefs. *Teacher Development, 19*(4), 461-482. http://dx.doi.org/10.1080/13664530.2015.1060254

Glock, S, & Krolak-Schwerdt, S. (2013). Does nationality matter? The impact of stereotypical expectations on student teachers' judgements. *Social Psychology Education, 16*, 111-127.

Golafshani, N. (2013). Teachers' beliefs and teaching mathematics with manipulatives.

Canadian Journal of Education, 36(3), 137-159.

Green, T. F. (1971). *The Activities of Teaching*. Tokyo: McGraw-Hill Kogakusha.

Gregoire, M. (2003). Is it a challenge or a threat? A dual-process model of teachers' cognition and appraisal processes during conceptual change. *Educational Psychology Review, 15*(2), 147-179.

Grierson, A.L. (2009). Show me, help me, let me: Supporting teachers' changing conceptions of reading assessment and reading instruction. Retrieved from ProQuest Dissertations and Theses.

Grierson, A. L., & Gallagher, T. L. (2009). Seeing is believing: creating a catalyst for teacher change through a demonstration classroom professional development initiative. *Professional Development in Education, 35*(4), 567-584. http://dx.doi.org/10.1080/19415250902930726

Guskey, T. R. (1985). The effects of staff development on teachers' perceptions about effective teaching. *Journal of Educational Research, 78*, 378-381.

Hanushek, E. A. (2005). Economic Outcomes and School Quality. *Education Policy Series, 4*, 1-26.

Herrington, D. G., Senetta, F. B., Molly, M. E., & Schairer, C. J. (2016). I want to be the inquiry guy! How research experiences for teachers change beliefs, attitudes, and values about teaching science as inquiry. *Journal of Science Teacher Education, 27*, 183-204. http://dx.doi.org/10.1007/s10972-016-9450-y

Hochberg, E.D. (2014). Novice mathematics teachers' professional learning: The role of

cognitive-affective processing and school organizations. Retrieved from ProQuest LLC. (AAT 3623854)

Hung, H., & Yeh, H. (2013). Forming a change environment to encourage professional development through a teacher study group. *Teaching and Teacher Education, 36*, 153-165. http://dx.doi.org/10.1016/j.tate.2013.07.009

Johnson, C. C., & Marx, S. (2009). Transformative professional development: A model for urban science education reform. *Journal of Science Teacher Education, 20*, 113-134. http://dx.doi.org/10.1007/s10972-009-9127-x

Kasoutas, M., & Malamitsa, K. (2009). Exploring Greek Teachers' Beliefs Using Metaphors. *Australian Journal of Teacher Education*, 34(2), 64-83.

Lakshmanan, A., Heath, B. P., Perlmutter, A., & Elder, M. (2011). The impact of science content and professional learning communities on science teaching efficacy and standards-based instruction. *Journal of Research in Science Teaching, 48*(5), 534-551. http://dx.doi.org/10.1002/tea.20404

Lebak, K. (2015). Unpacking the complex relationship between beliefs, practice, and change related to inquiry-based instruction of one science teacher. *Journal of Science Teacher Education, 26*, 695-713. http://dx.doi.org/10.1007/s10972-015-9445-0

Lee, O. (2004). Teacher change in beliefs and practices in science and literacy instruction with english language learners. *Journal of Research in Science Teaching, 41*(1), 65-93. http://dx.doi.org/10.1002/tea.10125

Lee Bae, C. L, Hayes, K. N., Seitz, J., O'Connor, D., & DiStefano, R. (2016). A coding

tool for examining the substance for teacher professional learning and change with example cases from middle school science lesson study. *Teaching and Teacher Education, 60*, 164-178. http://dx.doi.org/10.1016/j.tate.2016.08.016

Levin, B. (2015). The development of teachers' beliefs. In H. Fives & M. Gregoire Gill (Eds.), International handbook of research on teachers' beliefs (48-65). New York: Routledge.

