

JUST IN TIME: JOB-EMBEDDED PROFESSIONAL LEARNING FOR EARLY CAREER

MATHEMATICS TEACHERS

by

SUMMER TUGGLE SMITH

(Under the Direction of Sally J. Zepeda)

ABSTRACT

The purpose of this study was to examine how school leaders can support early career mathematics teachers with job-embedded professional development using action research cycles. The challenges of early career teachers are great and the high attrition rate that plague education is even greater. Early career teachers need leader support to face challenges as they arise in the classroom context. Job-embedded professional learning situates the learning directly in the context of the problem. Leaders can promote environments that foster collaboration, feedback, and reflection to support early career teachers with their just-in-time needs. The following thematic findings emerged from the study: 1) Reflective conversations matter; 2) Time and proximity are key supports for early career teachers; 3) Connection supports learning; and 4) Is just-in-time enough? The findings illuminate that while just-in-time support provides a solution to the most pressing challenge at that moment, there is a need to go deeper and create structures that support reflective inquiry into classroom practice to foster growth.

INDEX WORDS: Early career teachers, Job-embedded learning, Mathematics teachers, Professional learning, Real-time learning, School leaders, Teacher shortages

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DEDICATION

My heart is full with love and appreciation for those that have encouraged and supported me through this journey. Mom and Dad, your support has been constant and faithful my entire life. I am so lucky to have such loving and encouraging parents. There are not enough words to express my deep love and gratitude for you both. Glenda, you have walked with me throughout my entire career. To benefit from your guidance and wisdom as I have grown from teacher to leader is priceless. I cherish our journey together because it helped shape me into the educator that I am today.

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CHAPTER 1

INTRODUCTION

In 1983, an alarm was sounded in education. The nation was at risk. Our schools were not producing students who were as educated or as well-rounded as the previous generation, and the students were not college and career ready. High school lack of rigor was exposed and high schools were accused of offering diluted and purposeless courses. Demands were made for more rigorous standards, higher expectations, and better use of time. Teaching was called to attention and light was shone on the shortage of teachers in the critical areas of mathematics and science. Leaders were called to action; it was time for educational reform (National Commission on Excellence in Education, 1983).

Almost 40 years later, the teacher shortage is still a critical problem for education (Carver-Thomas & Darling-Hammond, 2019; Ingersoll et al., 2021; Redding & Henry, 2019; Sutchter et al., 2019). The national demand for teachers is outpacing supply, and the gap is projected to widen (Sutchter et al., 2016). The global COVID-19 pandemic is also projected to have a grim impact on teacher attrition (Burnette & Will, 2020; Erwin, 2020). Teacher support is critical at this time in our nation and practices that promote a high feeling of self-efficacy and sense of belonging can help protect against the struggles that an early career teacher will face (Bjorklund et al., 2020; Skaalvik & Skaalvik, 2011).

Decades of research has focused on teacher shortages and has informed policy decisions surrounding this issue (Bruno, 1986; Garcia & Weiss, 2019a; Ingersoll, 1997; Morse & Mujtaba, 2008). The predominant policies that arose saw the shortage as a supply problem and therefore

policies were created to attempt to increase supply through alternative certification paths for ease of entry and as a way to provide financial incentives (Aragon, 2016). Recent research suggests that teacher supply is still dwindling despite these efforts (Garcia & Weiss, 2019a; Ingersoll et al., 2019; Sutchter et al., 2019). The global COVID-19 pandemic has exacerbated teacher shortages (Gray Streeter, 2021; Maxouris & Zdanowicz, 2022; Professional Association of Georgia Educators, 2022).

The early research of Ingersoll (2001) suggested that merely fixing the supply will not solve the problem. Instead, school leaders must look at retention and the organizational climate of schools that affects that retention. The shortage problem is two-fold, one of lack of supply, but also one of turnover, often referred to as attrition or loss. There are two types of teachers reported in shortage data—movers and leavers. On the surface, it would seem that movers do not affect the shortage because they are still teaching. Ingersoll (2003) argues that whether a teacher leaves the profession all together or moves to a different teaching location, it still creates a vacancy at the school level.

This “revolving door” of teachers causes problems in education where the work is predicated on continuity and cohesion. Any disruption to staff causes a disruption in schools. Certain schools tend to experience more turnover than others. High poverty schools and urban schools have perennially higher rates of turnover (Djonko-Moore, 2016; Ingersoll, 2001; Ingersoll et al., 2021; Papay et al., 2017). Teaching positions are also not equally affected by shortages. Content areas such as science, mathematics, and special education are more likely to experience shortages (Ingersoll & Perda, 2010; Jacobs, 2021; Sutchter et al., 2016).

School systems, especially ones in urban settings, experience especially high turnover rates of early career teachers (Mirra & Rogers, 2020; Ingersoll et al., 2021; Redding & Henry,

2019; Smith & Ingersoll, 2004). Early career teachers (ECTs) are teachers within the first five years of their career. The demands on a teacher new to the profession are great (Perrone et al., 2019; Schuck et al., 2018; Zepeda, 2018). ECTs must establish their identity as a professional in the classroom as well as navigate the micro-political environment of the school (Mansfield & Gu, 2019; Schuck et al., 2018). Pedagogical skills and interpersonal skills must be developed simultaneously to grow as an effective teacher.

A common theme among ECT struggles is a feeling of powerlessness (Damico et al., 2018; Buchanan et al., 2013). The demands of the job are high and require ECTs to juggle instruction, curriculum, and classroom management. The day-to-day demands of teaching can leave the ECT focused on survival rather than control and ownership of a professional identity. A survival mindset often stunts professional growth that can lead to dissatisfaction and ultimately increased attrition rates (Gallant & Riley, 2014).

ECTs who are not supported during the critical first years of teaching are most likely to leave the profession (Schuck et al., 2018; Smith & Ingersoll, 2004). Professional progress is key to support ECTS and to help them feel a sense of belonging (Zepeda, 2018, 2019b). ECTs need to experience growth in their pedagogical skills to combat being overwhelmed by the demands of the job (Buchanan et al., 2013). ECT growth can be encouraged through collegial collaboration where they feel supported by their peers (Gallant & Riley, 2014) and leaders (Kim, 2019; Sullivan & Morrison, 2014).

