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## ACCEPTANCE

This dissertation, TOGETHER WE CAN: A COLLABORATIVE COMMUNITY AS A MEANS TO IMPROVE INSTRUCTIONAL PRACTICES OF SECONDARY MATHEMATICS TEACHERS, by JILLIAN OGUNDELE, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree, Doctor of Education, in the College of Education & Human Development, Georgia State University.

The Dissertation Advisory Committee and the student's Department Chairperson, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty.

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JILLIAN OGUNDELE

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2019 - Present

National Council of Teachers of Mathematics

**TOGETHER WE CAN: A COLLABORATIVE COMMUNITY AS A MEANS TO  
IMPROVE INSTRUCTIONAL PRACTICES OF SECONDARY MATHEMATICS  
TEACHERS**

by

**JILLIAN OGUNDELE**

Under the Direction of Dr. Pier Junor Clarke

**ABSTRACT**

Working in isolation is an obstacle when teachers are trying to improve and foster student achievement, yet teachers traditionally teach students in isolation from their faculty and colleagues. The pressure of preparing students for high stakes testing and mandated accountability measures can lead to a negative impact on classroom quality. These pressures were the impetus for a team of coordinate algebra teachers to work together as they explored the needs and expectations of their students. This study sought to explore how teachers can use a non-mandated intentional space for collaboration to work together towards the goal of supporting students' needs. In this space, the researcher-participant recognized that the team's work was aligned to the tenets of a community of practice, and they were supporting each other while engaging in purposeful collaboration. The following question, "how has mathematics teachers' voluntary participation in a community of practice in a secondary school shaped their instructional experiences", guided the research study. To explore this question, a narrative inquiry, grounded in a social constructivist theoretical perspective, was conducted.

Narrative inquiry was used to examine how mathematics teachers' participation in a community of practice in an urban secondary school shaped their instructional experiences. Their narratives, along with supporting documents, were collected and provided insight into their experience about the research question. Systematic manual coding, through qualitative data analysis software, were used to analyze the data. This software, NVIVO, was used to organize data after themes emerge, allowing for the construction of meaning and contextualized knowledge regarding the community. The resulting data analysis was used to create a narrative account of the participants' experience in a voluntarily organized CoP centered on teaching coordinate algebra.

While these narratives may not represent all collaborative settings, the findings highlight the community of practice as a support system, a means for teacher retention, its ability to facilitate professional development, and to improve student achievement.

**INDEX WORDS:** Community of Practice, Domain, Practice, Community, High-Stakes Testing, Accountability, Narrative Inquiry, Teacher Collaboration



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TEACHERS

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Jillian Ogundele

A Dissertation

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Doctor of Education

in

Curriculum and Instruction

in

The Department of Middle and Secondary Education

in

the College of Education & Human Development

Georgia State University

Atlanta, GA  
2022

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## **DEDICATION**

I dedicate this dissertation to my daughter, Noah Belle Ogundele. While you were not here when I began this journey, your life gave me purpose. Thank you for making me a better person. I pray that you too are a lover of learning.

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To my grandmother Theresa Jones, I hope you are looking down proud of this moment. While this will be the first graduation that you physically miss, I know that your spirit is with me. You left a legacy that stressed the importance of education and I hope that I have made you proud.

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## 1 INTRODUCTION

Although teachers traditionally teach students in isolation from faculty and colleagues, a teacher's isolation can be an obstacle when working to improve and foster student achievement (Goddard et al., 2007). On my first day in the classroom as a high school mathematics teacher, I felt completely unprepared. Three months after graduating from college as a biomedical engineering student, here I was in the classroom without teacher preparation or any plan for my students. Intuitively, I knew that being isolated in my classroom would not allow me to develop as a teacher. Through interactions with my peers in the building, I was able to build a support system and develop a knowledge bank that nurtured my professional development as a teacher. Throughout my career, I learned that collaboration was essential for my knowledge and educational praxis. I find collaboration to be essential in constructing meaning and development, which centers my research around its benefits that result from the exchanges of ideas among and between teachers (Vygotsky, 1978).

During my twelve years as a high school math teacher, I have been sent to a variety of professional development sessions and participated in mandated teams which I did not always feel were beneficial to me. Most professional development opportunities were a day of lecturing, with no support during implementation. Mandated teams typically came with forced meeting times and a wide range of effort with participation. I am currently a member of a non-mandated coordinate algebra team consisting of two other teachers and myself. Our team was brought together due to sharing common dilemmas and goals while teaching the same content. We created time and space, without it being required by administration, to discuss our experiences and provide support for each other. Initially, we found the work in our classrooms being heavily influenced by the national accountability practices in education, which centers on high stakes

testing as an accountability measure. Facing the pressure of preparing students for these tests seemed to have a negative impact on classroom quality such as teaching to the test, which brought us together to see how we could combat the added pressure of accountability measures (Plank & Condliffe, 2013). Overall, because of outside high-stake testing pressures, many teachers began to teach to the test to increase student performance, as the results are used for teacher accountability, leading them to exclude essential parts of the curriculum. Pressure on teachers to teach to the test for better test results to demonstrate student achievement, causes students to suffer as they are not prepared for the issues they will face as members of society (Darling-Hammond, 2007; Gunzenhauser, 2003; Jones et al., 1999). Preparing students to be successful in the real world should be an objective of all schools and the education system within the United States. Gunzenhauser (2003) contended that high-stakes tests are designed to drive state curricula, limit innovation in the classroom, and keep teachers from creating their vision and goals for their respective classrooms. Despite limited evidence of high stakes testing improving student learning, this pressure and demand for students to perform well on these assessments has resulted in teachers who focus specifically and only on the information that will be tested. To combat this, nonmandated teams allow space for teacher efficacy as they work together to create strategies allowing them to transform their teaching practices. Material that involves higher-order thinking and problem solving is often excluded from the curriculum (Gunzenhauser 2003). Therefore, with this study it was my hope to investigate the impact of secondary mathematic teachers having an authentic space centering collaboration and creativity for developing a curriculum suited to students' interests and needs. Over the last year, our collaboration allowed for different strategies in our classrooms as we worked to produce better student outcomes.

Collaborative planning will enhance a teacher's ability to identify student needs and directly respond to the challenges they face. Additionally, teacher collaboration will promote team building and strengthen professional learning which directly impacts teacher professionalism and accountability. I contend that teachers can use intentional space for collaboration and be supported by the administration regardless of whether it is a requirement, to work together towards the goal of supporting students' needs. In this space teachers are supported by their peers while engaging in collaboration (Reich & Bally, 2010). "Rather than solving one's problems, a community of practice can provide a platform in which questions can be raised and solved collectively. Success is due to the quality of teacher conversations and their ability to focus on the issues that matter most to the students whom they teach (Reich & Bally, 2010, p. 179). Here the authors are describing non-mandated teams. When allowed to meet without the constraints of mandates these communities allow teachers to work without inhibition, maintain autonomy, and reclaim their power as professionals. The communities also allow teachers the space to collaborate, reclaiming their role as leaders in response to the various policies in place which can limit teacher professionalism.

Our students benefited from what each of us brought to the table, such as different teaching styles, classroom structures, and educational backgrounds. Collaborating allowed us to learn from and incorporate each other's approaches in our classroom so that students can learn in different ways. The goal of our approach focused on the well-being and success of the students, rather than the process of creating competition amongst teachers for their professional survival. Being able to participate in such a collaborative process and observing how it affects our professional development as teachers were the reasons why I chose to further investigate our collaborative space.

While I knew there was something different and effective about our collaborative space, my time as a doctoral student at Georgia State allowed me to view this space through the lens of scholarly research and theory. For my coursework as I researched and read various articles, I recognized that this collaborative group in which I participated was enacting many tenets of what is called a community of practice (CoP). Researchers denote a community of practice as a group of teachers who meet regularly to discuss their practice. As I began to operationalize our group under the tenets of a CoP, I wanted to know “how do my peers operationalize and value the work we do?”

Through this study, I analyzed detailed narratives of this team of mathematics teachers as they voluntarily collaborate to improve teacher professionalism and instructional practices. The goal was to demonstrate that collaboration, through the construct of a community of practice (CoP), is a valuable means for teacher professionalism as opposed to other accountability measures driving the classroom.

### **Statement of the Problem**

I contend that while collaborative communities alone cannot fix issues with high stakes testing within the education system, they provide a useful platform in which instructional dilemmas and questions can be raised and solved collectively to mitigate the effects of curriculum shift and high stakes testing (Reich & Bally, 2010). Lave and Wenger’s *Situated Learning* (1991), on CoP has provided a useful perspective on learning for teachers. CoP serves as a way for teachers to simultaneously support their peers while learning from them.

Upon entering the workforce, novice teachers are expected to know how to apply research-based knowledge to diagnose and resolve student educational needs, often with little understanding and with relatively few opportunities for supportive, reflective research-based experiences in the field

(Buysse et. al. 2003). CoP allows for teachers to create ways for students to develop connections in their learning, as well as higher-order thinking skills to be better prepared for situations in the real world among other benefits. Through participation in a CoP, teachers are actively evaluating, critiquing, and developing educational conditions and practices (Mitchell, 1999). The work of CoPs further depends upon collaborative work environments characterized by open and honest communication, shared decision-making, respect, and common understandings among its voluntary members.

Power structures within schools, such as those created/supported by school administrators and district leaders, outside of teacher control, remain one of the biggest obstacles of communities of practice. This power imbalance limits the autonomy of classroom teachers and their ability to enact responsive classroom practices and meet the diverse needs of their students (Mitchell, 1999; Payne, 2008). Simultaneously, this imbalance also mutes teacher voice and limits teacher opportunities to contribute to methods used for teacher evaluation, types of professional development provided, and the frequency in which it occurs, which directly affect teacher retention and morale (Mitchell, 1999; Payne, 2008). This is problematic. Conversely, as a framework for supporting professional growth, the notion of a community of practice challenges the one-sided view of learning in which researchers and administration are perceived as experts and “knowledge generators” and on the other hand, practitioners are considered novices and “knowledge translators” (Buysse et. al. 2003, p. 266). The relationships that develop around unequal power structures regarding curriculum breed a sense of powerlessness at all levels of the system. Unless those within school systems who hold positions of power are willing to redress the imbalance of authority and create structures in which power is shared in real terms, learning communities are at risk and there will be no difference in how schools operate (Mitchell, 1999).

Therefore, the study's objective was to explore collaboration or the operationalization of voluntary collaborative communities in schools and their impact on teachers as they work to improve instructional practices with the needs of students as the driving force of their work.

### **Purpose of the Study**

Collaboration amongst teachers in communities of practice is necessary, and while it is often discussed in educational discourse, it is seldom and infrequently investigated. Hence, in this study I center the need for teacher collaboration and its impact on teacher experiences. Studies that have reported positive outcomes of teacher collaboration found improved teacher efficacy, more positive teacher attitudes toward teaching, and increased trust among teachers in a team (Bryk et al., 1999; Bryk & Schneider, 2002; McLaughlin & Talbert, 2001; Reich & Bally, 2010). Little had been done, however, to understand and investigate voluntary teacher collaboration and its association to improved instructional practices (Ronfeldt et al., 2015). Despite the positive effect of teacher collaboration on both teachers and their students, research shows that it should not be hierarchically imposed on teachers since it's a threat to professional autonomy (Hargreaves, 1991; Ostovar-Nameghi & Sheikahmadi, 2016). To explore communities of practice as an effective measure to improve instructional practices, the purpose of this study was to investigate detailed narrative accounts of a team of mathematics teachers as they work to improve their practice driven by student needs, through their voluntary collaboration.

Based on the prior literature on school-based problem-solving teams, Welch, Brownell, and Sheridan (1999) noted that there is a lack of studies that directly link voluntary, non-mandated collaboration to improved teachers' instructional practices. Another gap in the literature is that previous studies on teacher collaboration are largely concerned with facilitated

or mandated collaboration (Coughlin & Kajder, 2009; Seo & Han, 2013). Thus, there remained a lack of knowledge regarding the effects of voluntary teacher collaboration on teachers' instructional practices, which this study aimed to highlight through narrative inquiry of a CoP of algebra teachers at Central High School. This study investigated detailed narrative accounts of a team of mathematics teachers as they work to improve instructional practices driven by student needs, through their voluntary collaboration. Teachers will be able to use the professional knowledge gathered from the CoP in this study for improved decision-making for their students and allow students' needs to drive the classroom instruction. The following research question guided this study:

How have mathematics teachers' participation in a voluntary community of practice in a secondary school shaped their instructional experiences?

By centering this question, I aimed to use participant narratives to not only define us as a community of practice, but to examine how our participation shaped our overall practice and its influences.

### **Significance of the Study**

Research showed that teachers often find collaboration mandated by administration and policy makers as one more obligation that keeps them from doing what they consider to be their real work, and that this collaboration rarely leads to a positive impact on teaching and learning (Adamson & Walker, 2011; Grimmer & Crehan, 1992; Hargreaves, 1991; Webb & Vulliamy, 1993). Rather than be another obligatory burden, true support for teachers must be of perceived value to the teachers and keep them innovative in their practices as their students and student context evolves. Therefore, this study on a voluntary community of practice is pertinent to educational discourse regarding teacher professionalism and support. As new accountability

measures and instructional initiatives arise, it is of increased importance that teachers can work together and have the autonomy to exercise their judgment and decision-making capabilities with regards to curriculum and instruction.

While the construct of a community of practice particularly is not new to the field of education, this study will contribute to the support of inservice mathematics teachers and educational stakeholders by showing how their voluntary participation in a collaborative community can honor their voice. The findings of this study have profound implications for schools to develop and support intentional communities of practice, which will lead to improved educational outcomes for students. Therefore, the research is highly relevant to improving current school culture by providing key stakeholders such as teachers, administration, and district leaders the insight and knowledge to establish policy and school culture changes which facilitate teacher collaboration.

### **Overview of the Study**

The preparation for students to be successful in the real world is a priority of school and the education system. Therefore, policy makers and school-level leaders should provide teachers an authentic space for collaboration and creativity of developing curriculum suited to the interests and needs of those students in their classroom. Collaborative communities give teachers the intentional space to discuss ways how they could help students to develop connections in their learning, as well as higher-order thinking skills to be better prepared for post K-12 education. Goddard et. al. (2007) argued the possibility that collaboration may improve teaching and learning, but teachers must be central in curriculum reform for there to be meaningful change in schools (Goddard, Goddard, & Tschannen-Moran, 2007). Similarly, I contend that while collaborative communities alone cannot fix issues within education system, they provide a



useful platform in which instructional dilemmas and questions can be raised and solved collectively to mitigate the effects of curriculum shift and high stakes testing (Reich & Bally, 2010). The more teachers collaborate, the more they can converse knowledgeably about theories, methods, and processes of teaching and learning, and thus improve their instruction (Hausman & Goldring, 2001).

For my research study, I explored how intentional and voluntary teacher collaboration can influence instructional experiences for teachers. The goal of this investigation was to discover key components of their collaboration through reflective interviews and team meeting observations. A narrative inquiry methodology, grounded in a social constructivist theoretical perspective, was conducted to examine how ninth grade coordinate algebra teachers' participation in a community of practice shaped their instructional experiences. Through the data collected, I was able to develop an understanding of the meaning the teachers have created, how they have been influenced by the team, and how they operationalize their collaborative community. Data was collected through individual interviews and personal reflections conducted over a four-week period. Documents supporting the narratives (i.e., lesson plans, common assessments, and student tasks) were also collected (see Appendix D).

In the next chapter, I present a review of the scholarly literature, in which I will situate my study in the continuous research of communities of practice and their key components. Following the review, I present a detailed description of the narrative inquiry methodology that was used. In chapter four I present the analysis of the data, followed by implications and recommendations in chapter five.

## 2 REVIEW OF THE LITERATURE

Enrolled as doctoral student, exploring various aspects of curriculum and instruction I began to be more curious about the dynamics of the collaborative community in which I participate. Recognizing from the literature that the actions of my peers and myself in our collaborative community were aligned with the tenets of community of practice, I chose to further investigate this construct to examine the possible relationship between our collaborative community and communities of practice. In the next sections of this chapter, I present the successful characteristics of communities of practice through a review of the literature as I begin with an investigation of the key components of communities of practice (Lave & Wenger, 1991; Wenger 2002). I then move to a discussion of the functionality of CoP through what Tam (2015) explained as the five characteristics of successful communities as they relate to significant elements of communities of practice (Kruse et al., 1995; Louis & Marks, 1998; Wenger, 1996). Lastly, I will discuss professional learning communities as a form of communities of practice most common in a K-12 educational setting.

### **Components of A Community of Practice**

A Community of Practice (CoP) is described as "a group of people who deepen their knowledge and expertise in [an] area by interacting with one another on an on-going basis" (Wenger, McDermott & Snyder 2002, p. 4). Wenger et al. (2002) tell us how communities of practice may vary in size, longevity, or diversity; however, these unique combinations are based on three fundamental elements. These elements are 1) the domain of knowledge defining issues, 2) a community invested in that domain, and 3) the practice they develop to then be effective in that domain (Wenger, McDermott & Snyder 2002, p. 4).

Over the last four years, the members of the ninth-grade coordinate algebra team at Central High School began consistent, voluntary meetings to collaborate on lesson planning and discuss issues faced in the classroom, such as time-restraints, when covering material as we worked to combat the accountability pressures from high stakes testing. Our common struggles and challenges lend credence to the first element of communities of practice as they created our group identity defined as a shared domain of knowledge, which defines the issues of the CoP. This domain affirms the purpose and values of the CoP to its members and other stakeholders. Their understood membership confirms their commitment to the domain, in this case, collaboration on lesson planning and issues like student support.

Knowing a problem may be of interest to other members in the group and being invested in that domain to contribute insight towards resolutions shows commitment to a shared learning agenda. Certain learning dynamics, such as a shared goal, encourage teaching colleagues to direct their energies in productive ways rather than in resistance to change (Printy, 2008). As teachers develop professionally through participation in a community of practice, the shared obstacles evolve as a domain, which is not a fixed set of problems. As we worked together to solve issues such as student mathematical misconceptions or classroom strategies becoming less effective under the umbrella of accountability pressures, new problems will appear. Yet through the changes, our community continues to maintain a sense of identity grounded in a shared understanding of the classroom and mathematical content.