Levin, T., & Wadmany, R. (2005) Changes in educational beliefs and classroom practices of teachers and students in rich technology-based classrooms. *Technology, Pedagogy, and Education, 14*(3), 281-307. http://dx.doi.org/10.1080/14759390500200208

Levin, T., & Nevo, Y. (2009). Exploring teachers' views on learning and teaching in the context of a trans-disciplinary curriculum. *Journal of Curriculum Studies, 41*(4), 439-465. http://dx.doi.org/10.1080/00220270802210453

Lin, S., Lieu, S., Chen, S., Huang, M., & Chang, W. (2012). Affording explicit-reflective science teaching by using an educative teachers' guide. *International Journal of Science Education, 34*(7), 999-1026. http://dx.doi.org/10.1080/09500693.2012.661484

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Thousand Oaks, CA: Sage Publications, Inc.

Magos, K. (2006) Teachers from the majority population-pupils from the minority:

results of a research in the field of greek minority education. *European Journal of Teacher Education, 29*(3), 357-369. http://dx.doi.org/10.1080/02619760600795189

Mansour, N. (2013). Consistencies and inconsistencies between science teachers' beliefs and practices. *International Journal of Science Education, 35*(7), 1230-1275.

Markee, N. (1997). Second language acquisition research: A resource for changing teachers' professional cultures. *The Modern Language Journal, 81*(i), 80-93. http://dx.doi.org/10.1111/j.1540-4781.1997.tb01628.x

McLachlan, C., & Arrow, A. (2014). Promoting alphabet knowledge and phonological awareness in low socioeconomic child care settings: a quasi experimental study in five New Zealand centers. *Reading and Writing, 27*, 819-839. http://dx.doi.org/10.1007/s11145-013-9467-y

Meirink, J. A, Meijer, P. C., Verloop, N., & Bergen, T. C. M. (2009). Understanding teacher learning in secondary education: The relations of teacher activities to changed beliefs about teaching and learning. *Teaching and Teacher Education, 25*, 89-100. http://dx.doi.org/10.1016/j.tate.2008.07.003

Milner, A. R., Sondergeld, T. A., & Rop, C. (2014). The influence of an intensive and integrated place-based professional development program on teachers' views of nature of science. *Current Issues in Education, 17*(1), 1-16.

Miranda, R. J., & Damico, J. B. (2015). Changes in teachers' beliefs and classroom practices concerning inquiry-based instruction following a year-long RET-PLC program. *Science Educator, 24*(1), 23-35.

Mouza, C. (2006). Linking professional development to teacher learning and practice: A multi-case study analysis of urban teachers. *Journal of Computing Research, 34*(4), 405-440. http://dx.doi.org/10.2190/2218-567J-65P8-7J72

Munby, H. (1990). Metaphorical expressions of teachers' practical curriculum knowledge. *Journal of Curriculum & Supervision*, 6(1), 18-30.

Munby, H., & Russell, T. (1990). Metaphor in the Study of Teachers' Professional Knowledge. *Theory Into Practi*ce, 29(2), 116.

Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies, 19*(4), 317-328. http://dx.doi.org/10.1080/0022027870190403

Ni Chroinin, D. N, & O'Sullivan, M. (2014). From initial teacher education through induction and beyond: a longitudinal study of primary teacher beliefs. *Irish Educational Studies, 33*(4), 451-466. http://dx.doi.org/10.1080/03323315.2014.984387

Nishino, T. (2012). Modeling teacher beliefs and practices in context: A multimethods approach. *The Modern Language Journal, 96*(iii), 380-399. ttp://dx.doi.org/10.1111/j.1540-4781.2012.01364.x

Olafson, L., Grandy, C. S., & Owens, M. C. (2015). Qualitative approaches to studying teachers' beliefs. In H. Fives & M. Gregoire Gill (Eds.), International handbook of research on teachers' beliefs (128-149). New York: Routledge.

Opfer, V. D., Pedder, D. G., & Lavicza, Z. (2011). The role of teachers' orientation to

learning in professional development and change: A national study of teachers in England. *Teaching and Teacher Education, 27*, 443-453. http://dx.doi.org/10.1016/j.tate.2010.09.014

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62*(3), 307-332. http://dx.doi.org/10.3102/00346543062003307

Patton, K., & Griffin, L. L. (2008). Experiences and patterns of change in a physical education teacher development project. *Journal of Teaching in Physical Education, 27*, 272-291. http://dx.doi.org/10.1123/jtpe.27.3.272