Collaboration include observations, feedback, and conversations which are key supports for early career teachers (Zepeda, 2018). There is also evidence in the research to suggest that in addition to support, a sense of belonging is crucial to ECTs. Without it, alienation can lead to turnover (Kelly et al., 2018; Surette, 2020). The idea of collegial support and a sense of

belonging are key components that will allow ECTs to experience the growth needed to sustain them at the onset and then throughout their careers (Gallant & Riley, 2014).

Policymakers have sought to remedy early career turnover by creating induction programs that have provided various methods of support to ECTs. Smith and Ingersoll (2004) noted that the effectiveness of induction programs varies widely. Teacher induction programs tend to use an assortment of supports for ECTs including, but not limited to, mentorship by a veteran teacher, collaborative planning time, seminars focused on professional learning for content and pedagogy, and regular communication with school leaders. Data indicate that ECTs credit appropriate supports during the early years of teaching as influential on the decision to remain in the profession (Reitman & Karge, 2019).

Policy alone cannot solve the problem of early career turnover. School leaders must enact supports at the local level to slow the revolving door. Early career teachers need intellectual and emotional support to find success within their new profession (Damico et al., 2018). There are formal and informal ways for school leaders to support ECTs. Research has shown that mentor support, observation, collaboration, and engaging in informal dialogue with peers are effective practices (Fenwick, 2011; Herbert et al., 2018; Mansfield & Gu, 2019).

There is pervasive and compelling evidence that school leaders enact an important role in support of ECTs (Ingersoll, 2001; Kim, 2019; Mansfield & Gu, 2019; Perrone et al., 2019). Principals and other school leaders need to create a culture that is conducive to building relationships among staff, and they must ensure access to supports for ECTs. In many ways, supporting an ECT is a building-wide effort that has the potential to reduce the turnover rates for beginning teachers (Kim, 2019; Perrone et. al, 2019; Redding & Henry, 2019).

The Problem

The state in which this study is situated is not immune to teacher shortages. The state attrition rate for ECTs is unusually high, 44% as reported by the state's agency for professional standards status report (Henson et al., 2015). Following national trends, other findings from the report show that schools with high poverty rates have significantly higher attrition rates. Among high school subject areas, mathematics and foreign language teachers exhibited the highest attrition rates. The alarming attrition percentage for teachers within the first five years of teaching prompted a state Department of Education survey of teachers to reveal possible reasons for attrition. Nearly two-thirds of the 53,000 respondents indicated that they would not recommend teaching as a profession. The top two factors that teachers cited as reasons to leave the profession are the focus on standardized tests and the method of teacher evaluation (Owens, 2015).

Given that there is empirical evidence that teacher turnover negatively impacts student achievement (Adnot et al., 2017; Ronfeldt et al., 2013), a high rate of turnover is problematic for school leaders whose schools are high poverty. Early career teachers tend to get direct support from instructional coaches or fellow teachers while administrative support tends to be more indirect (Redding et al., 2019; Zepeda, 2018). Thomas Pointe High School administration faced its greatest challenge at the beginning of the 2020-2021 school year. The COVID-19 pandemic and the high rate of community spread forced the school to open fall 2020 virtually. TPHS welcomed 21 new staff members to a completely virtual environment. In a landscape of high turnover and teacher shortages, it is important for school leaders to find ways that directly support early career teachers as a way not only to influence instructional practices but also as a way to encourage retention.

Overview of the Research Site Context

Thomas Pointe High School (TPHS, a pseudonym) is a semi-urban public high school located about 50 miles east of a major southern city. Situated in a county that has a poverty rate more than double that of the state, TPHS is high-poverty school (United States Census Bureau, 2019). TPHS loses approximately one-fifth of its teaching staff each year. In a school with approximately 110 teachers, that is a significant loss. Turnover in the Mathematics Department has been even higher. Over the past 5 years, the Mathematics Department has lost 15 teachers. Out of a department of 13 teachers for the 2020-2021 school year, only 3 of the teachers were teaching at TPHS more than 5 years ago. High attrition rates make shallow the pool of experience and poses a problem when it comes to supporting new teachers. Many teachers in the department find themselves tapped as leaders with as little as two to three years of teaching experience.

This study used the action research process to develop a system of supports and interventions co-developed by the researcher, the action research design team, and the participants, five early career mathematics teachers. The supports and interventions were based on their perceived needs. The provision of professional learning as directed by the early career teachers was a way to promote teacher agency as well as to increase a shared voice in the professional learning process by five teachers in the Mathematics Department at Thomas Pointe High School.

Purpose of the Study

The purpose of this study was to examine the structure and processes of an early-career support group for high school mathematics teachers in a large, semi-urban public school as they received just in time professional learning based on their needs as they progressed through the

school year. The expectation was to support teachers using job-embedded, reflective processes to refine current instructional practices while simultaneously examining how school leaders can support early career teachers to build a sense of teacher agency within the group. It was also important to build a sense of belonging within the group to promote the retention of teachers.

Research Questions

To address the purpose of this action research study, the following research questions guided this inquiry:

1. How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?
2. How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?
3. What are the perspectives of the action research design team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?

As this study examined early career teachers and just in time professional learning in the context of Thomas Pointe High School, the researcher used specific terms to define key concepts. The next section includes a discussion of the definitions of key terms specifically related to the action research study. While these terms are used in a large body of research, this section discussed the terms specifically related to this study situated in the Thomas Pointe High School.

Definition of Terms

For the purposes of this study, the following key terms are defined:

- “Early Career Teacher” in the context of Thomas Pointe High School is a teacher with no more than five years’ experience and who is in the Mathematics Department.
- “Department Chair” in the context of Thomas Pointe High School is a teacher leader that assumes an administrative and instructional leader role within each of the content departments of the school.
- “Instructional coach” in the context of Thomas Pointe High School is a building instructional leader who partners with teachers and content teams to improve teaching and learning through observation, feedback, and the use of data.
- “School leaders” refers to the school administrative team which consists of the principal, an associate principal of instruction, an associate principal of operations, and two assistant principals. The primary researcher is an assistant principal.
- “Professional learning” is the preferable term for the activity in which educators engage to enhance their knowledge and skills (Hord, 2009) versus professional development which indicates that something is received by the educator and an exercise of mere compliance (Calvert, 2016).
- “Job-embedded learning” is closely related to professional learning but focuses on collaboration, joint problem-posing and problem-solving that stems from a desire to improve practice from lessons learned on the job (Zepeda, 2015).
- “Just-in-time” refers to professional learning that is timely and responsive to the real time work of early career teachers.