The second critical element of community focuses on how members interact, learn collectively, and develop relationships while having a sense of belonging and commitment. Their practice together allows them to be effective. "Having others who share your overall view of the domain and yet bring their perspectives on any given problem created a social learning system

that goes beyond the sum of its parts” (Wenger, McDermott & Snyder, 2002, p. 34). As members of the community of practice, we used each other as sounding boards, expand each other's ideas, and filter through the overload of information that teaching entails. Our sense of community was also developed through our regular interactions. Recurring intentional time spent together helped to develop trust in each other. Time spent together outside of the workplace, such as attending baby showers or birthday parties, deepens our relationships beyond the professional level. Being a community of practice is not created simply because we share the title of coordinate algebra Teacher or shared activities, that helped each other’s students. Creating an atmosphere of openness has allowed us to learn from each other. Our meetings are a safe space allowing us to speak the truth, ask the difficult questions, and handle dissension together.

The third element of a community of practice is that the members are practitioners. They develop a shared repertoire of resources which can include helpful tools, experiences, and ways of handling typical problems. While the domain references the topic, the community focuses on the practice that refers to the knowledge the community develops, shares, and maintains. When coming to the meetings with challenges, such as the best methods to teach a particular mathematical topic, we all assume a basic level of shared knowledge such as general math content knowledge that creates a common foundation for us to work together effectively. Each participant maintains their own identity within their contributions as it is important for mutual engagement amongst members. Each member is responsible for the professional development of themselves as an individual in the community. This individual, yet shared, goal represents the joint enterprise, and as the community of practice develops so does their shared repertoire, routines, and ways of doing things. Some communities of practice develop naturally as did the coordinate algebra team – the focus of this study. Many communities of practice are

mandated through reform efforts or outside/upper administrative mandates. The main difference between the two is that naturally occurring communities do not have pre-defined learning goals (Barab & Duffy, 2012; Hoadley, 2012). Therefore, communities must have some form of history for them to emerge from, and members must share a form of history allowing time to fully develop (Goodyear & Casey, 2015). This suggests that a community of practice can emerge from within a school, if a collective group of individuals have a shared purpose or learning goal and their connectivity with each other is fostered.

### **How Are Communities of Practice Beneficial?**

On the educational landscape, school reform is often a focal point of time, effort, and money, induced by extensive federal and state accountability frameworks (Printy, 2008). Race to the Top (RTT), a program signed into law by President Obama in 2009, challenged states across the country to contend for federal funds from a \$4.5 billion school improvement grant designed to result in significant improvement in student outcomes and to implement a rigorous teacher evaluation system. Strategies included the integration of required collaboration into every school schedule to allow specialty area coaches, mathematics classroom teachers, and other communities of teachers, for example, to develop a community of practice. For those teachers who were not able to discuss various issues in a physical space, a form of virtual collaboration was provided (Battersby & Verdi, 2015). The idea of professional development began to shift from workshop and training models to models of communities of practice where teachers engage actively in a collaborative inquiry into their practice to enhance their knowledge of content, pedagogy, and their students (Borko, Koellner, & Jacobs, 2014; Darling-Hammond & Richardson, 2009; Vale, Groves, & Doig, 2017).

Comparing reforms similar to RTT but on a state level, Supovitz and Christman (2003) found that despite different reforms and contexts in which they operated, the findings were interestingly consistent. In both cases, consistency of collaboration amongst teachers positively influenced the culture of schools and the professional relationships between teachers. They also found that participation in communities of practice enhances teachers' sense of pedagogical competence and encourages the use of research-based effective student-centered inquiry-based instructional techniques, which affect student performance (Supovitz & Christman, 2003). On one hand students' learning depends on what and how their teachers teach. On the other hand, teachers' teaching depends on their knowledge, skills, and commitments they bring to their craft and the opportunities they must continue learning in and from their practice. In one of the few studies available connecting the community of practice with student achievement, in those communities of practice where the teachers' common focus was changing the instructional practices of their members, also showed measurable improvements in teaching practices, which led to an increase in student achievement on standardized tests (Printy, 2008; Supovitz & Christman, 2003).

Positive research trends show why school and district leaders must continue to increase and improve, the instructional focus of school communities. School leaders can support these communities through facilitating their engagement around instructional improvement and creating professional learning opportunities for teachers. If leaders provide organizational support for communities of practice, such as time for meetings and rethinking the role of the central office and school administration to better leverage teachers' professional knowledge, they can better support the smaller communities of practice within schools. School and district leaders

should provide acceptability to communities within schools so that the power dynamics are consistent (Hadar, 2010; Patton & Parker, 2017; Supovitz & Christman, 2003).

Specifically, for secondary mathematics teachers, Darling-Hammond & Richardson (2009) stated, professional development sessions are more effective when schools approach these efforts not in isolation, such as a typical one-shot educational workshop, but as a consistent part of a school reform effort centered on professional and student growth. To avoid disparities between what teachers learn during professional development opportunities and what they can implement in their classrooms, schools should seamlessly link curricula, assessment, standards, and professional learning opportunities (Darling-Hammond & Richardson, 2009). Successful communities of practice demonstrate how the experiences contribute to teacher efficacy in mathematics.

### **Characteristics of Successful Communities of Practice**

When studying successful communities of practice, researchers commonly find five characteristics: 1) professional dialogue, 2) peer observation and feedback, 3) collaborative activity, 4) shared goals, and 5) a focus on student achievement (Kruse et al., 1995; Louis & Marks, 1998; Tam 2015; Wegner 1996). These characteristics represent how communities of practice can allow for mathematics teachers' collaboration to influence their views and understandings of the curriculum and their role as a professional (Tam, 2015).

*Mathematics teachers should engage in professional reflective dialogue, including inquiry focusing on specific issues in the classroom.* In examining teachers' talk, Horn (2010) found that differences amongst communities of practice at the level of procedures and practices are most useful in understanding opportunities to learn (Horn & Little, 2010). The theoretical rationale underlying the grouping of teachers into organizational units as a means of improving

their instructional practices brings together research from a variety of disciplines, including organizational theory, management theory, social learning theory, and education theory. Early organizational theorists say that team-based work organizations can more effectively meet the challenges of knowledge-based work (Galbraith, 1994; Mohrman, Cohen, & Mohrman, 1995). The group practices that underlie learning organizations are a means of creating a culture of continuous improvement (Deming, 1986; Senge, 1990). To improve their job skills, it is recommended that adults learn both with and from each other (Wenger, 1998). Within education, a key rationale for the teacher community is that it provides a more collegial work environment and a setting more conducive to teacher learning and growth (Darling-Hammond & Sykes, 1999; McLaughlin & Talbert, 2001; Resnick & Hall, 1998). Christman, Cohen, and MacPherson (1997) conclude inquiry as to the nucleus to the work of small communities. The small schools' movement emphasizes the benefits of more intimate environments for both teachers and students (Supovitz & Christman, 2003). This conducive learning environment promotes collaborative teacher dialogue within the community.

*Mathematics teachers can improve instructional practices through peer observation and feedback.* Communities of practice are a great way for groups of teachers to engage in instructional improvement through a continuous review into their practice and investigations into ways that their teaching can most effectively produce greater student learning. Learning communities focused on instruction bring teachers out of isolation in their classrooms and engage them in ways to systematically explore relationships between their teaching and the learning of their students. Working together, teachers learn with and from each other. Eventually what is learned collectively will amount to more than the sum of the knowledge participants bring (Cooper & Karsenty, 2018).



Restructuring school dynamics which may impede teacher collaboration such as, teacher schedules to provide collaborative space, or even reorganizing content groups is imperative to provide teachers with strategies and supports as they engage in instructional improvement. To support these communities, school and district leaders must provide these teacher communities with specific structures, strategies that help foster collaboration and supports which improve their instructional practices. Structures that provide opportunities for engagement in instructional practice should include enough protected time to meet and organize (Supovitz & Christman, 2003).

Professional learning communities are frequently initiated, approved, and supported by policymakers to satisfy the professional development component of teacher evaluations. If policy makers value and require professional development for mathematics specialists and teachers as a part of teacher evaluations, then it must be offered, structurally supported, and sustained. Successful implementation of effective learning communities further requires buy-in from teachers and administrators. Parties involved must be willing participants. This commitment ensures that communities are long- term and sustainable. While it may take time before results are clear in specific situations, the process is worth it for the success of students and teachers (Battersby & Verdi, 2015).

*A collaborative activity represents a progressive measure of the extent to which teachers engage in the mutual practice.* Research on effective professional development also highlights the importance of collaborative and collegial learning environments that help develop communities of practice promote school change beyond individual classrooms (Darling-Hammond & McLaughlin, 1995; Hord, 1997; Knapp, 2003; Louis, Marks, & Kruse, 1996; Perez et al., 2007). When whole grade levels, schools, or departments are involved, they create a

critical mass for changed instruction at the school level. Teachers serve as support groups for one another in improving practice. Collective work in trusting environments provides a basis for inquiry and reflection, allowing teachers to raise issues, take risks, and address dilemmas in their practice (Ball & Cohen, 1999; Bryk, Camburn & Louis, 1999; Little, 1990).

In their book *Learning Policy: When State Education Reform Works*, Cohen and Hill (2002) describe two approaches that were successful in California's statewide reform effort, which introduced new mathematics curriculum and related assessments. With two different approaches, teachers were provided with time and space to actively learn together about the new mathematics content, practice teaching methods, and share their knowledge. The first activity engaged teachers in learning the new mathematics curriculum by teaching the units and returning to share their experiences with other teachers and problem solve. In the second approach, teachers discussed student work samples from assessments based on the new curriculum. The teachers were guided through the conceptual obstacles students faced on the assessments, and they discussed and learned from each other how to prepare for and address these misunderstandings (Cohen & Hill, 2002). Teachers working together through classroom challenges is at the essence of communities of practice. With their professional knowledge they each contribute, they can engage in dialogue and collaborative practices, to work towards a common goal of student success.

*Mathematics teachers should share a sense of purpose and common goals aligning to the mission and operational principles of the school.* Over time, when a mathematics community of practice is pursuing a joint initiative, members create resources for the collaboration of meaning. These resources could include mission statements, common assessments, lesson plans, feedback forms, or course evaluations. All these resources establish meaning for the community of

practice (Laksov, Mann, & Dahlgren, 2008). Shared meaning further connects the participants of the community. Horn (2010) furthers this notion stating that growth of the school-based community of practice is marked by conversations that hold practice, pedagogy, and student learning to high regard. The collaboration amongst teachers promotes high standards of practice, which generates and reinforces the core beliefs, norms, and values of the school community. The conversation becomes the link between the overarching mission of the school and improved practice (Horn & Little, 2010). Without support and cultivation from the administration, communities of practice will not reach their complete potential. Instead, they will transfer knowledge only among friends and colleagues. With cultivation, communities of practice can influence the entire organization and develop a more wide-spread understanding aligning everyone to the mission and operational principles (Lave, 1996). With key stakeholders of the school on one accord, small communities of practice become connected through time and space. This allows knowledge to travel both within the community of practice and across the organization. Willing collaborators bring solutions to issues that may not pertain specifically or immediately to everyone (Iverson & McPhee, 2002).

*A major focus on student learning demonstrates the shared commitment of mathematics teachers to student success.* Communities of practice are an effective strategy in improving student achievement and increasing teacher quality (DuFour and DuFour, 2016). Successful implementation requires that an organization of teachers and administrators work collaboratively in an ongoing process of structured inquiry and action research to achieve better results for their students by ensuring high levels of learning for all (Battersby & Verdi, 2015). Teaching practices and student learning are more likely to be transformed by professional development that is sustained, coherent, and intense (Cohen & Hill, 2002; Garet et. al, 2001; Supovitz & Christman,

2003). Increased student achievement was associated with teachers' more intense participation in the professional development and students' greater exposure to the resulting reform-based instruction (Darling-Hammond & Richardson, 2009). In a review of nine studies, Yoon, Duncan, Lee, Scarloss, and Shapley (2007) found that continuous professional development through communities of practice is related to student achievement. Three of the studies out of those nine, showed professional development within communities of practice lasting 14 or fewer hours showed no effects on student learning, whereas other studies of schools offering more than 14 hours of sustained collaborative teacher learning opportunities showed significant positive effects. The greatest student success was found in schools offering between 30 and 100 hours spread out over 6–12 months (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007).

### **Implications of Successful Communities of Practice**

For meaningful collaboration to occur, several policies and practices must be reconsidered. Schools should stop pretending that merely presenting teachers with state standards or district curriculum guides will guarantee that all students have access to a common curriculum or that a common curriculum is even appropriate. DuFour (2004) states, “Even school districts that devote tremendous time and energy to designing the intended curriculum often pay little attention to the implemented curriculum (what teachers actually teach) and even less to the attained curriculum (what students learn).” Schools must also give teachers time to analyze and discuss state and district curriculum documents (DuFour, 2004).

While communities of practice have proven their worth, building these learning communities is by no means easy. Many influences, such as district level policies and school administration, both internal and external to schools that can either foster the growth of or severely inhibit the process of communities of practice. Nonetheless, it takes considerable effort

to create and develop them. There is still much more to learn about the sustainability of these communities of practice (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). Goodyear and Casey (2015) spoke to pedagogical innovation as a result of successful communities of practice. Teachers are supported in their inquiries and encouraged to engage in dialogue with other teachers as the community of practice emerges. This engagement supports pedagogical innovation resulting in a positive change of student achievement (Goodyear & Casey, 2015).

As a school begins to function as a collective of communities of practice, teachers may become aware of the disconnect between their commitment to learning for all students and their lack of a coordinated approach to respond when some students do not show evidence of learning (DuFour, 2004). As DuFour (2004) states, “Professional learning communities judge their effectiveness based on results. Working together to improve student achievement thus it becomes the routine work of everyone in the school (p. 10).” Every teacher team must participate in a reflective process of identifying the current level of student achievement, establishing a goal, and then working together to achieve that goal providing periodic evidence of progress. The focus of team goals shifts to a more specific goal, such as "we will reduce the failure rate in our course by 50 percent" (DuFour, 2004, p.10).

Through teacher inquiry, Goodyear and Casey (2015) discussed that teachers develop an understanding of whether pedagogical innovation produced from the learning community had more impact than their previous pedagogical approach, which in turn allowed them to look at the 'longer-term'. However, the impact of the practice on students' learning, students' responses to the model, recognition for the teachers' use of a model, and teachers' feelings of competence to teach through the model need to be facilitated before teachers were willing to, (a) move beyond the “honeymoon period”, and (b) freely engage in professional dialogue with each other (Goodyear

& Casey, 2015). Subsequently, where 'space' and 'time' were created the teachers began to construct an identity as a member of a community.

Ronfeldt, Farmer, McQueen, and Grissom (2015) conducted a large-scale mixed method study and found that teachers believe participation in some form of collaboration to have a positive effect on students' mathematics scores in all three levels of public schooling, showing a causal relationship between teacher collaboration and student achievement. Dufour (2004) claimed that the best school systems are those that use communities of practice to focus student learning support and improved student achievement.

### **Professional Learning Communities as They Relate to CoPs**

While this study is framed around the structure of communities of practice (CoP), in K-12 education these collaborative communities are more commonly referred to as professional learning communities (PLC). Formed under the umbrella of a CoP, a PLC is easily described and understood through the framework of a CoP, as they also facilitate the move from the traditional view of teachers being isolated practitioners toward a collaborative, learning-centered model (Morrissey, 2000; Stoll et al., 2006). Specifically, a PLC is characterized as a collaborative culture in which teachers participate in a continual process of creating new knowledge. There is also a collective focus on professional learning and a responsibility for supporting and helping each other to improve (Brodie & Borko, 2016). Wennergren and Blossing (2017) stated, "A PLC is a concept denoting teachers working together in an effective way. A CoP, on the other hand, denotes a theory of social learning" (p. 50).

When initially examining our collaborative team, the work was closely aligned with the tenets of a CoP (Lave & Wenger, 1991), therefore a theoretical frame of CoP was chosen to operationalize the work of the community. Throughout this study and within the frame of a CoP,

this research study will allow myself as the researcher to explore when new meaning and knowledge were created in these collaborative spaces. PLCs are a unique subset of CoPs that can help invigorate new appeal in these supportive groups. A PLC is grounded under the tenets of a CoP; however, they often have other characteristics which differ from the collaborative community of this research study. In a K-12 setting, other characteristics of PLCs often include mandated or required participation, support being provided through facilitators, other forms of teacher support in place to carry out mandated reforms, and the work taking place usually has a pre-determined timeline (Hord, 2008; Lutrick & Szabo, 2012; Wennergren & Blossing, 2017).

Support in a PLC enables teachers to carry out this work. Project facilitators or those with expertise in the area often provide an immediate support for the teachers participating in PLCs such as helping them develop meeting agendas, protocols for discussion, finding resources, identifying data sources, or by posing questions and facilitating discussion and collaboration. Facilitators also serve as a liaison between the teachers and school and district administrators usually helping to drive mandated top-down reforms. This connection helps administrators understand and provide input into the work and needs of the teachers as they develop their PLC focus and activity (Darling-Hammond & McLaughlin, 1995). There are common beliefs, that most teachers need this guidance and a clear understanding of specific strategies within a supportive structure when coming out of “isolation” (DuFour, Dufour, & Eaker, 2008).

Ndunda et. al (2017) conducted a study, in which mandated school-wide, content-based PLCs were developed and implemented as part of reform efforts. A partnership through a university facilitated the development and support of the teachers in the PLC. Through the study they observed teacher changes in pedagogy over years of reshaping instructional practices. Through the support offered by the university, teachers expressed elements of care, teacher

agency as they created inquiry based instructional materials, and they begin interacting in more meaningful ways after getting past the original tension caused by this work being mandated. The hinderance on the depth of collaboration on mandated PLCs was also found in the study that Nelson and Slavit conducted in 2007. The data suggested that imposing an inquiry cycle onto a nine-month school year may not be authentic to teachers' needs. Trusting and respectful professional relationships were shown to be important in the teachers' willingness to open their instructional practices to investigation by others. The progress may be slowed as these relationships develop. Support in this area is essential. A facilitator can help teachers use protocols to create safe spaces for sharing and for keeping conversations from focused. However, It may take significant time for a group to feel like they are a professional community with little real change occurring until this has been developed.

“In PLCs, teachers have opportunities to collaboratively explore their beliefs and values about teaching and learning, and may come to a shared understanding of the impacts of their practices on learners and/or the larger educational community” (Lave & Wenger, 1991, p. 98). For a PLC to be effective, learning experiences must occur over an extended period, and the members must have the opportunity to reflect on the process. Loucks-Horsley, Love, Stiles, Mundry, and Hewson (2010) noted that, in the past decade, time pressures and balancing responsibilities for teachers can be a challenge to mathematics school reform efforts. Professional development within a learning community requires informed and purposeful action that is focused on creating a culture of learning for teachers and students, but strategies for structuring and supporting a learning culture may not be clear to educational leaders who wonder what teachers should do when they meet to reflect on student learning (DuFour & DuFour, 2003).



For many teachers it is not enough to give time for teachers to focus on student work and instruct them to look for ways to improve instruction (DuFour & Eaker, 1998). Since PLCs are defined to be spaces needing long term, sustained learning for teachers Gee and Whaley (2016) and Chauraya and Brodie (2017) intentionally focused their case studies on PLCs taking place longer than one or two years. Gee and Whaley (2016) and Chauraya and Brodie (2017) concluded the teachers discovered the importance of collaboration and dialogue and that being involved in the program provided instructional strategies they could use in teaching mathematics to children that came out of some of the sharing sessions. In addition, the respondents spoke of their change in practice through a focus on student discourse, student thinking, and improved questioning strategies. In their reflection, teachers described how the change in their practice has resulted in a growth in students' understanding of mathematics. While acknowledging visible shifts in their study, greater shifts were documented in those who participated in the PLC longer (Molefe, 2016).

### **Gaps and Challenges**

Researchers, practitioners, and policymakers investigate the leadership role in districts to better understand how leaders can make a difference in how teachers think about their work and in the quality of their instruction. However, much of the research on communities of practice focuses on the connections between leadership and the community and not the connections of the community to the students (Printy, 2008). The influence of leadership does not account for a direct link in the causal chain between leadership and student achievement. Leadership does not directly influence student outcomes such as academic achievement, dropout, or turnover rates but can contribute indirectly through teachers or school cultures. Rather than focusing on the role of leadership, with teachers needing to be the driving force of change, studies have not shown how

teacher development through participation in the CoP leads to student achievement. In a non-mandated community of practice, these results could in turn influence leadership and other members of the school to want to participate in communities of practice, changing the school culture, and bringing teachers out of isolation (Printy, 2008).

Previous quantitative research on communities of practice as it pertains to teacher development and support, have found components believed to be important for an effective community of practice. However, further qualitative research needs to be done to address the potential to improve teacher quality and educational change that influence student achievement. To further the research on communities of practice, this study investigated if the learning that results from participation in the CoP feeds back into instructional practices and impacts subsequent participation. When teachers determine the purpose of their joint work, they come to understand what activities are valued, and they establish social norms for relationships among members (Wenger, 1998). Communities of practice have inherent learning opportunities that could offer a pathway to improve teacher quality, educational curriculum changes, as well as accountability measures. School leaders will need to understand the learning dynamics within communities of practice. Their role can ensure productive learning in the sense that it enhances teachers' belief systems, skills, and improves learning outcomes for all students. Providing an inside perspective of a functioning community of practice through this study will allow school leaders to understand how they can ensure this learning environment for teachers. This should lead to innovative changes in the organization and structure of professional learning in practice and furthermore, teacher education programs. As the research aims to show the importance of meaningful collaboration for true transformation in teacher education professional learning and practice.

## Summary of Literature

In this literature review, I demonstrated that socio-constructivist learning through the framework of a community of practice is the foundation of this research study. The communities of practice that promote collaboration between teachers foster effective learning or knowledge-building opportunities for teachers, and space for professional dialogue all of which are collectively created. This allows for the development of best practices when teaching mathematics. In this chapter of the literature review, I began with an investigation of the key components of communities of practice that Lave and Wenger (1991) supported and further explored through Wenger's (2002) work. The functionality of communities of practice was discussed through what Tam (2015) explains as essential components. Lastly, I described significant elements of community practice that Kruse et al. (1995) and Wenger (1996) proposed, and Louis and Marks (1998) further explained. In the next chapter, I describe the theoretical perspective that framed the study and the use of narrative inquiry as a research methodology that specifies the procedures to identify, select, process, and analyze the gathered data of this research study.

### 3 METHODOLOGY

This study examined a team of 9<sup>th</sup> grade Coordinate Algebra teachers through the construct of a community of practice formed voluntarily to combat the pressures of accountability measures by improving instructional practices. While studies show intentional collaboration to be beneficial for mathematics teachers, there was further research to be done to investigate how teachers' voluntary collaborative efforts improve instructional practices. The following question guided the research study: How have mathematics teachers' voluntary participation in a community of practice in a secondary school shaped their instructional experiences? To respond to the research question, narrative inquiry was used as a research methodology. Narrative inquiry is a form of qualitative research that prioritizes the exploration of "lived experience as a source of important knowledge and understanding" (Clandinin, 2013, p. 17). In terms of the relationship between curriculum and teachers' beliefs, Cortazzi (1994) states that any real change in the curriculum is not likely to be carried out unless teachers' perceptions, beliefs and experiences are considered. For him, what teachers know about context and instructional actions is tied to specific events they have experienced in the classroom. He affirms that this knowledge is expressed in narrative forms. Therefore, the story is what most adequately constitutes teachers' knowledge.

For exploratory purposes, narrative inquiry demands the inquirer to get as close as possible to the subjectivities of participants' lived experiences and stay "attentive to the intersubjective, relational, embedded spaces" (Clandinin, 2013, p. 24) in which life stories are lived and constructed. To access and understand participants' different social constructions of reality and the contexts and cultures in which their life stories have been constructed, narrative inquirers use their questions in a form of collaborative co-construction with participants (Trahar,

2008, 2013). This form of questioning is a collaborative research relationship based on rapport and trust. This study investigated how the experiences of members of a community of practice allowed them to construct meaning and new knowledge about themselves and their teaching of 9<sup>th</sup> grade coordinate algebra. Individual interviews were conducted with each member to allow for their individual stories to be told. Narrative inquiry requires a great deal of openness and trust between participant and researcher: the inquiry should involve a mutual and sincere collaboration, a caring relationship akin to friendship that is established over time for full participation in the storytelling, retelling, and reliving of personal experiences (Marshall & Miles, 2014).

Like any method that relies on participants' accounts, the narrative may suffer from recalling selectively, focusing on subsets of experience, filling in memory gaps through inference, and reinterpreting the past. There is a difference between life as told, and life as lived (Marshall & Miles, 2014). While this method is criticized for its focus on the individual rather than the social context, narrative inquiry seeks to understand sociological questions about groups, communities, and contexts through individuals' lived experiences.

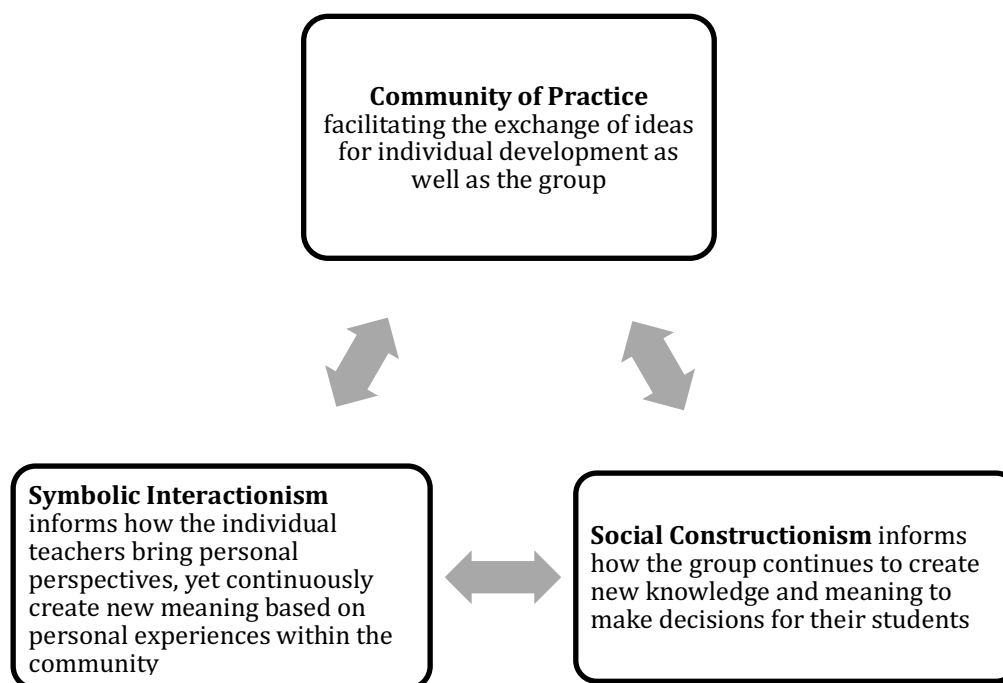
### **Conceptual Framework**

With my research grounded in the framework of a community of practice, I developed an understanding of the meaning the teachers created because of their collaboration. I also sought to understand the resulting effects on their teaching practice and students' achievement. This is an approach to the credibility or findings and conclusion of the research. The narratives allowed a contextualized and integrated understanding of teachers' beliefs, knowledge and prior experiences and, as Drake and Gamoran (2006) state: By situating the beliefs in teachers' narrative identities, the historical and developmental origins of the beliefs remain connected to

the beliefs themselves, which allows for an understanding of teachers' beliefs not as isolated statements, but as interrelated ideas rooted in teachers' identities- their stories of themselves as learners and teachers (p. 158). Sikes and Gale (2006) also value the use of narratives in educational research because "Human beings are storying creatures that make sense of the world and the things that happen to them by constructing narratives to explain and interpret events both to themselves and to other people" (p. 1). While framed around a community of practice, these narratives were viewed through the theoretical perspectives of social constructivism and symbolic interactionism as shown below in Figure 1.

**Figure 1**

*Theoretical Perspectives*



Through the social constructivism epistemological view, the research goal was to analyze how teachers narrated the process of creating new knowledge and understanding, which teachers

have developed of what they believe to be vital for their students to learn in their classroom through collaboration (Crotty, 1998; Merriam & Bierema, 2014). As Bogdan and Biklen (2007) stated:

People in a shared experience often develop common definitions or share perspectives since they regularly interact and share experiences, problems, and background; but the consensus is not inevitable. While some take the shared meaning to indicate truth, the meaning is always subject negotiation. (p. 119)

This meaning, which is not discovered but developed through their interactions with their students, other teachers, district and state policies, and administrative figures, allows these individuals to make sense of their unique individual experiences, or constructivist view (Crotty, 1998). The narrative inquiry method assumes that people construct their realities through narrating their stories. Narrative inquiry values the signs, the symbols, and the expression of feelings in language and other symbol systems, validating how the narrator constructs meaning. The nature of knowledge through the lens of social constructivism is one of construction, not of discovery (Spires, 2017)

As teachers work to balance the new initiatives as well as the daily work of teaching and the other tasks of running their classrooms, they make critical decisions regarding what is important and what they eliminate due to contextual circumstances such as time restraints and student abilities. As a member of the Coordinate Algebra collaborative team at my school, I have been able to listen to the perspective of teachers concerning what they find meaningful in the curriculum and choose to implement in their classroom as well as what they have the power to leave out. While a constructivist epistemology is foundational to how I developed knowledge through my research and how the participants created new knowledge and meaning to make

decisions for their classrooms, this concept is embodied in the theoretical perspective of symbolic interactionism (Figure 2). This theoretical perspective allowed me to seek an understanding of the experiences of the teachers in the community of practice within this research study (Blumer, 1969). As Blumer states, three features characterize this form of interpretivism. First:

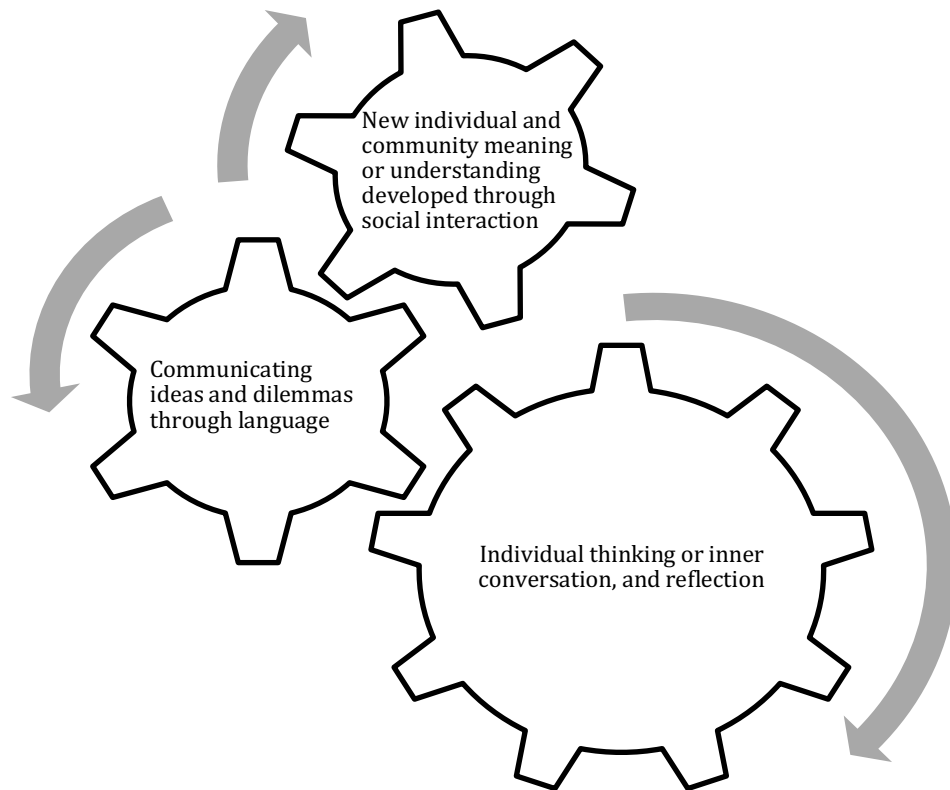
.....that human beings act toward things based on the meanings that these things have for them'; secondly, 'that the meaning of such things is derived from, and arises out of, the social interaction that one has with one's fellows'; and thirdly, 'that these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things [s]he encounters. (Blumer, 1969, p. 13).

The meaning people give to their experiences and their processes of interpretation are essential and constitutive, not accidental, or secondary to what the experience is (Bogdan & Biklen, 2007).



## Figure 2

### *Symbolic Interactionism*



### Research Design

John Dewey's thinking deeply shaped the work of Clandinin and Connelly's (1990) development of narrative inquiry as a research methodology. For Dewey, to study life and education is to study experience; that is, education, life, and experience are one and the same. Dewey (1983) used the three-dimensional space narrative structure approach (interaction, continuity and situation) to find meaning as shown below in Table 1. Dewey's three-dimensional

approach has had a profound influence in the study and practice of narrative inquiry in many disciplines including education. The fluidity in storytelling, moving from the past to the present or into the future, is at the heart of Dewey's theory of experience in the field of education.

As an educator and a researcher this study involved closely examining the instructional experiences of coordinate algebra educators, I was able to attend to their lived instructional experiences while participating in a collaborative community. Dewey linked the personal aspect of human experience to the social (Clandinin & Connelly, 2000), highlighting the overwhelmingly complex nature of human reality. In my research, the participants were not only viewed as individuals telling their story, but they were always in relation, always in context to the collaborative community (Clandinin & Connelly, 2013, 36). Dewey was committed to a transactional view of experience so that the reader can understand the research of narrative inquirers as distinct from the work of those grounded in other views of experience (Clandinin & Rosiek, 2007). Narrative inquiry allows us to understand meaning created between an individual and the world around them. This allows the participants, myself as the researcher, and the reader, to think about the aspects of experience that resonate with them. Narrative inquirers envisioned Dewey's view of experience to be "a collaboration between researcher and participants, over time, in a place or series of places, and in social interaction with milieus" (Clandinin & Connelly, 2000, p. 20). The ongoing collaborative interaction among the other two participants and myself, as the researcher, made a three-dimensional space (interaction, continuity and situation) necessary attending to each of the aforementioned dimensions of experience. Therefore, when creating the design of this research study, teacher narratives were prompted to inform Clandinin and Connelly's (1990) three aspects of this narrative approach: personal and social (Interaction); past, present, future (Continuity); and place (Situation) as shown in table 1.

**Table 1.**

*Clandinin and Connelly's three aspects of narrative approach*

Interaction		Continuity			Situation/place
Personal	Social	Past	Present	Future	
Look inward to internal conditions, feelings, hopes, aesthetic reactions, moral dispositions.	Look outward to existential conditions in the environment with other people feelings, and their intentions, purposes, assumptions, and points of view.	Look backward to remember experiences and stories from earlier times.	Look at current experiences, feelings, and stories relating to actions of an event.	Look forward to implied and possible experiences and plot lines.	Look at context, time, and place situated in a physical landscape or setting with topological and spatial boundaries with characters' intentions, purposes, and different points of view.

In the three-dimensional space narrative structure approach, interaction involves both the personal and the social aspects of the experience. To align with this area of the framework, the story for both the personal experiences of the storyteller and their interactions with other people, such as myself while being the researcher, were to be collected as participants had different intentions, purposes, and points of view which informed the analysis. Continuity or temporality is central to narrative research. When narrating a story, as the researcher I considered the past and present actions of the storyteller as those actions are likely to occur in the future (Clandinin & Connelly, 2000). Situation or place also needs to be considered when telling/retelling a story as the storyteller's landscape which gave meaning to the narrative, such as how the activities occurring in that place affected their experiences. The study being situated in this three-dimensional space allowed for the narratives to offer something different and distinctive in its inquiry other than generalized knowledge.

In this three-dimensional space I inquired into my participants' personal stories of experience, constructed with my own. I considered the following ontological assumption:

“Experiences do not simply appear to be connected through time; they are continuous” (Clandinin & Rosiek, 2007, p. 40). While we shared experiences and stories, as the researcher I could better understand how those stories of the past influenced their current experience. As the researcher I had to “honor their experiences as sources of important knowledge and understanding. It was their stories as they told them in relationship with [me] as [researcher], to which [I] attended”. Through this research I had the opportunity to retell their narratives about their experiences, as well as my own, as sources of important co-constructed knowledge and understanding. This research centered around their stories as told in relationship to mine as the researcher (Clandinin, Downey, & Schaefer, 2014, 44).

### **Research Setting**

The setting is important in the study as the research question refers to the location of the school, which was where the mathematics teachers’ voluntary participation in a community of practice in a secondary school shaped their instructional experiences. Therefore, the data was collected without manipulation of the community setting. Central High School, the site of the study, is a suburban high school located in a metropolitan area located in the Southeastern region of the United States. The student body is comprised of a little over 1400 students who wear uniforms daily. Of the 1400 students who must apply and be admitted through a lottery system, 98 % are African American and 2% Hispanic and Other. As a Title I school, 51% of the population at Central High School receives free or reduced lunch (State Governor's Office of Student Achievement, 2017). There are 75 full-time teachers, and the administrative team consists of the principal and four assistant principals, four counselors, and one media specialist. The school building is LEEDS (Leadership in Energy & Environmental Design) certified with an outdoor classroom near a nature preserve. As an EIC (Environment as the Integrating Context)

Model School, they provide an environmental, energy and engineering Magnet Program for grades 9-12. Students can take Advanced Placement® coursework and exams. The AP® participation rate at Central High School is 61% (Rankings). As a choice school, students are required to maintain a 2.5 GPA (grade point average) or they will be exited from the school to return to their zoned school. Aside from the school's instructional program, there are service-learning requirements, and support provided through parental involvement requirements. Students can participate in a wide variety of extracurricular and sports activities. With a 99% graduation rate, most students pursue post-secondary education.

### **Course Context**

Coordinate Algebra is the first in a sequence of three high school courses designed to ensure career and college readiness of freshman students. The course represents a discrete study of algebra with correlated statistics applications and a bridge to the second course through coordinate geometric topics. The fundamental purpose of Coordinate Algebra is to formalize and extend the mathematics that students learned in the middle grades. The critical areas, organized into six units, deepen and extend understanding of linear relationships, in part by contrasting them with exponential phenomena, and in part by applying linear models to data that exhibit a linear trend. Coordinate Algebra uses algebra to deepen and extend understanding of geometric knowledge from prior grades.

At the end of the school year student enrolled in the course must take the Coordinate Algebra Georgia Milestone assessment. The purpose of the Georgia Student Assessment Program is to measure student achievement of the state-adopted content standards and inform efforts to improve teaching and learning. Results of the assessment program are utilized to identify students failing to achieve mastery of content, to provide educators with feedback about

instructional practice, and to assist school districts in identifying strengths and weaknesses to establish priorities in planning educational programs. Georgia's Student Assessment Program is a comprehensive summative assessment program spanning Grade 3 through high school. The assessment system is a critical informant of the state's accountability measure, the College and Career Ready Performance Index (CCRPI), providing an important gauge of the quality of the educational services and opportunities provided throughout the state. The ultimate goal of Georgia's assessment and accountability system is to ensure that all students are provided the opportunity to engage with high-quality content standards, receive high-quality instruction predicated upon those standards, and are positioned to meet high academic expectations.

### **Research Participants**

Coulter, Michael, and Poyner (2007) argue that to understand teachers and teaching practices from a narrative perspective, as the researcher I must consider teacher feelings, past and present professional experiences, teacher beliefs, personal experiences, as well as the possible future implications of events. Additionally, as the researcher I had to value and explore the intersections of these factors to gain insight into the way teachers create and recreate their "professional self" in different settings. This means that the world of teaching goes beyond the mere transmission of content, or the implementation of a given syllabus. From a narrative perspective, teachers are recognized as human beings who live in specific social contexts and who participate in determined personal and professional situations, bringing to the classroom not only their content knowledge, but their multifaceted lives. Participants in the community of practice negotiate meaning through their voluntary participation in the community along with the reification of various resources such as the state created curriculum for coordinate algebra. The three-team members in the study initially consisted of Robert, an African American male aged

31 with three years of teaching experience, and two African American females, August and me, both age 31 with ten and eight years of experience, respectively. While there are many similarities amongst the three teachers such as race and age, each of the three teachers come from diverse academic backgrounds. Robert entered the teaching field after being a practicing lawyer for six years, I, (Jillian - the researcher) have an engineering background, and August is the only teacher in the group who majored in mathematics and attended college intending to be a mathematics teacher. The participants' different perspectives to approaching the curriculum, such as varying teaching styles, make for a well-rounded discussion.

After the group intentionally worked together for two years, we lost Robert as a member due to the expiration of his provisional license, a temporary license pending completion of a teacher education program, in which his culmination was 4 months shy of the start of school. Due to his termination, Robert was not a participant in the study. As a result of his termination, Eve was hired at Central High, and joined, as the newest member of the Coordinate Algebra team. Eve, a first-year teacher, had been a student-teacher at the school the previous school year and was familiar with the Coordinate Algebra team members. Eve had recently graduated with her master's degree from a local university.

With a new group member, the members of community of practice (see table 2) continued to function similarly as in previous years, centered on teachers' voluntary meetings during a common planning period. Participating in such a collaborative process, which wasn't required, and observing how it affects the development of teachers, is why I chose to further investigate this space.

As a small group of three teachers, the sample size allowed for depth and building relationships with the participants. This small setting, allowing space for depth in the research, lends to the trustworthiness of the study (Marshall & Rossman, 2016). Transparency about the

**Table 2**

*9<sup>th</sup> Grade Coordinate Algebra Team*

<b>Name</b>	<b>Age</b>	<b>Gender</b>	<b>Ethnicity</b>	<b>Teaching Experience</b>	<b>Highest Degree Earned</b>
Jillian	32	Female	Black	11	Masters
August	32	Female	Black	9	Bachelors
Eve	24	Female	White	1	Masters

study allowed me as the researcher to be credible. Aligned with constructs as put in place by Lincoln and Guba (1985), such as collecting multiple sets of data for triangulation and over an extended period, collaborating with the participants, and reflexivity allows for the construction of comprehensive analysis of the community. This also controls the trustworthiness of the study (Marshall & Rossman, 2016).

### **Researcher as Participant**

As a unique case, myself as the researcher, I continued to participate with the group so that it maintained normal function. As the researcher it is noteworthy that I am the primary instrument for data collection and analysis. Merriam (1998) states, “Data are mediated through this human instrument, the researcher, rather than through some inanimate inventory, questionnaire, or computer” (p. 7). There is no hierarchy amongst the community or positions of



power. Activities are shared amongst group members. Therefore, power dynamics between researcher and participants would not interfere with the data collection as there are no authoritative figures amongst the group. As a member of the community and an insider, I was privileged to information that an outsider may not be privy to when conducting research, such as personal feelings that a participant may share with me, as a relationship had already been established. I developed a deep understanding of the diverse contexts embedded within the participant's life as the stories were collected, and new ways of collaborating were developed with the participants to actively involve them in the research process. While this privileged data was appropriately protected, the participants and I constantly negotiated the meaning of the stories by providing validation checks throughout the collection and analysis

I acknowledge my subjectivity, belief in multiple meanings, and both individual and collective ways of knowing and understanding (Collins, 2000) as the researcher and as a member of the collaborative community. I considered how experience and context contributed to ways of knowing, interpreting, and understanding the world. As the researcher examining our voices and shared ways of knowing, I made these considerations when thinking about my participants' stories as well as the background knowledge that influence how we interpret our experiences. The experiences of the participants within this study are defined and redefined by what we see and hear within the context of our individual and collective interpretations as coordinate algebra teachers working in a secondary school. In qualitative ways of knowing, the perception, and the experience of each participant matters, as well as my experience, which combined tells a story of value (Stake, 2010)

## Data Collection

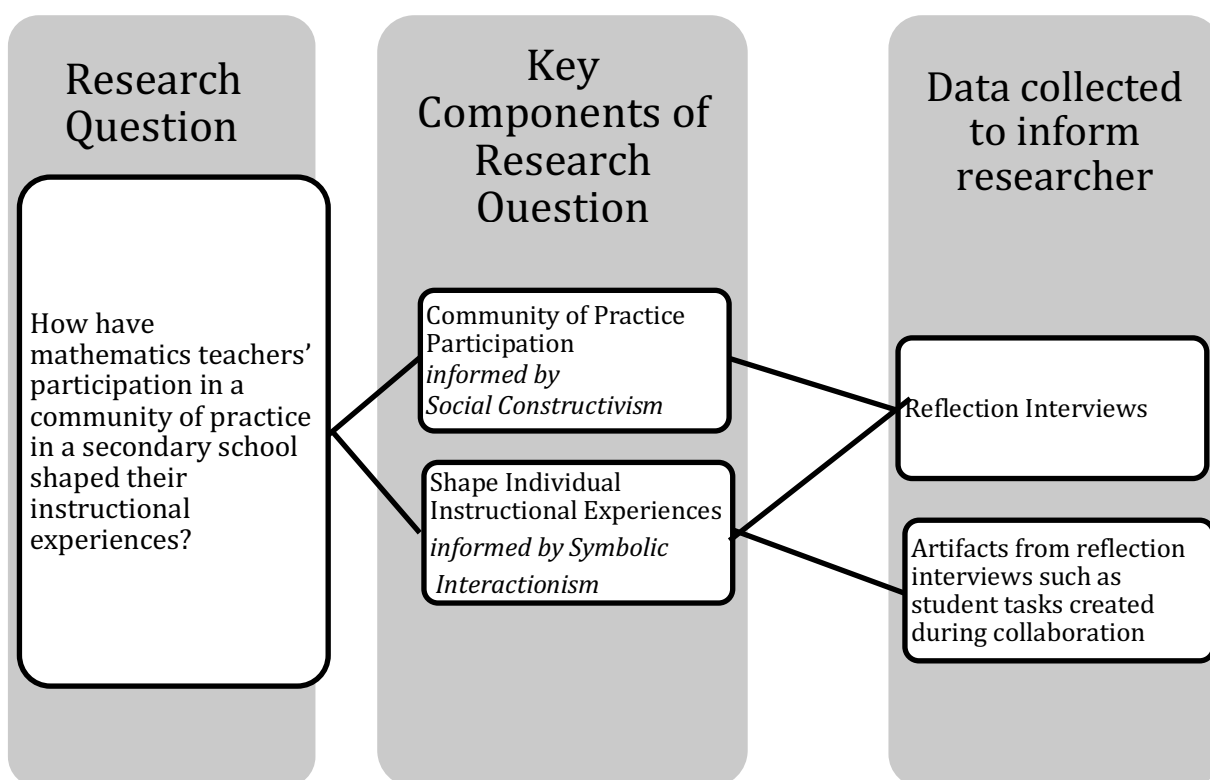
Before data collection, an Institutional Review Board application was submitted to Thomas State University as well as the school district in which the research took place. After receiving approval from both institutions, the participants completed consent documents, in which they were informed, pseudonyms were going to be used to protect their identities. This qualitative research study aimed to preserve the experience of participants. To understand the experiences of the teachers and their interpretation of their own experiences in the community of practice, the study demanded intense and active listening to give the narrator a full voice. Collaboration, however, it permitted all our voices to be heard (Marshall & Rossman, 2016). The study designed through narrative inquiry demonstrated the importance of context, setting, and the participants' perspective, with the focus on participants and the nature of their story (Marshall & Rossman, 2016). Figure 3 shows how the data collection informed the research question. Participation in the negotiation of meaning and new knowledge involves participating, engaging, and reflecting (Wenger, 2010). To develop an understanding of the teachers' participation in the community of practice, open-ended interviews were intended to capture the social meanings of the activities in which they participated as a member of the community.

The goal was to collect data in such a way that the researcher minimized personal bias through focusing less on my personal interpretations and more on the descriptions of the experiences that all participants provided for the study. Husserl (1970) refers to this as *epoche*, setting aside my personal experiences as the researcher, as much as possible, to see other perspectives (Moustakas, 1994). This study, which used narrative inquiry as a methodology, employed three methods of data collection, which included individual interviews as the primary focus, and analyzing text such as lesson plans and assignment samples, as needed, as shown in

Table 3. Interviews were recorded and later transcribed, allowing the interview to proceed without excessive notetaking disrupting the conversation and storytelling. Transcription of the narratives allowed the data to be readily available for review and analysis. Any products of the collaboration such as student assignment, were collected and analyzed as needed to support participants' narratives.

### Figure 3

*Data collection to inform the researcher*



**Table 3***Data Collection Matrix for December 2021*

<b>Research Question:</b> How has mathematics teachers' participation in a community of practice in a secondary school shaped their instructional experiences?		
<b>Data Source:</b>	<b>Goal:</b>	<b>Frequency:</b>
Individual Interviews (virtual due to pandemic restrictions)	Gather teacher perception on how they operationalize their collaborative group and of the influence of their participation in the collaborative group.	Two 1-hour interviews with each participant over a two-week span.
Personal Journal Reflection	To record the researcher's experience as a participant	Before, and after each interview
Student Assignment Samples	Corroborate teacher reflections on student achievement and to analyze products created collaboration.	Collected as needed to corroborate teacher reflections and as products of collaborative conversations

**Individual Interviews**

An initial interview was conducted with each teacher to gather their perspective, understanding of collaboration, and their view of the group. This helped to understand how the individuals positioned themselves and the group within the construct of a community of practice.

Following the initial interview, teacher participants took part in weekly interviews where they reflected on the group meetings, classroom experiences, and personal perspective. These interviews were semi-structured with a reflective interview protocol used as a guide (See Appendix B). The protocol allowed for the researcher to solicit narrative yet keep consistency and structure in the interview process. To solicit narratives, broad open-ended and probing questions were provided for encouraging detailed storytelling.

Questions varied, as well as follow up probes based on the interviewee's account. Due to a prior relationship, the interviews provided a better open space for teachers to exhibit professional dialogue, and to reflect on the meetings as well as their classroom operations. However, before conducting weekly interviews I used journal reflections as I am not able to self-interview but am still an active participant of the community.

### **Data Analysis**

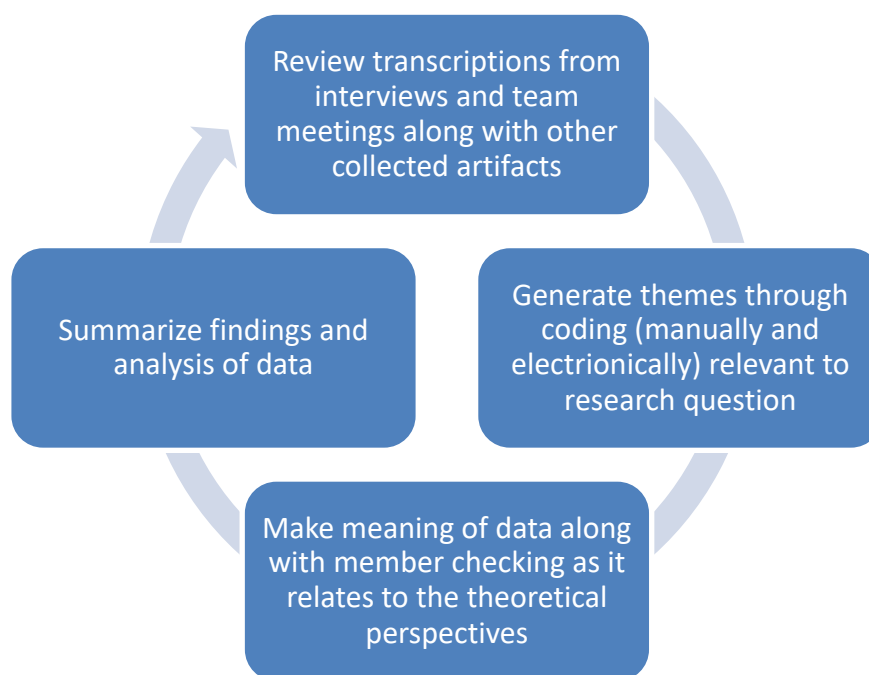
Merriam (1998) defines data analysis as “the process of making sense out of the data. And making sense out of data involves consolidating, reducing, and interpreting what people have said and what the researcher has seen and read – it is the process of making meaning” (p. 178). This definition of qualitative data analysis shows the application of constructionism epistemology in research and provides more concrete guidance.

Systematic collection of empirical data, not necessarily quantifiable, of which, the evidence is expected to provide a coherent portrait of a social setting, is replicable within the same historical period (Stake, 1995). The aim was both to question and try to make sense of data and make clear to the audience the narratives. As data was collected, I as the researcher simultaneously analyzed deductively considering the characteristic behaviors of a community of practice, developed by Lave and Wenger (1998). Merriam (1998) states the process "is not to say

that the analysis is finished when all the data have been collected. The analysis becomes more intensive as the study progresses, and once all the data are in" (Merriam, 1998, p. 155). This supports Stake's (1995) belief that data should be collected and analyzed simultaneously is supported. There was also inductive analysis (Argyris, 1993) conducted to identify patterns and changes in conversation and interaction styles to extract recurring themes (LeCompte & Preissle, 1993). The interviews were analyzed through coding to see how major themes appear across the data as illustrated in Figure 5.

#### Figure 4

##### *Data Analysis*



As a cyclic process, where the steps were continuous, coding is used to categorize the data. As the data is frequently revisited, using computer-assisted qualitative data analysis software NVIVO provided a platform with the capability to define and organize coding and information, and analyze themes in the data (Cope, 2014). Codes relevant to the research study

such as collaboration, as shown in Table 4, were identified along with other codes, such as openness, that arose from the data (Gilbert & Driscoll, 2002; Saldaña, 2016). Coding, subjective to the researcher, allows meaning to be created based on what the data shows (Saldaña, 2016). This allows the possibility of multiple realities and perspectives. Merriam (1998) stated "our analysis and interpretation – our study's findings – will reflect the constructs, concepts, language, models, and theories that structured the study in the first place" (p. 48). Therefore, coding of the collected data fits within the social constructivist epistemology guiding the research.

**Table 4.**

Nvivo Codes

Codes	Files	References
Autonomy	3	11
Collaboration	4	15
Limitations	2	3
Position	1	1
Support	3	10
Dilemma	1	5
Openness	4	8
Resonant Quote	1	1
Student Achievement	3	8

With the researcher as a participant of the study at the site of research, that space was respected so that the research did not interrupt the current setting and relationships. Not interrupting the natural setting or environment to collect data was important as the researcher. Our collaborative space was respected and not interrupted by data collection, which was done outside of our meetings. This enables the research to resonate with others and have the potential to lead to change in the culture of the school. Stake (1995) defines analysis as "a matter of giving meaning to first impressions as well as to final compilations" (p. 71). Therefore, the research was conducted with a thorough analysis of the data and its collection process. This evidence would support conclusions based on the research questions. The thorough analysis also aided the credibility of the study allowing it to resonate with the readers. Credibility is imperative that researchers convince an audience of the worth of their presentations (Preissle, 2004).

### **Validity**

Validity is a characteristic given to a claim by the ones to whom the claim is addressed. Sometimes validity is granted to a statement simply because of the authority of the person who makes it. However, for judgments about the validity of research to have merit, it is necessary that it's based on the weight of the evidence and argument offered in support of a statement or knowledge claim. Therefore, a conclusion is valid when there is sufficient evidence and/or reasons to reasonably believe it is so. There are degrees of validity given to a claim that is based on the strength of the argument the researcher uses. The purpose of the validation process is to convince readers of the probability that the support for the claim is strong enough that the claim can serve as a basis for understanding (Polkinghorne, 2007).

Narrative research gives insight about the meaning life events hold for people. It makes claims about how people understand situations, others, and themselves. When taking on narrative



research the purpose is to have knowledge to present about the human condition. The knowledge claims about the human condition produced, presented by this research are meant to be taken seriously requiring sufficient justification for claims made. Therefore, readers should be able to follow the evidence and argument presented in the next chapter to make their own judgment as to the relative validity. While it is not only the readers who should be able to follow evidence, but the participants or storytellers should further validate claims by member checking (Polkinghorne, 2007). The strength of the data collected should provide a progression of evidence and explanations. This data collected must be rich to allow for interpreted meaning and evidence as to why other interpretations are not as adequate.

### **Quality & Ethical Concerns**

Given the diverse fields in which qualitative studies are conducted, there is a constant critique of the research due to the lack of agreement for assessing quality (Leung, 2015). Tracy (2010) presented eight areas of consideration, (a) worthy topic, (b) rich rigor, (c) sincerity, (d) credibility, (e) resonance, (f) significant contribution, (g) ethics, and (h) meaningful coherence, to analyze the quality of qualitative research. These values for what is considered good qualitative research are changing with time, as new ideas and knowledge come about. While they are not in place to limit innovative practices in qualitative research, they provide a basis for scholarly conversation regarding strong qualitative studies (Tracy, 2010). For this study, there were ethical considerations to make, as well as a focus on the resonance and significant contribution to the work.

Like any method that relies on participant accounts, the narrative may suffer from recalling selectively, focusing on subsets of experience, filling in memory gaps through inference, and reinterpreting the past. There is a difference between life as told, and life as lived

(Marshall & Rossman, 2016). For its exploratory purposes, narrative inquiry demands the inquirer to get as close as possible to the subjectivities of participants' lived experiences and stay "attentive to the intersubjective, relational, embedded spaces" (Clandinin, 2013, p. 24) in which life stories are lived and constructed. To access and understand participants' different social constructions of reality and the contexts and cultures in which their life stories have been constructed, narrative inquirers use their questions in a form of collaborative co construction with participants (Trahar, 2008, 2013). Through these protocols, along with member checking, I sought to "to gain the needed confirmation, to increase credence in the interpretation, [and] to demonstrate the commonality of an assertion" (Stake, 1995, p. 112).

### **Summary**

Narrative inquiry was used to examine how mathematics teachers' participation in a community of practice in a secondary school shaped their instructional experiences. Their narratives, along with supporting documents, were collected and provided insight into their experience about the research question. Systematic manual coding, through qualitative data analysis software, were used to analyze the data. This software, NVIVO, was used to organize data after themes emerge, allowing for the construction of meaning and contextualized knowledge regarding the community. The resulting data analysis was used to create a narrative account of the participants' experience in a voluntarily organized CoP centered on teaching coordinate algebra.

## 4 RESULTS

As I prepared to collect data with my participants, August left Central High School for what she saw as a better opportunity. While this was tough for our coordinate algebra community we had developed, we understood her decision as we had just completed what we saw as an unprecedented and difficult school year. Due to the Covid-19 pandemic, the previous year was completely virtual, with teachers only returning to the building during the last few months of the school year. While August's departure changed how our collaborative group was composed, it did not take away from what had been created and sustained over four years. Through narrative inquiry, the participants personally described their experience, which allowed the reader to see how the participants' experiences were shaped by their participation in the group. In this chapter, I will provide background on the community, each participant, including myself, detailing our experience, followed with an analysis of themes developed across their interviews.

### **Collaborative Community**

There was no formal inception to the collaborative community. With all three teachers' classrooms being relatively close, it was the quick informal conversations, while monitoring the students in the hall between class changes, that led to regular weekly meetings during our planning periods. We met weekly as our lessons plans (see Appendix D) were due each week to an administrator who oversaw our department. These weekly meetings consisted of an exchange of ideas about which teaching strategies and an exchange of resources that would be best for the upcoming content to be taught. The state board of education developed the content standards that were mandated to be taught gave us little room for deviation. As "August" stated, "They do send us out surveys and ask our opinions on the curriculum, but I really don't know if they really look at them or they are just taking them because I really haven't seen a big change." "Eve", also had

a similar opinion as she stated, “The state says this is what you need to teach. This is what we have for you, and it's only been flexible in how we teach the content.” As we did not have control over the curriculum, the flexibility we were allowed on the delivery allowed us to produce a weekly lesson plan during our meetings. We soon realized that instead of us each creating an individual lesson plan, planning one together, and alternating the responsibility of writing them eased our workload. In my personal reflection I noted, as a person who is not a fan of writing out lesson plans, sharing this responsibility took a huge weight off.

There was no formal setting or time for the meetings originally. They would take place in one of our classrooms that we would choose at some point before the meeting and decide a time that was best during our free period. Eventually Eve’s classroom became the meeting location as she began storing most resources digitally and could display them on the Promethean board in her classroom as we discussed them. During the Covid-19 pandemic, while school was virtual, our meetings took place on Microsoft Teams.

Aside from meeting with each other, we would also meet with our students during afterschool tutorial. There was a demand for afterschool tutorial, and to meet this demand we decided to each host a one-hour session one day a week. During this tutorial, we did not only host our own students, but all coordinate algebra students at Central High were welcomed. This allowed our students to be able to hear instruction presented multiple ways. With us having common lesson plans, we were on the same page as well as our students. Therefore, no matter which tutorial session they attended there was no disconnect from the instruction they were receiving during the school day. As Central High school went virtual during the Covid-19 pandemic, these sessions continued virtually on Microsoft Teams as we saw them to be beneficial for our students.

Next, I will present the narratives of the participants in the collaborative community as they described their participation in the community. When engaging in these stories, which have been co constructed with myself as the researcher, it is my goal that you are able to see the transformation of each participant as they participated in the community.

## **August**

**Entering the Teaching Profession.** After graduating college with a Bachelor of Science in mathematics in 2009, August felt as though her career options were limited without having a master's degree. After exploring her options, she joined the Teacher Academy for Preparation and Pedagogy (TAPP) program to pursue a career in education. The Teacher Academy for Preparation and Pedagogy (TAPP) is a state approved, two-year non-traditional route to teacher certification designed to meet the critical teaching needs of the district. The academy prepares teacher candidates with degrees and content area expertise in developing the knowledge, skills, dispositions, and competencies needed to be successful in the classroom. As a participant in the TAPP program, August was assigned a mentor in the building. She stated, "TAPP assigns you a liaison person in the building and then as I was moving through within my department, I had people that had just coached me through it to make sure I was settling in. I had several mentors. And that's when I found out that we do a lot of stuff together [your content people]. We meet together so that everybody's on the same page, even though everybody went to their own class and built a separate lesson. We just made sure that we were all teaching the same standard." After spending four years at her school, three of which were required as a part of TAPP requirements. She transferred to Central High school. August saw Central High school as a better workplace due to it being an honors high school.

**Joining the collaborative team.** August was initially introduced to me in 2016 when I was told I was getting a new next-door neighbor that would also be teaching Algebra. While I was excited about having someone join me, her arrival quickly turned into changes I was not expecting. Shortly into the new year, the decision was made that she and another teacher would be taking my students and teaching Algebra while I would be teaching a new Title I funded math course aimed at remediating students' math skills while supporting them in their current math course. While changes such as this aren't unheard of, other reasons, which I will describe below, made me feel as though this was an attack against me of some sort.

August arrived at our school pregnant with twins. Therefore, she was planning to leave in the middle of the year for maternity leave. So why would the instructional principal, with whom I did not have the best working relationship, decide to put a state-tested course in the hands of a long-term substitute that would be there once August left? I knew it would be up to me to step in and help carry that load. Later I found out that August had a professional relationship with the principal making those decisions which was who encouraged August to transfer to Central High School. Knowing this the teaching assignment decision made me feel as though I was being replaced. This was jarring to me as it was my third year at Central High School, and I was just beginning to settle into my new school home.

However, after we were acclimated with our courses and new students, August and I began to talk much more as we were classroom neighbors. The first dilemma she brought to my attention is what sparked what would become quite the collaborative relationship. August approached me stressed about what she considered the “entitled parents of Central High School” . Students at Central High School have to maintain a 2.5 grade-point average, therefore parents were always in communication about students' grades and often would try to find any error on

the teachers' part to have grades changed. I could relate to this dilemma because I faced this same problem two years prior when I started at Central High School. What this dilemma had taught me, and what I was able to share with August, was that you had to be very organized and to document everything so that when parents came with questions you had documentation to support your assessment. Working through this dilemma together began a professional relationship that would later grow into a personal relationship.

**Experience.** Through our conversations, which took place on Zoom, August was able to discuss her experience working with a collaborative group she now regretted leaving. During our conversations which occurred over a 4-week span, August referenced the shared roles, diverse approaches to student achievement, and a sense of belonging being a part of the community created, that most influenced her experience. "August" stated:

I have changed because I recognized I can't do it all. And when you add other aspects of life, and you try to do it all... When I first started, I used to stay at work until I was ready to go home, until I felt like I was able to come back the next day and pick back up without so much on my to-do list. Being on the team helped crunch down to-do lists or what needs to get done because we will assign some things to break up, so we don't feel like we have to do it all.

August gave several instances in which shared responsibilities allowed the group to act as a support system for one another. As she stated above, no one had to do it all. When she described the stress of having to go on maternity leave for two months, August shared how the team "held it down". Her team made sure that her students learned the necessary content after learning the long-term substitute was not providing students with the materials left for them. After returning to school, she was able to "pick up and continue rolling forward" with her students. As August

reflected on her maternity leave, I remembered delivering exams to her house so that she would be able to continue grading assignments and providing feedback to her students. It was a full circle moment reflecting on how I initially felt about her maternity leave seeing it has an increase to my load, to then wanting to support her during this time as this had become the dynamic of our community. No one had to do it all.

Not only was sharing responsibilities beneficial for professional tasks we had to complete such as lesson planning, creating assessments, or alternating tutorial days, there was a shared responsibility for making sure our students were achieving in the classroom. In August's reflection, she shared that the consistency of collaboration amongst the group allowed for multiple strategies to be used with our students as we wanted to make sure we were prepared for the diverse learners in our classrooms. "Every time I meet with my cohort is definitely benefiting my students because it gives me a different outlook". Her open mind is what she attributes to being welcoming to new ideas and strategies. She found that when there were activities outside of her comfort level, such as those that could get the classroom messy, it was worth it to see the engagement from her students. An open mind, which she believes to be an important factor for the group to be beneficial and sustain longevity, allowed for the implementation of new teaching strategies, tailored to her various types of learners. "To see other open-minded people, think and brainstorm, it helps me develop a different, I guess, a different activity for them that I never even thought about. They can be very inventive with them (different activities), getting what they need to create a personalized learning environment for students". After seeing an increase of student achievement on exam scores and observing an increase in engagement during lessons, August believes it stemmed from innovative lessons designed by our collaborative group. The flexibility and variety of classroom lessons kept the students engaged as there was something for everybody



to enjoy. These lessons were designed with the shared goal of student achievement, and personalizing lessons based on the needs of their students.

Through the work done in our collective, August believed it helped with teacher retention. This is because of the sense of belonging she felt. Oftentimes in a large school, you only see some of the staff during faculty meetings or pep rallies, due to everyone working in their classrooms outside of mandatory group meetings. But when you work with the same group consistently, showing up not just for your students but for each other, you grow a sense of loyalty. Not to the building itself but to your team, to the people who help push you through each day. The ironic part of this loyalty is at the time of this interview August had left Central High School for another position. She was now at a school where she was the only Algebra teacher. After having been on a collaborative team for years this new assignment was a drastic shift for her. During our conversations, as she reflected on her experience in the collaborative group at Central High, she continuously said how much she missed us and now regretted her decision. She missed the support of our group so much, she interviewed for the role of an instructional coach at Central High School after only being at her new school for a few months. While she did not get the position, she made it clear that her goal was to return. She missed the collaboration and the support that our group had to offer. She had underestimated the value of the team until she was forced to be without it. For that reason and more, when the school year began, she quickly called Eve and me to see what time we would be planning because she wanted to continue to work with us after seeing how collaborating with the group benefited her performance and her students in the classroom.

For August, these benefits of shared responsibility, increasing student achievement, and a sense of belonging were factors that made her want to show up for her team and to keep the work

going. When speaking on mandated teams such as department meetings, she dreaded going because typically “you will hear a lot of gripe, not a lot of ideas, you know, just not a lot of things that make you want to come back”. While she trusts mandated collaborative groups are implemented with good intention, she believes teachers should be given the autonomy to create spaces that best suit their needs and positively influence their teaching practice, such as the one we continued to nurture for our performance and our students’ achievements.

### **Eve**

**Entering the teaching profession.** Being raised by a mother who was a teacher, Eve knew early on that she wanted to become a teacher. When enrolling in undergrad, Eve did not choose to major in education, she chose mathematics. After graduating with her bachelor’s degree in mathematics she began a master’s program where she received the Woodrow Wilson Fellowship opportunity. The Woodrow Wilson Teaching Fellowship focuses on preparing quality educators for Georgia’s most underserved public schools. Each fellow receives \$20,000 to complete a master’s degree program based on a yearlong classroom experience. Fellows commit to teach for three years in the urban and rural Georgia schools that need strong STEM teachers. Throughout the three-year commitment Eve would receive ongoing support and mentoring. The yearlong classroom experience is what brought Eve to Central High School. To describe her experience, “Eve” stated:

So, I know my first year technically was very different because like I was at Central 40 hours a week, but I was teaching the whole time while I was getting my masters. And I think like that made a night and day difference because while I was never thrown into it, like I feel like most teachers are and I always had like walk ins or the lead teacher to fall back on. Because I know, like when my coursework got really heavy, I was like, can I not

teach today or tomorrow, and I always had that option and like, their resources when I didn't have like a creative idea, or I didn't know what to do.

**Joining the collaborative team.** Eve began at Central High School as a student teacher working with our department chair as her mentor. We didn't interact much, as I was down on the freshman hall, and she was upstairs working with upperclassmen. However, our department chair would show us the innovative strategies that Eve had created for her students. August and I would always comment on Eve's youth and new ideas. When Eve joined our team the following school year in 2019 as a full-time teacher, we were thrilled to work with her.

At Central High School, freshman students attended an advisory period once a month for remediation of math skills. While this may seem simple, the implementation was not always smooth as teachers did not want to prepare or deliver a lesson for an extra course, and many of the teachers were not math teachers, and had no desire or skill to teach math. We tried to develop something more self-guided for students, easing the workload of teachers, Eve had the idea to create an impressive murder mystery. To solve the mystery students had to use various math skills, with the assignments lasting over a full semester. It was at this moment August, and I knew that our lessons were going to soon be transformed. Though we were comfortable in our collaboration, Eve brought new fresh ideas that weren't like anything August and I created before. As a math major, she had a depth of content knowledge and at about 6 years our junior, just finishing college, she was hip to new technologies and strategies.

**Experience.** While we were excited about the new addition to our team, it wasn't until interviewing Eve that I was able to hear her perspective on how she came to be a full participant in our team. When interviewing Eve, she consistently mentioned how the group allowed her to build confidence as a novice teacher. This was in part because she did not have to complete the

administrative tasks such as lesson plans, assessments, and find resources by herself. She was supported by the group and sharing responsibilities reduced her stress level as she was starting a new career.

So, the actual classes and being in the college setting didn't really help that much. The only one that honestly, I felt like helped was one that was going through like an IEP/ RTI process and broke that down completely. Otherwise, it was a lot of theory, which is great. But in the classroom, it's, you know, classroom management is huge. Knowing how to organize your things and communicate with the students and stuff like that are some of the biggest things which weren't really taught through the program, besides the connections. So, like getting to have my cohort and people that had been teaching or people that weren't brand new like me helped a ton to be able to talk to and bounce ideas off of and things like that.

Listening to Eve express her feelings of unpreparedness when entering the classroom was shocking, yet relatable. Shocking because in my opinion she had so many great ideas, but as an educator I understand that while we may have great ideas for our students, the delivery and student engagement can look very different from what we imagined. Her feelings were relatable because I felt the same, ten years prior, entering a career that I had not been prepared for. Just as I latched on to veteran coworkers my first year to help guide me, Eve was excited to join our team to help support her through her first year in the classroom full-time. This support during her first year became both critical and essential as Eve not only confronted an awareness of feeling unprepared, but she also struggled - like others around the globe - with navigating an unprecedented global pandemic, Covid-19. Teaching virtually for a year and a half, Eve

described the commitment of the team as they met regularly on Microsoft Teams to collaborate and check in on each other's well-being.

The commitment to the team allowed Eve to not feel alone in her work. As August and I were already acclimated to the culture of the school, she stated how we were able to help prepare her for obstacles she may face. Also, she was able to use us as a resource when she may be unsure of how to navigate a situation. Rather than situations that may have seemed small, such as proofreading an email to a difficult parent, to those that were considered large such as how to help prepare her students for the end of the year Milestone assessment, Eve knew that she could ask her team members. As recently as this current school year, Eve contacted August, who was no longer at Central High to ask for assistance.

So basically, it was like the Tuesday before we went on Thanksgiving break, I was told, or informed by the assistant principal over instruction, I would be getting a few new students and she came down and talked to me about it. She explained that the teacher I was receiving them from, decided that he was not able to teach the exceptional education students anymore and that they were going to be put in my seventh period. And so it was Thursday before Thanksgiving break, I got about 20 new students and was pretty much told like, try to get them to have passing and decent grades before the end of the semester and do what you can with them.

When this situation happened, I remembered Eve calling my classroom phone to tell me about the news she had received. She was blindsided and frustrated. And being that Eve teaches the accelerated sections of the Algebra course, she felt very unprepared for the students heading her way. Yet as Eve discussed these events in our conversation, just weeks later, I no longer heard

that frustration. Eve contacted August who had the most experience with exceptional education students at Central High School of the three of us. “Eve” stated,

I knew she wouldn’t beat around the bush or try to make it sound better or worse than it was going to be. I knew that she'd be very honest, straightforward about it, which at that time I knew I needed, and I knew that she would just give me that advice she felt I needed at the time.

August’s advice to Eve eased her nervousness and helped her feel confident working with a new group of students. “Eve” reflected on this saying, “It was definitely due to like working together, the collaboration, how much we are able to work together, that made me comfortable and not even pause about the idea of reaching out to her.”

While Eve has been building her confidence in her new career, being able to work with others to complete tasks, helping to manage her workload has been important. As a new educator, Eve talked about all the tasks that teachers have outside of facilitating lessons for your students. Teachers design lessons, create assessments, contact parents, participate in 504 meetings, analyze student data, along with a host of other things. These responsibilities left Eve with what she saw as an overwhelming to-do list. However, as she acclimated to the group, she saw that she was not alone in all she had to manage.

### **Jillian**

**Entering the teaching profession.** It was spring of my senior year in college, and I was preparing to graduate with a bachelor’s degree in Engineering Science. The United States was in the largest economic downturn since World War II and many companies were on hiring freezes making my job hunt feel very limited. I was participating in a program where we traveled to middle schools doing STEM experiments with students. A teacher we worked with pointed out

to me that he could see I really enjoyed working with the students and I should explore the teaching profession as an option upon graduation. He told me teachers were always needed and, in this economy, it could be a good option. A couple months later I passed the mathematics content assessment giving me a provisional teaching license. As a condition of my provisional license, I had to complete an education master's program within three years to earn a full license. August of that year I walked into my first classroom where I was to teach ninth grade students Algebra I.

**Joining the collaborative team.** I began teaching at Central High School my sixth year of teaching. When I began as a coordinate algebra teacher, I was the only teacher who exclusively taught coordinate algebra. Other teachers taught multiple courses, one of which was coordinate algebra. Our schedules not being aligned, and our classrooms not being located near each other made it very hard to work together. We did everything, i.e. lesson planning or developing assessments separate. Coming from a school where collaboration was common, it was very hard feeling I had to do everything on my own. It was especially challenging due to the administration frequently expressing how important it was to improve our Coordinate Algebra Milestone scores. I didn't see how this could be done without the coordinate algebra teachers being on one accord.

It wasn't until August was hired and placed in a classroom next door to me that I became excited about having someone that I could work with to better the learning experiences of our students. However, that excitement was short lived after the changes came following her hiring as previously mentioned. A few months after August was hired, while I was teaching the mathematics remediation elective course, Robert was added to our team. Robert was a practicing attorney who was volunteering as coach with our football team. He took a liking to the students

and our principal convinced him to give the teaching profession a try. Robert started in October of that school year. With him having no classroom experience, he was assigned to shadow me for two weeks before starting in his own classroom.

Now, August and I being next door to each other, and Robert in my room shadowing, put the three of us in a very close vicinity where interaction was frequent. Having been at Central High school the longest I was accustomed to how the school was run and was of a great resource to my new peers. August had the prior experience with the coordinate algebra curriculum and the content knowledge to help improve our instructional lessons. Robert being new to the profession had many questions would often spark great conversations and collaboration. These impromptu conversations began the relationships that led to the collaborative community.

**Experience.** After the dissolution of the mathematics remediation course the following school year, Robert, August, and myself were assigned to be the coordinate algebra teachers, and we were also given one common free period. This fifty-minute period allowed us to talk about everything from student behaviors issues, parent dilemmas, best practice for instructional strategies and our life outside of the classroom. While my roles and responsibilities as a teacher at Central High did not change, I started to see how having this community to work with made my workload feel a lot lighter.

We planned everything together and helped to carry the load for each other when necessary. Our work relationship continued outside of work as we attended each other's birthday parties, Robert's wife baby shower, or even just grabbing lunch together. After just one school year together our students' scores Coordinate Algebra Milestone scores improved, and I believed it to be a result of the work of our community. Our minds working together allowed me to develop lessons that were different than what I would usually come up with on my own. I believe



that planning with different perspectives helped with delivering the lessons to students who had different perspectives.

My job felt more rewarding as I saw my lessons becoming more engaging and my students' scores improving on assessments. I saw my own personal growth in my classroom because of my participation in the community. When we found out that Robert would not be able to return to Central High after completing his second year (because his master's program for full certification was due to be completed a semester after his provisional license would expire) it was tough news. I felt as though the work we were doing was good work and wondered how his departure would affect our community. I worried about whether the teacher that replaced Robert would participate in our community keeping the productive momentum going.

In this moment, August and I found importance in communicating our concerns to administration about the new hire. I had never gone to administration advocating for changes before, but we communicated the importance of our community and that it should be considered when hiring a new person. We wanted administration to understand the significance of our collaboration and see how it has benefitted ourselves as educators and the performance of our students. When meeting Eve as she student taught, we knew she would make an excellent person to work based on her willingness to collaborate and contribute innovative ideas. We advocated for her during the hiring process.

Over the years I saw the impact of this community and became amazed at the transition I saw in myself and my classroom as a result. I felt supported. I never felt as though I was alone to face any challenge. I felt my voice was amplified when I communicated with administration or policy leaders because we were on one accord. When working outside of school as a curriculum writer for the county, I was able to understand different perspectives and communicate

thoroughly when voicing an opinion. I was no longer just speaking on how I felt, but how we felt as a collective.

In my reflection, I recalled the day I gave birth to my daughter unexpectedly. I logged in on our weekly Microsoft Teams meeting to share the news. Eve and August both laughed and called me crazy for thinking about work and joining. As we were working virtually, I looked forward to our weekly meetings as we were no longer in the building to talk throughout the day. Logging into our meeting that day was a pivotal moment in me realizing how important this community was. This collaboration, and its influence, led to this study. In our building other teachers always comment on the algebra team and well we appear to work together. I have always wondered how this work can be replicated and fostered so that other educators and their students are able to be benefitted through collaboration with their peers.

### **March Madness**

When discussing how we collaborated to be innovative and improve instruction for students, participants mentioned our March Madness tournament assignment. We developed his student task and was a lesson that we improved each year to suit the needs of our students. As previously mentioned, students enrolled in coordinate algebra at Central High school must take the Milestone assessment at the end of the school year. This test affects students as their score is twenty percent of their final grade in the course. Not only does the students' performance affect their grade, but it also counts towards the school's College and Career Ready Performance Index (CCRPI) score which informs the state of the quality of education provided to students. Therefore, it is an indirect reflection of the quality of instruction we provide to our students. Not only do we want to see our students learning and being successful in our classrooms, but it is

important for us that they perform well on the Milestone assessment as it reflects our performance.

After teaching six units each year we try to explore best strategies for how to review material to prepare students for the assessment. As “August” stated, “We are trying to bridge those gaps that we're seeing and focusing on scaffolding for them, and which techniques help us with not only reviewing our standards but making sure that mathematically they understand the concepts and not just going through the motions. That there is comprehension mathematically.” Reflecting on a particular collaborative session where we were brainstorming as we began to prepare to review with students, “Eve” stated “Everyone was breaking down what they've done in the past, what they enjoyed in the past, what they're seeing in the classroom currently, what would and wouldn't work for their students and trying to find that happy medium.”

After participating in a March Madness bracket with a friend, I had the idea that a friendly competition would encourage and motivate our students to take their review and Milestone assessment preparation more serious. March Madness is the time during the month of March when the National Collegiate Athletic Association (NCAA) basketball tournament takes place. Each year fans across the county complete the March Madness bracket, which is the grid of all the teams in the tournament and the path they must follow to the championship game, predicting which team will win in each round. After bringing this idea to the collaborative team during one of our meetings we worked to develop this idea into an actual task for our students as a review for the Milestone test.

The assignment involved creating a bracket for our students where each week competed against each other to advance to the next round until the final winner wins a prize. The winner of each round was based on who scored the highest on a review assignment (see Appendix E).

As we continued to use this assignment every March, we were able to revisit what worked well and what didn't. Also, each teacher was able to use the assignment how they saw best for their students. For example, "Eve" and "August" used the assignment as extra credit. In their reflection they both stated how after students were eliminated, they were not motivated to complete the review assignments unless they needed extra credit. Because of this they saw many students not participate after being eliminated from the round. In my classroom I required each student to complete every round whether they had been eliminated or not. However, I saw students submitting the assignment, not taking it seriously just to get the participation grade. Each year we made minor changes in the requirements and grading of the assignment and how the review tournament worked to best suit the needs of our students that school year. We also altered how the tournament was presented to students to get them more involved. The March Madness Milestone review tournament got so much buy-in from our students as they enjoyed the competition. Each week they entered class, going straight to the bracket to see if they made it to the next round. After a couple of years, as students talked about the tournament in other classes, teachers from other content areas, whose students had to take a Milestone for their class, approached us about helping them get the tournament started for their students. As "Eve" shared, "With the group to get that different feedback or viewpoint it helps. When all of us are like doing the same activities, it probably can be repetitive for students. Like, if we're only doing scavenger hunts or we're only doing foldables, which are more fun I think, than a worksheet. But sometimes doing something different would be good." It was important for us as a team to continue to evolve our instructional practices and strategies to meet the needs of our students, while keeping them engaged in the content.

## **Defining the Community of Practice**

This study, through the participants' voices, spoke to the elements of what Wenger (2002) describes as a community of practice, as it relates to the field of education, specifically a group of Algebra teachers. Those elements are, 1) the domain of knowledge defining issues, 2) a community invested in that domain, and 3) the practice they develop to then be effective in that domain (Wenger, McDermott & Snyder 2002, p. 4). Through my research, I defined our collaborative group as a community of practice under the tenets of a CoP, however I wanted to know how my peers operationalized our community. Aligning their narratives with these three tenets, as shown in Table 3 solidified the group as a community of practice.

Our common interests and dilemmas such as teaching the same content, improving instructional practices to meet the diverse needs of students, and desire to increase student achievement on state mandated assessments, brought us together. While I was a participant in this community, as a researcher I recognized this as our shared domain. While this domain is not a fixed set of problems, but instead ever-changing, the domain allowed us to stay focused on common goals. This is opposed generic goals that come from a mandated collaborative group, our shared domain allowed our work to benefit our needs individually and as a collective. As we developed professionally through participation in the community of practice, the shared obstacles evolved. While new dilemmas arose, and the focus of our weekly meetings changed to address our needs, our community remained grounded in a shared domain.

Our work together created a sense of community through our frequent interactions. While these interactions started as impromptu conversations in the hallway, they transitioned to more structured weekly meetings during our common planning period. Understanding how members interact, learn collectively, and develop relationships while having a sense of belonging and

commitment is important to understand the tenet of community. As a participant I understood us to have a common understanding of the intention behind our work. We showed up for each other each week, without a structured agenda, but just the intention of addressing whatever our needs were. This could be an individual need such as classroom engagement on a particular topic, or a collective need such as creating a common assessment. As a researcher I saw this social learning system that was able to construct new meaning, through the group interactions, and go beyond what everyone brought to the community. This intentional time spent together helped to develop trust in each other, created an atmosphere of openness, and allowed us to learn from each other.

As we developed a sense of trust, feedback and assistance were well received. As a participant our meetings allowed for ideas and resources to be exchanged. I remember times I would ask about the best strategies and materials to use to present content to students, and I could always count on August and Eve to pull something from their personal collection of resources or for us to collectively search for materials. In conducting research on the community of practice I understood our shared repertoire of resources such as helpful classroom strategies, experiences, and ways of troubleshooting issues, to allow for growth and effectiveness in our practice.

As the researcher my privilege was that I understood a CoP and had already defined the group as such, therefore, it was important that the term was not used when interviewing the participants. The goal was to see if their experiences as told through the narratives aligned to the tenets of a CoP. In table 5, I highlight parts of their narratives that spoke to each tenet, collectively defining the group as a community of practice.

**Table 5.**

## Elements of a Community of Practice

<b>DOMAIN OF KNOWLEDGE DEFINING ISSUES</b>	
	Our common interests and dilemmas such as teaching the same content, improving instructional practices to meet the diverse needs of students, and desire to increase student achievement on state mandated assessments, brought us together. “Jillian”
	I've found that even other teachers might not necessarily understand the situation. There are some things that just feel very based out of Central with the students and parents and groups that we have at our school. So, it was nice to have people on the professional side of it that were teaching exactly the same thing and hope there, but then then, you know, personal. Just makes it easier to work with and all the aspects when you're more open about personal lives. “Eve”
	But also, when something's coming down from administration, or county, higher up something like that, it's been really helpful to have the team to decide how to go about incorporating it. Or even in moments of this isn't going to work for us, and we're going to either have to have a meeting and break this down further with administration and explain this isn't going to work and try to compromise or just kind of be able to have the group to be like, we can't get this done in the timeframe. We're not doing it and have the group to be able to support that instead of trying to get everything done. When it's not necessarily possible or should fall on us. “Eve”
	I was having a lot of issues with the administration, and I know August proofread

	<p>an email one time that I sent to them just kind of telling them what I thought and things like that. So professional, like personal professional development, though, most definitely helps to have someone to even just bounce off of like, am I crazy or like, should I be upset at this? “Eve”</p>
	<p>We don't even have to meet. You're more so wanting to talk about the curriculum and how we can enhance it to get our kids to learn. “August”</p>
<p><b>A COMMUNITY INVESTED IN THE DOMAIN</b></p>	
	<p>I understood us to have a common understanding of the intention behind our work. We showed up for each other each week, without a structured agenda, but just the intention of addressing whatever our needs were. “Jillian”</p>
	<p>You have like three maybe four minds working together through the problem of like the lesson planning versus just having to independently do it on your own. “Eve”</p>
	<p>Be open and honest. So being open to giving ideas where you're comfortable being open or admitting that you might not have ideas or know what's going on, along with being open to hear others and things like that. And just be honest of what you're dealing with, what you're thinking about are, definitely, the big things. I know in teacher prep programs they're always like, don't vent with other teachers, don't talk with other teachers about what you're dealing with, but like, it helps, and you need it. And sometimes you just feel crazy until you're like, oh no, this is literally happening to everyone. So being open and honest about whether it's class,</p>



	<p>planning classwork, and instructional side of it, or if it's just more personal and things like that, because I feel like that, definitely, would help with teacher burnout and stuff like that. "Eve"</p>
	<p>Every time I meet with my cohort is, definitely, benefiting my students because it gives me a different outlook, because I think I'm a very open-minded person when it comes out of creating. But to see other open-minded people, think and brainstorm, it helps me develop a different, I guess, a different activity for them that I never even thought about. "August"</p>
<p><b>PRACTICE DEVELOPED TO BE EFFECTIVE</b></p>	
	<p>I remember times I would ask about the best strategies and materials to use to present content to students, and I could always count on August and Eve to pull something from their personal collection of resources or for us to collectively search for materials. "Jillian"</p>
	<p>Everyone breaking down what they've done in the past, what they enjoyed in the past, what they're seeing in the classroom currently, what would and wouldn't work for their students and trying to find that happy medium. "Eve"</p>
	<p>And so, to just have the experience has, definitely, helped me with being more confident in knowing that I have what I need overall. "Eve"</p>
	<p>And so that [sharing responsibilities] is definitely a pro and helps a ton with time management and allows you to then also be able to do a lot of different things</p>

	because you have more time to be creative or get things done that your students actually need. “August”
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### **Resonant Narrative Threads**

Aside from defining the collaborative group as a community of practice, the participants, along with myself told of genuinely different experiences as a participant in the community of practice. These narratives provided evidence to address the research question, “how has mathematics teachers’ voluntary participation in a community of practice in a secondary school, shaped their instructional experiences?” Their rich narratives not only defined them as a community of practice, but they described their participation in the community and how their participation in the community influenced them. While their stories are unique, there were topics that they each spoke to connecting their narratives. These resonant narrative threads were 1) teacher autonomy support, 2) teaching practice, and 3) student achievement, which were a result of the collaborative participation in the community of practice. The narrative threads were a result of the codes that appeared during the analysis cycle (see table 3). These codes were combined into larger themes as the narratives were co constructed with me as the researcher.

### **Teacher Support**

Initially, the participants came together because of a simple commonality, we taught the same content. While this is not uncommon, the narratives showed how the relationships with each other developed into more than just teachers discussing the content. August spoke about how collaboration looked in previous work environments where content teams were required to meet. She stated, “You have people to say, oh, I got so much on my plate right now. I don't have time to collaborate, and whatever you want to do will do.” While this experience in collaborative

settings may be common, the narratives shared pivotal moments where the work and relationships shifted. The group began to become a support system.

For August and Eve, this moment took place when they had a parent issue. As a first-year teacher, Eve had not yet built many relationships in the building but had been comfortable enough with her coordinate algebra team to ask their opinion. For August, beginning her first year at Central High while pregnant, she found herself depending on her team as she transitioned to maternity leave. With my classroom being next door to August, I found myself asking for her opinion or reaching out to her more often throughout the day.

As we met more frequently our commitment, not only to our students and our work but to ourselves deepened. We became more motivated seeing all that we could accomplish together.

Eve stated:

There is that really personal like what's going on in our lives or things like that, or even just like knowing and being comfortable to like vent about what's happening, which probably started like professionally, OK, I need advice for this situation. Have you ever dealt with this type thing? But then it kind of morphs into a more personal thing and becoming more open about like what's happening, whether it's in or outside the classroom of just like, here's my life, here's what I'm dealing with.

Being able to share on a personal level, allowed participants in the group to see the total person.

Not just the teacher in the building from 8am to 4pm, but who they were and what their experiences for like outside of work. This is vital to understand as we construct meaning, and knowledge, these social interactions, and connections. Deeper relationships allow for stronger commitment to the mission and goals of the team.

## Teaching Practice

Teaching practice as a narrative thread was constructed from the analysis codes of openness, dilemmas, and collaboration. Through participation in the community of practice, we were able to present personal dilemmas and have the trust in each other to be open to receiving feedback. We were exposed to different teaching strategies and suggestions based on what each other brought to the table. To grow in our practice and be effective in this space we had to be open to receiving what the community had to offer, whether directly (shared resources) or indirectly (a mindset shift). When meeting August, she had a flash drive that had an entire school year mapped out. There was a PowerPoint for each day of the year. I rarely used PowerPoint and was so impressed by the organization of her resources. I used more foldables or interactive notetaking for notes, requiring a lot of cutting and gluing for students. In my reflection, I recall August saying how those types of activities left in her classroom untidy making her hesitant to use them for with her students. A few months into the school year August came to me wanting to use a foldable with her students. She told me she hoped the students didn't destroy her room, but she was wanting to give it a shot. Not only did she start to use foldables more often, but I also began to use PowerPoints with students and post them so they could refer to them when necessary. Our willingness to be open to trying new things and understanding the approaches of others, was imperative to us growing in our practice. Eve also spoke about trying new things in her narrative:

I know I tend to jump a little more to the hands-on or even, you know, just foldables, cut and paste activities. August did very well with PowerPoints and things like that, which I know I don't do well with PowerPoints and teaching from a PowerPoint. But once I was like, I don't know how to explain this. To be able to go look at her [August] PowerPoint

of how she taught it, or even sometimes like copy directly from her PowerPoint, were definitely really helpful and straightforward and easier to break down than going through the standard, trying to come up with something new and things like that. So, I feel like because we were using different resources, it also allows us to have even more resources at our disposal, just depending on what situation we needed each for.

This willingness to be receptive to other strategies allowed us to expand our strategies and knowledge of the content. However, we had to be honest with ourselves about needing a new approach and being open to receiving help from others. “August” stated:

Be open, you know, be willing to be open. It's a lot you can do to grow as a professional. It's a lot that you can learn from someone else that you think you didn't. You'll be amazed and surprised by what someone else can bring to the table. You know, it's like meeting new friends when you first start, you know, you just cool. Next thing they're so amazing to you.

An open mindset allowed the participants to trust each other and to develop as a professional by improving their classroom practices.

### **Student Achievement**

Our desire to grow in our practice was not to be better for ourselves but to be better for our students. Teaching a state-tested subject, brought more attention from administration and district leaders. Our students were frequently assessed, whether it was through classroom assessments, diagnostic testing, or mandated county benchmark assessments, to see how they were performing. While these mandated assessments and the designed curriculum were beyond our control, we focused on what could be done in our classrooms each day.

The narratives, along with my reflection shared how we conducted our after-school tutorials. While most teachers tutor their students, we shared our students. We each tutor on a different day so students could rotate through. On a given topic a certain teacher's delivery may resonate better with a student. Due to our collaborative nature as a community of practice, we found that it was only right that our students were able to collaborate as well. As Eve stated, “we're not just hopping back and forth, but also benefiting the students as much as possible by varying activities and opportunities for learning.” August shared her sentiments saying, “we're co-planning together because you just hear how everybody wants their child or their students to succeed versus in that environment where it's like they work by themselves. I'm a teacher or not at all. So, it's an enjoyable feeling.”

While we were able to implement strategies with our students at school, our group faced a challenge when the Covid-19 pandemic began, and our students became virtual learners. During unprecedented times our students still benefited through our collaborative effort. As “Eve” reflected on this time she shared “I feel like the students got a lot more in-depth learning while virtual because we collaborated so much and worked as a group.” Working as a group allowed us to better suit the needs of our students by understanding other perspectives incorporating them and applying them to our practice.

### **Summary of Results**

In this chapter, I told the narrative of each participant as it relates to experiences with their experiences while voluntarily participating in a collaborative group. Each narrative was a co-construction where each of the participants and I were a part of each other's experiences (Clandinin, 2013). Though each participant's narrative was unique, there were several resonant narrative threads. These resonant threads have the potential to speak to and transform

mathematics teachers' practices in the classroom. In the next chapter, I further discuss each of these narrative threads and their implications. I will also discuss in the next chapter a summary of the study and recommendations for future research.

## 5 DISCUSSION

### Summary of the Study

In this study, I captured the experiences of two high school Algebra teachers, along with my own experience, to investigate the following research question: “how has mathematics teachers’ voluntary participation in a community of practice in a secondary school, shaped their instructional experiences”. Teachers are rarely provided the space to engage in collaborative activities that go beyond mandated professional developments pushed down from the district level, account for the pace and content of teaching, or examine the nature and content of student evaluation or assessment. However, authentic, and ongoing collaboration, including an exchange and confrontation of underlying thoughts and opinions is essential for teacher learning (Van, 2020). Thus, the purpose of my study was to investigate the narrative accounts of a team of mathematics teachers as they work to improve their practice driven by student needs, through their voluntary participation in a community of practice.

Through the narrative inquiry methodology, this study allowed the participants and me to reflect on our experiences as we built a community in which we were invested to better our practice and the learning experiences of our students. While guided by the research question, narrative inquiry “is an approach to the study of human lives conceived as a way of honoring lived experiences as a source of important knowledge and understanding” (Clandinin, 2013, p. 17). Narrative inquiry engages less about answering a question but more about transforming those involved and ultimately the reader through personal engagement in the story (Clandinin, 2013). While these narratives may not represent all collaborative settings, honoring the experiences shared through the narratives, they lead us to further implications for similar collaborations and experiences.



## **Implications**

Each participant spoke about their unique experiences and their narratives provided evidence defining this collaborative group as a community of practice (CoP). While they each spoke to the tenets of a CoP, collectively their narratives provided more insights to their experience. My overall intent was to not just use our stories to define us as a community of practice, but to examine how our participation shaped our overall practice and its influences. As previously established in Chapter 2, participation in a CoP has several benefits such as enhancing pedagogical competencies and positively influencing school culture and professional confidence (Hargreaves, 2019). In this section, I take a deeper look at connections in their narratives and how to move forward in this work.

### **Implication for Teacher Autonomy**

During the analysis process autonomy was the second most referenced code (table 4). However, as researcher, rather than focus on autonomy as the focus of the narrative threads, I chose to focus more on the support, which created a sense of autonomy, because of participation in the CoP. Here I explain why. Teacher autonomy is often equated to independence and individual work, which is not the focus of collaboration and this work. Teachers strongly value autonomy but must shift their understanding of autonomy from independent thinking, as teacher collaboration is becoming more strongly emphasized in the field of education (Ronfeldt et al., 2015). Therefore, to highlight this notion of individualized autonomy in relation to group collaboration may have provided challenges to readers who interpret autonomy in the traditional sense. Teachers must see collaboration as complementary rather than as a threat to their autonomy. For example, “August” stated, “and then once we have what we are going to do, as far as our lesson, I think we go into our own little way of how we plan on delivering it to our

students in our own style.” While the lesson plan and pooling of resources was a product of group collaboration, her autonomy was not lost in the delivery of the lesson.

Over the years, there has been a shift in the conceptualization of teacher autonomy (Zeng, 2013). The focus has changed from independence to personal choice and collaborative decision-making. Various definitions of autonomy reveal different attitudes towards autonomy in relation to collaboration. For instance, Clement and Vandenberghe (2000) described a new form of teacher autonomy as a team recognizing the importance of the autonomy of a certain teacher to work on particular tasks. “Eve” stated:

Getting to plan and be able to use resources that you and August had definitely helped a ton of taking off the stress. It also made me realize like, I don't have to have everything, and I don't have to carry everything on my own. And that definitely helped because I didn't feel like we were shown that as much in grad school. Grad school made it feel very much like you need to be creating every lesson and you need be super creative and brand new with it. And it's like, that's very, very draining and kind of impossible, especially starting out fresh.

This sentiment underlines the close, but complex, relationship between teacher collaboration or teacher participation in professional communities and teacher autonomy (Clement and Vandenberghe, 2000). Therefore, teacher participation in a CoP and teacher autonomy can be complementary when autonomy is not seen as a sense of independence (Clement and Vandenberghe, 2000).

In summary, it is important that teachers understand the evolving meaning of autonomy as it relates to collaboration. In chapter 4 an example was given where August and I went to administration to advocate for Eve’s hiring. While this was my first time going to administration

to advocate for something, this was not the first time I had an opinion I wanted to share. As an individual I didn't feel as though I had the autonomy or that my voice alone was influential or enough to create change. However, the community of practice made me feel as though there was power in numbers and together our voices could be impactful. With this work, the goal is to bring teachers out of isolation in their classrooms to engage in in-depth conversations about teaching and learning with colleagues, and share knowledge, experiences and practices with each other. Together, bottom-up decision making can be impactful and provide a greater sense of power for educators.

### **Implications for Teacher Support**

One significant implication of this work is the benefit it has in the realm of teacher support. Schools have a long history of teacher isolation, where teachers lead a solitary existence as privately practicing professionals in their classrooms (Gajda & Koliba, 2008; Street & Licata, 1989). However current education trends, such as increasing classroom diversity, and improving student achievement with a focus on 21st-century skills, have increased the amount of pressure on individual teachers. As these challenges continue to increase, working in isolation will no longer suffice (Van, 2020). Collaboration among teachers provides learning opportunities and an exchange of expertise. Professional development initiatives are shifting the focus from the individual teacher to collaborative efforts because of the learning opportunities through collaboration. These collaborative efforts of administrators and teams of teachers, and the degree of trust within the school's collaborative culture positively affects the effectiveness relative to the performance of teachers and students (Bryk & Schneider, 2004; Forsyth, Barnes, & Adams, 2006). Teachers serve as support groups for one another in improving practice. Collective work in trusting environments provides a basis for inquiry and reflection, allowing teachers to raise

issues, take risks, and address dilemmas in their practice (Ball & Cohen, 1999; Bryk, Camburn & Louis, 1999; Little, 1990).

Research has shown the benefits of the collaborative mindset; however, its benefits have to penetrate the mindset of teachers. Goodwin (2020) found that in the United States education system, the high level of detail in standards suggests a ‘low trust’ relationship between policy makers and its teachers’ with teachers having restricted autonomy. Teacher autonomy refers to teachers' self-direction, capacity, and freedom, which are limited by institutional and other factors (Jackson, 2018). The concern with how effectively educators are fulfilling the expectations causes the teaching profession to become harshly criticized and even more tightly regulated (Goodwin, 2020).

Therefore, to truly manifest change towards a collaborative mindset, classroom teachers must shift their understanding of autonomy. Teachers’ common-sense beliefs tend to equate autonomy to working individually and independently, which may hamper the rise of a true collaborative culture in schools (Gajda & Koliba, 2008; Moomaw, 2005; Street & Licata, 1989). As “Eve” stated, “Not having everyone do everything is really nice. To be able to really split up the workload and focus more on the students and the teaching aspect.” Hence, installing a collective mindset among teachers requires a shift in teachers’ understanding of autonomy, away from a focus on independence and non-reliance (Van, 2020). So while we can install the collective ideology, we simultaneously need to encourage and develop teachers with a collaborative mindset.

### **Implications for Teacher Retention**

Increasing teachers’ autonomy, particularly over their professional development, has the potential for improving teacher job satisfaction and retention. Retaining more teachers is crucial

for the education system when currently there are not enough teachers entering the field and remaining in the profession to meet the growing need from rising pupil numbers. Unmanageable workloads and low job satisfaction are significant factors determining teachers' decision to stay in the profession or leave (Worth, Jack, & Jens, 2020). Therefore, school leaders should consider how to foster communities of practice, allowing teachers to have greater involvement in their professional practice and making decisions more widely (Worth, Jack, & Jens, 2020).

When something's coming down from administration or county higher ups, something like that, it's been really helpful to have the team to decide how to go about it. We have a meeting and break this down further with administration and explain this isn't going to work and try to compromise or just kind of be able to have the group to be like, we can't get this done in the timeframe. We're not doing it and have the group to be able to support that instead of trying to get everything done when it's not necessarily possible or should fall on us. "August"

Participating in a community of practice allowed participants to feel supported in their work and decision making as they faced obstacles as a united front. As a new teacher, Eve spoke on how this helped build confidence as a professional. Collaboration is one of several factors that can help make teachers feel more confident, committed to their school, and to teaching as a profession. Turnover is particularly high among teachers who are just beginning in the profession. However shared planning time, support from colleagues, and other types of collaboration, are associated with an increase in retention. The significance of job satisfaction and the impact it has on teachers' turnover should lead administrators to determine how to improve teachers working conditions. In general, teachers want to feel their efforts are meaningful and they are empowered in their roles. When teachers feel like they are making a

positive impact on their students, they are motivated to withstand the challenges that come with the teaching profession (Mahler, Großschedl, & Harms, 2018). “Administrators should help foster the autonomy of the teachers they work with by supporting ongoing professional development and engagement in decisions related to classroom issues, curriculum development, and school policies (Jackson, 2018, p. 5).” In general, inviting teachers to share responsibility for decisions that influence their working environment is conducive to the development of autonomy. Therefore, administrators are in a position to advocate for teachers when institutional constraints limit their decision-making.

### **Implications for Student Achievement**

Nothing matters more [to and] for young people in schools than the quality of their teachers (Hargreaves, 2019). When focusing on teacher learning rather than, or in concert with, program implementation, one can envision how new interventions and reform could come together with teachers’ prior learning and experience to help achieve goals valued by the reform and by teachers themselves (Levine & Marcus, 2007).

Every time I meet with my cohort it is definitely benefiting my students because it gives me a different outlook. I think I'm a very open-minded person when it comes to creating. But to see other open-minded people, think and brainstorm, it helps me develop a different, I guess, a different activity for them that I never even thought about. They can be very inventive with them (different activities), getting what they need to create a personalized learning environment for students. “Eve”

The true essence of collaboration is teachers working together to enhance their skills as a professional to increase student achievement. As a plethora of teaching strategies are continuously introduced as school districts struggle to improve student achievement,

collaboration allows teachers to assume a greater responsibility toward the academic progress of their students (Bunker, 2008). Fine (2010) noted teachers in schools where collaboration is prevalent are also more likely to assume shared responsibility for the student achievement and are more likely to be satisfied with their careers. Teachers who are collaborating have gained greater expectations of students and their colleagues (Schmoker, 2007b). Collaborative teams, such as a community of practice, provide space for teachers to constantly assess their teaching practices and monitor and adjust to the needs of the students.

### **Suggestions for Further Research**

As I reviewed the literature on communities of practice, and teacher collaboration, there was a noticeable gap in the research regarding collaborative groups that were teacher created and led. Thus, I aim in this study to add to the body of knowledge of non-mandated teacher collaboration. This topic is in need of further research to show how high school mathematics teachers specifically can be better supported while increasing student achievement, by having the professionalism and administrative support to create communities of practice suited for their needs and goals. As districts struggle with teacher shortages, how can communities of practice increase teacher commitment in their respective buildings? As teachers struggle with a feeling of loss of professionalism, as bills are introduced asking for lesson plans to be uploaded for a full school year, how can communities of practice help them regain a sense of control over their practice? Having the most interaction with students, as teachers improve their practice there will be a direct effect on student achievement and school culture.

The participant narratives gave insight to personal development as a direct result of the community of practice. Based on this study, I can re-emphasize Jackson's (2018) point of view that further understanding of these non-mandated communities of practice can be essential for

school leaders advocating for teachers when institutional constraints pose obstacles to their autonomy (Jackson, 2018).

### **Personal Reflection**

“August” stated, “We don't even have to meet. You're more so wanting to talk about the curriculum and how we can enhance it to get our kids to learn.” This quote resonated with me because since entering the classroom in 2009, I recognized that the work done in my classroom could not come from me alone. Early on, I saw the value in the relationships I created around the building. And having been a part of a community of practice for the last six years I have been able to experience firsthand how collaborative relationships can transform you and your practice. In doing this work while a doctoral student, I wondered why most communities of practice investigated were not teacher created or directed. Would teachers not know what they need to grow as a professional? How professionalism shift and student achievement be effected if teachers were given more control over their professional learning and development? While not forced to meet, without having a leader of the community, or formal team norms, this group has shown the capability of teachers having the space to cultivate a collegial atmosphere. This community has been my go-to not only in times of need when facing a dilemma, but also in times of celebration. As a doctoral student, conducting this research has given me the opportunity to take the everyday work of three educators at Central High school and tell our story. It is my hope that in reading this work other educators will open themselves to transformative collaborative relationships. That they too will come outside of their classrooms and see their peers as untapped resources. That they will not only meet with others when required by administration but will actively participate in building intentional collaborative relationships to grow in their profession.



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## APPENDICES

### Appendix A Georgia State University Department of Middle and Secondary Education Informed Consent

**Title:** Together We Can: Communities of Practice as A Means

**Principal Investigator:** Dr. Pier A. Junor Clarke

**Student Principal Investigator:** Jillian Lee

#### **Introduction and Key Information**

You are invited to participate in a research study. This is completely voluntary. This study seeks to explore how teachers can use a non-mandated intentional space for collaboration to work together towards the goal of supporting students' needs. Your role in this study will take place over 5 weeks and will require six hours and 30 minutes of your time.

#### **Purpose**

The purpose of this study is to investigate detailed narrative accounts of a team of mathematics teachers as they work to improve instructional practices driven by student needs, through their voluntary collaboration. As a member of this team, you are one of the four teachers invited to participate.

#### **Procedures**

If you choose to participate in the study, you will be asked to participate in two interviews, which will take at least an hour. Due to the pandemic, our interviews will be administered in ZOOM/Microsoft TEAMS and will be recorded with the security of a password. Based on information provided in your interview, you may be asked to provide evidence such as lesson plans or work products. The information, which is kept confidential, will be analyzed for data collection.

#### **Risks**

Participating in the study will not expose you to any risk different than what you would experience on a typical day.

#### **Benefits**

This study may benefit you personally. You may find the study to enhance your understanding of teacher collaboration to improve instructional practices. You may also gain insights from critical reflection on teacher collaboration to professionalize your practice and improve student achievement. Overall, we hope to gain information to improve our services to students and teachers in future school years.

The findings of this research study may contribute to the field of education by exploring the role of teacher collaboration in the development of teacher professional learning. The finding may also contribute to the insight of school leaders responsible for teacher professional development. Overall, the information may improve teachers' service to students.

#### **Voluntary Participation and Withdrawal**

Your participation is voluntary. You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may choose not to respond in an interview or stop participating at any time.

**Confidentiality**

We will keep your records private to the extent allowed by law. The following people and entities will have access to the information you provide:

- Jillian Lee, Dr. Junor Clarke, and the dissertation committee members
- GSU Institutional Review Board
- Office for Human Research Protection (OHRP)

We will use a pseudonym rather than your name on study records. The information you provide, and the audio-recorded files will be stored in a password-protected computer and locked cabinets. When we present or publish the results of this study, we will not use your name or other information that may identify you. The data collected will be destroyed after the completion of this dissertation.

**Contact Information**

Contact Jillian Lee at 770-367-1987 or [jlee7@student.gsu.edu](mailto:jlee7@student.gsu.edu) or Dr. Pier A. Junor Clarke at 678-571-5295 or [pjunor@gsu.edu](mailto:pjunor@gsu.edu) if you have questions about the study or your part in it. You may also call if you have questions, concerns, complaints, or believe you may have been hurt in the study.

The IRB at Georgia State University reviews all research that involves human participants. You can contact Susan Vogtner in the Office of Research Integrity at (404) 413-3513 or [svogtner1@gsu.edu](mailto:svogtner1@gsu.edu) if you would like to speak to someone who is not involved directly with the study. You can contact the IRB for questions, concerns, problems, information, input, or questions about your rights as a research participant. Contact the IRB at 404-413-3500 or [irb@gsu.edu](mailto:irb@gsu.edu).

**Consent**

We will give you a copy of this consent form to keep. If you are willing to volunteer for this research, please sign below.

\_\_\_\_\_

Printed Name of Participant

\_\_\_\_\_

Signature of Participant

\_\_\_\_\_

Date

\_\_\_\_\_

Principal Investigator or Researcher Obtaining Consent

\_\_\_\_\_

Date

## Appendix B

### Introduction Interview Protocol

**Research Question:** How have mathematics teachers' participation in a community of practice in a secondary school shaped their instructional experiences?

**Points of Focus in Interview:**

- Individual, professional views on the curriculum
- Teaching experiences
- Collaboration experience
- Teacher Efficacy

**Introduction:** Hello and I would like to thank you for volunteering your time today. The purpose of this interview and my research is to understand collaboration amongst teachers in our CoP and how it affects your teaching practice.

**Interview Questions:** *Accompanying probing questions in italics*

1. How did you get into teaching (background)?
2. Reflect on your earlier years of teaching (*before you began collaborating with the coordinate algebra team*)?
  - a. *Once entering the field did you have any assistance to help you navigate? Explain.*
  - b. Walk me through your process of preparing lessons for your students with and without the input of others.
3. Reflect on your more recent years of teaching as compared to the earlier years?
  - a. *Walk me through your process of preparing lessons for your students with and without the input of others.*
4. Have you ever been required to meet and collaborate with others, such as, department meetings, or interdisciplinary teams?
  - a. *Tell me about the pros and cons of these required teams.*
5. Describe how you feel when collaborating with others?
  - a. *In general, were you trained to collaborate with other teachers?*
6. Tell me about your experiences with other teachers, who you have worked with?
  - a. *After collaborating with others did the experience lead you to make any changes in your content knowledge or pedagogy?*
  - b. *How often are you provided these types of opportunities?*
7. Where does the curriculum you currently use come from?
  - a. *How much control do you have over the curriculum you present to your students?*
  - b. *Are you allowed to give input and make changes to the curriculum you use?*
  - c. *What are some resources you use?*

8. Were you ever mandated to co-teach a class or classes?
  - a. *If so, tell me about your experience collaborating with that teacher(s) to prepare for class.*
    - i. *Tell me about other collaboration experiences (outside of the classroom) you have had at school.*
  - b. *If not, tell me about other collaboration experiences (outside of the classroom) you have had at school.*
  
9. Is there anyone who you can reach out to when faced with an issue in your classroom?
  - a. *Walk me through a time when you reached out to someone for assistance on best practices in the classroom?*
  - b. *About how often do you consult them or anyone else for assistance?*
  - c. *Walk me through a time when you reached out to someone for assistance on assessment strategies in the classroom?*
  - d. *About how often do you consult them or anyone else for this type of assistance?*
  
10. Is there anything else you would like to add regarding your experience with collaboration?

## Appendix C

### Reflection Interview Protocol

**Research Question:** How have mathematics teachers' participation in a community of practice in a secondary school shaped their instructional experiences?

**Points of Focus in Interview:**

- Participation experience in the community
- Instructional decision making based on student evidence
- Instructional and Professional decision making based on collaboration

**Introduction: Hello and I would like to thank you for volunteering your time today. The purpose of this interview and my research is to understand the collaboration amongst your coordinate algebra team and how it affects decision making. These questions, which may vary each week, are posed for you to reflect on this past week.**

**Interview Questions:**

1. In our introduction interview, you spoke on your coordinate algebra team, could you tell me about how this team formed?
  - a. What was the purpose of forming this team?
  - b. How were you introduced to the team?
  - c. Explain your role in the team.
  - d. How long have you been in the team?
2. What is the purpose of your team meeting this week?
3. Based on the conversations in your team meeting this week, what are some personal take-a-ways that you may want to improve on?
  - a. What do you think you will need to improve in these areas?
4. What were the mathematics goals for your students this week and how were these used to make instructional decisions? (*Use evidence i.e formative assessment, student work*)
5. In what ways were you supported by your colleagues this week? In what ways did you support your colleagues in their students' learning?
6. Are the relationships you have with your colleagues conducive to creating a collaborative culture focused on learning?
7. Did the students' tasks developed for this week really reflect learning, or merely task completion or memorization skills? Explain.
8. Why did you choose the specific tasks for your students to cover this week's objectives?
9. What new strategies have you tried lately that might benefit a student who is struggling with the concept being taught?
10. What evidence of student thinking was used to adjust any instruction this week?
11. Do you find collaboration efforts to benefit your students? If so, tell me how.

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**Weekly Lesson Plan**

<b>Section A: Strategies &amp; Tasks</b>								
Check the appropriate box to indicate the inclusion of the task and/or strategies for the weekly lesson plan.								
STRATEGIES/TASKS	YES	NO	STRATEGIES/TASKS	YES	NO	STRATEGIES/TASKS	YES	NO
DCSD Unit Task	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Interdisciplinary Integration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Differentiated Instruction	<input checked="" type="checkbox"/>	<input type="checkbox"/>
GADOE Task/Activity/Resource	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Intervention Strategies	<input checked="" type="checkbox"/>	<input type="checkbox"/>	21 <sup>st</sup> Century Learning Skills	<input checked="" type="checkbox"/>	<input type="checkbox"/>
STEM/STEAM Integration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Gifted-Extensions for Learning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Research-Based Instructional Strategies	<input checked="" type="checkbox"/>	<input type="checkbox"/>

<b>Section B: Unit &amp; Standards Alignment</b>	
Provide information that gives an overview of the weekly focus.	
<b>School Name</b>	Arabia Mountain High School
<b>Teacher/Co-Teacher/Para Name(s)</b>	
<b>Grade/Subject/Course</b>	Coordinate Algebra
<b>Week of:</b>	Week 16: 2022
<b>Unit #, Name, and Pacing</b>	Unit- 2 – Relationships Between Quantities
FOR THE WEEK	<b>Priority Standard(s)</b> <i>(Content specific)</i> <b>MGSE9-12.A.CED2: CREATE</b> linear and exponential equations in two or more variables to REPRESENT relationships between quantities; <b>GRAPH</b> equations on coordinate axes with labels and scales. (The phrase “in two or more variables” refers to formulas like the compound interest formula, in which $A=P(1+r/n)^{nt}$ has multiple variables.)  <b>MGSE9-12.A.REI.6: SOLVE</b> systems of linear equations exactly and approximately (e.g., with graphs), <b>FOCUSING</b> on pairs of linear equations in two variables.
	<b>Supporting Standard(s)</b> <i>(Content specific)</i> Create linear/exponential equations in two or more variables. Represent relationships between quantities. Graph linear and exponential functions.
	<b>Non-Content Standard(s)</b> <i>(WIDA, Interdisciplinary, Literacy)</i>
	<b>Essential Question(s)</b> <i>(Address philosophical foundations; contain multiple answers; provoke inquiry)</i> <ul style="list-style-type: none"> <li>• How do I choose and interpret units consistently in formulas?</li> <li>• How do I interpret parts of an expression in terms of context?</li> </ul>
	<b>Big Ideas</b> <i>(Concepts or principles central to the lesson that anchor all of the smaller ideas in a lesson)</i> To use units of measure, To interpret the meaning of a unit for a specific formula. To solve equations and inequalities based on word problems.

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**Section C: Instructional Framework**

Identify the strategies from Section A that will be implemented within the daily instructional framework. List the specific strategies as provided on the strategy chart found at the end of the DCSD Instructional Planning Instrument.

<b>Daily Lesson Plan for Monday</b>		<b>Assessment Evidence</b>
<b>Learning Target/Success Criteria</b> <i>(What will students know and be able to do by the end of the lesson?)</i>	Solve system of equations using substitution	
<b>Pre-Instructional Activity</b> <i>(Sponge; bell-ringer; journal; allows attendance to be taken)</i>	Media Math Monday	Dialogical Based Learning
<b>Opening (ENGAGE)</b> <i>(Introduce the lesson; summarizes previous lesson; clarifies misconceptions)</i>	Review how to create equations and methods to solve system of equations	
<b>Work Period (EXPLORE/EXPLAIN EXTEND/ELABORATE)</b> <i>(Allows students to practice concept; assesses student learning)</i>	Solving system of equations using substitution foldable	Strategic Questioning
<b>Closing (EVALUATE)</b> <i>(Summarizes lesson; ensures understanding; clarifies misconceptions)</i>	Remind students about IXLs due Sunday and test next week	
<b>Resources/Instructional Materials</b> <i>(What do I need in order to teach the lesson?)</i>	Substitution foldable	
<b>Daily Lesson Plan for Tuesday</b>		<b>Assessment Evidence</b>
<b>Learning Target/Success Criteria</b>	Graph in slope intercept form	
<b>Pre-Instructional Activity</b>	Talk Tuesday	Dialogical Based Learning
<b>Opening (ENGAGE)</b>	Review how to create equations and methods to solve system of equations	
<b>Work Period (EXPLORE/EXPLAIN)</b>	Graphing review and practice problems	Strategic Questioning



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<b>EXTEND/ELABORATE)</b>		
<b>Closing (EVALUATE)</b>	Remind students about IXLs due Sunday and test next week	
<b>Resources/Instructional Materials</b>	Graphing practice problems	
<b>Daily Lesson Plan for Wednesday</b>		<b>Assessment Evidence</b>
<b>Learning Target/Success Criteria</b>	Solve system of equations by graphing	
<b>Pre-Instructional Activity</b>	Wacky Wednesday	Dialogical Based Learning
<b>Opening (ENGAGE)</b>	Review slope intercept form	
<b>Work Period (EXPLORE/EXPLAIN EXTEND/ELABORATE)</b>	Graphing system of equations foldable	Strategic Questioning
<b>Closing (EVALUATE)</b>	Remind students about IXLs due Sunday and test next week	
<b>Resources/Instructional Materials</b>	Graphing system of equations foldable	
<b>Daily Lesson Plan for Thursday</b>		<b>Assessment Evidence</b>
<b>Learning Target/Success Criteria</b>	Create and solve system of equations	
<b>Pre-Instructional Activity</b>	Throwback Thursday	Dialogical Based Learning
<b>Opening (ENGAGE)</b>	Review ways to solve a system of equations	
<b>Work Period (EXPLORE/EXPLAIN EXTEND/ELABORATE)</b>	System of equations booklet	Strategic Questioning
<b>Closing (EVALUATE)</b>	Remind students about IXLs due Sunday and test next week	
<b>Resources/Instructional Materials</b>	System of equations booklet	
<b>Daily Lesson Plan for Friday</b>		<b>Assessment Evidence</b>
<b>Learning Target/Success Criteria</b>	Create and solve system of equations	
<b>Pre-Instructional Activity</b>	Figure It Out Friday	Dialogical Based Learning
<b>Opening (ENGAGE)</b>	Review ways to solve a system of equations	
<b>Work Period (EXPLORE/EXPLAIN EXTEND/ELABORATE)</b>	System of equations booklet	Strategic Questioning

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<b>Closing (EVALUATE)</b>	Remind students about IXLs due Sunday and test next week	
<b>Resources/Instructional Materials</b>	System of equations booklet	

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**Weekly Lesson Plan**

**This page is for informational purposes only as lesson plans are developed.**  
**Do not attach this page to the weekly lesson plan.**

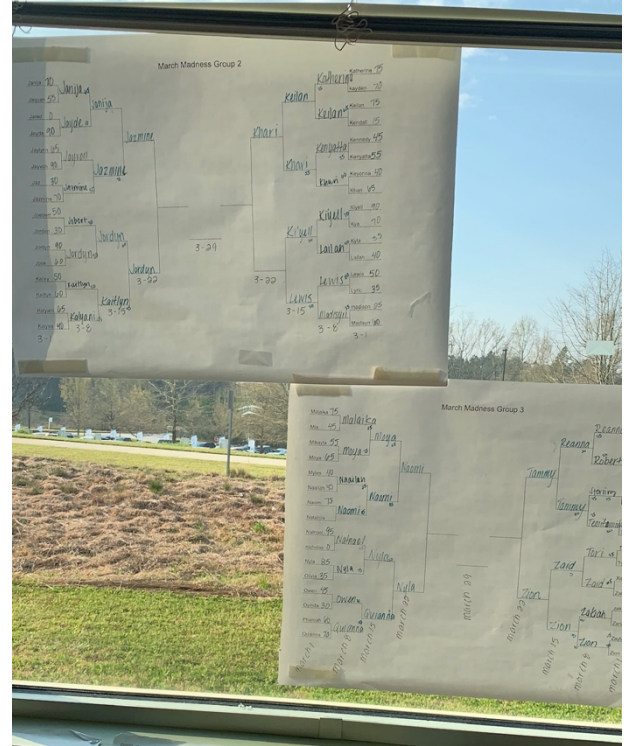
<b>Section D: Strategy Chart</b>				
<b>Research-Based Instructional Strategies</b> <small>(weekly strategies chosen to guide teaching and learning)</small>	<b>Opening</b>	<b>Work Period</b>		<b>Closing</b>
	Activate Prior Knowledge Provide Feedback Questioning (Raises questions) Scaffold Instruction Clarify Previous Lesson Create Interest Phenomenon Other...	Facilitate Learning Demonstrate/Model Academic Discussions High-level Questioning Cooperative Learning Independent Learning Interdisciplinary Writing Explain/Apply/Extend concepts and skills Generating and Testing Hypotheses Other...		Summarize Lessons Allow students to assess their own learning Provide Alternative Explanations Quick Write Respond to Essential Questions 3-2-1/K-W-L Other...
<b>21<sup>st</sup> Century Learning Skills</b> <small>(weekly strategies chosen to guide student engagement)</small>	Teamwork and Collaboration Initiative and Leadership Curiosity and Imagination	Innovation and Creativity Critical Thinking and Problem Solving Flexibility and Adaptability		Accessing and Analyzing Information Effective Oral and Written Communication Other...
<b>Intervention Strategies</b>	<b>Intervention Strategies (Tiers 1, 2, 3)</b> <b>Additional Support in Classroom</b>	<b>Specially Designed Instruction for Exceptional Education Students</b>		<b>Strategies for English Language Learners</b>
	Re-Voicing Explaining Prompting for Participation Challenging or countering Asking "Why?" or "How?" Reread Practice new academic vocabulary Assistive technology Pre-teach & re-teach in a different way Use of manipulatives Collaborative work Create differentiated text sets	Conferencing Additional time Small group collaboration Modify quantity of work Take student's dictation Scaffold information Differentiated (content/process/product) Consistent reward system Refer to students' IEP or 504 plan Assistive technology		Visuals/Realia Front-loading Echoing/Choral response Color-coding Multiple exposures in different media Pair-share Modeling Language scaffolds: example: sentence frames Deconstruct complex sentences Increase student-to-student talk Strategies vocabulary instruction Additional think time
<b>Gifted Extensions for Learning</b>	<b>Tier 1</b>	<b>Tier 2</b>	<b>Tier 3</b>	<b>Tier 4</b>
	Flexible-Learning Groups Choice of Books Homework Options Use of Reading Buddies Various Journal Prompts Student/Teacher Goal Setting Varied Pacing with Anchor Options Work Alone or Together Flexible Seating Varied Scaffolding Varied Computer Programs Design-A-Day Varied Supplemental Materials Computer Mentors Think-Pair-Share Open-ended Activities Explorations by Interest Options for Competition	Gifted Edu. Cluster Classes Gifted Edu. Collaboration Classes Tiered Activities and Products Use of Literature Clubs Multiple Testing Options Multiple Texts Alternative Assessments Subject Advancement within class Curriculum Compacting Tiered Centers Spelling by Readiness Varying Organizers Community Mentorships Stations Group Investigations Assess Students in Multiple Ways Student Choice Simulations	Advanced Content (all core content) Resource Classes Independent/Directed Study Socratic Seminars	Above grade level accelerated (all core content) Advanced Placement Classes International Baccalaureate Classes Internships Mentorships
<b>Assessment Evidence (Formative)</b>	Analyzing Student Work Round Robin Charts Strategic Questioning 3-Way Summaries	Think-Pair-Share 3-2-1 Countdown Classroom Polls Exit/Admit Tickets	One-Minute Paper Metacognition Table Four Corners Self-Evaluation	Stop and Go Classwork Trade/Peer Review Learning Logs Document Observations

# APPENDICES

## Appendix E

### March Madness

**March Madness Tournament Bracket on Display in the Classroom:**



**Winning March Madness Tournament Students Pose With Brackets**