Peter, L., Markham, P., & Frey, B. B. (2012). Preparing teachers for success with english language learners: challenges and opportunities for university TESOL educators. *The Teacher Educator, 47*, 302-327. http://dx.doi.org/10.1080/08878730.2012.707757

Pintrich, P. R., Marx, R. W., & Boyle, R. A. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research, 63*(2), 167-199. ttp://dx.doi.org/10.3102/00346543063002167

Polly, D., Wang, C., & McGee, J. (2012). Examining the influence of a curriculum-based elementary mathematics professional development program. *Journal of Research in Childhood Education, 28*, 327-343. http://dx.doi.org/10.1080/02568543.2014.913276

Posner, G. J., Strike, K. A., Hewson, P. W., and Gertzog, W. A. (1982). Accommodation

of scientific conception: Toward a theory of conceptual change. *Science Education, 66*(2), 211-227. http://dx.doi.org/10.1002/sce.3730660207

Powers, S. W., Zippay, C., & Butler, B. (2006). Investigating connections between teacher beliefs and instructional practices with struggling readers. *Reading Horizons Journal, 47*(2), 121-157.

Roberts, J. K., Henson, R. K., Tharp, B. Z., & Moreno, N. P. (2001). An examination of change in teacher self-efficacy beliefs in science education based on the duration of inservice activities. *Journal of Science Teacher Education, 12*(3), 199-213.

Rosenfeld, M., & Rosenfeld, S. (2004). Developing teacher sensitivity to individual learning differences. *Educational Psychology, 24*(4), 465-486. http://dx.doi.org/10.1080/0144341042000228852

Rubie-Davies, C. M., Flint, A., & McDonald, L. G. (2012). Teacher beliefs, teacher characteristics, and school contextual factors: What are the relationships? *British Journal of Educational Psychology, 82*, 270-288. http://dx.doi.org/10.1111/j.2044-8279.2011.02025.x

Russell, M., Carey, R., Kleiman, G., & Venable, J. D. (2009) Face-to-face and online professional development for mathematics teachers: A comparative study. *Journal of Asynchronous Learning Networks, 13*(2), 71-87.

Sahin, I., & Yildirim, A. (2016). Transforming professional learning into practice. *ELT Journal, 70*, 241-252. http://dx.doi.org/10.1093/elt/ccv070

Sailors, M., Hoffman, J. V., Pearson, P. D., McClung, N., Shin, J., Phiri, L. M., & Saka,

T. (2014). Supporting change in literacy instruction in Malawi. *Reading Research Quarterly, 49*(2), 209-231. http://dx.doi.org/10.1002/rrq.70

Schraw, G., & Olafson, L. (2015). Assessing teachers' beliefs: Challenges and solutions. In H. Fives & M. Gregoire Gill (Eds.), International handbook of research on teachers' beliefs (87-105). New York: Routledge.

Scott, J. (2015). The promises, problems, and prospects of research on teachers' beliefs. In H. Fives & M. Gregoire Gill (Eds.), International handbook of research on teachers' beliefs (13-30). New York: Routledge.

Senger, E. S. (1999). Reflective reform in mathematics: The recursive nature of teacher change. *Educational Studies in Mathematics, 37*, 199-221.

Service, B. (2016). Performativity in an era of mandated change: New Zealand teachers tell it as it is. *Journal of Educational Leadership, 31*(½), 76-91.

Seung, E., Park, S., & Narayan, R. (2011). Exploring Elementary Pre-Service Teachers' Beliefs about Science Teaching and Learning as Revealed in Their Metaphor Writing. *Journal of Science Education and Technology*, 20(6), 703-714.

Sinatra, G.M. (2005). The "warming trend" in conceptual change research: The legacy of Paul R. Pintrich. *Educational Psychologist, 40*(2), 107-115.

Smylie, M. (1988). The enhancement function of staff development: Organizational and psychological antecedents to individual teacher change. *American Educational Research Journal, 25*(1), 1-30. http://dx.doi.org/10.3102/00028312025001001

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage Publications, Inc..

Tam, A. C. F. (2015). The role of a professional learning community in teacher change: A perspective from beliefs and practices. *Teachers and Teaching: Theory and Practice,21*(1), 22-43. http://dx.doi.org/10.1080/13540602.2014.928122

Tannehill, D., & MacPhail, A. (2014). What Examining Teaching Metaphors Tells Us about Pre-Service Teachers' Developing Beliefs about Teaching and Learning. *Physical Education and Sport Pedagogy*, 19(2), 149-163.

Teng, L. S. (2016). Changes in teachers' beliefs after a professional development project for teaching writing: two Chinese cases. *Journal of Education for Teaching, 42*(1), 106-109. http://dx.doi.org/10.1080/02607476.2015.1135228

Theriot, S., & Tice, K. C. (2009). Teachers' knowledge development and change: Untangling beliefs and practices. *Literacy Research and Instruction, 48*, 65-75. http://dx.doi.org/10.1080/19388070802226287

Thomas, G. P., & McRobbie, C. J. (2002). Collaborating to enhance student reasoning: Frances' account of her reflections while teaching chemical equilibrium. *International Journal of Science Education, 24*(4), 405-423. http://dx.doi.org/10.1080/09500690110074035

Torner, G., Rolska, K., Rosken, B., & Sriraman, B. (2010). Understanding a teacher's actions in the classroom by applying Schoenfeld's theory teaching-in-context: Reflecting on goals and beliefs. *Theories of Mathematics Education*, 401-420. http://dx.doi.org/10.1007/978-3-642-00742-2_38

Turner, J. C., Warzon, K. B., Christensen, A. (2011). Motivating mathematics learning:

Changes in teachers' practices and beliefs during a nine-month collaboration. *American Educational Research Journal, 48*(3), 718-762. http://dx.doi.org/10.3102/0002831210385103

Vaino, K. (2009). Identifying chemistry teachers' beliefs. *Science Education International, 20*(1/2), 32-43.

Vaino, K., Holbrook, J., & Rannikmae, M. (2013). A case study examining change in teacher beliefs through collaborative action research. *Science Education Centre, 35*(1), 1-30. http://dx.doi.org/10.1080/09500693.2012.736034

Wallace, C. S., & Priestley, M. (2011). Teacher beliefs and mediation of curriculum innovation in Scotland: A socio-cultural perspective on professional development and change. *Journal of Curriculum Studies, 43*(3), 357-381. http://dx.doi.org/10.1080/00220272.2011.563447

Wang, L., & Du, X. (2016). Chinese language teachers' beliefs about their roles in Danish contexts. *System, 61*, 1-11.

Wheatley, K. F. (2002). The potential benefits of teacher efficacy doubts for educational reform. *Teaching and Teacher Education, 18*, 5-22. http://dx.doi.org/10.1016/S0742-051X(01)00047-6

Wolf, S. A., & Gearhart, M. (1997). New writing assessments: The challenge of changing teachers' beliefs about students as writers. *Theory Into Practice, 36*(4), 220-230. http://dx.doi.org/10.1080/00405849709543772

Wood, T., Cobb, P., & Yackel, E. (1991) Change in teaching mathematics: A case

study. *American Educational Research Journal, 28*(3), 587-616. http://dx.doi.org/10.3102/00028312028003587

Yerrick, R., Parke, H., & Nugent, J. (1997). Struggling to promote deeply rooted change: The "Filtering Effect" of teachers' beliefs on understanding transformational views of teaching science. *Science Education*, 81, 137-159. http://dx.doi.org/10.1002/(SICI)1098-237X(199704)81:2%3C137::AID-SCE2%3E3.0.CO;2-G

Yin, R. K. (2014). Case study research: Design and methods. Thousand Oaks, CA: Sage Publications, Inc.

Zhang, F., & Liu, Y. (2014). A study of secondary school English teachers' beliefs in the context of curriculum reform in China. *Language Teaching Research*, 18(2), 187-204.

APPENDIX A

INTERVIEW PROTOCOL

No	Interview Question	Purpose	Research Question (RQ)
GT	Tell me about a professional development experience you really enjoyed. What was it about and why did you enjoy it?	To set the stage for the remainder of the interview.	
1	What thoughts or emotions arose as you heard the administration announce their intention of implementing PLCs.	To determine if the participant initially implicated him/herself at the onset of the reform message.	RQ 1: Using the CAMCC as an initial framework, which behaviors and thought processes characterize teachers within different pathways to belief change?
2	What was your response to these emotions?	To explore further the participant's thought process when deciding if he/she initially implicated himself/herself at the onset of the reform message.	RQ 1: Using the CAMCC as an initial framework, which behaviors and thought processes characterize teachers within different pathways to belief change?
3	How did you react to professional development for PLCs?	To explore the participant's motivation and processing of their own efficacy beliefs in relation to the reform message.	RQ 1: Using the CAMCC as an initial framework, which behaviors and thought processes characterize teachers within different pathways to belief change?
4	What is your overall appraisal of your ability to engage and learning in PLCs?	To understand the participant's perception of the resources available (or not available) to him/her during the reform.	RQ 2: Which campus contextual factors do teachers within each pathway of belief change regard as pertinent to the implementation of

			professional learning communities?
5	What are factors that contributed to your success or failure in engaging and learning in PLCs?	To understand the factors that existed during the reform and how they impacted the level of success of the reform.	RQ 2: Which campus contextual factors do teachers within each pathway of belief change regard as pertinent to the implementation of professional learning communities?
6	What were the most important factors that helped you take ownership of PLCs?	To identify which factors teachers perceived as influencing their belief change toward the reform.	RQ 2: Which campus contextual factors do teachers within each pathway of belief change regard as pertinent to the implementation of professional learning communities?
7	Present metaphor #1: "My response to professional development is…" Can you explain your metaphor?	To explore the participant teachers' actions toward reform movements and their general beliefs about reform.	RQ 1: Using the CAMCC as an initial framework, which behaviors and thought processes characterize teachers within different pathways to belief change?
8	Present metaphor #2: "The campus's approach to professional development is…" Can you explain your metaphor?	To identify campus factors that arise during reform.	RQ 2: Which campus contextual factors do teachers within each pathway of belief change regard as pertinent to the implementation of professional learning communities?

APPENDIX B

THEMES AND SUBSUMING CATEGORIES

Table 4

Theme 1 and Subsuming Categories

Theme 1: Administrative decisions and operations open the door to opportunities for teachers to process beliefs.	
Essence	Rule
The Perceptions of Forced Change	Teachers react differently to the directions administrators use to force change.
Effects of Support on Campus Climate	Support from administration and colleagues during challenges can have a positive impact or lack thereof can create disgruntled employees.
Organizational Structure	Administration provides an organizational structure within which to work in the PLCs.
Scheduling Enables Action	Purposeful scheduling enables teachers to engage in necessary behaviors.
Gradual Release of Responsibility	Administration released control of the PLCs to teachers.
Excitement Leads to Belief Processing	Leader excitement initially engages staff in actions aligned to the new belief message and processing of the new belief.
Administration Willing to Listen and Act	The administration seeks out, considers, and utilizes input from teachers.

Table 5

Theme 2 and Subsuming Categories

Theme 2: The qualities of multi-level relationships influences individual mental engagement and participation in events pertaining to the campus reform.	
Essence	Rule
The Necessity of a Degree of Commonality	The teacher goals within a PLC must have a degree of commonality so teachers can mutually contribute to each person's professional goals.
Better Together	Teachers consider one another as professional resources when in collaborative settings.
Incongruous Values	Frustration builds when actions from the majority are consistently incongruous with individual values. Conversely, shared values create a connection between an individual and the group.
Reducing Variability of Practices	Active sharing and listening based on results reduces variability in knowledge and practice within a team.
The Great Unifier	Active listening and sharing of practices based on results creates a team orientation.
Relationships Lead to Learning	Collaboration founded on professional relationships leads to learning.

Table 6

Theme 3 and Subsuming Categories

Theme 3: Teachers expect an effective and efficient use of time and resources.	
Essence	Rule
Relevant Tasks	Teachers want to spend their time on relevant tasks.
Constraints of Time	Losing time frustrates teachers when it takes away from other tasks.
Resources as an Enabler	Resources enable teachers and students to engage in learning activities to be successful.

Table 7

Theme 4 and Subsuming Categories

Theme 4: Results that impact student achievement become a stimulus for the processing of new beliefs.	
Essence	Rule
Results as a Disruptor	Results help teachers see the importance of an educational practice.
Kids as a Litmus Test	What is best for kids becomes the litmus for decision making.
Data based Decision Making	Data becomes the basis by which decisions are made for students.