- “Teacher agency” is defined by Calvert (2016) as “the capacity of teachers to act purposefully and constructively to direct their professional growth and contribute to the growth of their colleagues” (p. 4).
- “Teacher voice” refers to teacher input in the school decision-making processes.
- “Sense of belonging” in the context of this study is the general sense that one belongs to the organization and has relationships with other members of the organization.

Theoretical Framework

This action research focused on the support of early career mathematics teachers. The experiences of a beginning teacher are as much about self-learning as they are about teaching students. The theoretical framework of constructivism undergirds the action research cycle for this study. Constructivism also contributes to the theory of change as it sheds light on how learning occurs with a focus on what happens cognitively and also what happens socially (Holmes, 2019; Lock, 2006).

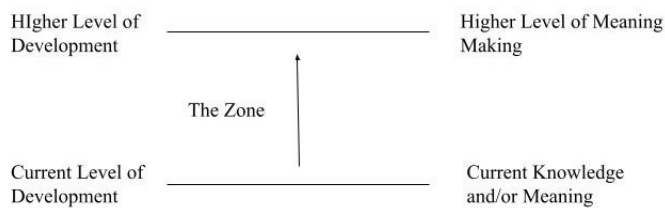
Piaget, Vygotsky, and Bruner led the constructivist field of study. Piaget’s work focused on the cognitive aspect of learning through assimilation and accommodation. Interaction with the environment creates knowledge that is either integrated into existing cognitive structures or into the structures that change and adjust to make room for new knowledge (Lutz & Huitt, 2004). Bruner added to the ideas of Piaget to stress that patterns and relationships can be discovered using past experiences and knowledge. This discovered learning is more than likely to be remembered because it was constructed by the individual (Jiang & Perkins, 2013).

Conversely, Vygotsky saw social structures and social interactions as the drivers of cognitive development. Collaboration is the cornerstone of Vygotsky’s Zone of Proximal Development Theory (ZPD) that indicates development and learning occurs with the assistance

of a more capable learner (Rentauli, 2019). Much of the research of the founding fathers of constructivist theory was focused on children and how children learn. It can be argued, though, that teachers, much like students, must have the opportunity to make meaning for themselves to learn, change, and grow in the profession (Zepeda, 2017, 2019b). In many ways, by supporting early career teachers through just-in-time professional learning helps to keep them moving into higher levels of sense-making around the practice of teaching. Figure 1.1 illustrates this idea.

Figure 1.1

Zone of Proximal Development



Note. (Zepeda, 2015, used with permission)

Collaboration and learning from more capable peers as described in Vygotsky’s zone of proximal development is an important theoretical underpinning of the efforts with ECTs. It is also important to note that Bandura’s social cognitive theory and observational learning stance should be considered when building a framework for ECTs. According to Bandura (1977), modeling and observation are powerful constructs for building learning and both activities are prime supports for early career teachers.

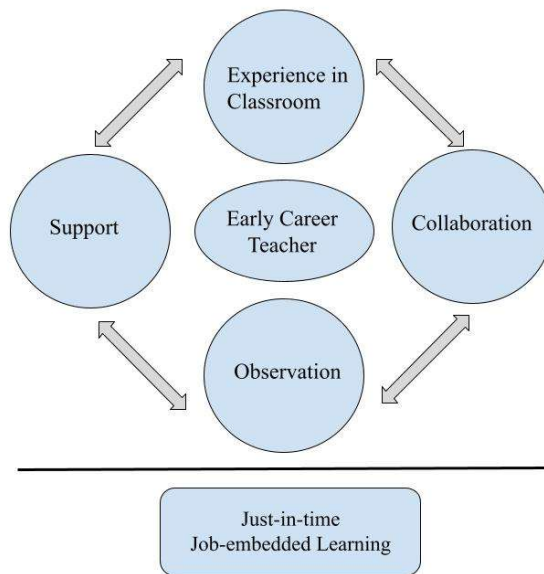
Constructivism as a theoretical framework for this action research situates the early career teacher as a learner who is actively seeking to make sense of their new profession. By examining both the cognitive and social aspects of constructivism, this framework highlights the

need to attend to both the intellectual and emotional side of teaching. New teachers need to be able to make meaning of their new learning, but they also need to be able to learn with others and to grow from the collective expertise.

Job-embedded learning allows teachers to actively construct knowledge that is meaningful to them which is an important characteristic of adult learning (Zepeda, 2015). Constructed learning situated within the context of the school and classroom allows the teacher to transfer the skills into practice through collaboration and reflection thus promoting the social aspect and continuous growth characteristic to constructivism.

Figure 1.2

Theoretical Framework Based on Constructivism



In the present study, the tenets of constructivism, discovery learning, collaboration and peer support, and modeling and observation were used to build a theoretical framework as

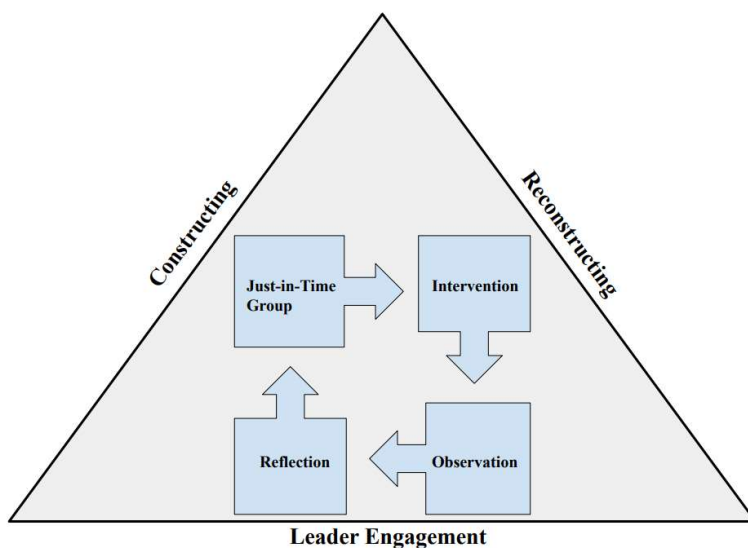
depicted in Figure 1.2. Just-in-time learning for a teacher happens within the context of the classroom. Teachers then often collaborate with peers or observe peers to create their own network of support. Teachers learn from their practice and then seek support to help them address problems that arise from that practice. All constructed learning is firmly situated around the needs and experiences of the early career teacher.

Logic Model

Given the foundation of constructivist views for this research study, the logic model, or conceptual framework, must be rooted in the needs of the teacher and the actions of support for the early career teacher. The logic model depicted in Figure 1.3 provides the guide for the study to examine how a school leader can engage with early career teachers as they construct and reconstruct their knowledge of the teaching profession. This model provides an opportunity for growth for the individual teacher and a framework that allows for the school leader to engage with the process.

Figure 1.3

Logic Model for Study



Theory of Change

The foundation of the study is predicated on the idea that teachers construct and reconstruct their knowledge through their experiences in the classroom. The theory of change is situated in the premises involved in the Zone of Proximal Development. When teachers are in the Zone of Proximal Development leaders can help teachers stretch from their existing level of performance to higher levels through such activities as observation and feedback and coaching cycles. The current study sought to examine how school leaders can engage in this process to serve as a means of support for early career teachers as they continually refine their practices through the construction and reconstruction of their ideas. The logic model used in this study provided a cycle of support for the ECTs that includes peers and school leaders.

The cycle of support started with the just-in-time group of ECTs and leaders discussing problems of practice. The problems that surface for the ECTs based on classroom practice became the focus of collaboration and subsequent professional learning. Observation of the applied intervention was used to gather data around the transfer of the learning and peer support offered based on the feedback from observation. The teacher then reflected on classroom practice to either further clarify the existing problem or to determine a new area of need. The entire cycle was firmly situated around the needs of the early career teacher that arose directly from experiences in the classroom. The study sought to investigate what changes in practice and in thinking occurred when just-in-time support was offered to ECTs.

Overview of the Methodology

The purpose of action research in an educational context was to improve education from the inside out by using the practitioner as the researcher and participant in a way where context and purpose matter (Somekh & Zeichner, 2009). Practitioner-researchers are uniquely situated to

marry “thought and action” to bring about change (Elliott, 2015, p. 6). In the context of this study, the primary researcher and action research design team used the literature surrounding early career teachers and professional learning to create a small group of support for the teachers that served as the implementation team. The action research design team sought to support early career mathematics teachers by exploring the thoughts of the novice teacher and bringing resources and support that could lead to actionable change based on the expressed needs of the teachers.

Action Research

Action research was an appropriate methodology for this study because it allowed for real-time collaborative problem-solving. The cyclical framework of action research is grounded in the context of the problem as well as the relationship of the researcher and the members of the system being studied. Action research is research from within the system and that characteristic makes it very personal. Coghlan and Brannick (2014) captured the personal qualities of action research by describing the main elements as “a good story, rigorous reflection on that story and an extrapolation of usable knowledge or theory from the reflection on the story” (p.16). Every teacher has an early career story. Far too many teachers do not make it past their early career story because they were not offered the appropriate supports and framing needed to learn and grow through the tough and formative early years.

Action research allowed a space for the researcher and participants to reflect on the challenges faced in the classroom, put learning into action, and then gain some understanding around improvement of practice. Action research was also a sound methodology for the researcher and school leader to make decisions about the best support for teachers. Glanz (2014) notes that school leaders are confronted with decisions every day, but that “decisions are made

more intelligently and equitably” when grounded in action research (p. 11). The process of gathering and using information should be deeply embedded in the school leaders’ approach to decision-making as they complete their daily tasks. Simply put, action research allows school leaders to “better understand their work” (p. 16).

The exposure of the systematic problem-solving framework of action research for the early career teachers cannot be overstated either. Participation in this study provided a guide for reflecting on their professional story that can serve teachers throughout their careers. The habits of reflecting, refining, and improving practice is at the heart of action research. Glanz (2005; 2014) also suggests that action research can provide a meaningful way to engage in instructional supervision for school leaders. Fostering the growth of teachers is the purpose of instructional supervision and action research allows the teachers to help direct that growth (Zepeda, 2017). The process allowed for dialogue between school leaders and teachers while keeping the focus on data-informed practices coupled with the individual and collective supports that early career teachers needed.

Throughout the study, the action research design team and the implementation team worked together to support early career mathematics teachers in a semi-urban and high-poverty school. Data from the implementation team were collected and analyzed to provide direction for the action research design team and to create interventions based on the appropriate literature. The research cycle provided time for implementation and reflection for both the action research design team and the implementation team based on the results of key interventions. Interviews were conducted with the early career teachers at beginning and end of the cycle to elicit growth in teacher thinking. Weekly check-ins were held to provide continuous feedback and support

while also gathering evidence for the direction of the professional learning. Bi-weekly meetings were used to engage in professional learning and dialogue around the identified areas of need.

Data Collection

Data collection for this study incorporated numerous qualitative methods. These methods included:

1. Individual interviews with both the early career teachers and school leaders at the beginning, middle, and end of the research process;
2. Focus group conducted with the action research design team during the mid-point and at the end of the study for the purposes of gaining perspectives about the progress of the early career teachers and most especially, the interventions;
3. Observations of meetings conducted by the Mathematics Department chairs;
4. Researcher journal notes based on observations during early career teacher support meetings and observations during the action research design team meetings; and,
5. Documents, including teaching artifacts, provided additional context about the focus of the study, and these documents were used to corroborate observations and other data.

The researcher analyzed the qualitative data generated from the individual interviews and focus group meetings. From combing through the data coding scheme was developed to track specific instances. Finally, these codes were examined by looking for overall patterns that led to the generation of themes.

Interventions

The primary intervention of this study took the form of small group professional learning communities comprised of early career teachers of mathematics, the mathematics instructional coach, the school district's secondary mathematics coordinator, and the researcher. The early

career teachers all taught Algebra I during the 2021-2022 school year. The group's focus was to support the early career teachers with professional learning based on their perceived needs and to build individual capacity and resiliency through reflection and collaboration. The interventions were created and implemented by the action research design team which included the district's secondary mathematics coordinator, the mathematics instructional coach, the teacher leader from the Algebra I team, and the researcher.

The interventions were created after weekly check-ins with the group. The check-ins were used to determine what needs were most significant to the group at a given time, referred to as just-in-time. The intervention was then implemented by the early career teachers in combination with some members of the action research design team, if necessary, over the course of the immediate next week.

The interventions included a variety of professional learning activities that were developed to meet the emerging needs as they surfaced in the group. The activities included planning an engaging lesson for a mathematics review, scripting a lesson with questions that teachers can use to propel student thinking, and modeling a lesson with a focus on pacing and chunking of important ideas. These interventions were designed to meet the needs of the early career teachers as they arose in real-time teaching while providing a group setting of support. Each intervention was implemented within the early career teachers' classrooms and were observed by the researcher followed by a group debrief and reflection on implementation.

Significance of the Study

Teacher shortages have been written about extensively in the field of education (Ingersoll, 2001; Ingersoll & May, 2012; Sutcher et al., 2019). Certain areas, such as mathematics and science, are especially prone to a lack of viable teacher candidates (Henson et

al., 2015; Zahner et al., 2019). Contrary to typical teacher shortage research that focuses on recruitment, Ingersoll's research (2001) went further than the teacher (age, area of certification) and school characteristics (public vs. private, poverty levels) that contribute to turnover. He showed that there are school level factors that are quite controllable that can reduce turnover like administrative support, student discipline support, and shared leadership.

The spring of 2020 introduced another factor that exacerbated the problems in education. COVID-19 and the subsequent global pandemic altered the status quo of schooling seemingly overnight. Across the nation, schools were shuttered and instruction moved online to close out the 2019-2020 school year. Many of the schools opened for virtual instruction only to start the 2020-2021 school year. The unintended consequences of the measures enacted to protect the public from COVID-19 are not certain at this point. Some of the predicted challenges for education could be shortages of teachers and higher attrition rates especially for early career teachers (Erwin, 2020). Support for teachers is crucial while the educational community navigates the uncharted waters created by COVID-19.

This study looked specifically at what can be done in a semi-urban, high-poverty school to support early career mathematics teachers. The study adds to the gap in the research around retaining early career mathematics teachers by focusing on group support outside of the formal induction program. This study is situated in an unprecedented time—the COVID pandemic in which schools were shuttered (Zepeda & Lanoue, 2021). The findings from this study hope to shed light on the gap in the literature related to supporting early career teachers during the unprecedented impact of COVID-19 as they started their teaching careers.

Organization of the Dissertation

Chapter 1 gives an overview of the study of this dissertation, and lays out an overview of the research questions, the problem of practice, and methods for the study. Chapter 2 provides a review of the related literature for the study, and discusses early career teacher support, professional learning, and teacher agency. Chapter 3 describes the methodology involved in action research and the qualitative methods as they relate to this study as well as amplifies the context in which the study was conducted. Chapter 4 examines the findings from the action research case. This chapter also describes the interventions implemented by the researcher and the action research design team.

Chapter 5 details the analysis of findings from the action research case based on the action research cycles related to the research questions that guided this study. The data and findings were analyzed data through a thematic approach. Chapter 6 summarizes the study, provides discussion about the findings from the research questions, and offers implications for school leaders, as well as implications for further research.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

The purpose of this study was to examine the structure and processes of an early-career support group for early career high school mathematics teachers in a large, semi-urban public school as they received just in time professional learning based on their needs as they progressed through the school year. To address the purpose of this action research study, the following research questions guided this inquiry:

1. How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?
2. How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?
3. What are the perspectives of the action research design team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?

Chapter 2 explores the major writings and areas that influenced the conceptualization of the present study. The topical areas included a review of the related literature on teacher shortages, early career teachers, teacher supports, and leadership. Articles, both empirically based and scholarly works, were examined in tandem with the development of the literature

review. The research methods of these works were examined to aid in the development of the current study. The empirical findings table can be found in Appendix A.

Teacher Shortages

Teacher shortages have been a problem in the United States for over 40 years. The National Commission on Excellence in Education (1983) report brought attention to the fact that a teacher shortage was imminent. Since that time, the notion of teacher shortages has interested researchers and there is no shortage on ideas behind the cause. Teacher shortage is a problem that depends on local context and for that reason it can be argued that there are really 50 different job markets for the teaching profession (Sutcher et al., 2019) which brings a vast array of causes for shortages. Most recently, the COVID-19 pandemic has contributed to teaching shortages across the nation (Bailey & Schurz, 2020; Gray Streeter, 2021; Maxouris & Zdanowicz, 2022).

Typically, teacher shortage theorists tend to fall into two camps. The first suggest that teacher shortage is a problem of supply while the second group contends that the problem is more closely related to retention. The reality is that teacher shortage is a complex problem that is the result of many different drivers. The latest research suggests that shortages have risen to crisis level and are critically important for policy makers and school leaders to address (Garcia & Weiss, 2019a). Both supply and attrition have an impact on teacher shortages and must be considered when addressing the problem.

Supply versus Attrition

One thought surrounding teacher shortage is one of a supply problem. There are simply not enough teachers in the teacher preparation pipeline to meet the increasing needs of schools (Black, D., 2016; Garcia, 2019b). It is true that the demand for teachers has outpaced the demand for teacher preparation programs (Sutcher et al., 2019). The reasons for the gap in supply have

been attributed to an increasing student population, an aging teacher population entering retirement, and the mandate for highly-qualified teachers and then later the accountability-fueled designation of highly-effective that eventually led to the emergence of value-added measures in teacher evaluation systems (Zepeda, 2019b). These conditions created a front-end problem. There were not enough people choosing the mainstream certification route to enter teaching as a profession to meet the demand for teachers.

In an effort to attract new people to teaching, alternative certification programs continued to provide paths outside of the traditional college route to certification (Darling-Hammond, 1990; Zeichner & Schulte, 2001). Some alternative programs were created at the state level and others were national programs like Troops for Teachers and Teach for America (Ludlow, 2013). The effects of alternative programs are mixed. There are some effective programs that produce alternatively certified teachers (Boyd et al., 2007; Humphrey et al., 2008). There is also research that shows that teachers who take alternative certification routes do not stay in education for the long term (Zhang & Zeller, 2016).

On the surface, alternative certification programs seem to be an appropriate solution to increasing the front-end teacher supply problem. As a lower cost option and shorter time commitment than the traditional collegiate route, alternative programs are enticing many adults into the profession (Newton et al., 2020). There are some downsides to this path. Interestingly, pedagogical knowledge matters. There is some evidence that teachers receive less instruction on pedagogy in alternative certification programs, and this is strongly related to the retention rates of alternatively certified teachers (Bowling & Ball, 2018; Ingersoll et al., 2012). It seems that alternatively certified teachers are not as prepared for the often-challenging environments in which they are placed since teacher shortages are most often found in high needs schools

(Zeichner & Schulte, 2001). Support is necessary for alternatively certified teachers, but often high needs schools lack the staff expertise needed to extend the appropriate amount of support. Hence, a teacher turnover problem is created (Morettini, 2016).

Contrary to the idea of a front-end supply problem, other researchers have found that the teacher shortage is driven by attrition (Carver-Thomas & Darling-Hammond, 2019; Ingersoll, 2003). School leaders are able to hire teachers, but they are not able to keep them. Some turnover is necessary to maintain the effectiveness of schools. In a system that works to the benefit of students and schools, less effective teachers leave the profession and are replaced by more effective teachers. However, a problem is created when effective teachers leave and are replaced by less effective teachers or not replaced at all. The rate of attrition is problematic, and Ingersoll (2001) describes this as revolving door attrition. This revolving door attrition is very discriminating and tends to affect certain subjects and certain schools disproportionately.

Content Areas with High Attrition Rates

While it has been established that teacher shortages across the board are of a concern, there are certain content areas that have especially high attrition and shortage rates. Special education, science, and mathematics are all areas that have higher than normal attrition rates (Carver-Thomas & Darling-Hammond, 2019). Again, a much-used solution to these shortage problems has been to increase supply, and many of the initiatives have targeted science and mathematics teachers through alternative certification routes. It is also a concern that the shortage puts pressure on school leaders to lower standards while hiring science and mathematics teachers which would most certainly have an effect on student achievement (Ronfeldt et al., 2013).

Ingersoll and May (2012) suggest that the attrition of mathematics teachers is the most important driver of the shortage because supply has kept up with the pacing of demand. They recognize that some attrition is normal and healthy for an organization as a type of quality control, but even normal attrition has a high cost in the area of mathematics. The high turnover in mathematics deemed it important to look at why mathematics teachers are leaving at the organizational level, and Ingersoll and May (2012) discovered that there were several school-related factors that contributed to turnover of mathematics teachers. Interestingly, the biggest predictor of turnover of mathematics teachers was the degree of individual autonomy over the classroom choice of materials, teaching techniques, and grading, for example.

Ingersoll and May (2012) hypothesized that the need for autonomy could be a direct result of the high-stakes testing focus on mathematics. The desire to control the classroom by some school leaders in an effort to raise achievement could actually be the factor that is driving away qualified teachers from low performing schools. Ultimately, increased recruitment of mathematics teachers matters, but recruitment will not solve the problem alone. School leaders must look inward to organizational conditions to retain qualified teachers especially in high poverty and high minority schools.

High Poverty, High Minority Schools

An in-depth look at teacher shortages and teacher attrition reveals that not all schools are equally impacted. High needs schools which are high poverty and high minority schools for the purposes of this discussion, have a much higher attrition rate, and these schools are more negatively impacted by turnover (Djonko-Moore, 2016; Garcia & Weiss, 2019b). High-needs schools pay a higher price for the revolving door of teachers. The loss of human capital means that there is a lack of available mentors for new teachers. School leaders must constantly pour

resources into developing new teachers without the chance to bear the fruits of the work by the never-ending turnover. School leaders also find it more difficult to replace staff at high-needs schools.

Teachers in high needs schools not only have to deal with the everyday pressures of teaching, but they also have to deal with poverty-related and inequity-related problems that increase the stress and pressures of the job (Garcia & Weiss, 2019b). The high turnover in high needs schools is clearly related to the work environments that are often found in high needs schools (Simon & Johnson, 2015). The school context matters and is a driver of teacher attrition. Broadly, administrative support, positive collegial relationships, and strong student discipline are all found to increase the likelihood that teachers will stay in high-needs schools. Schools that lack these conditions tend to signal high attrition rates for schools making it clear that the working environment for teachers is an important factor to consider in the plight against teacher attrition. However, other factors out of the control of schools can exacerbate attrition.

Teacher Attrition and the Impact of COVID-19

Literature in the area of teacher attrition did not account for the toll that the global pandemic of COVID-19 would bring to the education workforce. The impact of COVID-19 brought a new threat to the teacher shortage crisis. The world-wide pandemic closed schools in the spring of 2020 and caused virtual openings for many schools for the 2020-2021 school year. The pandemic created conditions that negatively impacted teacher attrition. People above the age of 65 were disproportionately affected by COVID-19 which caused concerns with the older end of the teaching population and increased fears of a wave of early retirements (Bailey & Schurz, 2020). The high stress environment of teaching from home and in some cases teaching students face-to-face as well as virtually on top of health concerns pushed teachers to leave (Flannery,

2020). The overall dissatisfaction of teachers with their work environment during the pandemic threatened the job force (Lachlan et al., 2020).

The pandemic also brought with it an economic downturn that plagued school funding and forced many districts to freeze hiring or to eliminate teaching positions (Erwin, 2020; Griffith, 2020). Many school districts were still recovering from the Great Recession of 2008 which forced large scale layoffs in education when the pandemic hit (Goldhaber & Theobald, 2020). The loss of revenue from taxes at the local and state levels hurt local boards of education and caused budget cuts throughout. The health problems and economic problems of COVID-19 became drivers that forced more teachers to leave the profession which exacerbated the ongoing teacher shortage.

Ingersoll et al. (2018) stated that the teaching force is getting “greener.” The most common years of teaching experience was 15 years in 1987-1988, but dropped to only 3 years during the 2015-2016 school year. These green teachers are now teaching in unprecedented times and the anecdotal evidence shows that teaching during COVID-19 is isolating (Smylie, 2020) for early career teachers. These factors combined with the high attrition rate for early career teachers (Ingersoll et al., 2018; Smith & Ingersoll, 2004) merit a closer look at the challenges and needs of early career teachers.

Early Career Teachers

Early career teachers (ECTs), teachers in the first five years of teaching, tend to suffer from especially high turnover rates (Ingersoll et al., 2021; Smith & Ingersoll, 2004). The high turnover in the first five years of a teacher’s career contributes to the teacher shortages seen across the nation and merits a closer look at the early career teacher’s characteristics and challenges.

Characteristics of Early Career Teachers

Early career teachers come from two major areas. Some ECTs come directly from post-secondary teacher preparation programs, and they are considered newly-prepared teachers. The second major area are considered delayed entrants who spent more than one year prior to their entry to the profession outside of college or teaching (Warner-Griffith et al., 2016). The 2011-2012 Schools and Staffing Survey (SASS) reported that 41% of newly-hired teachers were either newly-prepared or delayed entrants for schools in the public sector.

Newly-prepared teachers and delayed entrants as reported by the SASS were mostly White, female, and young; however, there were some differences between the two groups. The mean age for newly-prepared teachers was 26.3 in 2011-2012 while the mean age for delayed entrants was 30.3. Both groups were predominately female with newly-prepared teachers at 75.6% and delayed entrants at 71.7%. The biggest difference was in racial make-up. Newly-prepared teachers were 85.4% White, but delayed entrants were only 69.8% White. The next largest subgroup of delayed entrants was Hispanic at 17.8% (Warner-Griffith et al., 2016).

The path to the profession for newly-prepared teachers and delayed entrants is different. Only 15.7% of newly-prepared teachers were certified through alternative certification routes while 45.3% of delayed entrants went through alternative certification. Delayed entrants were also less likely to have a major and certification in their main teaching assignment at 46% while newly-prepared teachers' major and certification matched their assignment 62% of the time (Warner-Griffith et al., 2016). The most alarming characteristic of ECTs, both newly-prepared and delayed entrants, is their instability. More than 44% of teachers will leave the profession within the first five years of their career (Ingersoll et al., 2018). The alarming attrition rate demands that school leaders focus on the challenges of ECTs and find ways to support them.

Challenges of Early Career Teachers

Regardless of the path to teaching, ECTs face many challenges beginning with the initial assimilation into the profession. Over 50 years later, Lortie's (1975) statement that a new teacher in his or her first year of teaching assumes the same responsibilities as a veteran on day one still holds true. ECTs must quickly transition from theoretical learning to the application of that learning as they experience the reality of the classroom environment. A common result of this transition is shock at the imbalance between idealistic beliefs and the reality of the classroom and has long been documented (Veenman, 1984). The conflict between beliefs held about teaching and the actual experience in the classroom can bring high levels of stress for an ECT (Nichols et al., 2016). How ECTs respond to this shock and stress can pave the way for a successful teaching career or a path to an early exit.

The main challenges for ECTs can be characterized under three subgroups. The challenges relate broadly to self, tasks, or impact (Aarts et al., 2020; Fuller, 1969). ECTs must establish themselves a professional, deal with the varied organizational and technical demands of teaching, as well as continually assess their impact on students and student learning. Hobson and Maxwell (2017) found that teacher well-being is an important factor for effectiveness and yet it was often overlooked for ECTs because of a sharper focus on performance. The researchers identified relatedness, competence, and autonomy as three factors of well-being. It is no surprise that these three subgroups closely tie to the three subgroups of challenges for ECTs. Finding a relatedness for self with respect to the school as a whole, feeling competent in tasks, and having autonomy to choose what is best for student achievement are noble goals for ECTs and would move them on a path toward teacher well-being and effectiveness.

Self-Challenges

The challenges of an ECT can be great as they learn to navigate two new environments, the school environment, and the classroom environment. ECTs must create a place for themselves within a school, and that can be hard to do in the context of an already established culture. The stress and demands of teaching are even greater to an ECT who does not find their fit within the already existing culture of a school. ECTs must find a way to integrate into the school community to navigate the political structures of a school (Mansfield & Gu, 2019). It is crucial for an ECT to develop a sense of belonging to foster their resilience (Le Cornu, 2013).

The same time that the ECT is trying to navigate the culture of the school, he or she is also building a new teacher identity within the classroom. The idea of becoming a teacher now confronts the reality of actually being the instructional leader of the classroom and that can cause tension for the teacher. The challenge to shift one's identity from student to teacher can create stress and uncertainty about fit for the profession. These tensions can lead to negative emotions like feeling helpless, awareness of shortcomings, and feeling insecure (Mansfield & Gu, 2019; Pillen et al., 2013) which makes support for ECTs even more important. As ECTs develop their professional identity they need feedback and confirmation that they are a valued member of the school wide community as well as a teacher of value in the classroom (McCormack et al., 2006). How an ECT conquers the challenge of developing their professional identity will impact the rest of their career.

Task Challenges

Another monumental challenge for ECTs involves the tasks related to teaching. The shift of learning about the theory of teaching and actually putting it into practice forces ECTs to confront a barrage of tasks that cannot be learned in a teacher preparation program. Classroom

management, student misbehavior, lesson planning, grading, communication with parents, and even the simple act of taking attendance all become real challenges for the ECT (Aarts, et al., 2020; Buchanan et al., 2013; Schuck et al., 2018). Classroom management is consistently listed as one of the top problems of ECTs (Kwok, 2017). The need to maintain an orderly learning environment is high priority for an ECT, but support of this skill outside of the basic tenets of classroom management is often lacking in teacher preparation programs (Flower et al., 2017).

While learning to effectively manage a classroom, an ECT must also simultaneously balance the workload and administrative duties that come with teaching. Some duties like grading and lesson planning directly are aligned with classroom practice, but other duties are more school wide in nature such as supervision, serving on committees, etc. These “other” duties often detract from the time available to support ECT’s to plan and prepare for the work involved with students (Lawrence et al., 2019; McCann & Johannessen, 2004; Pogodzinski, 2014). The monumental tasks related to teaching can easily overwhelm ECTs and contribute to the likelihood that they will leave the profession.

Managing student behavior and managing workload are the two predominant challenges for an ECT that must be mastered to move forward successfully in the profession. The goal for ECTs would be to move from coping, or merely surviving, with these challenges to actually managing them. Coping is more of a short-term response that allows a teacher to survive a particular challenge. Coping for long periods of time does not provide a framework for teacher growth which is necessary to develop a positive professional identity. Managing, on the other hand, allows a teacher to be proactive when facing the challenges of teaching and allows a teacher to build agency and a positive professional identity (Hong et al., 2018). Support is

needed to help the ECT transition to management of challenges and it is necessary to reduce burnout among teachers (Lawrence et al., 2019).

Impact Challenges

Student learning is the ultimate goal for teachers, so it is reasonable to suggest that impact on students is challenge for ECTs. An ECT has spent considerable time thinking about their content and the skills of teaching during a teacher preparation program, but largely without students in the picture. Students bring a certain amount of variability into the classroom that cannot be replicated without authentic experience. ECTs must develop positive relationships with students, encourage student motivation, and meet the individual needs of students (Aarts et al., 2020). All of these student focused challenges happen simultaneously while the ECT is developing his/her identity and managing the workload of teaching children.

Attrition of Early Career Teachers

The challenges of early career teachers are great which makes the school leader's challenge to retain ECTs even greater. More than 44% of teachers leave the profession with their first five years (Ingersoll et al., 2021). This statistic is shocking, costly, and has lasting negative effects. The instability in schools that continue to lose teachers at an alarming rate is harmful to quality of instruction and student learning (Sorensen & Ladd, 2020). It is especially important to note that high-needs schools tend to suffer from the highest rates of attrition which further endangers the education of students who comprise the highest risk populations (Djonko-Moore, 2016).

While some turnover is necessary and others leave for reasons outside of school influence, most ECTs cite dissatisfaction with their school work environment. Some characteristics that cause the dissatisfaction are student misbehavior, lack of opportunity for

development, lack of input into school decision making, and school leadership (Buchanan et al., 2013; Gallant & Riley, 2014; Ingersoll et al., 2018). Other research demonstrates that perception is reality. Teachers who perceived the student population and the community negatively as well as teachers who had negative perceptions of administrative support are more likely to leave (Carver-Thomas & Darling-Hammond, 2019; Djonko-Moore, 2016). It is clear that there is a need for ECT support to quell the flow of beginning teachers from the profession before they ever are able to make a difference for students. Teacher supports must be integrated into the school environment to address the myriad of problems that ECTs face.

Teacher Supports

It is clear that there is a high need to attract and retain effective teachers. Teachers must be supported so that they can, in turn, effectively support students. Working conditions, or broadly school climate, greatly affects teacher satisfaction and the general perception that teachers have of their jobs (Garcia & Weiss, 2019b; Ingersoll, 2001). Much of school climate is dictated by relationships. Relationships between staff and students, staff and school leaders, and among staff can enhance positive feelings and job satisfaction or lead to discontentment (Podolsky et al., 2016).

Teachers need ultimately what students need, to feel valued and to derive a sense of satisfaction from their work. The emotional needs of teachers first have to be met to create conditions for them flourish in their work (Gallant & Riley, 2014). When these conditions are in place, then school leaders can use tools such as coaching, feedback, and differentiated professional learning based on career stage (e.g. beginning teacher, mid-career, etc.) to foster teacher growth (Aarts et al., 2020; Buchanan et al., 2013; Zepeda, 2018, 2019a, 2019b).

Providing for the emotional and professional needs of teachers helps to build more effective teachers which in turn helps reduce attrition (Redding & Henry, 2019).

Support for Early Career Teachers

The teaching population is changing. Ingersoll et al. (2018) found an increase in the number of beginning teachers in the profession. They coined the term “greening of the teaching force” to represent this trend. They stressed that teacher supports need to be geared toward the ECTs to meet their unique challenges. Challenges related to self, task, and impact are high priority for ECTs so supports must directly meet those needs. The supports the ECTs need can be categorized in the areas of relatedness, competence, and autonomy (Fenwick, 2011; Gallant & Riley, 2014; Hobson & Maxwell, 2017).

Relatedness

Early career teachers need to first feel that they belong to the school community. They are finding their way in an established group and the risk of isolation is great. Collaboration with peers provides opportunities for collegial relationships to develop and support the ECT. Intentional collaboration also allows for relationships to develop between novice teachers and veteran teachers. It is important, though, for ECTs to experience formal and informal connections to others in the building.

While it is obvious the professional benefits of collaboration, one cannot discount the importance of social connectedness. ECTs who feel socially connected to others in the school are more likely to be committed to their school (Struyve et al., 2016). Zepeda (2018) insists that a sense of belonging meets a psychological need for ECTs. Once this condition is met, ECTs are then more able to experience growth and satisfaction from their work. It is crucial for systems to exist that build opportunities for relatedness and connection.

Observation and team collaboration are structures that can encourage and nurture relationships among staff. Observations of veteran teachers by the ECTs paired with a structure for reflection and debrief of the observation create a space for the two teachers to connect (Herbert et al., 2018). Conversations about practice between veterans and ECTs strengthen the relationships between these two groups of teachers and also contributes to an overall supportive school culture (Gallant & Riley, 2014; Mansfield & Gu, 2019). Team collaborations, whether it be grade level collaboration or content collaboration, provide formal and informal opportunities for relationships to develop and flourish (Fenwick, 2011; Schuck et al., 2018). These teams are important to help the ECT feel connected to others in the building for professional and personal support. Ultimately, the more teachers talk to each other, the more that the ECT can strengthen their social network, and thus their sense of belonging, within the school.

Competence

The ECT is a learner as much as they are a teacher during the first few years in the profession. It is crucial for ECTs to develop and grow their competence as teachers. Each ECT comes into the profession with individual needs and a specific teaching context which creates individual learning paths. It is important that teaching skills are developed as issues arise in the course of their classroom practice (Buchanan et al., 2013; Mansfield & Gu, 2019; