Expert Teachers Practices to Aide in Student Achievement

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Expert Teachers Practices to Aide in Student Achievement

A Dissertation by

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Irvine, California

School of Education

Submitted in partial fulfillment of the requirements for the degree of

Doctor in Organizational Leadership

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ABSTRACT
Expert Teachers Practices to Aide in Student Achievement
by JT Cameron

Purpose: The purpose of this phenomenological study was to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ Professional Learning Communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in mathematics at the end of their term regardless of where the student began.

Methodology: The researcher identified comprehensive public high schools within the state of California. Of this target population, purposeful sampling was applied to identify participants that were rich with information and that met specific criteria and 12 high school expert mathematics teachers were identified. The researcher collected and coded data from in depth interviews; interview protocol directly correlated with the research questions of this study. A variety of related artifacts were additionally gathered and analyzed for the generated codes to triangulate the interview data.

Findings: Examination of qualitative data from the 12 comprehensive high school mathematics teachers were organized by research sub questions, identifying the impact of the five variable recognized in the study: (a) school culture, (b) classroom culture, (c) intervention, (d) differentiation, and (e) first best instruction has on student learning and teaching practices.

Conclusions: The study supported the conclusions that school culture is a major factor in a school's ability to have an impact on teaching practices and student learning. Furthermore, the findings from this study lead to the conclusion that classroom culture or
the role of the teacher in the classroom is paramount to the ability of students accessing the curriculum. Additionally, the findings from this study lead to the conclusion that having planned and structured intervention embedded into the regular school day is vital for student success. Finally, the findings from this study lead to the conclusion that teachers must be trained in methods that are effective in intervention and can be differentiated from the original lesson

**Recommendations:** Six areas of further research were recommended to increase the body of literature related to these variables.
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CHAPTER 1: INTRODUCTION

How do we make lasting cultural change in our staff so that student learning is the focus of all the decisions we make and actions we take? Public schools are expected to ensure that all students will learn and do so at high levels (R. DuFour, DuFour, Eaker, & Karhanek, 2004). There are three fundamental questions for schools developing professional learning communities (PLC): (a) What do we want each student to learn? (Barth, 1991); (b) How will we know when they learn it?; and (c) How will we respond when they don’t? (R. DuFour et al., 2004). The most tangible and unanswered questions are: (a) What does it look like?; (b) What tools do we use?; and (c) How can we be most effective? (R. DuFour, 2004a). R. DuFour (2004b) states that intervention has shown through compelling evidence, that schools can be transformed when every child has the opportunity to use time within the school day with support to get what they need academically (Buffum, Mattos, & Weber, 2011). However, what we find in many cases is that schools fall short of the proper tools to intervene with all students, especially those students at the greatest risk (Buffum et al., 2011). The focus of this research is to study organizations and their structure of schools effectively using PLCs, and how they build the relationships of teachers and students that shape their intervention practices.

The Issue

The issue to be addressed is: How can teachers use the proper methods to intervene most effectively with individual students, and how does the collaborative group’s best share their information about what works. Teachers can use collaboration for many aspects like planning and sharing assessment data. To truly begin to change a schools culture, collaborative teams must use effectively the processes of re-teaching,
reassessing, and mastery grading, or also known as standards based grading (Butler & Schnellert, 2012). When collaborative teams experience transformational change in their mindset, it changes their thinking to where student learning outcomes take priority over grades and covering content. A changed mindset teacher should be able to make the statement that, “I know that my students have learned what I taught because they have demonstrated the knowledge in my assessments.”

The relationship between the teacher and student in the process is also a key factor. A teacher who is most concerned with the students learning and is focused on what intervention practices will be most effective, will build trust with the student, and the student will be open to the intervention. The students want to know that you care, before they will care what you know.

**What Conditions Must Exist for Change**

Teachers must be at a school that uses collaborative teams, and has time set aside for those teams to work together. The team should meet on a regular basis and share similar content and students (M. Fullan & DuFour, 2013). Resources need to exist that allow these teams to determine the essential learnings of the content so that lessons and formative assessments can be designed. To effectively intervene, the school needs to create time within the school day, open to all students where teachers can use the data from the formative assessment to reteach and reassess (Stiggins & DuFour, 2009).

**Background**

Schools are looking to use PLCs to improve their school and to put the focus on student learning. The three fundamental questions for schools developing PLCs: (a) What do we want each student to learn? (Barth, 1991); (b) How will we know when they
learn it?; and (c) How will we respond when they don’t? These three questions help schools organize themselves, and agree upon the essential elements of the curriculum. They differentiate instruction for all students to be able to learn, regardless of their program, and decide how the school will intervene when the student does not learn the content the first time (R. DuFour et al., 2004). It is in the gap between the first best instruction and the intervention that research attempts to fill. The tools: (a) common formative assessments (CFAs), (b) the school structure (time built in for response to intervention, [RTI]), and (c) the methods of intervening, are the elements that schools struggle with (Buffum et al., 2011). When effective schools identify the students who need intervention, and target them with re-teaching and reassessment, they achieve academic success (Butler & Schnellert, 2012).

**Characteristics of Schools**

Schools must begin the work and lay the foundation to transform the mindset of the school culture and vision of student learning. They will need to invest money and resources in the appropriate training, and put time and physical mechanisms into place to begin a process of true intervention, where student outcomes are tied to content mastery. Teachers will collaborate, check data, and use it to make a difference in the first their best instruction and intervention (Stiggins & DuFour, 2009). The overwhelming majority of teachers know that there is a way forward that will increase their effectiveness, and make a real impact in learning outcomes, effective PLC is that way (Buffum et al., 2011).

Schools will have to begin to define what will constitute mastery when they grade. This starts by identifying the most important content that all students, regardless of program, must know (R. DuFour, 2004b). Once collaborative teams determine and
define the essential learnings, they now need to determine what mastery of that content will look like. There will also need to be a variety of assessments used; authentic assessments like projects and portfolios, formative assessments so teachers can adjust instruction if they did not get it, and reassessment. Most importantly collaborative teams must decide by what measure they agree upon when mastery has been reached.

Instructional leaders need to work to capture the hearts and minds of those teachers who are most willing to jump into the deep end of the change pool. They need to inspire teachers to begin becoming risk takers, and take a leadership role in their collaborative groups (M. Fullan & DuFour, 2013). The shift away from what teachers have done for years, and take risks in learning how to read unique data, and collaborate in instruction and intervention is a big shift in cultural mindset, for some they are willing, for others they will need evidence to be convinced (M. Fullan & DuFour, 2013).

**Relationships**

Working in the gap between first best instruction and intervention is where the teacher student relationship is most critical. Many times a teacher will point out that they covered it, or they taught it. But the focus needs to be on student learning outcomes, teachers need to believe that if it has not been learned, it has not been taught (A. Muhammad, 2009). The mindset and culture of teachers will need to change from grades, points, and homework completion, to *how will I know when the students have truly learned what I am teaching?* (R. DuFour & Fullan, 2013). Teachers will be willing to do whatever it takes to do what is best for students. Prioritizing the student learning outcomes over the traditional measurements of success.
Experts agree that teacher collaboration, referred to by many as professional learning communities, is an effective way to raise the learning standards and expectations of students (R. DuFour et al., 2004; R. DuFour & Mattos, 2013; M. Fullan & DuFour, 2013; A. Muhammad, 2009). The idea for teacher collaboration in schools and the use of the term PLC began in the 1990s. Several authors and presenters began to introduce the topic and concept; Shirley Hord (1997) issued a paper as a transformational method to improve schools and student learning. One of the seminal practical works being published a year later in 1998 was Richard DuFour and Robert E. Eaker’s book *Professional Learning Communities at Work*. R. DuFour and Eaker state in the book:

> If schools are to be significantly more effective, they must break from the industrial model upon which they were created and embrace a new model that enables them to function as learning organizations. We prefer characterizing learning organizations as ‘professional learning communities’ for several vital reasons. While the term ‘organization’ suggests a partnership enhanced by efficiency, expediency, and mutual interests, ‘community’ places greater emphasis on relationships, shared ideals, and a strong culture—all factors that are critical to school improvement. The challenge for educators is to create a community of commitment—a professional learning community. [...] It sounds simple enough, but as the old adage warns, ‘the devil is in the details.’ Educators willing to embrace the concept of the school as a professional learning community will be given ambiguous, oftentimes conflicting advice on how they should proceed. (pp. 15-16)
Although tremendous amount of studies have been conducted, there is still a gap that persist. That along with the collaboration, teachers also must infuse an emotional intelligence into the process to make a connection to the student so that the connection will foster engagement and make the intervention most effective (R. DuFour & Eaker, 1998). We must examine our thinking into what must be examined, do I need to rethink what I believe about this child? The answer may be yes, and I must change my mindset so that I can best intervene on the child’s behalf (A. Muhammed, 2015). Teachers must step beyond just the process and take “collective responsibility for student learning” (M. Fullan & DuFour, 2013, p. 67).

There are many well respected researchers, and practitioners in the research and implementation of PLCs. Schools and teachers have a wide range of books, conferences, and videos at their disposal to help gain knowledge. How to structure the day, run a meeting, write and use formative assessments, are a part of the topics well covered by many authors.

**Statement of the Research Problem**

The focus of this research is to study organizations and the structure of schools effectively using PLCs, and how they build the relationships of teachers and students that shape their intervention practices. Measuring the extent of collaboration planning and student teacher relationship on the positive effects for student learning and how that practice can be quantified and replicated. It will seek to fill the gap by examining what the most effective tools and structures have been to bring about transformational change.

To help fill the gap in the knowledge of what school systems and educators must do, they must first ensure we are asking the right questions (Buffum et al., 2011) such as:
“Are the right school structures and commitments from the staff?” (R. DuFour & Mattos, 2013); (b) “What is the purpose?; and (c) “What is needed to be taught to prepare students to be successful adults” (Buffum et al., 2011). Providing schools and educators a guide to effective school structures and tools to answer these questions will help foster transformational change. What professional development will motivate teachers to develop deep connections to students that will enhance teaching and intervention to be most effective? R. DuFour, DuFour, Eaker and Karhanek (2004) emphasize the importance of the team’s decision making ability and accountability:

The PLC process also promotes shared leadership by empowering teams to make important decisions. Teachers have a voice in determining the content they'll teach, how they'll sequence the content, which instructional strategies they'll use, and how they'll assess student learning. At the same time, principals ask their teams to be accountable for results, and they publicly recognize and celebrate incremental progress. (p. 38)

Schools are looking to use PLCs to put the focus on student learning. Educators can push our RTI to the level where teachers collaborate and focus on the learning for all students. Teachers will share responsibilities as a team where all students are “our kids” and that means we can rely on and use all the talents of our colleagues to intervene for kids. Dr. Anthony Mohammad (2009) asked that if a student did not learn on Friday with you, is it ok for them to learn on Monday, and maybe with someone else? If a school is able to answer “yes” to this question the mindset of the school is different than the typical high school. Most schools and teachers have not challenged the traditional assumptions, and most teachers learned their grading practices from their mentor teacher
that oversaw their student teaching, so they have never asked themselves *what are the purpose of my grades?* R. DuFour and Mattos (2013) believe that grades should reflect the student learning.

**Purpose Statement**

The purpose of this phenomenological study was to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction culture to make every student in their classroom successful in mathematics.

**Research Question**

This study was guided by the following central research question: *How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction culture to make every student in their classroom successful in mathematics.*

**Research Sub Questions**

The following research sub questions were developed to help answer the central research question:

1. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic
intervention identify and describe the activities they use with respect to school culture to make every student in their classroom successful in mathematics.

2. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to classroom culture to make every student in their classroom successful in mathematics.

3. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to interventions to make every student in their classroom more successful in mathematics.

4. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to differentiated instruction to make every student in their classroom more successful in mathematics.

5. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to first best instruction to make every student in their classroom more successful in mathematics.
Significance

The last 20 years has brought local and national initiatives such as No Child Left Behind (NCLB) and Race to the Top, which have put pressure on school districts to improve academic performance (Harlacher, Potter, & Weber, 2016). Education is looking for the best ways to improve student learning and there have been many studies conducted where experts have shared their ideas and theories on how to make the improvements. Many have focused successfully on changing how teachers see their role in improving student learning; the PLC movement is one of those. Along with PLCs, is questioning what teachers should do when they discover students are not learning; this has become the RTI movement (Harlacher et al., 2016; Samuels, 2011).

Translating those movements into practice for everyday teachers in real-world classrooms is the toughest part and the area that has had the least attention. Huat See Beng (2016) stated in the article Teachers’ Use of Research Evidence in Practice: A Pilot Study of Feedback to Enhance Learning that there has been a limited number of studies that come with the practical guide and application methods as to how to implement them into real world classrooms. This phenomenon has led to a great wealth of information on the benefits of the PLC and RTI practices but a lack of concrete professional development of the actual skills required. Skills that develop positive classroom culture, tools for structured intervention, and how to develop first best instruction. “Educators implementing RTI may not have all the skills needed to guide a conversation that examines the effectiveness of core instruction” (Jacobs, Gregory, Hoppery, & Yendel-Hoppey, 2009, p. 41).
Teachers who are asked to collaborate in PLC groups, and participate in an RTI model require specific thinking and understanding. There is an important link between the PLC and RTI initiatives, and their first best instruction. In a typical model for the tiers of intervention Harlacher, Potter, and Weber (2016) states that to implement RTI effectively, school teams should regularly examine the effectiveness of their core instruction to determine if at least 80% of students meet the proficiency standard with core support alone. If that school team discovers that less than 80% of the students were able to demonstrate mastery, it does not mean that the teacher is ineffective, or even that the instruction was bad, rather it means that the core instruction (first best instruction) did not meet the needs of those students (Harlacher et al., 2016). Teachers will need to adjust their instruction during the intervention to be more effective for those students (Buffum et al., 2011). It will also mean that student needs will be different for every new unit of instruction (Harlacher et al., 2016). This ability to create first best instruction, assess for mastery, plan and implement the intervention, then re-assess are steps that are important to student learning. The skills required to plan, collaborate, read data, and intervene are essential for teachers to be effective in the process (Buffum et al., 2011).

There is limited research that focuses on what teaching practices have been and are being successfully implemented in real-world classrooms. Most of the studies that focused on student learning were small case studies with perhaps one or two schools, “while very few were large-scale or well-designed evaluations” (Datnow & Hubbard, 2015, pp. 11-12). This study will add to the literature by disseminating to teachers the expert teachers knowledge and skill to implement all phases of the learning cycle so that one phase does not suffer in the process. While some schools and districts seem to have
effectively used the PLC and RTI tools, many other school districts are not experiencing the change and growth for student learning they had expected (O'Connor & Freeman, 2012).

This study will also identify for schools and educators the practices, activities, and insights gathered from successful expert teachers in real life classrooms. The study will help fill the gap in the knowledge base regarding practical application in the classroom. Teachers will know what the activities and practices expert teachers use for collaboration and intervention. It will also answer how teachers in school groups develop common formative assessments, and how expert teachers read the data to know with whom and how to intervene.

This study may also provide information administrators can use to design professional developments that will inform teachers and develop the skills needed that will enhance classroom culture, intervention, first best instruction, and ultimately increase student learning. Schools and districts use RTI to help identify and target instruction for students who need it the most (Samuels, 2011). The information gathered in this study will inform professional development design as to what are the most effective practices for collaboration, assessment, and intervention. This information is valuable and necessary for practitioners who want to improve student learning.

**Definition of Terms**

The following terms are used throughout the study:

*21st-century skills.* Essential skills students need to be productive and competitive citizens in a global society. For the purpose of this study, these skills are critical
thinking, creativity, communicating effectively, and working collaboratively and often referred as the 4Cs (Couros, 2015).

*Classroom culture.* The peer influences, the amount of disruptive influences within the class, how receptive is the classroom for student’s to make errors and develop as learners (J. Hattie, 2010).

*Collaborative teams.* Teams whose members work interdependently to achieve common goals (R. DuFour, 2004a).

*Differentiated instruction.* The attempt to adapt the core instructional program to meet the varying demands of individual student needs (Gregory, Kaufeldt, & Mattos, 2016).

*Enrichment.* Activities meant to broaden the educational lives of some group of students (J. Hattie, 2010).

*Essential learnings.* The selected targeted content by the teachers in the PLC groups (Many, Maffoni, Sparks, & Thomas, 2018).

*First Best Instruction.* The researched based delivery of curriculum and content (Gregory, 2016).

*Instructional strategies.* All approaches that a teacher may take to engage students in the learning process actively (R. DuFour, 2015).

*Intervention.* The action taken by the educator to respond to students who need help understanding and mastering the target learning (Gregory, 2016).

*Pedagogical knowledge (PK).* A teacher’s deep understanding of the theories, processes, and/or practices of teaching and learning (Howell, 2012; Koehler & Mishra, 2009).
*Professional Learning Community (PLC).* These are collaborative teams focused on student learning with shared mission, vision, values, and goals (R. DuFour, 2015).

*Response to Intervention (RTI).* The structured process of intervention when teachers discover what students did not learn.

*School culture.* How the school supports the classroom, and how it invites to become a part of the learning process (J. Hattie, 2010).

*STEAM.* Science, Technology, Engineering, Arts, and Mathematics

*Teacher strategies.* The method by which content and curriculum is delivered. Examples include: Reciprocal teaching, direct instruction, inquiry based teaching, etc. (J. Hattie, 2010).

**Delimitations**

This study was delimited to expert secondary mathematics teachers in comprehensive high schools that employ PLCs and structured academic intervention use with respect to classroom culture, interventions, and first best instruction to increase achievement in mathematics and were employed at a public high school in Riverside County, California.

**Organization of the Study**

The remainder of this study is organized into four additional chapters, the list of references, and the appendices. Chapter II provides a review of the literature regarding the change drivers affecting K-12 education in the 21st century, the 21st century skills framework, the history of technology in education, and the role of the teacher. Chapter III describes the methodology of the study, including the research design, sample, data collection protocols, data analysis procedures, and limitations of the study. Chapter IV
presents the findings of the study in a report of collected data and the results of data analysis. Chapter V presents a summary of the study and provides major findings and conclusions, implications for actions, and recommendations for future research.
CHAPTER II: REVIEW OF THE LITERATURE

Introduction

Improving student learning for all students is the focus of many schools across the nation. Many districts have employed PLCs, evidenced-based practices, and RTI (Mundschenk & Fuchs, 2016). The element this paper will focus on is the PLC and RTI relationship. This literature review will focus on how do expert mathematics teachers in comprehensive high schools that employ PLCs and structured academic intervention identify and describe the activities they use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in mathematics at the end of their term regardless of where the student began.

Schools have incorporated PLC and RTI to meet the expectations of ensuring that all students will learn and do so at high levels (R. DuFour et al., 2004; Mundschenk & Fuchs, 2016). Collaboration and intervention have shown through compelling evidence that schools are transformed when every child has the opportunity to use time within the school day, with support, to get what they need academically (Buffum et al., 2011). RTI systems need a healthy core to build upon; schools must invest time in core instruction and evaluating the effectiveness of that instruction (Harlacher et al., 2016). PLC creates an environment where teachers see themselves as a community of teachers, where “my students” become “our students” (Mundschenk & Fuchs, 2016). Many times, schools implement systems without a proper base in core instruction and find the system falls short. What is found in many cases is schools fall short of the proper tools, and first best instruction to be able to intervene with all kids, especially those kids at the greatest risk.
(Buffum et al., 2011). To make the relationship clear, PLC is how teachers interact, and it defines their working environment, whereas RTI is the systemic plan created in that environment to help facilitate and ensure student learning (Clarke, 2018; Mundschenk & Fuchs, 2016).

**History of Teacher Collaboration and Professional Learning Communities**

The idea of teachers collaborating is not new to the education community, and using the PLC model has been with us for well over a decade. DuFour and Eaker (1998) stated in their book *Professional Communities at Work: Best Practices for Enhancing Student Achievement*, PLC is “an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve” (p. 10). This collaborative process is to be where learning is constant and cyclical while fostering innovation and experimentation.

As noted by M. Fullan (2009) many times is that with the spread of PLCs, the term has traveled faster than the necessary structures and mindset of the concept. As is the case with many popular innovations, people begin to use the vocabulary and some of the methods without having a true understanding of the process. The PLC innovation is a deep thought out process and requires constant, careful, and persistent attention given to it (R. DuFour & Reeves, 2016).

For a school to move successfully to a PLC model, there needs to be more than a structural change. R. DuFour and Fullan (2013) write in their book *Cultures Built to Last: Systemic PLCs at Work TM*, “that structural change deals with policies, programs, rules, and procedures” (p. 2). These changes can be implemented easily and can be top-down, but the authors go on to state that “cultural change requires altering long-held
assumptions, beliefs, expectations, and habits that represent the norm for people within
the organization” (p. 2). The authors continue to state that cultural change is doable and
at the same time, extremely difficult (R. DuFour & Fullan, 2013). School culture affects
student learning and performance; schools with cultures rooted in high expectations will
spend time reinforcing and cultivating those expectations (A. Muhammad & Hollie,
2012).

School culture is more important to the success of student achievement than any
of the imposed structural initiatives that a school site may implement. A school’s culture
is more than how people feel about the school or the school’s morale; it runs deeper than
that (A. Muhammad & Hollie, 2012). A. Muhammad and Hollie (2012) writes in their
book, The Will to Lead, The Skill to Teach: Transforming Schools at Every Level, that “it
is the deep patterns of values, beliefs, practices, and traditions that have been compiled
and normalized throughout the school's history” (p. 21). A school’s culture creates the
way a school sees itself when setting goals for outcomes, and in how it compares itself to
others in the expected standards of a district, county, or state. Researchers have
examined the effects of school culture on student achievement, especially when
comparing one school to another in standardized testing. The way a school perceived the
testing through the lens of their culture did have a self-fulfilling effect on the outcomes of
the testing (A. Muhammad & Hollie, 2012).

Knowing that the culture of a school has a direct effect on the achievement of the
students in the school. Muhammed and Hollie (2012) continue by writing, “Therefore,
the development of a healthy culture cannot be left to chance” (p. 21). If a school’s
culture is not open to change, or even resistant to it, it will be very difficult to implement
change, even for improvement. Some experts contend that in a toxic ingrained culture, it
could take anywhere from three to seven years to bring about substantive change
(Whitaker, 2012).

**Restructuring Schools – Organizational Development**

The cultural change requires the leaders of the change to recognize that a “whole-
system” overhaul and restructuring must occur. A new culture will need an environment
to grow in that is supportive and positive to the process (M. Fullan & DuFour, 2013).
The other aspect of this change is that it is not about the program that a school
implements; it is always about the people (Whitaker, 2012).

The cultural change is a change in people’s mindset; the educator must change the
way they view the student in their environment. One old from of reference is that
students were like the soil, and knowledge was the seed. The teacher would need to plant
the knowledge and water it and expose it to sunlight. Some soil was more fertile than
others, so the amount of cultivation and fertilization to allow the seeds to grow could vary
from soil to soil, or rather student to student (Scott & Marzano, 2014). Scott and
Marzano (2014), in their book *Awaken the Learner: Finding the Source of Effective
Education*, see the relationship of the students and knowledge differently than this
example. The seed represents the student, and different individuals will grow from
different seeds. Some seeds have tougher outer shells, some require more water or
sunlight, but they all have within them what it takes to be a fully realized something once
they blossom. The soil, on the other hand, is the culture (the environment) and the
fertility, the water, and sunlight, as well as the safety to allow the seed to grow depends
on the soil, its care, and sometimes its location. As educators we are not planting seeds
of knowledge into the soil and hoping what we do will make the seed grow. The authors contend that we have the responsibility to take seeds that all have the potential to grow and create the soil or the environment that fosters growth. This change in mindset puts the responsibility onto the educator to engage, inspire, and intervene with students, and to help ensure they become what it is, and who it is they are meant to be (Scott & Marzano, 2014).

When the mindset believes that it is the environment or school culture that will create the fertile ground for students to grow, we must lean on each other and collaborate to create the wholistic environment needed for growth. After the schools' collective mindset has changed; the next step is to change the structural elements that reflect the changing culture. To grow the process at a site, PLC groups will need to work and change the structural and cultural issues that arise. M. Fullan (2009) also noted that transforming a school's culture and the systems they operate within is the main point. It is not an innovation or a program to be implemented, but rather a new culture to be developed (M. Fullan, 2009). When mindsets and culture are in alignment with goals and organizations effectively use PLCs, they can build the relationships between teachers and students that will shape their intervention practices, and ultimately improve student-learning outcomes. (R. DuFour & Eaker, 1998)

Having highly collaborative teams are the foundation that drives the PLC model; schools and the entire district have helped create time within the school day to allow teachers to collaborate. But it takes more than just the structural change that puts teachers together. The other aspect that helps foster PLCs and the improved cultural mindset is that educational leaders must also employ effective coaching models to help
foster the collaboration. The PLC model, as described by R. DuFour and Reeves (2016), is not a destination but rather a continuous journey where learning and discovery apart of the process. The process of collaborating must be taught; many of our professionals do not know how to collaborate and share more than just a best practice. Teachers within the PLC need to take as a group, responsibility for the learning of all students (R. DuFour & Reeve, 2016). The old model for meetings was for teachers to come together for management and large scale professional development; in schools with smaller learning communities, there is a continuous cycle of learning with frequent and regular times set aside for collaboration (S. M. Hord, 2007).

The implementation model for PLCs consists of a framework built on the three pillars of clarity, feedback, and support. Clarity is the cornerstone of implementing an effective PLC. “Clarity proceeds competence” (Many et al., 2018, p. 2). When the teachers have clarity or a true understanding of the PLC process, they can interact most effectively within it. One way to create this structure is to have the teachers create the norms or guidelines they will operate with for their collaborations. Norms are the agreed upon guidelines or rules the group will hold each other to as the work together. Clarity is achieved when the teacher understands what is expected from them, how they are to function together, and their agreement to the process (Many et al., 2018).

As groups work together, learning occurs. The most effective method for learning is to get real-time, clear feedback. Feedback allows someone to make adjustments to the work they are producing and make improvements. This feedback can come from multiple areas, one area can be from the administrator or the leader, but this needs to happen within the proper framework of the norms (Many et al., 2018). The norms help
set up the “how” feedback will be given, and hopefully create a safe place for it. The second feedback and an effective tool should be from the peers in the group. The group norms should also allow for critical and constructive discussion and feedback. The third and most important feedback comes from the data that is produced by the student. The student work, assessments, writing, etc. should be reflective of the outcomes predicted. If the outcomes fall short, the teacher can make adjustments to the instruction and tools (Many et al., 2018).

The final pillar is the element of support. The leaders at the school must be “all in” on the implementation of PLCs so that the proper supports will be in place. Supports come in a wide range of tangible and intangible items and actions. Leaders providing the tools and the time, along with proper training, is essential in the growth of the PLC (Many et al., 2018). The leaders also need to be prepared to do the coaching for new members and to keep even veteran teams focused on new collaborative practices. Most importantly, the greatest support will come from an environment where the people are committed to PLCs and feel safe to employ the changes needed to be a successful team (Many et al., 2018). Teachers, to be successful working within collaborative teams, need to receive proper direction and given the time needed to develop the skills and competencies to work within collaborative teams (R. DuFour & Reeves, 2016).

In the book, *Amplify Your Impact: Coaching Collaborative Teams in PLC’s at Work*, the authors state, “We argue that improved PLC practices require clarity around expectations, differentiated feedback anchored in an agreed-on standard of best practice, and specific strategies that support collaborative teams” (Many et al., p. 3). The instructional leader must be prepared to encourage, direct, and praise the PLC teams.
effectively to move teachers to become a team that is achieving the purpose of their collaboration. A coach may also have to fill the role of helping teams move past conflicts. Even in teams with established norms, a conflict over ideas, methods, and next steps may occur. A coaching model requires a leader to be trained to help the team move past the differences through cognitive coaching models and employing interpersonal conflict skills for mediation (Many et al., 2018).

**Shirley Hord: Transformational Method for Improving Schools**

The idea for teacher collaboration in schools and the use of the term PLC began in the 1990s. Several authors and presenters began to introduce the topic and concept; S. M. Hord (1997) issued a paper as a transformational method to improve schools and student learning. S. M. Hord (2007) writes in a later article, *Learn in Community with Others*, that many professions such as medicine and law the members study, peer review, read articles, all about observing each other’s feedback and learning from each other. S. M. Hord also states that “educators typically have been physically isolated from each other because of the structures of school facilities and schedules that dominate the school day” (p. 39). S. M. Hord sees this as a lost opportunity for teachers to grow and become more proficient in their profession. S. M. Hord further states, “Studying one's profession, especially when in community with others, where the learning is richer and deeper, that has not been the norm in the education community” (p. 39). S. M. Hord continues in her writing stating, “in the future, collective learning will be the hallmark of the school” (p. 39).
Richard DuFour and Robert Eaker: PLC Best Practices

One of the seminal practical works being published a year later in 1998 was Richard DuFour and Robert E. Eaker’s book *Professional Learning Communities at Work: Best Practices for Enhancing Student Achievement*. R. DuFour and Eaker state,

If schools are to be significantly more effective, they must break from the industrial model upon which they were created and embrace a new model that enables them to function as learning organizations. We prefer characterizing learning organizations as professional learning communities. (pp. 15-16)

**Professional Learning Communities Factors**

There are three fundamental questions for schools employing PLCs: (a) What do we want each student to learn? (Barth, 1991); (b) How will we know when they learn it?; and (c) How will we respond when they don’t? (R. DuFour & Eaker, 1998). When students do not learn, a teacher or a school with a structure in place must intervene. Intervention has shown through compelling evidence, that schools can be transformed when every child has the opportunity to use time within the school day with support to get what they need academically (A. Buffum & Mattos, 2011; R. DuFour, 2004a). These three questions are paired with the three big factors or ideas of a PLC: (a) a focus on learning, (b) a collaborative culture, and (c) a results orientation (R. DuFour & Reeves, 2016).

A focus on learning is essentially examining what a student can demonstrate they have learned. Too much time in the past has focused on teaching, methods, and practices. Even the teacher’s evaluations focused on what the teacher did, organized, or presented. But in truth, nothing has been taught if it is not learned. The focus on if the
student has learned directs the teacher to find the proper methods and engagement opportunities to build an environment for learning. Multiple methods may be used; some may be through direct instruction, while others could be through discovery or problem-solving. The teacher who uses various techniques, novelty, choice, and collaborative groups report their effectiveness with the learner's increase. Focusing on the learning allows the teacher to be freed up from a fixed presentation, and allow for adjustment, and flexibility. If the student did not learn it on Monday, we need to teach it differently so they can learn it on Tuesday (A. Muhammad & Hollie, 2012).

Recent research shows that a collaborative culture promotes positive change within the school structure, teacher instruction, and environment for learning. A collaborative culture is where team members work together interdependently for the achievement of common goals, and they hold each other accountable. It is within the collaborative culture where the teacher learns, which is important because as the focus is on student learning, they will need to lean on each other for the varied practices and methods that bring about results, in both first best instruction, and during an intervention (S. M. Hord, 2009).

A results orientation means that a team is always seeking evidence of the results they desire, which is high levels of mastery or student success. The results orientation aligns with the focus on the learning and pushes the team to continuously improve their instruction and guides the process of their intervention (Many et al., 2018). An example may be if one teacher received a very high score on a target skill or learning objective, the other teacher may send their student who did not demonstrate mastery to that teacher for a re-teaching session during the intervention. Another teacher may use the
information to change their technique or methods during the intervention. Teams with a results orientation can assess data without blame and focus on the reason for the results. Data use in these instances is about improving instruction to foster learning (R. DuFour et al., 2004). This element is hard for teams to achieve; many teachers struggle with this level of honest feedback and see the data as an indictment on their teaching. Pairing results orientation with a focus on learning can overcome those feelings because it is about what the students learn, not what the teacher teaches. S. M. Hord (2009) wrote, “Trust is a prime factor in developing positive and productive relationships among staff” (p. 40). S. M. Hord continues by emphasizing that groups earning trust will allow for open dialogue, discussion, and debate to take place within the group in a professional way.

In 2001, R. J. Marzano, Pickering, and Pollock coauthored *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement*. In the book, the authors outlined nine researched-based instructional strategies likely to improve student achievement. The nine researched-based instructional strategies are:

- Identifying similarities and differences.
- Summarizing and note-taking.
- Reinforcing effort and providing recognition.
- Homework and practice.
- Nonlinguistic representations.
- Cooperative learning.
- Setting objectives and providing feedback.
• Generating and testing hypotheses, questions, and cues.

The aim was to help teachers have strategies that improved student engagement and the tools to operate effective classrooms.

S. M. Hord (2009) stated,

Staff members study student needs to make decisions about the adoption of new practices or programs and accept the need for their learning to employ the new knowledge and practices effectively. They plan precisely what they will learn, how they will engage in their learning, and the resources needed. (p. 40)

John Hattie (2015), working from his position of Visible Learning, stated that high-impact leadership in schools is even riskier than transformational leadership because they must declare publically what success means. It also implies that it might take a long time to get to real success and that the impact created by a program will need to be examined, and many times adjusted (Hattie, 2015). Wanting to improve student learning will take school leaders measuring the impact of what they are doing to achieve that goal. Leaders need to focus on learning and the impact of teaching. They need to focus on evaluating the effect of everyone in their school on student learning. Hattie states:

Believe that success and failure in student learning are about what they, as teachers or leaders, did or didn’t do. They see themselves as change agents. See assessment as feedback on their impact. Understand the importance of dialogue and of listening to student and teacher voice. Set challenging targets for themselves and for teachers to maximize student outcomes. Welcome errors,
share what they’ve learned from their errors, and create environments in which teachers and students can learn from errors without losing face. (p. 38)

Looking back at R. J. Marzano et al.’s work (2001), the focus is on the teaching strategies through research, work in the classroom. He refers to the teaching techniques and practices as “High Yield Strategies” and explains how they are developed from the research in the studies conducted by his group. R. J. Marzano et al. further expands his description to the reader by describing how that strategy would look like in the classroom. Table 1, identifies the high yield strategies, alongside the research, and the description of their use in the classroom.

Table 1

*Marzano’s (Nine) High-Yield Instructional Strategies*

<table>
<thead>
<tr>
<th>High Yield Instructional Strategies</th>
<th>What the Research Says</th>
<th>How it Looks in the Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying similarities and differences (Yields a 45 percentile gain)</td>
<td>Students should compare, classify, and create metaphors, analogies, and non-linguistic or graphic representations</td>
<td>A chart is created, images are used, analogies, cause and effect links, computer and contact organizers</td>
</tr>
<tr>
<td>Summarizing and note taking (Yields a 54 percentile gain)</td>
<td>Students should learn to eliminate unnecessary information, understand core information, long-term retention, note-take and analyze information. Students should be encouraged to use core information into their work.</td>
<td>Table with input, output, graphic organizer, different colors, graphic organizers, brainstorming, different colors, graphic organizers, brainstorming, different colors</td>
</tr>
<tr>
<td>Reinforcing effort and providing recognition (Yields a 39 percentile gain)</td>
<td>Students should reward effort on the task of performance, use co-operative recognition other than just tangible rewards.</td>
<td>Hold-back expectations, delayed punished reward, more students receive immediate feedback, individual learning styles, confer integretively with students, authentic portfolios, stress-free environment, high-tech, Spelling Bee, Constitution Day, School newspaper</td>
</tr>
<tr>
<td>Homework and practice (Yields a 28 percentile gain)</td>
<td>Teachers should vary the amount of homework based on student grade level, use at the elementary level, assign at the secondary level, complete for a minimum, peer over, self, or assigned, should be above</td>
<td></td>
</tr>
<tr>
<td>Note-taking strategies (Yields a 17 percentile gain)</td>
<td>Students should note graphic representations, mental images, deepen, develop, organize, and produce a kinesthetic, sound-relate activity in order to maintain knowledge.</td>
<td>Visual aids and manipulatives, problem solving, sequencing, reading, writing, drawing, charts, visuals, tables, graphs, graphic organizer, sketch, reading, writing, drawing, charts, visuals, tables, graphs, graphic organizer, sketch, reading, writing, drawing, charts, visuals, tables, graphs, graphic organizer, sketch</td>
</tr>
<tr>
<td>Cooperative learning (Yields a 25 percentile gain)</td>
<td>Students should use large group size, groups work, apply strategy, recognize, and systematically use for success. Assign roles and responsibilities in groups.</td>
<td>Increased collaboration, social support, group discussions, students evaluate, formative feedback, student feedback, team work, team feedback in groups and explain their answers, etc</td>
</tr>
<tr>
<td>Sorting objective and matching feedback (Yields a 25 percentile gain)</td>
<td>Students should review the rules for flexible work, prioritize main student tasks. Feedback should be concise, timely, and specific to a context.</td>
<td>Articulating and displaying learning goals, KWL, concept maps, etc. Teacher can clarify objectives on the on-launch projector and follow-up on the summary of the objective of the end of the lesson</td>
</tr>
<tr>
<td>Generating and solving key problems (Yields a 23 percentile gain)</td>
<td>Students should practice, generate, anticipate, and define hypotheses, causal both inductive and deductive strategies through problem solving, inquiry development, invention, experimental planning, and decision making.</td>
<td>Setting procedures, constructing performance, plans, thinking, social construction of knowledge, use of inductive and deductive reasoning, assessing the author of books, finding other ways to solve same math problem, etc</td>
</tr>
<tr>
<td>Questioning, cues, and advance organizers (Yields a 22 percentile gain)</td>
<td>Students should not use such questions that focus on what is important rather than essential, test students, and feedback in order to evaluate. Advance organizers should focus on what is important and are more useful with information that is not well organized.</td>
<td>Graphic organizers, provide package questions before each section, highlight key concepts, practice, predicting, drawing conclusions, think chapter to identify key vocabulary, concepts and skills, abbreviate meaning twice</td>
</tr>
</tbody>
</table>

*Note.* Adapted from “Classroom Instruction that Works: Research-based Strategies for Increasing Student Achievement,” by R. Marzano, 2001.
Theoretical Framework - Collaboration and Learning Cycle

When examining the collaboration process through the Learning Cycle, which is the process of a PLC group using to ensure learning, the four essential questions used by the PLC teams constitute each section of the cycle. The major questions of PLC are:

- What do we want students to learn?
- How will we know when they have learned it?
- What do we do when they don’t?
- If they have learned it, how do I extend their learning? (Many et al., 2018).

**Quadrant 1 – What do we Want Students to Learn?**

The first section of the learning cycle concentrates on what we want students to learn. That is the knowledge, skills, and dispositions every student should know as a result of the unit of study, this course, or this grade level so they can be proficient and ready for advancement (R. DuFour & Reeves, 2016). There are clear steps that a PLC group should take during this first phase of the learning cycle. The group should (a) prioritize the standards, (b) identifying targets, (c) determining proficiency, (d) planning units, (e) analyzing strategies, and (f) putting it all together (Many et al., 2018).

Prioritizing the standards is when the group comes to consensus about the priority levels of their list of standards. The priority of the standard should be determined by the PLC through the lenses of the following criteria:

- Provides students with endurance in the subject area over the long run.
- Prepares students for the next grade level.
- Offers students leverage in multiple subject areas.
- Is likely a topic for assessment on standardized tests’.
The group works through the list of standards prioritizing the list with only the ones that reach the level of scrutiny above, and with team consensus, are top priority standards (Many et al., 2018). The team can disagree, which should lead to a good and spirited discussion within the team’s norms. “At some point, only those that reach a consensus (not necessarily a unanimous decision) should be what the team takes collective ownership of” (Many et al., 2018, p. 92). The essential learnings do not constitute everything that a teacher will teach. Multiple skills and standards will remain and should fit within the context of the overarching high priority standards or essential learnings. These are the skills and knowledge that every student, regardless of level, should know from taking this class.

The next step in the cycle of what we want students to know is identifying the targets that are embedded into the high priority standards or essential learnings. The target selection happens when the team begins unpacking the standards to identify the specific learning targets within them (Many et al., 2018). Unpacking will help the teacher make a very large standard accessible by breaking it down into discrete skills that the teacher can focus daily classroom lessons on. Since the essential learning is typically large standards, the process of unpacking the standards into the learning targets, and specifics skills, or knowledge is essential to the mastery of the large standard (Many et al., 2018). Knowing the skills and targets will ultimately guide the team to design the common formative assessments and summative assessments (R. DuFour & Mattos, 2013).

Another step in what we want the student to know is for the team the determine proficiency, that is when is it that a student has shown mastery of proficiency of the
learning target to move forward (Many et al., 2018). If a PLC team does not determine what mastery or proficiency looks like, it will be hard to focus on the design of the lesson or create the proper assessments. Knowing what proficiency will look like will require the team to envision and design the end product that will establish the level of mastery (Many et al., 2018). The design process will also require discussion based on the team's norms to come once again to consensus (several attempts may need to be used to refine and adjust this process).

The PLC team also needs to plan the basis of the units together. Unit planning is different than typical common planning (although it can also include this), as it is not about planning the student activities, or deciding which day a book, novelty, or technology they will use (Many et al., 2018). This planning revolves first around what types of research-based strategies work best in delivering this lesson; it is about common pacing, not a play by play script. It is about determining the common data to be gathered to review and compare, the discussions of the depth of knowledge (DOK) level used, and how to infuse rigor. Although lessons can be written by the team, it is not about creating identical lesson plans; it is about collectively using the best knowledge and experience of the team, so a teacher to use in their creativity to implement, and know that each student taking that class is ensured academic equity and fidelity (S. M. Hord, 2009).

PLC teams also need to use their time when deciding what we want the student to know, analyzing strategies. Once the lessons begin and teaching the students the standard, skills, and targets, the PLC should discuss the strategies used for this process and analyze their effectiveness (R. DuFour, 2004b). Analyzing will require a high level of trust because it will mean honest representation of how students are performing on
CFA’s and other forms of feedback. Through analyzing the effectiveness of the strategies used, the teacher that is not comfortable with their results can look to adjust their strategies through the input of others (M. Fullan & DuFour, 2013). The changes could be for future lessons or re-teaching. The change should not just be through anecdotal information, but also for hard data gathered through student work, and CFA’s (A. Buffum et al., 2012).

Making a change is a large process, and it can consume large amounts of planning but should be rooted in the day to day implementation of the class content. Putting it all together is about documenting the process so that it can be readdressed in future years and during the planning of future standards (Many et al., 2018).

**Quadrant 2 - How will we Know if They Have Learned it?**

The second major question for PLC teams is *How will we know when they (students) have learned it?* The second question is where the second phase of the learning cycle begins and where data will come through a variety of formal and informal assessments. The first phase and the second phase are interdependent because the PLC teams will use the results of the second phase to adjust new planning, which is a function of the first phase (Many et al., 2018). Within the larger learning cycle, which concentrates on the large essential learnings, the second phase will assess in increments of the sub-skills and knowledge requirements to meet the large goals. Small formative assessments will allow adjustments in the planning as the teacher moves forward. The PLC teams know that students will need to be ready to perform on summative assessments; these will be the assessments that go on grade transcripts and standardized tests. However, to best ensure that students perform optimally on the summative
assessments is to create a series of formative assessments, both formal and informal, that allow the teacher to adjust instruction (A. Buffum et al., 2012). Many, Maffoni, Sparks, and Thomas (2018) state, “The best way to measure where students are in their mastery is to utilize regularly scheduled, short cycle, common formative assessments” (p. 98). The use of common formative assessments allows the PLC teams to examine the data and analyze where the students are not “getting it” that may adjust the instruction. The other and most important aspect of reading the data and analyzing the student's needs is to target the areas where the student failed to show mastery with intervention. The only reason formative assessment is considered formative is so the teacher can use intervention, re-teach, target, and eventually reassess the student to gain mastery. In a short cycle of learning, this process would need to be repeated until mastery is reached (Many et al., 2018).

The ability of the PLC team to accurately answer the second question of - how will we know if they learned it? – will be determined by the level of knowledge the team has in analyzing data, and the ability of the team to infuse the proper level of depth of knowledge to bring about mastery and proficiency (Many et al., 2018). But before the analyzing of assessments can occur, the PLC team needs to develop the assessment that will target the knowledge and skills required in a way that they can determine the pinpoint deficiency. The level of training and supports the leadership will need to provide to the PLC teams. In a school community where the has been a mindset change, and the culture is ready for PLC, these pieces of training need to be a part of the natural professional development offered to the staff (R. DuFour & Mattos, 2013). The ability to design and analyze the assessments will help develop the skills of the teams and the
Knowing the DOK needed for demonstrating mastery is also a necessary skill that will need to be initiated in the first phase of the learning cycle but is not fully determined until the PLC analyzes the effectiveness of planning through the assessments (R. J. Marzano, Simms, & Warrick, 2018). The analyzing of the assessment data and student work will expose some of the gaps in knowledge and misconceptions and make plans for the next instructional steps. Teachers within PLC teams that function at a high level in a good environment are encouraged to use analysis to reflect on their instructional practices (R. J. Marzano et al., 2018).

**Creating common formative assessments.** M. Fullan and DuFour (2013) states that formative assessment is one of the most powerful strategies a teacher can use if they act on the data they receive from the assessments. Feedback given to students in a relevant and timely manner will allow for corrections to be made in the gaps in knowledge. The important aspect of gathering this specific information for feedback is to have short term learning cycles that target the specific knowledge and skills required for the overall mastery of the high yield goals or essential learnings (M. Fullan & DuFour, 2013). Most of the work in determining what skill and which knowledge needs to be assessed comes in the priority stage of the planning during the first phase of the large learning cycle. The daily lesson design and the formative assessments should and must align to the overarching high yield standard or essential learning (Many et al., 2018).

Teams will be about to determine the mastery when the assessment results match the expected learning determination from the initial planning. As stated earlier, if a PLC
team does not determine what mastery or proficiency looks like, it will be hard to focus the design of the lesson or create the proper assessments (Many et al., 2018). Knowing what they want proficiency to look like will require the team to envision and design the product that will establish the level of mastery. The analyzing of the results from assessment and student work will allow the teacher and PLC team to adjust the focus, or DOK level to bring about mastery. A well-written assessment will allow the team to analyze the data so that the team can identify the weaknesses or gaps in knowledge to intervene quickly and effectively (Many et al., 2018).

**Analyzing informal assessment data – student work.** Another aspect in the book *Amplify Your Impact: Coaching Collaborative Teams in PLCs at Work*, authors Many et al. (2018) commented that we also need to look at and analyze the wrong answers given during the assessment; these are called distractors. The authors state, “When written carefully, the distractors students choose as answers can tell a teacher a great deal about where a student is in their learning” (Many et al., 2018, p. 101). Analyzing the mistakes, or the selection of wrong answers, teachers and teams can determine what sorts of misconceptions, or confusions exist for the student. So attention should be paid to the PLC teams as they develop the assessments on what kinds details should be used as distractors (Many et al., 2018).

Analyzing student work as a collaborative PLC team will assist them in forming consensus about what constitutes proficiency and mastery. When the team has a common vision for proficiency and mastery, it aids them during the task of designing the common formative assessments and interventions (R. DuFour & Reeves, 2016). As the assessment reveals the exact point where a students’ thinking begins to go off task, the
effectiveness of the intervention will improve and set the students back on the same path. The use of analyzing student work creates a pathway for teachers to reflect on their instruction and make decisions about the practices used for instruction and the level of student learning (Many et al., 2018).

**Quadrant 3 - What Do We Do When They Don’t Learn It?**

PLC teams can more easily begin to plan lessons together, create assessments, and even create ideas for intervention, but it is very hard for teams to begin discussing their practices that may have led to some of the results (S. M. Hord, 2007). Teachers will examine the numbers and begin a discussion on the reasons for the numbers or what they may mean, but many times they fall short in their examination of the practices they employ that may be a factor. When we respond to a student who has not mastered the skill or demonstrated proficiency in the assessment, we must do so with a new approach and practice. If they did not “get it” the first time, doing it again the same way is not a good practice (R. DuFour et al., 2004). Teachers often feel that the student was given their best opportunity to learn it, and they struggle with new ways to approach the content or skill in a different way (Many et al., 2018). This is where the strength of the PLC team can be at its best, and a colleague may have taken a different approach to the same content or skill. Through collaboration a couple choices for intervention exist; one is that the teacher can adapt some of the practices of their colleagues and re-teach the topic, or second, the team could have other teachers on the team re-teach to all student who struggled with a skill or content. This could be determined by which teacher seemed to have the greatest impact on that skill or contact or to expose the student to a different perspective that may work better for them on that skill or content (Many et al., 2018).
As the teams answer question three of *what do we do when a student does not learn it?* – The PLC team will need to employ multiple strategies to intervene effectively. The PLC teams must analyze the strategies, review the effectiveness of the assessments, plan re-teaching or lessons, and utilize other supports that may help contribute to the underlying results falling short of mastery (R. DuFour et al., 2004). Some of the major programs being used by educators today are multi-tiered system of supports (MTSS), RTI, and pyramids of interventions (Many et al., 2018). These programs all differ in how they are implemented and create different structures at the school site, but they all have in common that the attempt to identify those who are struggling early and provide them with systemic interventions (R. DuFour et al., 2004; Many et al., 2018). The types of intervention provided to students are tiered based on who and when they receive the intervention.

Support system divided into tiers:

- **Tier 1:** Instruction that all students receive.
- **Tier 2:** Instruction for students who have difficulty mastering essential learnings, their instruction will also include instruction targeted toward specific student needs or weaknesses.
- **Tier 3:** Intervention for students who require a more intensive level of instruction to master the essential material; delivered with increased intensity, duration, and frequency.

The focus of the PLC teams is on the first two tiers of the intervention systems. During the first section of the learning cycle, the focus is on Tier 1, or the instruction that all students receive. But it is during the second and third phases of the learning cycle that
the PLC teams focus on the Tier 2 level of intervention. One of the main tasks for the
PLC team is to determine what are the essential learnings or high stake standards that all
students must master or become proficient (R. Dufour, Dufour, Rebecca, & Eaker,
Robert., 2009). When a student has difficulty mastering the essential learnings, the team
must design and implement an intervention that targets the specific needs or weaknesses
(Many et al., 2018). As stated above, the PLC teams plan to intervene through the
process of analyzing the strategies used, reviewing the effectiveness of the assessments,
plan re-teaching or lessons, and utilizing other supports that may help contribute to the
underlying results of students falling short of mastery.

**Response to intervention.** RTI is a good model for many schools because of its
dependency on the other elements used. RTI focuses on teachers collaborating, creating
common formative assessments, reviewing data, and then targeting the needs and skills to
re-teach (Harlacher et al., 2016). RTI is the school-wide system that brings together the
collaboration (PLC), evidenced-based practices, and intervention system to help improve
student learning.

**Purpose of assessment.** R. DuFour and Eaker (1998), outlined how K-12 schools
can implement PLCs. Both have contributed to the research and instruction of PLC and
they state: “The Big Idea, or guiding principle, of schools that operate as PLCs, is simple:
“The fundamental purpose of the school is to ensure high levels of learning for all
students” (R. DuFour et al., 2004c, p. 135). R. DuFour et al. (2004c) outlined the
methods and strategies that schools can use when the faculty and staff refuse to let
students fail. Staffs must put their focus on what the individual student needs to help
them learn, PLCs “requires the school staff to focus on learning rather than teaching,
work collaboratively on matters related to learning, and hold itself accountable for the kind of results that fuel continual improvement” (R. DuFour, 2004b).

**Methods, tools, practices – re-teaching, re-assessing.** For a PLC and RTI model to work, a school must have certain conditions in place, such as: (a) time for teachers to meet, (b) ample training and professional development, (c) time for intervention during the school day, and (d) support from all site stakeholders and the district office (A. Buffum et al., 2012; Clarke, 2018). Resources need to exist that allow these teams to determine the essential learnings of the content so that lessons and common formative assessments can be designed. Teachers will need to be trained, also read, and discuss data. To effectively intervene, the school needs to create time within the school day, open to all students where teachers can use the data from the formative assessment to reteach and reassess (Stiggins & DuFour, 2009).

**Quadrant 4 - If They Have Learned, How Do I Extend Their Learning?**

The fourth question for the PLC teams to consider is that when a student has demonstrated mastery or proficiency, how do we extend their learning? One of the major struggles a PLC team faces is that when a significant number of students need intervention, that is additional instruction, new assessment, etc., educator should not hold back the learners that have demonstrated the skills and knowledge of the content that are considered mastery and proficiency (Many et al., 2018). Some schools have solved this problem by creating time within the school day to implement the interventions while providing choice time and enrichment opportunities for the rest of the campus students (R. DuFour & Mattos, 2013).
Schools where a separate in-school time is not set aside for intervention and enrichment, a teacher must be more creative in providing the learning extensions and enrichment. Teachers will need to look at resources provided to provide lessons and content at more depth and at DOK levels that exceed essential learning targets — having students who have mastered the essential learnings possibly doing new activities like giving a presentation or completing a project that will take the information further in-depth (Many et al., 2018). The PLC team can also work collaboratively to create enrichment within the classroom, and possibly the team can divide the responsibilities of both intervention and enrichment between the team and provide multiple levels of instruction for essential learning targets and opportunities for enrichment (A. Buffum et al., 2012).

**Definitions of Collaboration and Learning Cycle**

R. DuFour and Mattos (2013) is known to give substance to both PLCs and RTI. They speaks about the interconnectedness between both and how schools need to collaborate but must finish with an intervention to complete the promise that all students will learn at high levels (R. DuFour & Mattos, 2013). In the book *Simplifying Response to Intervention: Four Essential Guiding Principles*, Buffum et al. (2011) states: “To secure the benefits of RTI, we must do more than provide teachers with new protocols, assessments, and intervention programs” (p. 4). R. DuFour and Mattos (2013) also imply that the teacher and how they build engagement and relationships with students are important and must be a part of the teacher's training. Mattos spends most of his instruction time in teaching RTI structures and strategies to educators; it is in closing the cycle of inquiry that student achievement is accomplished. Buffum et al. goes on to note:
“The fundamental purpose of response to intervention is to provide every child with the additional time and support needed to learn at high levels” (p. 15).

Organizational Structure of Professional Learning Communities

Schools are looking to use PLC to improve their school and to put the focus on student learning. The three fundamental questions for schools developing PLCs are: (a) What do we want students to learn?; (b) How will we know when they learn it?; and (c) How will we respond when they don’t? (R. DuFour et al., 2004). These three questions help schools organize themselves and agree on the essential elements of the curriculum. They differentiate instruction for all students to be able to learn, regardless of their program, and decide how the school will intervene when the student does not learn the content the first time (R. DuFour et al., 2004). It is in the gap between the first best instruction and the intervention that research attempts to fill. The tools (common formative assessments), the school structure (time built-in for RTI), and the methods of intervening are the elements that schools struggle with (Buffum et al., 2011). When effective schools identify the students who need intervention and target them with re-teaching and reassessment, they achieve academic success (Butler & Schnellert, 2012).

Student Achievement

Defining Student Achievement

Improving student learning for all students is the focus of many schools across the nation, and schools measured improvement through student achievement. Schools will have to begin to define what will constitute mastery when they grade. Defining student achievement starts by identifying the most important content that all students, regardless of program, must know (R. DuFour, 2004b). Once collaborative teams determine and
define the essential learnings, they now need to determine what constitutes mastery of that content. There will also need to be a variety of assessments used; authentic assessments like projects and portfolios, formative assessments so you can adjust instruction if they did not get it, and reassessment. Most importantly collaborative teams must decide by what measure they agree upon when mastery has been reached.

Instructional leaders need to work to capture the hearts and minds of those teachers who are most willing to jump into the deep end of the transformational change pool. Instructional leaders need teachers to begin becoming risk-takers and take a leadership role in their collaborative groups (Many et al., 2018). The shift away from what teachers have done for years and take risks in learning how to read unique data and collaborate in instruction and intervention. Taking these risks is a big shift in the cultural mindset; for some, they are willing; for others, they will need evidence to be convinced (Couros, 2015).

Achievement Gap

As schools look to focus on improving student learning, they will discover there are gaps in student achievement between certain groups of students. Although tremendous amounts of studies have been conducted to ascertain why these gaps exist, the achievement gap persists. Using tools and practices, the skilled teacher looks to close the gap. That along with the collaboration, teachers also must infuse emotional intelligence into the process to make a connection to the student so that the connection will foster engagement and make the intervention most effective (R. DuFour & Mattos, 2013b). We must examine our thinking into what must be examined: Do I need to rethink what I believe about this child? The answer may be yes, and I must change my
mindset so that I can best intervene on the child’s behalf (Muhammed, 2015). The teacher must step beyond just the process and take “collective responsibility for student learning” (M. Fullan & DuFour, 2013, p. 67).

In Muhammed’s (2015) book, *Overcoming the Achievement Gap Trap: Liberating Mindsets to Effect Change*, he explores the connection between personal and institutional mindsets and academic achievement gaps. The issue of inequality in student learning outcomes has been studied and debated for many years, but Muhammed seeks to establish that the primary culprit in the fight to overcome the achievement gap is in the thinking of the people in education.

**The connection of response to intervention to student achievement.** Measuring the extent of collaborative planning and student-teacher relationship on student learning and how that practice can be quantified and replicated is the key to RTI. RTI will help close the achievement gap and will do so by examining what the most effective tools and structures are that bring about transformational change. For RTI to be able to close the gap in the knowledge of students, one must first ensure that they are asking the right questions (Buffum et al., 2011) such as: (a) Are the right school structures in place and are there commitments from the staff? (R. DuFour & Mattos, 2013); (b) “What is the purpose?”; (c) “What is needed to be taught to prepare students to be successful adults?” (Buffum et al., 2011)? Providing schools and educators a guide to effective school structures and tools to answer these questions will help foster transformational change. What professional development will motivate teachers to develop deep connections with students that will enhance teaching and allow intervention to be most effective? R.
DuFour and Mattos (2013) emphasize the importance of the team’s decision-making ability and accountability.

The PLC process also promotes shared leadership by empowering teams to make important decisions. Teachers have a voice in determining the content they'll teach, how they'll sequence the content, which instructional strategies they'll use, and how they'll assess student learning. (DuFour & Mattos, 2013, p. 38)

RTI systems need a healthy core to build upon; schools must invest time in core instruction and evaluating the effectiveness of that instruction (Harlacher et al., 2016). To make the relationship clear, PLC is how teachers interact, and it defines the working environment, whereas RTI is the systemic plan created in that environment to help facilitate and ensure student learning (Clarke, 2018; Mundschenk & Fuchs, 2016).

**Teacher - Student Relationship**

The teacher in the classroom has a unique and special place in the minds of the student. To young students, the teacher is a major authority figure in their lives. In secondary schools, teachers will continue the role of an authority figure, but the role of the teacher turns to role model and supporter. What a teacher says to the students makes a huge impact on the students, but most importantly, the relationships established by the teacher with their students will affect the student motivation to engage in the learning process (R. DuFour & Reeves, 2016).

As schools look to make the cultural change to focus on student learning, teachers will need to make an emotional connection to their students and use the proper methods to intervene. The question is, *how will collaborative groups share their information about what works best?* The relationship between the teacher and student in the process
is also a key factor. A teacher who is most concerned with the students learning and is focused on what intervention practices will be most effective will build trust with the student, and the student will be open to the intervention (R. DuFour & Mattos, 2013). The students want to know that you care before they care what you know.

Collaboration is used for many aspects of sharing teaching practices, lesson planning, creating assessments, and sharing assessment data. To change a school's culture, collaborative teams must effectively use the processes of re-teaching, reassessing, and mastery grading, or also known as standards-based grading (Butler & Schnellert, 2012). When collaborative teams experience a transformational change in their mindset, it changes their thinking about where student learning outcomes take priority over grades and covering content. A changed mindset teacher should be able to make the statement that, I know that my students have learned what I taught because they have demonstrated the knowledge in my assessments (R. DuFour & Mattos, 2013).

**Professional Development**

Schools must begin the work and lay the foundation to transform the mindset of the school culture and vision of student learning. They will need to invest money and resources in the appropriate training and put in the time and physical mechanisms into place to begin a process of true intervention, where student outcomes (grades) match content mastery. Teachers will collaborate, check data, and use it to make a difference in the first of their best instruction and intervention (Stiggins & DuFour, 2009). The overwhelming majority of teachers know that there is a way forward that will increase their effectiveness, and make a real impact in learning outcomes, effective PLC is that
way (Buffum et al., 2011). Social-emotional professional development is not a one-time training, teachers who begin to delve into the practice of establishing relationships.

**Research Gap**

Educators are always looking for the best methods and strategies to improve student learning, there have been many studies and experts that have shared their ideas and theories on how to make the improvements. Many have focused successfully on changing how teachers see their role in improving student learning; the PLC movement is one of those along with PLCs, is what teachers should do when they discover students are not learning, that is the RTI movement (Harlacher et al., 2016; Samuels, 2011).

Translating those movements into practice for everyday teachers in real-world classrooms is the toughest part and the area that has had the least attention. Huat See Beng (2016) stated in the article *Teachers’ Use of Research Evidence in Practice: A Pilot Study of Feedback to Enhance Learning* that there has been a limited number of studies that come with the practical guide and application methods as to how to implement them into real world classrooms. This phenomenon has led to a great wealth of information on the benefits of the PLC and RTI practices but a lack of concrete professional development of the actual skills required. Skills that develop positive classroom culture, tools for structured intervention, and how to develop first best instruction. “Educators implementing RTI may not have all the skills needed to guide a conversation that examines the effectiveness of core instruction” (Jacobs et al., 2009, p. 41).

There is limited research that focuses on what teaching practices have been and are being successfully implemented in real-world classrooms. Most of the studies that focused on student learning were small case studies with perhaps one or two schools,
“while very few were large-scale or well-designed evaluations” (Datnow & Hubbard, 2015, pp. 11-12). This study will add to the literature by disseminating to teachers the expert teacher’s knowledge and skill to implement all phases of the learning cycle so that one phase does not suffer in the process. While some schools and districts seem to have effectively used the PLC and RTI tools, many other school districts are not experiencing the change and growth for student learning they had expected (O’Connor & Freeman, 2012).

This study will also identify for schools and educators the practices, activities, and insights gathered from successful expert teachers in real life classrooms. The study will help fill the gap in the knowledge base regarding practical application in the classroom. Teachers will: (a) Know what are the activities and practices expert teachers use for collaboration and intervention?; (b) How do teachers in school groups develop common formative assessments?; and (c) How do expert teachers read the data to know with whom and how to intervene?

This study may also provide information administrators can use to design professional developments that will inform teachers and develop the skills needed that will enhance classroom culture, intervention, first best instruction, and ultimately increase student learning. Schools and districts use RTI to help identify and target instruction for students who need it the most (Samuels, 2011). The information gathered in this study will inform professional development design as to what are the most effective practices for collaboration, assessment, and intervention. This information is valuable and necessary for practitioners who want to improve student learning.
Summary

Creating cultural change in our schools so that student learning is the focus of all the decisions that are made and actions that are taken, and it is essential to the success of our public schools. The most tangible and unanswered questions are: (a) What does it look like?; (b) What tools do we use?; and (c) How can we be most effective? (R. DuFour, 2004a). Schools that employ PLC and RTI are on the right path to changing their school's culture. R. DuFour (2004b) states that intervention has shown through compelling evidence, that schools can be transformed when every child has the opportunity to use time within the school day with support to get what they need academically (Buffum et al., 2011). However, what we find in many cases, schools fall short of the proper tools to intervene with all kids, especially those kids at the greatest risk (Buffum et al., 2011).

A literature matrix was created to organize and categorizes the various findings of each study found within this topic (see Appendix A). Despite the information and studies that exist in the literature, there remains the need to study the activities used by expert teachers in the schools that employ PLC and RTI that makes every student in their classroom more successful in language arts and mathematics at the end of their term regardless of where the student began.
CHAPTER III: METHODOLOGY

Overview

This chapter describes the methodology that was used for the study. The research purpose statement and research questions are presented in order to establish the basis for the study. This qualitative study used a phenomenological approach to describe the activities expert mathematics teachers in comprehensive high schools that employ PLCs and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction use to ensure student success. Data were collected through interviews and observations. The population and sample are defined and identified. The data collection and analysis protocols are explained, and the limitations of the research design are acknowledged.

Purpose Statement

The purpose of this phenomenological study was to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction culture to make every student in their classroom successful in mathematics.

Research Question

This study was guided by the following central research question: How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to school culture, classroom culture, interventions, differentiated
instruction, and first best instruction culture to make every student in their classroom successful in mathematics.

**Research Sub Questions**

The following research sub questions were developed to help answer the central research question:

1. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to school culture to make every student in their classroom more successful in mathematics.

2. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to classroom culture to make every student in their classroom more successful in mathematics.

3. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to interventions to make every student in their classroom more successful in mathematics.

4. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to
differentiated instruction to make every student in their classroom more successful in mathematics.

5. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to first best instruction to make every student in their classroom more successful in mathematics.

**Research Design**

The study method used was a phenomenological qualitative study. As described by Patten (2014), the purpose is to identify and describe how people experience the phenomenon, their perceptions, descriptions, emotions, judgments, and memories along with many other insights. The purpose of this study is to identify and describe the educational practices expert mathematics teachers in comprehensive high schools that employ PLCs and structured academic intervention use concerning classroom culture, interventions, and first best instruction to increase achievement; this methodology is well suited for the researcher. Qualitative studies aim at gaining “deeper understanding of the nature or meaning of everyday experiences…” (Patton, 2017, p. 115). This study examines the classroom culture, interventions, and first best instruction that increase achievement from the lived experiences of comprehensive high school expert teachers. Gaining the insights from the expert teachers, lived experiences make a phenomenological qualitative study an appropriate method. McMillian and Schumacher (2010) contend that there are nine characteristics of qualitative research (see Table 2). These characteristics guided the researcher in qualitative practices.
Table 2

Nine Characteristics of Qualitative Research

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Description</th>
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<tbody>
<tr>
<td>Natural setting</td>
<td>Study of behavior as it naturally occurs or occurred.</td>
</tr>
<tr>
<td>Contextual sensitivity</td>
<td>Consideration of situational factors, such as social, political, or technological influences.</td>
</tr>
<tr>
<td>Direct data collection</td>
<td>Researcher is emerged in the natural setting to collect data from primary source(s): observations, interviews, artifacts.</td>
</tr>
<tr>
<td>Rich narrative description</td>
<td>Detailed narratives to uncover peoples’ perspectives and understanding of behavior.</td>
</tr>
<tr>
<td>Process orientation</td>
<td>Focus on why and how behavior occurs.</td>
</tr>
<tr>
<td>Inductive data analysis</td>
<td>Generalization are induced from synthesizing gathered information.</td>
</tr>
<tr>
<td>Participants perspectives</td>
<td>Focus on participants’ understanding, descriptions, labels, and meanings.</td>
</tr>
<tr>
<td>Emergent design</td>
<td>The design evolves and changes throughout the study.</td>
</tr>
<tr>
<td>Complexity of understanding and explanation</td>
<td>Understanding and experiences are complex, with multiple perspectives.</td>
</tr>
</tbody>
</table>


As described by Patten (2014), qualitative research inquiries about the stories of those individuals and seek their perspective and memories. The researcher will conduct interviews and gain insights as to their lived experience in the environment of the interviewees. This type of research method and study is personal, and the researcher is the instrument of inquiry (Patten, 2014). In this study, the researcher will seek to interview the expert teachers to identify and describe their successful activities according to the prescribed variables. Once the interviews were conducted, the interview transcripts were analyzed then and coded for the study. The study will look to identify and describe
the successful activities and practice used by expert mathematics teachers to provide data and insight for others to study and possibly create professional development.

**Population**

The population of a study is the group of subjects that fit into the area of research and in general fit the results of the purpose for the research (J. H. McMillan & Schumacher, 2010; Patten, 2014). According to McMillan and Schumacher (2010) the population is a group that “conforms to specific criteria” (p. 129) to which research results can be generalized. For this study, the population will come from teachers at comprehensive high schools in California. The intended population of this study is designed to include all public high school teachers in California. In the 2018-19 school year, California’s education system was composed of 76 public high school districts and 344 public unified school districts, totaling 82,342 potential public high school teachers for the population of this study (California Department of Education [CDE], 2018). Assuming a six period day at high schools, and assuming one of each six periods is math, the potential population is one-sixth of the overall population or 13,724 math teachers.

**Target Population**

A narrowed group from which a sample was drawn from the overall population group is referred to as the target population (J. H. McMillan & Schumacher, 2010). According to J. W. Creswell (2003), the target population is the “actual list of sampling units from which the sample is selected” (p. 393). A target population for a study is the entire set of individuals chosen from the overall population for which the study data are to be used to make inferences. The target population defines the population to which the findings are meant to be generalized. It is important that target populations are clearly
identified for the purposes of research study (McMillan & Schumacher, 2010). It is typically not feasible, due to time or cost constrain. As to study large groups, therefore, the researcher chose population *samples* from within a larger group.

The total population of comprehensive high school teachers in California is too large to conduct interviews with, so the population was narrowed. Therefore, one county in California was chosen for the next level of selecting a target population. The county selected for the study was Riverside County, California. With the ethnic diversity, a mixture of urban, suburban, rural populations, and the options available to these populations for education, Riverside County is similar to the other 58 counties in California (CDE, 2018). Riverside provided 18 districts with a total of 55 high schools with nearly 4,400 teachers and specifically, 730 mathematics teachers to identify and select as study participants. A target population was selected for individuals with requisite qualifications to participate in the study. The study also has further qualifications for the work environment in the comprehensive high schools. The target population for this study was expert teachers in comprehensive high schools that employ PLCs and structured academic intervention in Riverside County, California. There are 55 comprehensive high schools in Riverside County, California, and 11 of comprehensive high schools identify employing both PLCs and structured academic intervention. The target population for this study was the 146 Mathematics teachers in those 11 schools in Riverside County (CDE, 2018).

**Sample**

A sample in a qualitative study is naturally small, and in contrast to quantitative probabilistic sampling, the sampling is purposeful, as Patton (2014) stated, “selecting
information-rich cases for in-depth study” (p. 264). There are no hard and fast rules for sample size in qualitative inquiry (Patton, 2017). Qualitative analyses typically require a smaller sample size than quantitative analyses. Qualitative sample sizes should be large enough to obtain feedback for most or all perceptions. Obtaining most or all of the perceptions will lead to the attainment of saturation. Saturation occurs when adding more participants to the study does not result in additional perspectives or information. For phenomenological studies, J. W. Creswell (2000) recommends five to 25 and Morse (1994) suggests at least six. There are no specific rules when determining an appropriate sample size in qualitative research. Qualitative sample size may best be determined by the time allotted, resources available, and study objectives (Patton, 2014).

To gain an understanding of the insights and lived experiences of the expert teachers, the use of a small sample size of these expert teachers is most practical for gathering information through the interview or observation process. The sample of 12 high school expert mathematics teachers for the study was chosen from the 11 public comprehensive high schools that met the specific criteria of the study. The schools identified came from four school districts: Corona Norco Unified School District (CNUSD), Riverside Unified School District (RUSD), Val Verde Unified School District (VVUSD), and Murrieta Valley Unified School District (MVUSD), and all are located in Riverside County, California.

**Sample Selection Process**

The researcher used purposeful sampling for this study. Purposeful sampling is used in qualitative inquiry to identify and select subjects who are knowledgeable and experienced in the area of study (Patton, 2014). To be more specific, this study looks to
use purposeful sampling to identify expert teachers that fit a broad category for the study. The purposive selection criteria were as follows:

- Teachers who had a minimum of three or more years of experience as a comprehensive high school mathematics teacher at the same school they are currently employed at as a teacher during this study.

- The teacher was nominated and recommended by their current principal as a math teacher whose students progressed significantly.

- The teacher was nominated and recommended by their current principal as a math teacher who they felt would be a good source of information for study purposes.

- The teacher has received recognition for outstanding teaching service at the school, district, or county level.

The sample for this study was 12 public comprehensive high school expert mathematics teachers that employ PLC and structured academic intervention from four school districts (CNUSD, RUSD, VVUSD, and MVUSD) within Riverside County, California. The selection process was as follows:

1. The researcher began the study by identifying the 11 public comprehensive high schools from CNUSD, RUSD, VVUSD, and MVUSD in Riverside County that employ PLCs and structured academic intervention. This information was obtained through the CDE Public Schools and Districts Data Files, and school profiles online.

2. The researcher began contacting site principals or designee who the researcher had identified as high schools that qualified for the study for a list of possible
teacher contacts for participation until the desired number of candidates were reached.

3. A list of all potential participants with three or more years’ experience was created.

4. All teachers from the list of recommended participants were contacted to see if they would participate.

5. Of those who agreed to participate, 12 were chosen from the four districts that met the criteria in Riverside County.

6. Selected participants were given Letters of Participation (see Appendix B) and Informed Consent materials (see Appendix C).

7. Upon return of Informed Consent, interviews were scheduled and administered.

**Instrumentation**

As stated by Patten (2014), the researcher is the main instrument for data collection in qualitative inquiries. The researcher developed interview questions from examining the PLC learning cycle as shown in the Interview Question Development Matrix (IQDM) in Appendix D (Many et al., 2018, M. Fullan and DuFour, 2013).

When examining this statement, it is imperative for the researcher in a qualitative study to be aware of their own biases and to have studied and trained in the process of interviewing observation, and the collection of artifacts relevant and important for their study. Understanding the process of qualitative data collection and how to limit the negative effects of self-bias helps the reliability of the study (Patten, 2014). Therefore, in this phenomenological study, the researcher has employed several safeguards for
interviews and collecting artifacts to reduce the effects of researcher bias and complete a valid and reliable study.

For this study, the researcher was employed as an assistant principal at one of the qualifying high schools for this study. As a result, the researcher brought a potential bias to the study based on personal experiences in a similar setting to those which were studied. The researcher conducted qualitative interviews with the research participants. The interview questions and responses were conducted face to face and were recorded digitally via a hand held recording device. The researcher took steps to prevent the influence of researcher bias on interviewees.

Interviews

This qualitative study utilized a phenomenological design. The primary source of data collection were semi structured interview questions aligned to the research questions for the participants (McMillan & Schumacher, 2010; Patten, 2014). The researcher contacted the target population for the study to help create a schedule for interviews and were sent the Participant’s Bill of Rights (Appendix E) and the documentation for informed consent. The interview questions were predetermined, based on the research questions, variables identified in the study, a review of literature, and were also carefully worded to focus participants’ toward describing the phenomena. The use of an interview protocol and the same questions for each participant in the semi-structured open-ended interviews (Appendix F) also provided a consistent structure for reliability (McMillan & Schumacher, 2010; Patten, 2014).
Observations

The researcher also performed observations of the planning and intervention periods. Observation will allow the researcher to experience the nuance, language, and routine of the subjects to understand better the data gathered from the interviews. To paraphrase Patton (2017) what we observe and experience is that the participants are changed as much or more by what happens beyond the formal planned curriculum and exercises. Through observation, the research can witness the phenomenon of the teacher’s collaboration, preparation and implementation that must occur for intervention.

Artifacts

The researcher acquired artifacts during the data collection process. Documentary and artefactual data include texts, photos, lesson plans and other tangible items from the site that are collected and analyzed. Bamberger et al. (2012) states that “review of documents and other artifacts of material culture provides a relatively unobtrusive method of gaining information and may offer information unavailable from other types of data sources” (p. 310). Additionally, Silverman (2001) states when analyzing artifacts, the researcher may focus on how and for whom the artifact is created, what is included and not included in the artifact, and how it is used. Collected artifacts were utilized to verify or reject the information gathered from the one-on-one interviews with the study participants.

Reliability

Reliability is achieved when an instrument continues to produce similar results when used in different circumstances (Roberts, 2010). There are different strategies to ensure reliability of instruments whether they are used for quantitative or qualitative
methods (McMillan & Schumacher, 2010). This is imperative in research design as it
indicates the rigor and trustworthiness of the research findings.

To promote reliability, the researcher in this study conducted a semi-structured,
interview aligned to the research questions for the participants. The researcher used the
same interview protocol for all participants to ensure consistency and to promote
reliability. The researcher can help ensure reliability through a consistent and
standardized data collection process (McMillan & Schumacher, 2010; Patten, 2014). The
researcher was also concerned with self-bias in the study and used reflexivity to promote
reliable results. Reflexivity is the conscious practice of self-reflection by the researcher
to ensure the limitation of human bias (McMillan & Schumacher, 2010; Patten, 2014).

To create reliability while analyzing the data, inter-coder reliability was utilized to
ensure code consistency (Patten, 2014). The following coding protocol was established
and two peers familiar with but not a part of the study were asked to participate:

1. First, the researcher chose to code the responses of the participants by using
   the same interview question using abbreviated terms (Patten, 2014).
2. During the first read of the data, the researcher noted possible data segments
   in the margins noting the multiple possible themes to develop the categories or
   classification system (Patten, 2014).
3. The researcher employed the NVivo qualitative data analysis software to code
   the same interview question from all participants.
4. Two peers familiar with but not a part of the study were given the themes
   created by the researcher to use as they analyzed the data.
5. As two peers reviewed the participants’ responses to the same interview question, they coded the data to the themes provided. Any discrepancies between the researchers coding and the two peers would lead to a conversation where the researcher and the two peers discussed the coding and the themes.

6. The primary researcher compared the results looking for recurring regularities (Patten, 2014).

The interview questions were also checked for reliability by the researcher. An expert panel was selected to review the interview questions to ensure that the questions are not leading the participant to a conclusion but allows them to tell their story (McMillan & Schumacher, 2010; Patten, 2014). Following the review, the researcher conducted a pilot test by conducting two interviews with teachers who met the criteria of the study but were not participants. This pilot helped the researcher obtain meaningful data to answer the research questions.

**Pilot Test**

Before conducting the interviews for the study, two teachers who met the study criteria but were not a part of the study were asked to perform pilot interviews to field-test the interview schedule and questions. The teachers who participated in the pilot interviews were able to experience the pace and order of the interview, and answer the interview questions. The pilot interview was important for the researcher to gain feedback from the participants about the interviews structure, length of time, clarity of the questions, and the use of the recording device. In addition, a colleague who has received training in the administration of interviews observed the researcher as he
administered the pilot interview. Following the pilot interviews the observer provided feedback regarding actions by the researcher that could be biased or could influence the responses of the interviewees. The researcher was able to make adjustments to the interview process before the actual study was to begin. Using a pilot test increased the reliability of the study and reduced the influence of self-bias (McMillan & Schumacher, 2010). According to McMillan and Schumacher (2010), “A pilot is necessary as a check for bias in the procedures, the interviewer, and the questions. (p. 206).”

Validity

Validity ensures that the study “measures or tests what is actually intended” (Shenton, 2004, p. 64). Validity also assures that the findings from the instruments are true (Roberts, 2010) and aligned directly to the research questions (Patten, 2014). Various strategies were employed to ensure that both the quantitative and qualitative data collected were valid. For the researcher to have validity in their qualitative study, both the participants and the researcher must have an understanding of the language and subject of the study (McMillan & Schumacher, 2010). To help ensure validity to this study, the researcher put into action the following items:

- The interviews were recorded electronically in the participant’s voice. These recordings aim to ensure a verbatim collection of participants’ words rather than relying on the researcher’s written account and memory (McMillan & Schumacher, 2010; Patten, 2014).
- A panel of peers reviewed the interview questions for clarity of language.
- The researcher provided a common sheet of terms and meaning to create a common vernacular during the interview for both the participant and the
A common understanding of these terms ensured comprehension of the interview questions and informed targeted participants’ responses (McMillan & Schumacher, 2010).

- The participants were provided the opportunity to review the transcription of their interview to verify their experiences were accurately captured.

**Interview Question Development Matrix**

As a validity measure, the researcher used an IQDM designed to directly align the interview questions with the research questions and variables of the study. The use of the IQDM assures validity in that the data gathered directly addresses the research questions and variables of the study.

**Data Collection**

Analyzing what public high school mathematics teachers perceive that contributes to students success in mathematics in comprehensive high schools with PLCs with structured academic intervention meeting or exceeding standards in mathematics was the purpose of the gathering the data. For this study, the population of high school mathematics teachers in a PLC strands from Riverside County, California. The target population comes from an estimated 4,400 public school teachers in general who participate in a weekly PLC strand group meetings. “In quantitative studies, the group of subjects or participants from whom the data is collected is referred to as the sample” (McMillan & Schumacher, 2010, p. 129). The sample came from the estimated 4,400 high school teachers in comprehensive high schools in Riverside County, California. The 12 teachers selected were mathematics teachers from various districts that make the sample group of participants.
To determine what the teacher perceives to contribute to the success of the students in the classes, the researcher developed six semi structured open-ended research questions that were asked of the 12 public high school mathematics teachers. The interviews were conducted individually and face to face. The teachers were aware that they were to be recorded for this study. The interviews took place on their campus, during school hours, and during the teacher's preparation period. Each teacher was invited into an office space and asked to share their thoughts about collaboration, determining mastery, reteaching, and academic intervention. If the teacher needed any clarification of the question, the researcher would restate the question. The interviews were recorded and transcribed. The questions were designed to draw out the teachers perceptions of the various methods used by them and at their school for teaching, collaboration, and academic intervention. After the interviews, the researcher transcribed the recordings to determine themes for coding.

The researcher also conducted observations of intervention time at the school sites. The times observed were both in the teacher planning during PLCs and the actual interventions with students. Observing the PLC strand, collaborating, and discussing the key components of their planning and interventions were related to the core evidence of the study, along with observing the teacher interacting and using their planning in the intervention period. The advantage for the researcher was the ability to observe authentic discussions about the main factors, and their interaction and discussions about their perceptions and use of the tools for PLC and academic intervention, and observe those plans in practice. The field notes gathered by the researcher were coded for the study.
The researcher used an observation guide to direct the specific data gathered from the observations (see Appendix G).

**Human Subject Considerations**

Before any data collection could begin, to protect the rights of participants the researcher submitted the research design and interview protocols to the Brandman University Institutional Review Board (BUIRB) (see Appendix H) and received approval to begin (McMillan & Schumacher, 2010; Patten, 2014). Additionally, the necessary coursework was taken and certification was granted by The National Institutes of Health to protect human research participants prior to any data collection (see Appendix I). The researcher sent a formal invitation to prospective participants via e-mail, which included a description and the purpose of the study, along with the protocols. The email was to allow the participant to have full information about their role and commitment would be by participating. Once the participant’s accepted the invitation to join the study, they were provided an electronic copy of the Brandman University “Research Participant’s Bill of Rights” via e-mail. Also, before participation, participants were provided an informed consent form that included the title of the research study, the purpose of the research, a description of the study’s procedures, the risks, and benefits of participation. Permission was also obtained to use an audio recorder, and the option to review one’s transcription (see Appendix J). Also included was the request to observe their planning and intervention period, and the contact information of the researcher (see Appendix K). The completed consent forms were stored in a locked file cabinet in the researcher’s office, and a signed copy was provided to individual participants.
It is the responsibility of the researcher to keep the confidentiality of both the participants and their work location protected (McMillan & Schumacher, 2010; Patten, 2014). However, the sampling method included recommendations from professionals in the field, the identity of individual participants, and their worksite could have been recognized. Therefore, the researcher and the dissertation committee chair only knew the names and work locations of participants. The researcher also shared with the participants before interviewing that they were guaranteed the confidentiality of all information shared, and the following safeguards were explained:

- Names and locations would be generalized in the participants’ transcription to protect identity.

- Audio recordings were password protected and would be destroyed after transcriptions were completed.

Data Analysis

According to McMillan and Schumacher (2010), in qualitative research, inductive data analysis is used to collect systematically, code, and categorize emerging patterns and themes and then interpret the data to describe the phenomena under study. Many of the analytical steps are not sequential, and the researcher often moves between them throughout the data analysis process (McMillan & Schumacher, 2010; Patten, 2014).

Data Coding

The reason that phenomenology was selected for this study is so the researcher can gather data about “what” and the “how” the subjects use, motivate, and develop student success. The tools that are in place at their high schools provide a structure for the teacher to work within. The PLC time gives them a chance to collaborate and sets a
direction for what that collaboration will look like. The structured intervention time allows the teacher the time and access to students and give them a chance to employ many of the strategies offered in training and collaboration. Therefore, as themes were developed, the researcher considered the connection of the themes to the research questions (Patten, 2014). How each theme answered the research question by representing a teacher’s perception or tool that leads to the student’s success was coded for the study. The researcher marked potential themes in the margins of the transcribed data documents, after the first read. Following the first read, the researcher reflected on the possible codes that can be assigned (McMillan & Schumacher, 2010; Patten, 2014).

After the initial reading and reflection the researcher employed NVivo software for qualitative data analysis, this will help gather the coded materials together under themes and includes interviews and observations. In addition to the coding of the researcher, two peers familiar with but not a part of the study were asked to read and code the data independently based on the themes originally identified. The use of peers to independently code the data creates intercoder reliability (McMillan & Schumacher, 2010; Patten, 2014). Creating intercoder reliability help the researcher further reduce the impact of bias in the data used.

**Categorizing and Identifying Themes**

When conducting qualitative research, the main goal is to establish a relationship between the various codes that form a pattern into established themes (McMillan & Schumacher, 2010). The patterns that were identified were then referenced throughout all data collected. This included the interviews and the observation note of the
researcher. This was how, throughout the coding process, the data was separated into emerging themes (McMillan & Schumacher, 2010; Patten, 2014).

**Depiction of the Findings**

A researcher’s job while conducting a qualitative phenomenological research study is to describe and interpret participants’ lived experiences (McMillan & Schumacher, 2010; Patten, 2014). The tools at the researcher’s disposal consist of words, observations, and documents and as the authors, McMillan and Schumacher (2010) state the use of the tools need to create “thick descriptions” to detail and report to the reader the finding of the study. This study aimed to use thick descriptions and help include the context, emotions, and perceptions of the lived experiences of the participants in the study. Along with the interviews, detailed notes were used from the observation of the researcher to support the activities and interviews of the participants. Also included for the reader, frequency tables, visual displays such as: charts and tables, along with descriptive narrative were used to enhance the reader’s access to understanding the data and how the findings were determined (McMillan & Schumacher, 2010; Patten, 2014).

**Limitations**

The researcher must note that there are limitations to this study. One such limitation is the unintended bias of the researcher that must be acknowledged. Knowing that this can limit the effectiveness of the study, the researcher employed several measures and steps to reduce this bias, along with the constant reflection of the processes.

The design of phenomenological studies also has some built-in limitations in the design. The sample size is not completely random and may lead to a less generalized example of the population. Also, the semi-structured question may not always yield the
same topic response from every participant and may modify the question in each interview (McMillan & Schumacher, 2010; Patten, 2014). Further, the interview process requires a level of trust, and interaction between the participant and the interviewer, it may be hard to establish the necessary rapport without injecting bias into the process (Patten, 2014). When examining the factors that limit the study, they may contribute to the quality of the data collected.

**Summary**

This chapter provided an overview of the qualitative phenomenological research study methodology. This chapter also reviewed the purpose statement, research questions and the design model used by the researcher to gather this data. The research design was outlined and included the population, sample, data collection procedures, data analysis process, and the limitation of the study. The next chapter presents the data and findings from the study. The final chapter presents the conclusions, implications, and recommendations of the study.
CHAPTER IV: RESEARCH, DATA COLLECTION, AND FINDINGS

Overview

A review of the literature demonstrated the need to identify expert teacher practices used by mathematics teachers to aid in gathering data and developing professional development for mathematics teachers in regards to school culture, classroom culture, intervention, differentiated instruction, and first best. Therefore, this study focused on describing the instructional practices of expert comprehensive high school mathematics teachers perceived in raising student achievement. In order to address this topic, the researcher interviewed 12 comprehensive high school educators in Riverside County, California, that employ both PLC and structured in-school intervention. This chapter presents the findings of the research. The chapter begins by stating the purpose and research questions, followed by a description of the methodology, population, and sample. The chapter concludes with a summary of the findings.

Purpose Statement

The purpose of this phenomenological study was to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction culture to make every student in their classroom successful in mathematics.

Research Question

This study was guided by the following central research question: How do expert mathematics teachers in comprehensive high schools that employ professional learning
Communities and structured academic intervention identify and describe the activities they use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction culture to make every student in their classroom successful in mathematics.

Research Sub Questions

The following research sub questions were developed to help answer the central research question:

1. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to school culture to make every student in their classroom successful in mathematics.

2. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to classroom culture to make every student in their classroom successful in mathematics.

3. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to interventions to make every student in their classroom more successful in mathematics.

4. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to...
intervention identify and describe the activities they use with respect to
differentiated instruction to make every student in their classroom more
successful in mathematics.

5. How do expert mathematics teachers in comprehensive high schools that
employ professional learning communities and structured academic
intervention identify and describe the activities they use with respect to first
best instruction to make every student in their classroom more successful in
mathematics.

Research Methods and Data Collection Procedures

The study method used was a phenomenological qualitative study. As described
by Patten (2014), the purpose is to identify and describe how people experience the
phenomenon, their perceptions, descriptions, emotions, judgments, and memories along
with many other insights. The purpose of this study is to identify and describe the
educational practice's expert mathematics teachers in comprehensive high schools that
employ PLCs and structured academic intervention use concerning classroom culture,
interventions, and first best instruction to increase achievement; this methodology is well
suited for the researcher. Qualitative studies aim at gaining a deeper understanding of the
lived experiences of its subjects (Patton, 2014). This study examines the classroom
culture, interventions, and first best instruction that increase achievement from the lived
experiences of comprehensive high school expert teachers. Gaining the insights from the
expert teachers, lived experiences make a phenomenological qualitative study an
appropriate method.
The researcher will conduct interviews and gain insights as to their lived experience in the environment of the interviewees. This type of research method and study is personal, and the researcher is the instrument of inquiry (Patten, 2014). In this study, the researcher will seek to interview the expert teachers to identify and describe their successful activities according to the prescribed variables. Once the interviews were conducted, the interview transcripts were analyzed then and coded for the study. The study will look to identify and describe the successful activities and practice used by expert mathematics teachers to provide data and insight for others to study and possibly create professional development.

**Data Collection Methods**

Analyzing what public high school mathematics teachers perceive that contributes to students' success in mathematics in comprehensive high schools with PLCs with structured academic intervention meeting or exceeding standards in mathematics was the purpose of gathering the data. For this study, the population of high school mathematics teachers in a PLC strand from Riverside County, California. The target population comes from an estimated 4,400 public school teachers in general who participate in a weekly PLC strand group meetings. “In quantitative studies, the group of subjects or participants from whom the data is collected is referred to as the sample” (McMillan & Schumacher, 2010, p. 129). The sample came from the estimated 4,400 high school teachers in comprehensive high schools in Riverside County, California. The 12 teachers selected were mathematics teachers from various districts that make the sample group of participants.
To determine what the teacher perceives to contribute to the success of the students in the classes, the researcher developed six semi-structured open-ended research questions that were asked of the 12 public high school mathematics teachers. The interviews were conducted individually and face to face. The teachers were aware that they were to be recorded for this study. The interviews took place on their campus, during school hours, and the teacher's preparation period. Each teacher was invited into an office space and asked to share their thoughts about collaboration, determining mastery, reteaching, and academic intervention. If the teacher needed any clarification of the question, the researcher would restate the question. The interviews were recorded and transcribed and appear in the appendix of this document. The questions were designed to draw out the teachers' perceptions of the various methods used by them and at their school for teaching, collaboration, and academic intervention. After the interviews, the researcher transcribed the recordings to determine themes for coding.

The researcher also conducted observations of intervention time at the school sites. The times observed were both in the teacher planning during PLCs and the actual interventions with students. Observing the PLC strand, collaborating, and discussing the key components of their planning and interventions were related to the core evidence of the study, along with observing the teacher interacting and using their planning in the intervention period. The advantage for the researcher was the ability to observe authentic discussions about the main factors, and their interaction and discussions about their perceptions and use of the tools for PLC and academic intervention, and observe those plans in practice. The field notes gathered by the researcher were coded for the study.
The researcher used an observation guide to direct the specific data gathered from the observations.

**Coding Procedures**

The reason that phenomenology was selected for this study is so the researcher can gather data about “what” and the “how” the subjects use, motivate, and develop student success. The tools that are in place at their high schools provide a structure for the teacher to work within. The PLC time gives them a chance to collaborate and sets a direction for what that collaboration will look like. The structured intervention time allows the teacher the time and access to students and give them a chance to employ many of the strategies offered in training and collaboration. Therefore, as themes were developed, the researcher considered the connection of the themes to the research questions (Patten, 2014). How each theme answered the research question by representing a teacher’s perception or tool that leads to the student’s success was coded for the study. The researcher marked potential themes in the margins of the transcribed data documents, after the first read. Following the first read, the researcher reflected on the possible codes that can be assigned (McMillan & Schumacher, 2010; Patten, 2014).

After the initial reading and reflection the researcher employed NVivo software for qualitative data analysis, this will help gather the coded materials together under themes and includes interviews and observations. In addition to the coding of the researcher, two peers familiar with but not a part of the study were asked to read and code the data independently based on the themes originally identified. The use of peers to independently code the data creates intercoder reliability (McMillan & Schumacher,
Categorizing and Identifying Themes

When conducting qualitative research, the main goal is to establish a relationship between the various codes that form a pattern into established themes (McMillan & Schumacher, 2010). The patterns that were identified were then referenced throughout all data collected. This included the interviews and the observation note of the researcher. This was how, throughout the coding process, the data was separated into emerging themes (McMillan & Schumacher, 2010; Patten, 2014).

Population

The population of a study is the group of subjects that fit into the area of research and in general, fits the results if the purpose for the research (McMillan & Schumacher, 2010; Patten, 2014). For this study, the population will come from teachers at comprehensive high schools in California. The intended population of this study is designed to include all public high school principals in California. In the 2017-18 school year, California’s education system was composed of 76 public high school districts and 344 public unified school districts, totaling 82,342 potential public high school teachers for the population of this study (CDE, 2018).

Target Population

A narrowed group from which a sample was drawn from the overall population group is referred to as the target population (McMillan & Schumacher, 2010). The total population of comprehensive high school teachers in California is too large to conduct interviews with the population was narrowed. The county of Riverside was chosen for
the next level of selecting a target population. The county selected for the study was Riverside County, California. With the ethnic diversity, a mixture of urban, suburban, rural populations, and the options available to these populations for education, Riverside County is similar to the other 58 counties in California (CDE, 2018). Riverside has 18 districts with a total of 55 high schools with nearly 4,400 teachers to identify and select as study participants. A target population was selected with individuals with requisite qualifications to participate in the study. The study also has further qualifications for the work environment in the comprehensive high schools. The target population for this study will be expert teachers in comprehensive high schools that employ PLCs and structured academic intervention in Riverside County, California. There are 55 comprehensive high schools in Riverside County, California and 11 of comprehensive high schools identify employing both PLCs and structured academic intervention.

Sample

There are no hard and fast rules for sample size in qualitative inquiry (Patton, 2017). To gain an understanding of the insights and lived experiences of the expert teachers, the use of a sample size of these expert teachers is most practical for gathering information through the interview or observation process. The sample of 12 comprehensive public high school expert teachers for the study was chosen from the 11 public comprehensive high schools that employ PLC and structured academic intervention from four school districts (CNUSD, RUSD, VVUSD, and MVUSD) within Riverside County, California.
Demographic Data

A sample in a qualitative study is naturally small, and in contrast to quantitative probabilistic sampling, the sampling is purposeful, as Patton (2014) stated, “selecting information-rich cases for in-depth study” (p. 264). There are no hard and fast rules for sample size in qualitative inquiry (Patton, 2017). Qualitative analyses typically require a smaller sample size than quantitative analyses. Qualitative sample sizes should be large enough to obtain feedback for most or all perceptions. Obtaining most or all of the perceptions will lead to the attainment of saturation. Saturation occurs when adding more participants to the study does not result in additional perspectives or information. For phenomenological studies, J. W. Creswell (1998) recommends five to 25, and Morse (1994) suggests at least six. There are no specific rules when determining the appropriate sample size in qualitative research. Qualitative sample size may best be determined by the time allotted, resources available, and study objectives (Patton, 1990).

To gain an understanding of the insights and lived experiences of the expert teachers, the use of a small sample size of these expert teachers is most practical for gathering information through the interview or observation process. The sample of 12 high school expert mathematics teachers for the study was chosen from the 11 public comprehensive high schools that met the specific criteria of the study (see Table 3). The schools identified came from four school districts: CNUSD, RUSD, VVUSD, and MVUSD, and all are located in Riverside County.
Table 3

Demographic Data Related to Research Study Participants

<table>
<thead>
<tr>
<th>Study Participant</th>
<th>Gender</th>
<th>Approximate Student Enrollment at current school for 2019-2020</th>
<th>Number of Years as Teacher at Current School</th>
<th>Total Number of Years as a Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Male</td>
<td>3,750</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>B</td>
<td>Male</td>
<td>4,600</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>C</td>
<td>Male</td>
<td>3,750</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>D</td>
<td>Female</td>
<td>4,600</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>E</td>
<td>Female</td>
<td>3,680</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>F</td>
<td>Female</td>
<td>3,750</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>G</td>
<td>Male</td>
<td>3,750</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>H</td>
<td>Male</td>
<td>2,400</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>I</td>
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<td>3,130</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>J</td>
<td>Female</td>
<td>3,130</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>K</td>
<td>Male</td>
<td>3,680</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>L</td>
<td>Female</td>
<td>3,750</td>
<td>5</td>
<td>13</td>
</tr>
</tbody>
</table>

Presentation and Analysis of Data

When a researcher uses phenomenology to guide a research study, the attempt is made to gain a deeper understanding of the nature or meaning of the lived experience experiences of the subjects (McMillan & Schumacher, 2010; Patten, 2014). This study focused on the lived experiences of comprehensive high school teachers in Riverside County, California that have both PLCs and structured intervention to identify and describe their teaching practices are impacted by school culture, classroom culture, intervention, differentiated instruction, and their planning for first best instruction. The data consisted of 12 interviews and the collection of artifacts, and observations of the intervention periods. Dominant themes were those considered consistent if presented from the interviews and further supported by artifacts for each research sub question. To answer the central research question, the researcher coded the emergent themes from the data as they related to the impact of the variable from the sub questions. These variables
are school culture, classroom culture, intervention, differentiated instruction, and their planning for first best instruction. The findings of this study are presented by research sub questions.

**Research Sub Question 1: Impact of School Culture on Teaching Practices and Student Learning**

The first research sub question sought to answer: *How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to school culture to make every student in their classroom successful in mathematics.* Three themes emerged among the 12 participants, which ranged in a frequency count from 7 to 30.

**Teacher relationships and collaboration.** The most frequently referenced theme in the study was the impact that teacher relationships with colleagues and students, and the collaboration of those same groups. This theme was the highest reported theme in Research Sub Question 1 and was the highest reported frequency in the study. This theme was recorded from 10 of the 12 interview sources with 33 frequencies. The teachers interviewed expressed the advantages of having a good relationship with their peers, and being able to collaborate. Teacher C expressed,

I would say the PLC is the biggest thing that I use. You know, I'm not. Because I'm a little bit younger as a teacher. There are other teachers who've taught the same topic before and that could be within my PLC or that could sometimes be, I go to see (my fellow teachers) and say, ‘How do you teach this?’
Additionally, Teacher E stated,

So having the school culture and having that set time, for example, with PLC time, and where I can plan with my fellow teachers about not just one aspect or one student, type of student might in my classroom, but able to target different students and having that mentality where we're collaborating and we're trying to divide and conquer. So we all have different aspects. I think it gives me the opportunity to be able to do more instead of just being able to maybe get time to do one thing that I want to address with my students. We can, as a group, come up with more resources, more strategies, more opportunities for the students to learn.

Teacher F goes on to state,

We're like a family. There's good and bad, but we all get along and we all respect each other. And I think you just have that when you walk into a classroom or you can rely on other colleagues to help you out. That's important and that's good. Also just the school culture, just walking on the school and you just feel that positive vibe throughout campus.

Lastly, Teacher L added,

We have a really positive, uplifting school culture, and I think that helps in many ways. Because relationships with teachers is a big thing, because I need to get along with my coworkers, I need to get along with them on a professional level. The theme first point of contact emerged several times from all twelve interviews. I think it helps build those relationships with us. Where, if I'm having an issue with a student, I can go to them and I say, 'Can you talk to this student? You
might be able to reach them a little better, I know you guys are close’ - the
students knowing that we provide a united front here. That we are all on the same
page, that we do the be a shark, that we are going to recognize certain behaviors
and that things that we're looking for.

**High expectations.** The second most frequent finding of the study from the
belief of the teachers that there are high expectations for learning placed on the students.
This theme was cited for various reasons, but it all revolved around what helps define the
schools' culture. This theme was the second-highest reported theme in Research Sub
Question 1. This theme was recorded from 6 interview sources with 12 frequencies.
Teacher G commented,

> I see us more as college-ready. So the overall culture is the expectation is our
students, we are preparing our students to go to college if they so choose. Being
within that culture. That means there is a lot of emphases placed on academics
and the key skills necessary for students to be successful at the higher levels of
education. …When they don't get it, the culture is they need to get it, okay,
obviously there are some students... There is a very low percentage of students
that I believe here just refuse to learn. So at some level, every single student here
I believe wants to be successful, okay? My belief is every student wants to be
successful at some level. So when they are not learning, are they not
understanding the materials that are being taught? Then those are the students
that we identify and we try to give the support necessary so they can be
successful.
Teacher H added, “I think school culture has everything to do with how successful students are.” Teacher L shared

Those are their expectations when they come in, to know that we're going to hit a certain level with these kids. And whether its special education, or general education, or honors, we're going to take them as far as we can go. Because that is kind of our school culture, is that strong academic piece.

Teacher D reinforces the idea that the community plays a large role in the high learning expectations of a school's culture. Teacher D states,

In this area, there's a high expectation for student achievement. We have a lot of parents who have either been educated or they're staying at home, and they're I guess what we would refer to as involved parents. And so they're very on top of their students, checking their grades very often so that the bar is set high here as far as the school culture goes. School culture is definitely important for a student's learning. It's what the expectation is across the board. So it's not just what we want kids to learn, but also what behaviors we expect in the classroom.

**Expanding learning.** A third finding of the study from the domain school culture was identified as the school culture that helps expand student learning. This theme was the third-highest reported theme in Research Sub Question 1 under school culture. This theme was recorded from 7 interview sources with 8 frequencies. Teacher E stated,

I found myself trying to do a lot of different things within the one lesson, which maybe I do a couple to try to reach the higher level kids but also those that might need intervention. But now with the set time, with office hours, I can actually differentiate and challenge some students. And then when students come in, I
offer extra opportunities for some students to come in and explore some higher-level thinking that they're ready for and not keep them within the classroom.

Teacher A reflected,

Oh, absolutely. Because again, because of the high push for achievement, I think there are a lot more resources or push for extensions on things like that. I know there's a lot of teachers doing, I don't want to say innovative as much as extending things.

Additionally, Teacher J stated,

Just asking questions in class, letting students share out their ideas. One of the things that I need to learn a little bit more myself is letting students share their various ideas. I'm looking for a few particular ones, but I also want to acknowledge that the students are thinking on other levels.

When questioning Teacher G about the impact of school culture on the high expectations for learning, Teacher G commented,

Once students are getting it, there are enrichment activities that students can participate in order to take their learning to another level. I always try to go above the standards, so I teach the standards, but I try to teach a little bit above the standards and show how what they're learning in my class is going to connect in other classes. So they have an idea of why are we learning this? Why is this important, and how is this going to fit into other classes?

Table 4 illustrates the major findings identified as themes by frequency counts as it relates to the impact of school climate on teaching practices and student learning.
Table 4

Identified Impact of School Climate on Teaching Practices and Student Learning

<table>
<thead>
<tr>
<th>Theme</th>
<th>Frequency</th>
<th>Number of Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Relationships and Collaboration</td>
<td>33</td>
<td>10</td>
</tr>
<tr>
<td>High Expectations</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Expanding Learning</td>
<td>8</td>
<td>7</td>
</tr>
</tbody>
</table>

Research Sub Question 2: Impact of Classroom Culture on Teaching Practices and Student Learning

The second research sub question sought to answer: How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to classroom culture to make every student in their classroom successful in mathematics? Five themes emerged among the 12 participants, which ranged in a frequency count from 11 to 32.

Safe space. One of the major findings of the study from the variable of classroom culture identified that teachers are providing a safe space for students to attempt something new or ask questions and not feel threatened or fearful to do so. This theme was the highest reported theme in Research Sub Question 2 and the second overall cited reference in the study. This theme was recorded from all 12 interview sources with 32 frequencies.
Teacher G stated what a safe classroom looks like,

I think the biggest part of my classroom culture is I want students to feel comfortable in my class. I want them to be able to ask questions, okay, and not feel any fear of reprisal or being made to feel stupid or anything like that. Students in my classroom feel like they can ask questions and get answers and they are not in any way demeaning, okay, for those questions. So I try to create an environment where they're comfortable, where they can feel like they can ask questions, where they can come and get help.

Teacher A focused on the idea that mistakes are natural parts of learning and that all students should feel empowered to try and work through their mistakes. Teacher A expressed,

I think the first thing is to basically allow students, or make the students understand that mistakes will happen and mistakes are not failures. The mistakes are opportunities to learn. It's one of the first things I start off with at the beginning of the year and throughout the year, is that basically I even make mistakes intentionally and expect them to catch them to realize that mistakes are just opportunities to improve. That part of the process of human learning is making mistakes and then improving on them and so I do that throughout the year, not only in my teaching and in the lesson, and encouraging them, even when I call on kids to answer questions, they don't get a right. I ask them, ‘Would you like to try again?’ Because again, for me it's an issue of, ‘all right, I didn't get that one right, but it's okay not to get it right the first time, you want to try again.’
Teacher A further explained, “I don't want to say that they're allowed to make mistakes, but it's safe to make mistakes. I want them to understand that they're going to make mistakes and that's okay.”

Teacher B reinforces this idea by modeling this behavior,

I think that's the culture within my classroom, and I really try to make it open.

When I make a mistake I don't try to cover it up. I try to use that as an example of like, ‘Okay, see look, I do this all the time, and I'm still making mistakes.’ And I think that's comforting to students, because they realize it's all right to make a mistake, and it's all right that it takes me a while.

Teacher D discussed that classroom culture, for the most part, is set by the teacher, and you must be intentional bout how to proceed. Teacher D stated,

So for my culture, we start right off the back with culture. We don't start the first day with math because the expectation is, I help a lot of kids who struggle in math. And so throughout the year, I have a lot of kids coming in and a lot of kids going out. And I learned pretty early that one kid will disrupt the whole thing so I have to have a good foundation so we invest in the beginning in the culture so then that no matter who comes in or out we're all on the same and they're invited in and hopefully they don't disrupt everything that's going on.

Teacher E focused on the aspect of communication, and student knowing how to ask for help when they need it. Teacher E commented,

I focused on that in math content and just general academics. But also have the students be an advocate for themselves in terms of we’ll be open to, it's like if this isn't where you needed to be, you need to let me know and say, ‘Hey,’ otherwise I
don't know how to help you. So I encourage that whole environment of students to communicate and advocate for themselves and let them know you're in charge of your math education.

Teacher F added,

When they're not afraid to tell you they don't get it and they're not afraid to admit that they got something wrong or why they get something wrong. And you're approachable, and they'll talk with you or even if they talk with their peers in the classroom, just having that environment. And again, that school culture just makes them more comfortable. And as long as they're more comfortable in the classroom, then they won't be afraid to say, 'I didn't get something,' than hide back and then you don't know, and they don't admit it and you don't find out. It's a kind of a balance of you got to have obviously your ruleset and your expectations, but you have to realize that they're just kids and you accept the fact that sometimes they're not perfect. They're going to make mistakes and it's okay to fail and you just build that relationship with them and just make them feel comfortable.

Teacher F expressed the main benefit of fostering a safe space in your classroom culture by stating,

So again, if they feel comfortable, then I think they're willing to push themselves further to extend what they're learning and again, not afraid to ask the question as far as how will this apply to this or they trust me when I want to push them. They don't really fight back and have that guard up or if they're just so solidified.
**Communication.** Communication was the second most frequent theme under Research Sub Question 2. This theme focused on the student’s ability being able to articulate their needs to the teacher and the teacher being able to respond appropriately. This theme was recorded from the 11 interview sources with 28 frequencies.

Teacher A makes the need for students to communicate very clear. Teacher A expressed, “I tell the students, ‘I can't read your minds.’ And there can be misimpressions. I mean it's like anything, you've got to actually just go to the source.”

Teacher E takes this idea further by stating.

I told them I don't have superpowers yet, so until I can x-ray into the brain, I got to see it on paper. But it does provide a lot of insight because the sequencing is part of that, is just in where their thinking process is in order too ... there's sequential things and sometimes they deviate and they go the wrong way, but you can learn from that wrong path. I'm going to go back to communication. To me, the communication piece is very crucial.

Teacher F discussed how you begin to foster this communication with students by stating,

I think that the students, for you to understand that the student has learned something, there has to obviously ... not so much just the obvious on the work they do, but it has to be communication and you have to be able to have that relationship with a student that they can trust and tell you, ‘Hey, I haven't gotten something,’ or, ‘I have,’ or by not just looking at their work. So again, it goes back from being able to have a relationship with them and that they trust me and they can tell me when ... if they can verbally tell me, I can see it on their work.
Teacher H explains, “To me, even when I'm helping the kids individually when the student is able to verbalize to me their point of confusion question, I'm able to then understand at what depth I need to go in my explanation.”

In addition to the communication that is critical between the student and teacher, there is also a critical communication between the school, the teacher, and the parents. That relationship is focused on by Teacher G who stated,

The only other real key to student success and this is kind of on an individual basis, but it works for most students, is there needs to be excellent communication with parents, so it needs to be a team effort. It's the teacher, it's the student, it's the parent, it's the administration of the school. All four concepts need to work together in order to ensure a student is successful. If any one of those pieces is not part of the overall picture, the education for the student will probably not be as rich as it could be.

**Relationships.** A third major finding of the study from the impact of classroom culture on student learning was the relationships developed between the student and the teacher. This was a unique theme in that although its frequency did not rate the highest, teachers seemed to state that this was the most important aspect. In fact, 10 of the 12 subjects stated this is the most important aspect for a teacher to develop and for student learning to be successful. This theme was recorded from the 10 interview sources with 22 frequencies. Teacher A explains,

I would say it's at the beginning. Students will work for you if they have a personal connection with you. Every student that I have has had a bad experience with math. Most of them come in thinking they hate math because they are in a
resource class. That means they've struggled with a gen ed class. You just don't move straight to there. So at some point, they have failed and most of the time when we fail at something we avoid it or we have a very bad feeling about it. So creating a connection for students, some of the connection might be motivating them by showing them what they could do later. Some of them would just be asking them what they did that weekend. But I would say the number one thing is making sure that every student knows that you care about them and you care about their learning. And I think 99% of the time you can get a student to learn for you if they can see that connection that you have a positive classroom. Students don't really work if it's like 'Well you're going to work here or you get a detention.' That does not work in my experience. That does not work.

Several comments emerged from the interviews that help correlate this theme.

Teacher G stated,

I try to make individual connections with students so I can find out what's going on. A lot of them come in, sometimes they have a lot of baggage and things going on, and school is not the number one priority. They've got bigger things on their plates. So if I can make those personal connections, I find that I get a lot more effort out of them, even when they have other things going on around them that they're dealing with.

Teacher H included,

Early on I recognized that the kids will always rise to my expectation, and if my expectation is low, I'm not going to get much out of them. If my expectation is higher, then they will, especially if we build the kind of relationship where they
know I'm here for you. I want you to do what's best. Then they will bend over backward for me.

Additionally, teachers echoed the impact a good relationship with students can impact teaching and learning in the classroom. Teacher C commented, “The expectation is every student passes. We have a very positive culture in the classroom. It's all about building relationships with those students.” Teacher L highlighted that good relationships create mutual respect stating, “A really solid relationship. I know that they have respect for me, and I know that I respect them. And so having that mutual respect for each other.” Teacher D stated,

Besides culture and relationships, that's just throughout the year. If your kid is having a bad day, it's easier to get them back into what they need to do if you have a solid relationship with them. Teacher D stated that because of the good relationship, I think that kids can learn at higher levels if the expectations are set higher and if they believe in themselves and the parents believe in them. And so giving them the opportunity. So I think you have to set the bar high, but you have to give them support. You can't just expect them to get there and do it on their own. Not every kid is going to get it in the same amount of time. But I truly believe that everything that I'm doing and I like love taking freshmen on purpose because it's a very hard group to work with. But I think it’s the most rewarding because then you see them in a couple of years and you see how maybe it clicks now.

**Motivation.** A fourth major finding of the study from the impact of classroom culture on student learning was the theme of motivation. This theme was the fourth
highest reported theme in Research Sub Question 2. This theme was recorded from the 8 interview sources with 14 frequencies.

Teacher B focused on motivation being the key, whether that situational or because of your relationship, motivation moves students. Teacher B stated,

It's really about motivation with the kids, and sometimes they need to hit rock bottom before they decide, ‘Oh shoot, I need to ...’ Typical at the end of the semester the kid's coming up and being like, ‘What can I do to get my grade up?’ It's like, ‘Well now you're serious about it.’

Teacher C expressed that motivation is a part of their relationship with students,

See the expectation is you cannot just get a four out of 10 and be happy with that. If you are in class, we are going to give that back to you. If it needs to be me re-teaching, then I'll reteach. If it's an aid who can go and just motivate the students to try it again, that might be what happened. And if it's a whole class who failed, then we're going to redo the entire lesson. So we're not going to go onto a different topic if not everybody can move on. But we're not going to move on until everybody is (ready) because everything builds on everything.

Teacher I states, “You've got to be able to say, ‘Everybody can learn.’ You got to be able to look there and say, ‘Okay, how can I get you farther than what you are?’” Teacher I continues with, “It's okay to hate math, but you could still learn how to do it.”

Teacher L adds that motivation alone won’t do it, there must also be the relationship. Teacher L states, “And so I think, but those relationships without, if my kids didn't trust me and didn't respect me, they wouldn't work for me.”
**Exploration.** The fifth major finding of the study from the impact of classroom culture on student learning was exploration or having student’s problem-solve for themselves. This theme was recorded from 8 interview sources with 12 frequencies.

Teacher F explains that instead of direct instruction many times,

They do a lot of group work and working with their peers. And I think, and again that extends to the culture as far as having that environment, having that positive environment in the classroom, and them wanting to learn with their peers, helps them to have that desire. Like, ‘Oh I see that this can be applied this way.’ Or, ‘Let's see if it works this way.’

Teacher J explained,

I assign problems of the week, which I don't do as often as I like to. I don't tell the students how to start it. I tell them, ‘I can give you a hint on Wednesday.’ If they get it on Monday, it's done on their own. I give a hint on Wednesday if they need it and then turn it on Friday. Normally you'll have the main way that students solve it, but I'd love to see those other ways that students are thinking.

Teacher K uses exploration when presenting new material,

So, in class, I will say, ‘Go ahead and work on this.’ And then, but I do give them the instructions of, ‘Don't come up to me in the first two minutes and ask me how to do this bump, look back on your notes, ask a friend.’
Teacher K adds exploration extends the learning process by stating,

I find some of my students can take that extra step and say, ‘Oh, I got it. I can apply it now.’ It's because I would just add on, just something else they have to do, and so forth. Trying to drag them, as I said, into deeper waters.

Table 5 illustrates the major findings identified as themes by frequency counts as it relates to the impact of classroom culture on teaching practices and student learning.

Table 5

| Identified Impact of Classroom Culture on Teaching Practices and Student Learning |
|-----------------------------------------|----------------|----------------|
| Theme   | Frequency | Number of Sources |
| Safe Space | 32         | 12              |
| Communication | 28         | 11              |
| Relationship | 22         | 10              |
| Motivation  | 14         | 8               |
| Exploration | 12         | 8               |

Research Sub Question 3: Impact of Intervention on Teaching Practices and Student Learning

The third research sub question sought to answer: How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to interventions to make every student in their classroom more successful in
mathematics? Five themes emerged among the 12 participants, which ranged in a frequency count from 13 to 29.

**Effective intervention.** One major finding of the study from the variable intervention and its impact on teaching practices and student learning has effective interventions. This theme was the highest reported theme in Research Sub Question 3. This theme was recorded from all 12 interview sources with 30 frequencies. Teacher E commented about having structured intervention campus-wide,

Before it was so sporadic and then maybe I can meet with them here or there and it was just inconsistent, and the students, now it's become a culture, not just in my classroom but in the school so the students know and I have more attendance to these interventions that I have more interaction and more opportunities that are being taken advantage of. So the students are being more successful.

Teacher F added,

We have office hours, if I'm able to accommodate those students, if there's a group that, it's not a whole class thing, there's a group of kids who don't get it then ‘okay, come tomorrow at office hours and then we'll do some extra, whatever we need to make sure that you are getting it and understanding it.’

Additionally, Teacher H stated,

So for us, office hours gave us 90 teachers who could act as tutors two days a week. For me, it means that I can now get through my lesson without being concerned as much about the two to five students who are still confused. Okay, I can keep moving for the 30 students who are getting it because I know that those two to five, I'm going to invite to office hours on Tuesday, and we're going to go
over it again. I don't have to worry about their work schedules after school, or do they need to go home and babysit, or they're not going to have a ride, or their parents just don't want them to stay because they don't feel safe. They're here now. They're already here on campus, and so they have no excuse. So to me, the structure, intervention of office hours, taking the excuse to fail, excuse away from the kids. There's no reason, and the only thing that would mean a student should be failing now is because the student wants to fail.

Teacher I shared how the structured intervention helps them take a different approach in intervention,

I explain the lesson one way in class, and then I'm calling that kid in office hours, I'm not going to explain it the same way. It makes sense. They didn't get it the first time. But for me, it means finding where their point of confusion is and starting from there. So we'll go through the problem together until I find, 'okay, here's where your confusion. This is what's keeping you from going forward.' And from then on, I can pinpoint that and find better ways to explain to them what to do from them on.

Not all interventions happen during the structured period; most take place or at least begin during the class period. Teacher L commented,

What I've started to do is, I have been giving it a pull, calling them up one by one, asking them to solve one problem of that concept that we're on. And I'm counting that as a quiz and they do it right in front of me so that I can see where they're making their mistakes. Because I'm watching them do the problem right in front
of me. So, I'm following along and I can see where they're making a mistake from the very get-go.

Furthermore, Teacher A commented,

So I tried to set it to an intervention time in my classroom. That's more of the time when I have them, I don't want to say captive, but they're not going other places to do that kind of intervention. So for me, I get more done in my class time intervention than I do necessarily outside of the... during the intervention time. Because there's more on the topic, at the point of confusion and relative at the moment. Where sometimes I'll have the kid who makes a mistake or is struggling on a Monday. Well, I don't see him until Thursday or Friday, and by then, he's got 15 other issues to dealing with by then.

Teacher D also states that quick and immediate interventions can help a teacher guide a student so they can make small adjustments when the errors are calculations or just a missed step. Teacher D states,

So we're still targeting and working and practicing those skills that they get. They understand the main concept. Maybe they need more individual practice with it, but it's not a misunderstanding of it; it's just that they may be miscalculated or they forgot and they need the reminder and then that has to do with their learning process. But that doesn't mean that they can't do it.

**Teaching to mastery.** Another major finding of the study from the variable intervention and its impact on teaching practices and student learning is teaching to mastery. That is the continuous teaching and assessment until mastery is reached. This
theme was the second-highest reported theme in Research Sub Question 3. This theme was recorded from 8 interview sources with 21 frequencies.

Teacher B supported this theme by stating,

Well, of course. Most kids, they need to see things multiple times, and I think it's okay, but there are time limits. Life has time limits, and for me to pretend like there's not, they have a certain window to learn the concept. They may not learn it the day that I taught it, but they have a window that they have to learn it in, and if they learn it in that window they can show achievement in terms of higher grades.

Teacher C added,

I would say that I do like at least one to two quizzes a week on smaller topics, but then you have a chance to retake those quizzes or to build on it on the next quiz. So if you pass it on the next quiz, then you're able to show mastery over that. And we all do retakes and also sometimes kids want to come in for the retake, but if they can pass it into chapter tests, then that's a passed topic.

Teacher I commented, “I allow them to retake tests as many times until they can get it, as long as they're doing better. I told them, ‘I don't want you wasting my time and your time, so you study, retake the test. Let's just say you get one point better. You did better.’” Teacher H emphasized, “My rule is always, regardless of what your average says from your work, if you pass my final, you pass the class because that proves to me that in the long term, you've learned the material.”
So what does it mean to find mastery, Teacher A states, When you've got 40 students, it's hard to figure that out on a daily basis. That's what the whole point of having a daily exit ticket or a weekly quiz to kind of get that information in and out quickly because on a daily basis it is challenging to get that many kids across. Okay now I have physical evidence that says half you didn't get this question. I have physical evidence that says most of you got this question. So that one's going to be more individual. This one I've got to do more with the class because somewhere on the line I didn't teach it well, you didn't understand it well, there was something screwy going on with it.

Teacher A sums up the overall feeling of the teachers and expresses their thoughts this way, “So yes, I want you to know it. Yes, that's why I give you a second opportunity at the time to work through things.”

**When to intervene.** The third major finding of the study from the variable intervention and its impact on teaching practices and student learning is teachers knowing when to intervene. This theme was recorded from the nine interview sources with 19 frequencies.

Teacher C commented on the ways they know when to intervene,

We'll use the short term quizzes. I like those better because a lot of the things that I have if you have five different topics on the test, have trouble going in between those topics. So the short quizzes really can show me, ‘okay, you got this, we're ready to move on’.

Similarly, Teacher E stated, “I do little two or three quizzes per unit, small little chunks to do our essential learning. So I'll go through and do little, so I'll scan in really
quickly and we'd go through and I can see those through eliminate and do some little item analysis.” In the same way, Teacher G added about know when they have got it, “when I'm hearing really good explanations when a student can explain the concept clearly to another student and have that student understand, I know that student understands the concepts.” Furthermore, Teacher J added,

Because if they're willing to share with me, they're raising their hand, ‘I didn't get that answer. What happened?’ I'll just go back and, ‘Oh, you just put this in your calculator wrong.’ Or they feel comfortable in sharing if they got a different answer. And so then I can either troubleshoot or say, ‘Hey, that's a different idea. What did you do?’

Lastly, Teacher B commented on the obvious,

When I see high performing students miss concepts I feel like that's where I target. High performing students, if they're all missing the same question, then that's the red flag in my mind where I'm like, ‘Okay, something was missed in the learning or in the teaching.’

**Expanded learning.** The fourth finding of the study from the variable intervention and its impact on teaching practices and student learning is does intervention expand a student’s learning? This theme was recorded from the 9 interview sources with 15 frequencies.

Teacher A expressed that,

I'll have students who will be like, ‘Okay, I get that, but what about this? What about that?’ And I do always encourage them. I love jumping out of my lesson when students would be like, ‘Okay, if that's true, what about this situation? Does
that work? Is this over here?’ And I love it because sometimes the kids will challenge me.

Teacher C added,

We'll take opportunities with certain topics where it really lends itself to, ‘Okay, you are done before everybody else. Let's not just have you do extra problems, let's have you do a more difficult problem because you can access it.’ I would say in my geometry unit, some students are just barely getting by trying to solve the basics of the problem and other students are ready to multi-step problems where they have to apply multiple rules to one thing.

Teacher C states that even for students that did not get it at first,

What I found with office hours is that it gives them a chance to know, ‘can I have this chance to relearn this? If I fail this quiz, it's not the end of the world because I'm going to have a chance to retake it during the school day.’ So it kind of lessens the immediacy.

Several teachers commented on group work acting as its own intervention and allowed students to relearn information and teach information to others. Teacher E states,

I'm noticing they come and use that time and they'll come in and I, they don't need me. They're just sitting there with themselves. And I think that's a form of extending their learning because they're learning to use each other as resources. They're learning skills, not just going to help them in my class, but it's going to help them beyond (this class) because they're not just copying notes and trying to figure a problem out. They're talking about the problem. They're discussing it.
and they're trying to teach each other. And those kinds of things I think have grown out. And so now when I walk around and I hear them talking about certain things, I think they're becoming, they're owning their learning. They're owning how they do their own work. So it gives them that opportunity, I think, pushes them over.

Teacher F adds,

The structure is, ‘okay if you understand it, now explain to this person how did you do that problem or explain the steps.’ And so that does extend the learning for them. Not that they can just solve the problem, but they can teach it to their peers.

Teacher I agrees and states,

They're allowed to talk to people, as they're doing it, to make sure they can get it.

I have them come and teach problems from the board. Meaning, after you've worked the problem, now teach us how to do the problem.

Teacher H states their students expand their own learning “When the students are teaching it to each other.”

Expectations. The final finding of the study from the variable intervention and its impact on teaching practices and student learning is the expectations placed on the students. This theme was recorded from the 9 interview sources with 14 frequencies.

Teacher D commented,

Office hours have helped a lot within intervention because we just have that automatic time and it's a school-wide expectation. Now, not that people couldn't
do it, but maybe they weren't understanding where to fit in and how they're going
to take the time to do it.

Teacher F commented, “So definitely raises the expectation. I mean, when you
have some sort of interventions, you don't give the kids a chance to fail, they can't fail.
There are always ways that they can succeed and get extra help.”

Teacher C stated,

The expectation is every kid is going to pass every assessment. If you get
below... So we grade classwork and quizzes. If you don't pass the classwork you
have to do it until you have passed it. So passing it would be 70% and if you
don't pass the quizzes we automatically just give it back to you and have you try
those questions again.

Furthermore, Teacher E added,

It's always an expectation that for math, a significant percentage of our students
will need intervention. So everything I work through my lessons, I always have
my own expectation that I will need to re-teach, somehow provide different
strategies. Something because, yes, I always expect them to be leading that
intervention. A lot of it just comes from the students telling me what their
thinking is. So a lot of times when I have those in-class sessions when they're
asking to do something, and I'll say, ‘I noticed when we did this in class, you were
doing this.’

Teacher G emphasized,

With all the interventions that are necessary, I have high expectations. I expect
every student is going to pass, okay. I realize the reality of that is there probably
will be some students that don't pass. I wish that wasn't true. I do everything I can to not make it true, but again, the interventions that we use, okay, are specifically designed and the culture that's there is specifically designed to help students be successful and give them the intervention opportunities.

Teacher H introduced the idea that intervention and its effectiveness are challenging by high expectations. Teacher H states, “The expectation for learning causes intervention or a school or teachers to find better ways to intervene.”

Teacher K adds,

We’re holding them accountable, that we expect them to learn, that we want them to learn. And I'm open with my students about that. That from the very beginning day one of their freshman year when they're in my class, I expect you guys to learn. I want them to walk away with something?

Finally Teacher I tells their students the expectations for learning, “I'm not trying to get you into college. I'm going to get you to graduate from college.”

Table 6 illustrates the major findings identified as themes by frequency counts as it relates to the impact of the intervention on teaching practices and student learning.

Table 6

Identified Impact of Intervention on Teaching Practices and Student Learning

<table>
<thead>
<tr>
<th>Theme</th>
<th>Frequency</th>
<th>Number of Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective Intervention</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Teaching to Mastery</td>
<td>21</td>
<td>8</td>
</tr>
<tr>
<td>When to Intervene</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>Expanded Learning</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Expectations</td>
<td>14</td>
<td>9</td>
</tr>
</tbody>
</table>
Research Sub Question 4: Impact of Differentiated Instruction on Teaching Practices and Student Learning

The fourth research sub question sought to answer: How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to differentiated instruction to make every student in their classroom more successful? Two themes emerged among the 12 participants, which ranged in a frequency count from 14 to 26.

Different teaching methods. One major finding of the study from the variable differentiated instruction and its impact on teaching practices and student learning is using different teaching methods. This theme was the highest reported theme in Research Sub Question 4. This theme was recorded from all 12 interview sources with 30 frequencies. Teacher A commented, “There are times when I start off like, Okay, this will cover everything.” But as Teacher B adds, “Okay, maybe that approach, that style, that way that I presented that material was not an effective approach, and so I'd go back to the drawing board.” Teacher D stated,

I'm doing best practices in general that I can target all of my kids because it's nearly impossible to make individual learning programs for every single one of them. So visual aids, auditory supports; I'm breaking things down into smaller steps for them. We're doing a lot of open middle things where if you're high, you can come in here at this level, but if you're low you can still contribute to what we're doing and get something out of it and doing different activities within the station.
The approach Teacher I takes is, “I don't put too many methods out there. I'll put one method out there. And if I see a kid's not getting it, like you say, I'll ask, ‘You want me to show you another way?’ And if they're a ‘yes’, then yes.” Teacher E commented, There's just not one way. But if I teach a procedure, it locks me into just one thing. But going back to the mothership, if you will, I can branch out many different ways and students will be able to understand. So it gives me a wider variety of choices for a student that I might think could be there, versus middle, or versus low, I can branch out from the same concept. Teacher F also commented, “Differentiated instruction does increase learning. Not all students learn the same way and so you can't just stick to one method.” Teacher F goes on to state, “So showing in the other ways, then they're like, ‘Oh, that's what it is.’ Or, ‘I can do it this way.’ Because everyone does learn differently.”

Teacher G emphasized,

I tried to emphasize there's more than one way to solve a problem, and I tell my students, the more ways you know how to enter a problem and solve a problem, the stronger you're going to be at that skill, okay. Which method you use on an exam or an assessment that is entirely up to you. But the more ways you have to enter the problem, okay, the easier it's going to be.

Furthermore, Teacher J added,

I try to welcome lots of different ways of solving. In fact, we just again, that poster that they did today. And I feel bad that students feel things are wrong. Today they showed how they got their answers on their posters. Two groups did it very differently. The first group that did it differently said, ‘Oh, we did it
wrong.’ I said, ‘Why do you say it was wrong? There's nothing wrong with your method. You've got the answer and it's correct and you justified your answer. There's nothing wrong with that. You just did it differently.’ I'm trying to help these students understand that there are more ways to answer a problem and that it's not the wrong method if you can justify your answer. Because that's more tools in their toolbox and they don't have to be doing it just this one way, because then they're making connections, and that's opening up other doors for other ways of problem-solving. I love that.

Likewise, Teacher K stated,

In math, I think it does benefit students because they have a way of helping each other explaining. I can explain it to a student and they won't understand it, but then a friend explains it to them in their own way and they see it and they'll understand it. And sometimes I'm confused as to why they didn't understand it coming from me.

Teacher G agrees,

Sometimes there's more than one way to solve a problem. So what I want you to do is try to look at how your partner solved it and try to make sense of that and have them look at your solution and try to make sense of that. A lot of times it will, and again, I tried to emphasize there's more than one way to solve a problem, and I tell my students, ‘the more ways you know how to enter a problem and solve a problem, the stronger you're going to be at that skill, okay.’ Which method you use on an exam or an assessment that is entirely up to you. But the more ways you have to enter the problem, okay, the easier it's going to be.
Teacher L sums up differentiated methods by stating, “I think it's just kind of finding resources that'll make sure that I can reach them at where they're at.”

**Changes to teaching over time.** The second major finding of the study from the variable differentiated instruction and its impact on teaching practices and student learning is how it has changed their teaching over time. This theme was the second-highest reported theme in Research Sub Question 4. This theme was recorded from 10 interview sources with 14 frequencies. Teacher B commented,

My lesson plans, I used to be super laid out, and I'd have a PowerPoint, and it was predicting my every move. But recently, I've kind of flipped it, and I've done more feelers with the class when I'm teaching, and then I have my resources all available because I've been able to accumulate a lot, and I keep it all. I have stacks of worksheets for any concept and just ready to pull and give it to the kids where I see the need.

Teacher D in reviewing how they have changed stated,

So that might be maybe instead of working on the whole standard, maybe we break it into smaller pieces and we just work on part of it so that they can at least get that piece of it. Maybe they can't do the whole thing together. Maybe instead of doing multiple steps, they can do one step. Or maybe it's just instead of explaining it or describing it maybe we're going to a deeper depth of knowledge. Because that's really a lot of the standards bridge the fundamental standards and it's kind of the same thing.
Teacher E added that,

I think it's really changed, is the why. I really try to, before it was just tricks and procedures and things that I would try to teach them. This is how I do this. Now, you guys do 20 of them. And now it's more like this is a math concept. So I really focus on the conceptual learning part. Let's develop this concept. And I think that the first instruction try has really changed in the last few years. But also when I go back and remediate since they have a more conceptual understanding or that's my goal, is I can maybe try a little pneumonic device, try a little trick there, but it makes sense because now they understand why. Why we're going to do that shortcut or why are we going to do that procedure?

Other teachers suggested several changes to their approach. Teacher F, “I'm not really giving them direct instruction until maybe after the fact.” Teacher F goes on to state, “it was really rewarding to hear their conversations and see them actually ... they can learn stuff on their own and then teach each other.” Teacher G adds, “Every brain is wired a little differently. I have tried over the years to find the best practices that worked for most students most of the time.”

Table 7 illustrates the major findings identified as themes by frequency counts as it relates to the impact of differentiated instruction on teaching practices and student learning.
Table 7

*Identified Impact of Differentiated Instruction on Teaching Practices and Student Learning*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Frequency</th>
<th>Number of Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different Teaching methods</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Changes to Teaching Over Time</td>
<td>14</td>
<td>10</td>
</tr>
</tbody>
</table>

**Research Sub Question 5: Impact of First Best Instruction on Teaching Practices and Student Learning**

The fifth research sub question sought to answer: *How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to first best instruction to make every student in their classroom more successful in mathematics?* Four themes emerged among the 12 participants, which ranged in a frequency count from 8 to 16.

**Designed with tools in mind.** One major finding of the study from the variable first best instruction and its impact on teaching practices and student learning is effecting how they design their lesson with the tools and resources available to them. This theme was the highest reported theme in Research Sub Question 5. This theme was recorded from 11 interview sources with 17 frequencies. Teacher G commented,

I used to teach concepts in terms of in a classroom setting, I would try to maybe do two or three different approaches for a concept. And sometimes it would be all over the place because kids are trying to learn one thing and it's like, ‘Wait, but you're saying this and this?’ It would be more confusing than anything. And now
the way our approach is, I really focus on one strategy. Instead of trying to
confuse too many, it's like, we're just going to stick with this to be consistent.
And when it doesn't work for the students, then I can go through and provide
other strategies and it gives me a different setting to be able to try something else
with students that didn't get it the first time. When I'm doing the lesson, I always
build in certain questions where I'm trying to get to what their previous
knowledge is. So I'll go through and I've built in something because before I
present this concept, I want to make sure that the foundation for the previous
concept is there. So I try to do that as we move forward with the concept. So it's
built-in prior to it. And then once I feel like they've gotten everything they need
for that concept, we do a little short five problem quiz.
Teacher H discusses drawing on the experience and knowledge they have of their
students,

Well, I think in my planning, especially as I get to know the students, I know
what depth I need to go into to get them to learn what I want them to learn. I
know when I am better able to anticipate when I can speed up and when I need to
slow down.

Teacher K adds,

Early on in the school year when it's easier concepts or it's more of a review
concept, I will let them, I'll challenge them more, but as it becomes more difficult
than I have to be more flexible. I have to change them, how I'm going to teach it
and how I'm going to check for understanding.
Finally, Teacher C states,

I know what I have and what problem it is they eventually need to be able to
solve. It's going to take me 12 lessons to give them all the tools that they'll need
to do it, but in the end, they should be able to solve this problem.

**Collaboration.** The second major finding of the study from the variable first best
instruction and its impact on teaching practices and student learning is effecting how they
use collaboration (PLC). This theme was the second-highest reported theme in Research
Sub Question 5. This theme was recorded from seven interview sources with 11
frequencies. Teacher B commented on the collaboration that happens in their PLC,

When we are in our PLC groups with other math three teachers we'll sit down and
be like, ‘All right, what are we covering in this next couple of weeks?’ And then
people will be like, ‘Okay, this, this.’ And then we'll say, ‘Okay, well I really like
what the book does here. I tried this, and this didn't work.’ Then so we all kind
of hear each other's successes and failures, and then sometimes we'll go up on the
board and be like, ‘Well look, you could approach it this way. Teaching that had
a lot of success for kids understanding.’ And then another person will be like,
‘Oh yeah, I have this worksheet that I've created,’ and so we're able to pull
together all of our resources of maybe the way of teaching it from one person, an
awesome resource like a worksheet from somebody else. And then something
that didn't work, so don't go down that path from somebody else. Then through
that when you stand up in front of your class you feel maybe a little bit more
prepared and ready to present the material.
Teacher C added,

You know, so we do a lot of talking about students who are... If they're failing, okay. We'll kind of like, first thing, I'll look into who they had and see, how did they do in your class? Okay. They got a D in your class. They have an F in my class. We need to figure it out, something, what worked for him, what do we need to do?

Teacher G shared,

Every once in a while I'll get a question. It's like, ‘That is a great question. I need to find out more about it.’ That's where I would collaborate with some of my colleagues to find out, okay, where can I point this student to get more information on what they're curious about? And then I'll pass that onto the student and if they have additional questions, give them whatever guidance they need.

Teacher L concludes,

If I had to pick one, I think it would definitely be relationships. Because I think having relationships, not just with my students but with coworkers also, my students work for me because they know that I respect them and that I'm going to get work out of them. But they don't mind it as much when they know that they're actually learning and they're growing. And so I think having that, having coworkers that I know that I can go on and I can count on if I make a mistake, or if I do something, or I need assistance or they need assistance, they know that they can come to me and I'm a team player.
**Designed for expanded learning.** Another major finding of the study from the variable first best instruction and its impact on teaching practices and student learning is having on expanded learning opportunities. This theme was the third-highest reported theme in Research Sub Question 5. This theme was recorded from 9 interview sources with 10 frequencies. Teacher A stated, “Wow, they got this one. Let's give them one a little bit more challenging.” And even with the challenging one, I will set them up because I know its extended learning.”

In addition, Teacher D adds,

I have that usually planned ahead of time and if we get there we get there as a whole group because we can all benefit from it if we get there. But I think to start with the end result in mind, what are you going to get there? Give them some kind of hook. Don't give them too much information, give them an opportunity to discover it on their own, give them time to explore.

Teacher F agrees, “I do plan that with my instruction. How are we going to extend it and how far we're going to extend their learning?” Teacher J states,

Here's what I want my students to understand, but can I throw in some extra thinking extension for it? What I've looked for in a textbook is, is there a problem that I can give them that is novel that they'll have to think about? Sometimes those are my problems of the week. It's related to the topic but it's a little bit beyond their reach right now. So then they have to think about it, maybe talk to the other teachers.
Teacher G comments,

It’s always extended a little bit anyway, a little bit beyond the standard and I show them those connections to future classes, okay? But if students have unique individual questions, that's something that I will encourage them to continue to explore and give them to guidance or resources or point them in the correct direction.

Teacher A concludes,

There's always... and I ask them, ‘Wow they got this one. Let's give them one a little bit more challenging.’ And even with the challenging one, I will set them up because I know it's extended learning. I will actually tell students, ‘Okay, this one's challenging. If you feel like you're not getting it, that's completely okay. You get these first three, you're golden. This is for those of you that are going to go a little bit further, a little beyond. I mean some of you are bound for mathematically driven occupations.’ I go, ‘This is a question you're going to want to look at.’ But I try to again, instill in them that sometimes they're going to be challenged and it's okay to not get this one.

**Activities.** The final major finding of the study from the variable first best instruction and its impact on teaching practices and student learning is having on teacher-designed activities. This theme was the fourth reported theme in Research Sub Question 5. This theme was recorded from eight interview sources with nine frequencies. Teacher G comments on a practice they use to help a student learn,

Have students paired up in groups, okay, and in shoulder partners and I will walk around the room and listen to them. I will have them explain how to do a problem
with their shoulder partner. Their shoulder partner will be listening and will essentially repeat back.

Another teacher uses something different, Teacher J states,

I've asked them at the beginning of each semester to highlight what items that you know in green, what you don't know in pink and what you think you know in yellow. They turn those into me, and that helped guide me as to what I need to teach for the semester.

Teacher K takes a more direct route with their class activities,

What I've started to do is calling them up one by one, asking them to solve one problem of that concept that we're on. And I'm counting that as a quiz and they do it right in front of me so that I can see where they're making their mistakes.

Teacher D explains,

I try to make some kind of connection that they can remember because then I can refer back to and say, ‘Who's your good guy?’ I use that all year long. Who's your good guy? When we're going into the harder stuff when we start adding variables into it or graphs or stories, who's the good guy? What's the important information? What are your numbers? What are your quantities? So I work a lot on mathematical literacy. So for them to figure out what they need to know, what's important, what they don't need to know, but then also creating the experience because they might not remember what the lesson is, but they'll remember the experience.
Teacher E states that their activities are more rewarding,
I just did a quiz today and I was very encouraged. I haven't sat down and graded, but I was very encouraged by the type of work. Before it was more minimal work and stuff. And now it's rich in text and drawings and diagrams and I'm very excited to go grade it because I think at least they're thinking and demonstrating on paper is happening. So I need to see if it actually achieved the goal.

Table 8 illustrates the major findings identified as themes by frequency counts as it relates to the impact of first best instruction on teaching practices and student learning.

Table 8

*Identified Impact of First Best Instruction on Teaching Practices and Student Learning*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Frequency</th>
<th>Number of Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed with Tools in Mind</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Collaboration</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Designed Expanded Learning</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Activities</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

**Most Frequent Codes**

Table 9 synthesizes the top four most frequent themes that emerged from throughout the entire study. The table outlines the themes, along with the impact domain, frequency count, number of sources, and correlated research sub question.
Table 9

*Five Most Frequent Themes that Emerged From the Entire Study*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Teaching/Learning Domain</th>
<th>Frequency</th>
<th>Number of Sources</th>
<th>Research Sub Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Relationships and Collaboration</td>
<td>School Culture</td>
<td>33</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Safe Space</td>
<td>Class Culture</td>
<td>32</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Different Methods</td>
<td>Differentiated Instruction</td>
<td>30</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Effective Intervention</td>
<td>Intervention</td>
<td>30</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Communication</td>
<td>Class Culture</td>
<td>28</td>
<td>11</td>
<td>2</td>
</tr>
</tbody>
</table>

*Note.* Data sorted in descending order from most frequent to least frequent.

In this study, the five themes with the most frequency spread across four of the studies sub questions. The top two frequencies fell in the domains of school culture and class culture, with both having a frequency of 33 and 32 representing 10 out of 12 and all 12 teachers interviewed.

**Summary**

The study’s findings and the collected data were presented in Chapter IV. The focus of the study was how expert mathematics teachers' insights and lived experiences in comprehensive high schools that employ both PLCs, and structured intervention perceives the impact of school culture, classroom culture, intervention, differentiated instruction, and first best instruction have on their teaching practices and student learning. The target population of this study encompassed the comprehensive public high schools throughout the state of California. The researcher narrowed the population to 12 high
school expert mathematics teachers for the study was chosen from the 11 public comprehensive high schools that met the specific criteria of the study.

The researcher met with the study’s participants in an in-depth, face-to-face interview at a location of their choice. All interviews were recorded and transcribed using the Rev Transcription service. The data was coded for emergent themes using NVivo coding software. To help ensure the study's reliability, increased inter-coder reliability by working with peer researchers to aid and check the coding in a portion of the data. The coding was examined and reviewed as the researcher came to a common conclusion.

Chapter V presents conclusions based on the findings of the research study as well as the implications for future actions and recommendations for further research.
CHAPTER V: FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Purpose Statement

The purpose of this phenomenological study was to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction culture to make every student in their classroom successful in mathematics.

Research Question

This study was guided by the following central research question: How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction culture to make every student in their classroom successful in mathematics.

Research Sub Questions

1. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to school culture to make every student in their classroom more successful in mathematics.

2. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic
intervention identify and describe the activities they use with respect to classroom culture to make every student in their classroom more successful in mathematics.

3. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to interventions to make every student in their classroom more successful in mathematics.

4. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to differentiated instruction to make every student in their classroom more successful in mathematics.

5. How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to first best instruction to make every student in their classroom more successful in mathematics.

Population

The population of a study is the group of subjects that fit into the area of research and in general, fit the results if the purpose for the research (McMillan & Schumacher, 2010; Patten, 2014). For this study, the population will come from teachers at comprehensive high schools in California. The intended population of this study was
designed to include all public high school principals in California. In the 2017-18 school year, California’s education system was composed of 76 public high school districts and 344 public unified school districts, totaling 82,342 potential public high school teachers for the population of this study (CDE, 2018).

**Target Population**

A narrowed group from which a sample was drawn from the overall population group is referred to as the target population (McMillan & Schumacher, 2010). The total population of comprehensive high school teachers in California is too large to conduct interviews with the population was narrowed. The county of Riverside was chosen for the next level of selecting a target population. The county selected for the study was Riverside County, California. With the ethnic diversity, a mixture of urban, suburban, rural populations, and the options available to these populations for education, Riverside County is similar to the other 58 counties in California (CDE, 2018). Riverside provided 18 districts with a total of 55 high schools with nearly 4,400 teachers to identify and select as study participants. A target population was selected with individuals with requisite qualifications to participate in the study. The study also has further qualifications for the work environment in the comprehensive high schools. The target population for this study was expert teachers in comprehensive high schools that employ PLCs and structured academic intervention in Riverside County, California. There are 55 comprehensive high schools in Riverside County, California and 11 of comprehensive high schools identify employing both PLCs and structured academic intervention.
Sample

There are no hard and fast rules for sample size in qualitative inquiry (Patton, 2017). To gain an understanding of the insights and lived experiences of the expert teachers the use of a sample size of these expert teachers is most practical for gathering information through the interview or observation process. The sample of 12 high school expert teachers for the study was chosen from the 11 public comprehensive high schools in Riverside County that met the specific criteria of the study.

Major Findings

The major findings of this qualitative study are organized and presented by the research sub question.

Research Sub Question 1

Research Sub Question 1 inquired: How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to school culture to make every student in their classroom more successful in mathematics. The major findings for this sub question yielded three themes from comprehensive high school teachers perceived to have the greatest impact on their teaching and student learning.

The most frequently identified theme that 10 out of 12 teachers identified was teacher relationships and collaboration with a frequency count of 33. The teacher’s emphasized how having a good relationship with their colleagues and being able to share information and receive support is critical for their successes in the classroom. The ability to draw on other teacher's experience and knowledge also broadens the teaching
strengths in their teaching. In the review of literature, the need for schools that use collaboration to have structural change is necessary. Those schools need to implement time for a teacher to collaborate and an expectation of collaborative results (M. Fullan & DuFour, 2013).

The second most frequent theme for school culture was high expectations. From the literature, school culture affects student learning and performance; schools with cultures rooted in high expectations will spend time reinforcing and cultivating those expectations (A. Muhammad & Hollie, 2012). Teachers spoke to how the expectation at their school does affect the performance of the student. Where high expectations are prevalent, students rise to the challenge. Other teachers, especially in special education, spoke of raising the expectations of the students.

However, teachers also remarked that having a positive school culture also allows a student to expand their learning. Seven teachers with a frequency of eight references spoke to the student asking for more information on how to apply their learning beyond mastery. The largest effect perceived by teachers was that students who experience positive school culture get involved in co-curricular and extra-curricular activities that help broaden the learning. The review of the literature indicated that school culture is more important to the success of student achievement than any of the imposed structural initiatives that a school site may implement. A school’s culture is more than how people feel about the school or the school’s morale; it runs deeper than that (A. Muhammad & Hollie, 2012). Muhammad writes in his book, The Will to Lead, The Skill to Teach, that “it is the deep patterns of values, beliefs, practices, and traditions that have been compiled and normalized throughout the school's history” (p. 21). A school’s culture
creates the way a school sees itself when setting goals for outcomes, and in how it compares itself to others in the expected standards of a district, county, or state. Researchers have examined the effects of school culture on student achievement, especially when comparing one school to another in standardized testing. The way a school perceived the testing through the lens of their culture did have a self-fulfilling effect on the outcomes of the testing (A. Muhammad & Hollie, 2012).

**Research Sub Question 2**

Research Sub Question 2 inquired: *How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to classroom culture to make every student in their classroom more successful in mathematics.* The major findings for this sub question yielded five themes from comprehensive high school teachers perceived to have the greatest impact on their teaching and student learning.

The most frequent theme with all 12 subjects and a frequency of 32 was that students need to have the classroom to be a safe space. Teachers spoke to how a student needs to feel safe and comfortable in the classroom so they can express their needs. A frightened or uncomfortable student will not volunteer or ask for help and clarification. Many times by the time a teacher is aware of their needs, it is too late. A safe classroom allows the teacher to know where students need help, and they can intervene more quickly. From the review of literature that the development of trust in the classroom and with peers is a key element to the student's success (S. M. Hord, 2007).
Communication was the second-highest theme by frequency, and the teacher eluded two strands in this theme. The first strand was the open and honest dialogue that must occur for learning. Literature tells us that groups earning trust will allow for open dialogue, discussion, and debate to take place within the group in a positive way (S. M. Hord, 2007). Teachers and students need to ask honest questions and give honest feedback for progress and success to occur. The second strand is everyone needs to understand the vocabulary or speak in the same vernacular. Teacher H stated, “when the student is able to verbalize to me their point of confusion question, I'm able to then understand at what depth I need to go in my explanation.”

The third theme, relationship with students, also emerged and had a high frequency of 22, but all teachers interviewed seemed to allude that this theme was the most important for all teachers. Teacher A stated, “Students will work for you if they have a personal connection with you.” The teachers all stated that you need to get to know the student, you build trust, they know you care, and then they want to know what you know. The literature also reminded us that regardless of the activity, in truth, nothing has been taught if it is not learned. The focus on if the student has learned directs the teacher to find the proper methods and engagement opportunities to build an environment for learning. Understanding only comes through a relationship you build with the student (A. Muhammad & Hollie, 2012). The literature review reminds us that the teacher in the classroom has a unique and special place in the minds of the student. To young students, the teacher is a major authority figure in their lives. In secondary schools, teachers will continue the role of an authority figure, but the role of the teacher turns to role model and supporter. What a teacher says to the students makes a huge impact on the students, but
most importantly, the relationships established by the teacher with their students will affect the student motivation to engage in the learning process (R. DuFour & Reeves, 2016).

Eleven of the 12 teacher participants perceived student motivation to be a major theme under classroom culture. Teacher B stated, “It's really about motivation with the kids.” The outside world does play a part in motivation, but the teacher can help within the classroom to create motivation. The literature tells us the teacher can employ various methods and techniques to help build motivation through engagement. The focus on if the student has learned directs the teacher to find the proper methods and engagement opportunities to build an environment for learning. Multiple methods may be used; some may be through direct instruction, while others could be through discovery or problem-solving (A. Muhammad & Hollie, 2012).

The final theme to emerge from the classroom culture variable was that of student exploration. Having a student discover the learning is a powerful and lasting teaching method. Teachers expressed that it cannot be employed for every concept, but can be an element in each lesson to help authenticate the learning. The teacher who changes their techniques uses novelty, exploration, and choice to help the learner be more successful. Using exploration is one method to focus on the learning of the student and exploration allows the teacher to be freed up from a fixed mindset (A. Muhammad & Hollie, 2012).

**Research Sub Question 3**

Research Sub Question 3 inquired: *How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect*
to interventions to make every student in their classroom more successful in mathematics.

The major findings for this sub question yielded five themes from comprehensive high school teachers perceived to have the greatest impact on their teaching and student learning.

The most frequent theme that emerged from these interviews was using effective interventions. This was reported by all 12 teacher participants with a frequency count of 30. Teacher participants expressed the importance of immediate interventions with students. Teacher F commented, “Having the in-class structure, as far as they can do their work in class and we can slow things down, when they don't get it, helps their learning.” Teacher participants felt students needed a clear assessment and explanation of what they are not doing right. Giving blanket feedback is not as effective as targeted feedback.

Having the structured school-wide intervention in place allows a teacher to reteach to a student in greater depth. Teacher F reported,

We have office hours, I'm able to accommodate those students, if there's a group that, it's not a whole class thing, there's a group of kids who don't get it. Okay, come tomorrow at office hours, and then we'll do some extra, whatever we need to make sure that you are getting it and understanding it.

Additionally from the literature review we know when students do not learn, a teacher or a school with a structure in place, must intervene. Intervention has shown through compelling evidence, that schools can be transformed when every child has the opportunity to use time within the school day with support to get what they need academically (Buffum & Mattos, 2011; R. DuFour, 2004).
The second highest frequency for a theme under intervention was teaching to mastery. With a frequency of 21 and with eight respondents citing it, teaching to mastery was seen as necessary and controversial. All the respondents were behind using intervention to teach to mastery, but many recognized that many teachers still believe that once the material is assessed, then the opportunity for learning has passed. Teachers interviewed like Teacher A stated,

I think there are some difficult philosophical things. It's like the difference between a lot of retesting and not a lot of retesting. Somebody will say, ‘Well, I retest because I'm testing for mastery.’ And other people are like, ‘Yeah, but then you're basically giving them an excuse not to learn the first time.’

From the review of the literature, we see that a results orientation (teaching to mastery) means that a team is always seeking evidence of the results they desire, which high levels of mastery or student success. The results orientation aligns with the focus on the learning and pushes the team to continuously improve their instruction and guides the process of their intervention (Many, 2018).

The third theme to emerge was when to intervene. This theme had a frequency of 19 with nine respondents. All respondents stated that intervention is best when it is closer to the dissemination of the instruction. Teachers use a variety of checks for understandings, observations, exit tickets, and short quizzes to know who has learned the material. When a teacher discovers that a student does not get the material, a decision is made on how to intervene. If it is one student or a small group, one course of action could be appropriate. Like inviting them to the structured intervention and re-teaching
the concept. If it is a large group or most of the class, it may mean the teacher must readdress the topic class-wide. Teacher A states,

So for example, when I give a quiz, then what I do is I will go through and accumulate data based on where we're at. And I tell the student, ‘I will go look, and if half of you were missing it or more than half of you were missing this or somewhere around there, I want to go over the question in a long class because that seems like a systemic issue.’ If I have to say 10 or fewer students missing something, then that's something where I will intervene individually. Because I just don't think it's a good use of class time to go over a question that five people missed. Then you've got 35 people that sit around going, ‘Yeah I already got that.’ So having interventions and trying to individualize it that way.

From the literature review, we know the benefits of intervening with a student who has fallen short of mastery, but it also relates the power of schools using the time to expand the learning. Schools where a separate in school time is not set aside for intervention and enrichment, a teacher must be more creative in providing the learning extensions and enrichment. Teachers will need to look at resources provided to provide lessons and content at more depth and at DOK levels that exceed essential learning targets — having students who have mastered the essential learnings possibly doing new activities like giving a presentation or completing a project that will take the information further in-depth (Many, 2018).

The fourth theme to be cited was expanding student learning through intervention. Expanded learning had a frequency count of 15 with 9 respondents. The teachers during interviews mentioned that intervention time was used by some students to broaden their
knowledge and thus it became more of an enrichment period for them. Other students, although not understanding the material at first, after coming to intervention and receiving help were not only able to understand but even broadened their overall knowledge. Having intervention time allowed the teacher to expand learning for their students, where in the past, the time would not have been available. The teachers reported that when students can understand and teach others their learning and knowledge is expanded through the application. Teacher I added,

They're allowed to talk to people, as they're doing it, to make sure they can get it.
I have them come and teach problems from the board. Meaning, after you've worked the problem, now teach us how to do the problem.

Finally, the last theme to emerge from intervention was expectations. With a frequency count of 14 and 9 respondents citing it. Teachers all stated that having intervention practices, time, and tools available to them raises the expectations for student learning. Teacher F added, “It definitely raises the expectation. I mean, when you have some sort of interventions, you don't give the kids a chance, they can't fail. There are always ways that they can succeed and get extra help.” The process of knowing what is important for students to learn sets a high bar for learning. The literature shows that schools will have to begin to define what will constitute mastery when they grade. Defining student achievement starts by identifying the most important content that all students, regardless of program, must know (R. DuFour, 2004b). Once collaborative teams determine and define the essential learnings, they now need to determine what constitutes mastery of that content. There will also need to be a variety of assessments
used; authentic assessments like projects and portfolios, formative assessments so you can adjust instruction if they did not get it, and reassessment.

**Research Sub Question 4**

Research Sub Question 4 inquired: *How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to differentiated instruction to make every student in their classroom more successful in mathematics.* The major findings for this sub question yielded two themes from comprehensive high school teachers perceived to have the greatest impact on their teaching and student learning.

The highest frequency theme of different methods for teaching under the variable of differentiated instruction was cited by all 12 respondents. The teachers all stated that there are multiple ways to solve the problems. Teacher E states, “there is not just one way.” So, they feel that when a student does not get the material the first time they need to explore different methods. Teacher B added, “Okay, maybe that approach, that style, that way that I presented that material it's not an effective approach, and so I'd go back to the drawing board.” The review of the literature shows that the teacher who uses various techniques, novelty, choice, and collaborative groups report their effectiveness with the learner's increase. Focusing on the learning allows the teacher to be freed up from a fixed presentation, and allow for adjustment and flexibility. If the student did not learn it on Monday, we need to teach it differently so they can learn it on Tuesday (A. Muhammad & Hollie, 2012).
Ten of the 12 teacher participants cited that their teaching style has changed over time. As Teacher J noted, their change came from experience,

I used to think when I was beginning teaching that any students should be able to learn from any teacher. I used to think that until I took a class from a professor. As hard as I tried, I could not learn from him. And that put me in a position that I understood, okay, not every kid is going to understand what I'm saying.

Teacher G adds, “Every brain is wired a little differently. I have tried over the years to find the best practices that worked for most students most of the time.”

The literature expanded on the importance of experience but also that we must employ the use of analyzing student work creates a pathway for teachers to reflect on their instruction and make decisions about the practices used for instruction and the level of student learning (Many, 2018).

**Research Sub Question 5**

Research Sub Question 5 inquired: *How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the activities they use with respect to first best instruction to make every student in their classroom more successful in mathematics.* The major findings for this sub question yielded four themes from comprehensive high school teachers perceived to have the greatest impact on their teaching and student learning.

The theme of teachers designing their lessons with all the tools for intervention and collaboration at hand was the highest frequency reported for first best instruction. Teachers report that they create lessons so they can adjust to the needs of the class.
Teacher K states, “Early on in the school year when it's easier concepts or it's more of a review concept, I will let them, I'll challenge them more, but as it becomes more difficult than I have to be more flexible.” The literature tells us the most effective planning comes from creating lessons and assessments that are formative. Formative assessment is one of the most powerful strategies a teacher can use if they act on the data they receive from the assessments. Feedback given to students in a relevant and timely manner will allow for corrections to be made in the gaps in knowledge. The important aspect of gathering this specific information for feedback is to have short term learning cycles that target the specific knowledge and skills required for the overall mastery of the high yield goals or essential learnings (M. Fullan & DuFour, 2013). Most of the work in determining what skill and which knowledge needs to be assessed comes in the priority stage of the planning during the first phase of the large learning cycle. The daily lesson design and the formative assessments should and must align to the overarching high yield standard or essential learning (Many, 2018).

The second most frequent theme under first best instruction was the use of teacher collaboration. We know from research that a collaborative culture promotes positive change within the school structure, teacher instruction, and environment for learning. A collaborative culture is where team members work together interdependently for the achievement of common goals, and they hold each other accountable. It is within the collaborative culture where the teacher learns, that is important because as the focus on student learning, they will need to lean on each other for the varied practices and methods that bring about results, in both first best instruction, and during an intervention (S. M. Hord, 2009). Teacher B states,
In our PLC groups with other math three teachers we'll sit down and be like, ‘All right, what are we covering in this next couple of weeks?’ And then people will be like, ‘Okay, this, this.’ And then we'll say, ‘Okay, well I really like what the book does here. I tried this, and this didn't work.’ Then so we all kind of hear each other's successes and failures.

The third theme to emerge from first best instruction was that teacher design lessons to expand the learning of the students. Teacher A emphasized, “There's always... and I ask them, ‘Wow they got this one. Let's give them one a little bit more challenging.’ And even with the challenging one, I will set them up because I know its extended learning.” The review of the literature shows us that teachers knowing what they want proficiency to look like will require the team to envision and design the product that will establish the level of mastery. The analysis of the results from the assessment and student work will allow the teacher and PLC team to adjust the focus, or DOK level to bring about mastery, and push beyond the essentials (Many, 2018).

The fourth and final theme to emerge from first best instruction was the activities planned to impact student learning. Does this come from the question in PLC of what do we want our students to learn? The review of literature tells us that what we want students to know is identifying the targets that are embedded into the high priority standards or essential learnings. The target selection happens when the team begins unpacking the standards to identify the specific learning targets within them (Many, 2018). Unpacking will help the teacher make a very large standard accessible by breaking it down into discrete skills that the teacher can focus daily classroom lessons on. Since the essential learning is typically large standards, the process of unpacking the
standards into the learning targets, and specifics skills, or knowledge is essential to the mastery of the large standard (Many, 2018). The teacher reported that they take this knowledge from their PLCs, and this is how they formulate the lessons and activities they use in class. Teacher D spoke of this planning to give students a strong connection to learning. Teacher D states, “I figure out what they need to know, what's important, what they don't need to know, but then also creating the experience because they might not remember what the lesson is, but they'll remember the experience.”

Conclusions

Examining the findings of the data collected in this study and supported by the review of the literature, several conclusions were developed. The review of literature supported this study in identifying the elements and practices employed to transform schools through implementing programs like PLCs and intervention programs. Teachers need to have a better understanding of the tools and practices offered to them. The purpose of school transformation is to improve student learning by increasing the effectiveness of the teaching practices and intervene when students fall into the gaps. Schools have incorporated PLC and RTI to meet the expectations of ensuring that all students will learn and do so at high levels (R. DuFour et al., 2004; Mundschenk & Fuchs, 2016). Collaboration and intervention have shown through compelling evidence that schools are transformed when every child has the opportunity to use time within the school day, with support, to get what they need academically (Buffum & Mattos, 2011). RTI systems need a healthy core to build upon; schools must invest time in core instruction and evaluating the effectiveness of that instruction (Harlacher et al., 2016). These conclusions were further supported by the review of the literature in Chapter II.
Conclusion 1

The findings from this study lead to the conclusion that School Culture is a major factor in a school’s ability to have an impact on teaching practices and student learning. As we see from the review of literature, school culture affects student learning and performance; schools with cultures rooted in high expectations will spend time reinforcing and cultivating those expectations (A. Muhammad & Hollie, 2012). The teachers in this study overwhelmingly agreed that school culture is the most important element in the success of students,

The teachers cite those teacher relationships as professional, and their ability to collaborate create a synergy of experience and practices that help lift all students’ success. The teachers state in a positive school culture there are high expectations for learning; students know this and must be engaged in the process. But the high expectations are coupled with teachers and school personnel willing to do what it takes to help the student be successful. Interventions, both academic and social-emotional, must be in place and the teacher must act as leaders, counselors, and mentors to their students.

Lastly, a positive school culture will help students discover more about themselves. The student is more likely to engage in co-curricular and extra-curricular activities, which help bind a student to the school and the academic programs. The student will seek out positions of leadership and service providing tools for their future. Finally, the positive school culture makes available help to those who seek it and help identify those in need. From the literature, we find that school culture is more important to the success of student achievement than any of the imposed structural initiatives that a
school site may implement. A school’s culture is more than how people feel about the school or the school’s morale; it runs deeper than that (A. Muhammad & Hollie, 2012).

**Conclusion 2**

*The findings from this study lead to the conclusion that classroom culture or the role of the teacher in the classroom is paramount to the ability of students accessing the curriculum.* The teachers in this study stated they wanted their classrooms to be a positive and supportive space where students can attempt difficult tasks without a fear of failing. This was characterized in the statement by Teacher A when they stated, “I think the first thing is to basically allow students, or make the students understand that mistakes will happen and mistakes are not failures. The mistakes are opportunities to learn.” The teacher sets the tone inside their classroom, as stated above school culture is the largest factor in student success, in conjunction with a teacher in the classroom that promotes a positive culture it is empowering. However, in the absence of a positive school culture, a teacher must create that positive space.

There are two major factors for teachers creating positive classroom cultures. The first one is that they need to create a safe space for students. The literature states, “the development of a healthy culture cannot be left to chance” (Mohammed, 2012 p. 21). The teacher needs to hold all members to norms; they must encourage all students to participate, and sometimes require it. Teachers need to motivate, encourage, and show patience and flexibility with students. The teachers in the study reinforced this idea, Teacher F added, “As long as they're more comfortable in the classroom, then they won't be afraid to say, ‘I didn't get something.’” The teacher must also be consistent in their behaviors and enforcement of classroom management. Students need to know what to
expect. The classroom needs to be a place where a student can explore, attempt something new, and make mistakes in a safe environment. Teacher D agreed with this by stating,

I learned pretty early that one kid will disrupt the whole thing so I have to have a good foundation so we invest in the beginning in the culture so then that no matter who comes in or out we're all on the same page.

The second major factor is the teacher needs to develop a relationship with their students. The review of literature tells us that the teacher in the classroom has a unique and special place in the minds of the student. Teacher C reinforces this when they said, “The expectation is every student passes. We have a very positive culture in the classroom. It's all about building relationships with those students.” To young students, the teacher is a major authority figure in their lives. In secondary schools, teachers will continue the role of an authority figure, but the role of the teacher turns to role model and supporter. What a teacher says to the students makes a huge impact on the students, but most importantly, the relationships established by the teacher with their students will affect the student motivation to engage in the learning process (R. DuFour & Reeves, 2016). The teachers in the study all stated that having a relationship with the student is the most important factor in student success. Some students may learn despite a teacher, but most need the teacher to help guide and lead them. The student and teacher relationship creates trust and communication so that a teacher can intervene at the right times and appropriate ways.
Conclusion 3

The findings from this study lead to the conclusion that having planned and structured intervention embedded into the regular school day is vital for student success. The teachers that were a part of this study all stated that intervention is the key to ensuring student success. The teachers also stated the use of multiple types and times for intervention allowed the teacher to more effective. They stated that immediately in the classroom is often most effective, but when it is a one on one scenario or a small group, it is better to have structured time for re-teaching. The structured time also allows the student to come and ask specific questions for themselves, thus deepening their learning and understanding. The review of literature states that intervention will help close the achievement gap and will do so by examining what the most effective tools and structures are that bring about transformational change (Bufum, 2011). We also find that for a PLC and RTI model to work, a school must have certain conditions in place. Such as time for teachers to meet, ample training and professional development, time for intervention during the school day, and support from all site stakeholders and the district office (Buffum et al., 2012; Clarke, 2018).

Conclusion 4

The findings from this study lead to the conclusion that teachers must be trained in methods that are effective for intervention and can be differentiated from the original lesson. The teacher in the study all reported that students learn at different speeds and in different ways. The idea of training teachers to use the proper methods for intervention and differentiation goes beyond the pedagogical. Training would need to include how to write assessments, access and interpret data, and new methods of teaching and
approaches to content. Teachers will need to be trained, also read, and discuss data. To intervene effectively, the school needs to create time within the school day, open to all students where teachers can use the data from the formative assessment to reteach and reassess (Stiggins & DuFour, 2009). The teachers report that if the whole class or most of the class did not understand something, that should be addressed in the class. But for the 20% or so, teachers reported that structured intervention helps a teacher target specific student needs. When a student has difficulty mastering the essential learnings, the team must design and implement an intervention that targets the specific needs or weaknesses (Many, 2018). As stated above, the PLC teams plan to intervene through the process of analyzing the strategies used, reviewing the effectiveness of the assessments, plan re-teaching or lessons, and utilizing other supports that may help contribute to the underlying results of students falling short of mastery. Having tools in the box to meet the needs of all children is essential.

Implications for Action

Examining the lived experiences of expert mathematics teachers in comprehensive high schools that employ both PLCs and structured intervention, and along with an extensive review of the literature revealed major findings for the development of new and experienced teacher’s instructional practices. By examining the impact of the particular variables: (a) school culture, (b) classroom culture, (c) intervention, (d) differentiation, and (e) first best instruction, we were able to discover the impact these variables had on their teaching practices and learning outcomes for their students. Additionally, these important findings contribute to the literature on effective instructional and intervention practices in education. Based on this inquiry, four
implications for action are directly correlated with the conclusions drawn from the major findings and are as follows:

**Implications for Action 1**

Based on Conclusion 1, the implication for action is: *School culture is the paramount concern for both the district offices and the sites administrative staff.*

- School-wide implementation of positive behavior standards, with an in-house developed plan to shape the culture to what to community standards will be. This will take a community outreach to gain the knowledge and support of the stakeholders.
- Ongoing professional development, whether it is at the county, district, or site level, must include an understanding of the socio-emotional practices and resources to meet the needs of the students in the school.
- Set both short term and long to goals for both behavior standards and academic achievement.

**Implications for Action 2**

Based on Conclusion 2, the implication for action is: *Teachers need to be trained in the use of PLCs.*

- Teachers need ongoing professional development, whether it is at the county, district, or site level, must include an understanding of cooperative group work, including information on team and self-reflection on teams’ work and social dynamics.
• Continued commitment to focus on student learning and how to bridge the gaps for all students must be central. Also, all students must be taught content at their current grade level.

• District and site administration model needs to be shared at leadership and staff meetings. The characteristics of highly effective teams include: (a) the establishment of roles, (b) responsibilities, (c) norms for behavior, (d) working interdependently toward a common goal, and (e) reflecting on their team’s dynamics and progress toward the common goal. Then expect grade department PLC teams to incorporate these characteristics into their meetings.

Implications for Action 3

Based on Conclusion 3, the implication for action is: The school site must begin to institute structured intervention into the school day. This should be modeled on an RTI program and work with the socio-behavioral MTSS models.

• School committee to be formed to examine the type of structured interventions that fit within the culture as it is created at the school.

• Professional development opportunities for site principals, teachers, and staff must be developed to plan and implement an effective RTI structure and model.

• District leadership, principals, and teachers incorporate the use of structure school-wide intervention periods during the school day.
Implications for Action 4

Based upon Conclusion 4, the implication for action is: *A substantial commitment by the district office and the school site to obtain professional development to ensure all teacher will have the tools to collaborate, write assessments, interpret data, and intervene effectively, the following needs to occur:*

- Board of education, district leadership, site principals, teachers, and all other stakeholders need to embrace and model PLC and RTI.
- Ongoing professional development, whether it be at the county, district, or site level, must include expert knowledge of collaboration, assessment writing, data interpretation, and effective intervention.

Recommendations for Further Research

The following recommendations that were derived from the findings and conclusions of this study are made for further research.

- The lived experiences of expert middle school mathematics teachers that employ PLCs and structured academic intervention identify and describe the activities they use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in mathematics.
- The lived experiences of various subjects expert teachers in comprehensive high schools that employ PLCs and structured academic intervention identify and describe the activities they use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful.
A qualitative study of the lived experience of teachers and administrators that have gone through the transformational process of implementing PLC and RTI.

A qualitative comparative study of the lived experiences of the teachers teaching at schools with PLC and RTI and teacher teaching at schools without PLC and RTI.

A quantitative comparative study between student outcomes on a standardized test in schools with PLC and RTI and with students at schools without PLC and RTI to determine the effectiveness of those programs on standardized testing.

A comparative qualitative phenomenological study to hear students’ stories on the effectiveness of attending schools that employs PLC and RTI and attending schools that do not employ PLC and RTI.

A quantitative study that identifies best practices for alternate methods of delivering curriculum for interventions.

A qualitative study that identifies the best practices for monitoring and assessing student interventions based on rate of learning.

A replicate of this study with alternative education math teachers.

**Concluding Remarks and Reflections**

This study began by asking the question of: *How do we make a lasting cultural change in our staff so that student learning is the focus of all the decisions we make and the actions we take?* Through this study and the review of the literature, we have examined the impact of variables in schools, such as: (a) school culture, (b) classroom
culture, (c) intervention, (d) differentiation, and (e) the teacher's first best instruction and how they impact a teacher's activities and student learning. We know that public schools are expected to ensure that all students will learn and do so at high levels (R. DuFour et al., 2004) and that there are three fundamental questions for schools developing PLCs including: (a) What do we want each student to learn? (Barth, 1991); (b) How will we know when they learn it?; and (c) How will we respond when they don’t? (R. DuFour et al., 2004). This study looked to answer the more tangible and unanswered questions of: (a) What does it look like?; (b) What tools do we use?; and (c) How can we be most effective? (R. DuFour, 2004a).

We know that the key to all student success is not simple, and it requires much from the environment and people around that student. But those elements can be quantified, and their impact is apparent in all schools. Developing a positive school culture is not something that just happens, and it is affected by factors that are out of the student’s control. However, the school culture can be changed, safeguarded, protected, and maintained by the adults and the other stakeholders in the community. The development of school culture must be intentional, where a positive culture exists, stakeholders much preserve it and protect it. In places that a positive culture does not exist, a transformation must occur. This is not easy, but it is a rewarding process and must permeate all aspects of what the school does, and why it does it. Schools need to define who they are, and they do that by expecting the best of the students and committing to do whatever it takes to help them achieve it. Schools need the proper tools to make this happen in their school. However, as we said in the opener of this study, what we find in many cases is that schools fall short of the proper tools to intervene with
all students, especially those students at the greatest risk (Buffum et al., 2011). The focus of this research was to study organizations and their structure of schools effectively using PLCs, and how they build the relationships of teachers and students that shape their intervention practices.

The relationship between the teacher and student in the process is also a key factor. A teacher who is most concerned with the students learning and is focused on what intervention practices will be most effective will build trust with the student, and the student will be open to the intervention. The students want to know that you care before they will care what you know. The teacher plays a vital role in the success of students, and they are authority figures, mentors, and many times protectors. Teachers need to create safe spaces for students to learn. A comfortable student who feels safe will challenge themselves, they will take risks, and they will accomplish much. Teachers need to be trained with the best tools, have the best technologies, and be offered the best resources because they are developing our future.

Reflecting on this study and my current role as a high school administrator, I see clear applications of this study for myself. When the administration supports teachers, they do so by reminding the teacher of why they teach; they need to reward teachers for all the successes they have. They support them in their classroom management, and they find ways to say “yes” to as many of the teacher’s requests as possible. Administrators need to develop relationships with teachers and be a role model for the relationship teachers need to develop with students. My doctoral journey has reminded me that we all need to be courageous and bold. Our collective educational focus must be on student learning, or we all fail.
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## APPENDIX A

### Literature Matrix

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<th>Study</th>
<th>Higher Themes</th>
<th>History of Teacher Collaboration and PLC</th>
<th>Professional Learning Communities-Excellence</th>
<th>Theoretical Framework</th>
<th>Change of Teachers</th>
<th>Response To Intervention</th>
<th>Student Achievement</th>
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APPENDIX B

Letter of Participation

Study: Expert Teachers Practices to Aide in Student Achievement

Date: January 2020

Dear Prospective Study Participant:

My name is JT Cameron and I am currently a doctoral candidate at Brandman University in the organizational leadership program. I am conducting a study to identify and describe the activities expert mathematics teachers in comprehensive high schools employ using Professional Learning Communities (PLC) and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in math at the end of their term regardless of where the student began.

An extensive search of the literature produced limited results, the focus of this research is to study organizations and the structure of schools effectively using PLCs, and how they build the relationships of teachers and students that shape their intervention practices. Measuring the extent of collaborative planning and student teacher relationship on the positive effects for student learning and how that practice can be quantified and replicated. It will seek to fill the gap by examining what the most effective tools and structures have been to bring about transformational change. The gap will be addressed in this research study. Approximately 12 high school math teachers will be enrolled in this study. Participation should require about one to one and a half hours of your time and is entirely voluntary. You may withdraw from the study at any time without consequences.

I have these criteria to participate in this study:

- Teachers who had a minimum of three or more years of experience as a comprehensive high school teacher at the same school they are currently employed at as a teacher during this study.

- The teacher was nominated and recommended by their current principal as a math teacher whose students progressed significantly.

- The teacher was nominated and recommended by their current principal as a math teacher who they felt would be a good source of information for study purposes.

- The teacher has received recognition for outstanding teaching service at the school, district, or county level.
PURPOSE: The purpose of this phenomenological study is to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ Professional Learning Communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in math at the end of their term regardless of where the student began.

PROCEDURES: In participating in this research study, you agree to partake in an interview. The interview will take a minimum of one hour and will be audio-recorded and you will be asked a series of questions designed to elicit your input on how support staff impacts school climate. The interview will take place at a location of your choosing.

RISKS, INCONVENIENCES, AND DISCOMFORTS: There are no known major risks or discomforts associated with this research. The session will be held at a location of your choosing to minimize inconvenience. There are no major benefits to you for participation, but a potential may be that your input may help add to the research regarding the impact support staff has on school climate.

POTENTIAL BENEFITS: There are no major benefits to you for participation, however, your input and feedback could help determine comprehensive high school math teachers plan more effective lessons and interventions. Also more effective professional development for teacher can be designed. The information from this study is intended to inform researchers, policymakers, and educators. Additionally, the findings and recommendations from this study will be made available to all participants.

ANONYMITY: Records of information that you provide for the research study, and any personal information you provide, will not be linked in any way. It will not be possible to identify you as the person who provided any specific information for the study.

You are encouraged to ask questions, at any time, that will help you understand how this study will be performed and/or how it will affect you. You may contact me at by email at jcamero3@mail.brandman.edu. You can also contact Dr. Phil Pendley, Dissertation Chair, by email at pendley@brandman.edu. If you have any further questions or concerns about this study or your rights as a study participant, you may write or call the Office of the Executive Vice Chancellor of Academic Affairs, Brandman University, 16355 Laguna Canyon Road, Irvine, CA 92618, (949) 341-7641.

I very much appreciate your time and consideration in participating in this study.

Very Respectfully,
JT Cameron
Doctoral Candidate, Brandman University
APPENDIX C

Informed Consent

INFORMATION ABOUT: A qualitative study

RESEARCH STUDY TITLE: Expert Teachers Practices to Aide in Student Achievement

RESPONSIBLE INVESTIGATOR: JT Cameron, Doctoral Candidate

PURPOSE OF THE STUDY: You are being asked to participate in a research study conducted by JT Cameron, a doctoral student from the Doctor of Education in Organizational Leadership program at Brandman University. The purpose of this phenomenological study is to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ Professional Learning Communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in math at the end of their term regardless of where the student began.

An extensive search of the literature produced limited results, the focus of this research is to study organizations and the structure of schools effectively using PLCs, and how they build the relationships of teachers and students that shape their intervention practices. Measuring the extent of collaboration planning and student teacher relationship on the positive effects for student learning and how that practice can be quantified and replicated. It will seek to fill the gap by examining what the most effective tools and structures have been to bring about transformational change. This gap will be addressed in this research study.

PROCEDURES: By participating in this study, I agree to participate in a one-on-one interview with the researcher. The interview will last between one and one and a half hours. Completion of the interview will take place in January of 2020 or February of 2020.

I understand that:

a. There are no known major risks or discomforts associated with this research. The session will be held at a location of my choosing to minimize inconvenience.

b. There are no major benefits to me for participation, but a potential may be that I will have an opportunity to share my lived experiences as a high school principal. The possible benefit of this study to me is that my input may help add to the research regarding how behaviors between the genders affect a workplace relationship. The findings will be available to me at the conclusion of the study.

c. Money will not be provided for my time and involvement; however, I will receive gift of appreciation from the researcher following the interview.
d. Any questions I have concerning my participation in this study will be answered by JT Cameron, Brandman University Doctoral Candidate. I understand that Mr. Cameron may be contacted by email at jcamero3@mail.brandman.edu. You can also contact Dr. Phil Pendley, Dissertation Chair, by email at pendley@brandman.edu.

e. I understand that I may refuse to participate or withdraw from this study at any time without any negative consequences. Also, the investigator may stop the study at any time.

f. I understand that the audio recordings will be used to transcribe the interview. I understand that the recordings will not be used beyond the scope of this project. Upon completion of the study all transcripts and notes taken by the researcher during the interview will be shredded.

g. I also understand that no information that identifies me will be released without my separate consent and that all identifiable information will be protected to the limits allowed by law. If the study design or the use of the data is to be changed, I will be so informed, and my consent re-obtained. I understand that if I have any questions, comments, or concerns about the study or the informed consent process, I may write or call the Office of the Executive Vice Chancellor of Academic Affairs, Brandman University, and 16355 Laguna Canyon Road, Irvine, CA 92618, (949) 341-7641.

I acknowledge that I have received a copy of this form and the Research Participant’s Bill of Rights. I have read the above and understand it and hereby voluntarily consent to the procedures(s) set forth. I have read the above and understand it and hereby voluntarily consent to the procedures(s) set forth.

________________________________________________________________________
Signature of Participant or Responsible Party                              Date

________________________________________________________________________
Signature of Witness (if appropriate)                                   Date

________________________________________________________________________
Signature of Principal Investigator                                     Date
# Qualitative Interview Question Development Matrix

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| RQ1 - How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to school culture to increase student learning and achievement? | IQ1 - Please describe how school culture affects what do we want students to learn?  
IQ2 - Please describe how school culture affects how we know when they have learned it?  
IQ3 - Please describe how school culture affects what we do when they don’t learn?  
IQ4 - Please describe how school culture affects how we extend their learning if they have learned what we want them to? | PLC Learning Cycle  
Many et al., 2018  
Fullan and DuFour, 2013  
Literature Review |
| RQ2 - How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to classroom culture to increase student learning and achievement? | IQ5 - Please describe how classroom culture affects what do we want students to learn?  
IQ6 - Please describe how classroom culture affects how we know when they have learned it?  
IQ7 - Please describe how classroom culture affects what we do when they don’t learn?  
IQ8 - Please describe how classroom culture affects how we extend their learning if they have learned what we want them to? | PLC Learning Cycle  
Many et al., 2018  
Fullan and DuFour, 2013  
Literature Review |
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<td>How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to differentiated instruction to increase student learning and achievement?</td>
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PLC Learning Cycle
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Fullan and DuFour, 2013
Literature Review

PLC Learning Cycle
Many et al., 2018
Fullan and DuFour, 2013
Literature Review
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<th>Interview Questions (IQ)</th>
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| RQ5 - How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to first best instruction to increase student learning and achievement? | IQ17 - Please describe how first best instruction affects what do we want students to learn?  
IQ18 - Please describe how first best instruction affects how we know when they have learned it?  
IQ19 - Please describe how first best instruction affects what we do when they don’t learn?  
IQ20 - Please describe how first best instruction affects how we extend their learning if they have learned what we want them to? | PLC Learning Cycle  
Many et al., 2018  
Fullan and DuFour, 2013  
Literature Review |

Notes:

1. Each Research Question must be addressed.
2. Interview Questions should tie directly to a Research Question.
3. Each Interview Question should have a source/rationale for asking it that ties directly to the purpose and RQ’s of the study so the information acquired addresses the Purpose and RQ’s.
APPENDIX E

Participant’s Bill of Rights

BRANDMAN UNIVERSITY INSTITUTIONAL REVIEW BOARD

Research Participant’s Bill of Rights

Any person who is requested to consent to participate as a subject in an experiment, or who is requested to consent on behalf of another, has the following rights:

1. To be told what the study is attempting to discover.
2. To be told what will happen in the study and whether any of the procedures, drugs or devices are different from what would be used in standard practice.
3. To be told about the risks, side effects or discomforts of the things that may happen to him/her.
4. To be told if he/she can expect any benefit from participating and, if so, what the benefits might be.
5. To be told what other choices he/she has and how they may be better or worse than being in the study.
6. To be allowed to ask any questions concerning the study both before agreeing to be involved and during the study.
7. To be told what sort of medical treatment is available if any complications arise.
8. To refuse to participate at all before or after the study is started without any adverse effects.
9. To receive a copy of the signed and dated consent form.
10. To be free of pressures when considering whether he/she wishes to agree to be in the study.

If at any time you have questions regarding a research study, you should ask the researchers to answer them. You also may contact the Brandman University Institutional Review Board, which is concerned with the protection of volunteers in research projects. The Brandman University Institutional Review Board may be contacted either by telephoning the Office of Academic Affairs at (949) 341-9937 or by writing to the Vice Chancellor of Academic Affairs, Brandman University, 16355 Laguna Canyon Road, Irvine, CA, 92618.

Brandman University IRB Adopted November 2013
APPENDIX F

Interview Protocol

Interviewer: JT Cameron

Interview time planned: Approximately one hour

Interview place: A convenient agreed upon location or phone/webcam

Recording: Digital voice recorders

Written: Field and observational notes

Introductions: Introduce ourselves to one another.

Opening Statement: [Interviewer states:] Thank you for taking time to meet with me and agreeing to participate in this interview. To review, the purpose of this phenomenological study is to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ Professional Learning Communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in math at the end of their term regardless of where the student began. The questions I will ask are written to elicit this information and to provide you an opportunity to share any personal stories and experiences you have had, at your discretion, throughout this interview. Also, your identity will remain anonymous, our interview will not take place until after a consent form is signed, and I encourage you to be open and honest for the purposes of this research study.

Interview Agenda: [Interviewer states:] I anticipate this interview will take about an hour today. As a review of the process leading up to this interview, you were invited to participate via phone call or email and signed an informed consent form that outlined the interview process and the condition of complete anonymity for this study. We will begin with reviewing the Letter of Invitation, Informed Consent Form, the Participant’s Bill of Rights, and the Audio Release Form. Then after reviewing all the forms, you will be asked to sign documents pertinent for this study, which include the Informed Consent and Audio Release Form. Next, I will begin the audio recorders and ask a list of questions related to the purpose of the study. I may take notes as the interview is being recorded. If you are uncomfortable with me taking notes, please let me know and I will only continue with the audio recording of the interview. Finally, I will stop the recorder and conclude our interview session. After your interview is transcribed, you will receive a copy of the complete transcripts to check for accuracy prior to the data being analyzed. Please remember that anytime during this process you have the right to stop the interview. If at any time you do not understand the questions being asked, please do not hesitate to ask for clarification. Are there any questions or concerns before we begin with the questions?
Background Questions:

1. How many years have you been a high school mathematics teacher?

2. How long have you been a mathematics teacher at your current high school?

Content Questions: The purpose of this phenomenological study is to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ Professional Learning Communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in mathematics.

RQ1 - How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to school culture to increase student learning and achievement?

IQ1 – Please describe how school culture affects what do we want students to learn?

IQ2 – Please describe how school culture affects how we know when they have learned it?

IQ3 – Please describe how school culture affects what we do when they don’t learn?

IQ4 – Please describe how school culture affects how we extend their learning if they have learned what we want them to?

RQ2 - How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to classroom culture to increase student learning and achievement?

IQ5 – Please describe how classroom culture affects what do we want students to learn?

IQ6 – Please describe how classroom culture affects how we know when they have learned it?

IQ7 – Please describe how classroom culture affects what we do when they don’t learn?

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IQ8 – Please describe how classroom culture affects how we extend their learning if they have learned what we want them to?

RQ3 - How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to interventions to increase student learning and achievement?

IQ9 – Please describe how intervention affects what we want students to learn?

IQ10 – Please describe how intervention affects how we know when they have learned it?

IQ11 – Please describe how intervention affects what we do when they don’t learn?

IQ12 – Please describe how intervention affects how we extend their learning if they have learned what we want them to?

RQ4 - How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to differentiated instruction to increase student learning and achievement?

IQ13 – Please describe how differentiated instruction affects what we want students to learn?

IQ14 – Please describe how differentiated instruction affects how we know when they have learned it?

IQ15 – Please describe how differentiated instruction affects what we do when they don’t learn?

IQ16 – Please describe how differentiated instruction affects how we extend their learning if they have learned what we want them to?

RQ5 - How do expert mathematics teachers in comprehensive high schools that employ professional learning communities and structured academic intervention identify and describe the educational practices they use with respect to first best instruction to increase student learning and achievement?

IQ17 – Please describe how first best instruction affects what do we want students to learn?

IQ18 – Please describe how first best instruction affects how we know when they have learned it?
IQ19 – Please describe how first best instruction affects what we do when they don’t learn?

IQ20 – Please describe how first best instruction affects how we extend their learning if they have learned what we want them to?

Potential Follow-Up Question(s):
1. Are there any final comments you would like to make before we conclude?

Possible probes that can be added to any question, for clarification:
1. “Would you expand upon that a bit?”
2. “Do you have more to add?”
3. “What did you mean by ….”
4. “Why do think that was the case?”
5. “Could you please tell me more about….”
6. “Can you give me an example of ….”
7. “How did you feel about that?”

Closing Statement:
These are all the questions I have for you at this time. Thank you very much for your time today and your willingness to allow me to interview you for my dissertation. If you would like a copy of my research at the conclusion of my study, I will be happy to provide that for you. Please accept this as a small token of my appreciation for your participation.
## APPENDIX G

### Observation Guide

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<thead>
<tr>
<th>Intervention Activities Observed:</th>
<th>Notes</th>
<th>Time</th>
<th>Materials used</th>
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<tbody>
<tr>
<td>Intervention Planning</td>
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<td>Intervention Preparation</td>
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<td>Intervention Implementation</td>
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<td>Additional Comments</td>
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APPENDIX H

Brandman University Institutional Review Board

Fri 1/3/2020 8:04 AM
MyBrandman <my@brandman.edu>
[EXTERNAL] - BUIRB Application Approved As Submitted: JT Cameron
to: jmamers3@mail.brandman.edu
cc: Pinney, Philip; bubar; Smith Selace, Viki


Dear JT Cameron,

Congratulations, your IRB application to conduct research has been approved by the Brandman University Institutional Review Board. This approval grants permission for you to proceed with data collection for your research. Please keep this email for your records, as it will need to be included in your research appendix.

If any issues should arise that are pertinent to your IRB approval, please contact the IRB immediately at BUIRB@brandman.edu. If you need to modify your BUIRB application for any reason, please fill out the "Application Modification Form" before proceeding with your research. The Modification form can be found at the following link: https://irb.brandman.edu/Applications/Modification.pdf.

Best wishes for a successful completion of your study.

Thank you,
Doug DeVore, Ed.D.
Professor
Organizational Leadership
BUIRB Chair
ddevore@brandman.edu
www.brandman.edu
APPENDIX I

National Institute of Health Certification

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that Jeffery Cameron successfully completed the NIH Web-based training course "Protecting Human Research Participants."

Date of Completion: 05/15/2018

Certification Number: 2819976
APPENDIX J

Audio Release Form

RESEARCH STUDY TITLE: Expert Teachers Practices to Aide in Student Achievement

BRANDMAN UNIVERSITY
16355 LAGUNA CANYON ROAD
IRVINE, CA  92618

I authorize JT Cameron, Brandman University Doctoral Candidate, to record my voice. I give Brandman University and all persons or entities associated with this research study permission or authority to use this recording for activities associated with this research study.

I understand that the recording will be used for transcription purposes and the information obtained during the interview may be published in a journal/dissertation or presented at meetings/presentations.

I will be consulted about the use of the audio recordings for any purpose other than those listed above. Additionally, I waive any right to royalties or other compensation arising correlated to the use of information obtained from the recording.

By signing this form, I acknowledge that I have completely read and fully understand the above release and agree to the outlined terms. I hereby release all claims against any person or organization utilizing this material.

_________________________________________________ __________________
Signature of Participant or Responsible Party   Date
APPENDIX K

Request and Release to Observe

RESEARCH STUDY TITLE: Expert Teachers Practices to Aide in Student Achievement

I request to observe your school's site structured intervention period. I will take notes and gather information as to the process, planning, and implementation of the structured intervention period.

The Purpose: Your site is to participate in a research study conducted by JT Cameron, a doctoral student from the Doctor of Education in Organizational Leadership program at Brandman University. The purpose of this phenomenological study is to identify and describe the activities expert mathematics teachers in comprehensive high schools that employ Professional Learning Communities and structured academic intervention use with respect to school culture, classroom culture, interventions, differentiated instruction, and first best instruction to make every student in their classroom more successful in math.

BRANDMAN UNIVERSITY
16355 LAGUNA CANYON ROAD
IRVINE, CA 92618

I authorize JT Cameron, Brandman University Doctoral Candidate, to observe the structured intervention period. I give Brandman University and all persons or entities associated with this research study permission or authority to use this observation for activities associated with this research study.

I understand that the observation will be used for the study, and the information obtained during the observation may be published in a journal/dissertation or presented at meetings/presentations.

I will be consulted about the use of the observation for any purpose other than those listed above. Additionally, I waive any right to royalties or other compensation arising correlated to the use of information obtained from the observation.

By signing this form, I acknowledge that I have completely read and fully understand the above release and agree to the outlined terms. I hereby release all claims against any person or organization utilizing this material.

_________________________________________________ __________________
Signature of Participant or Responsible Party   Date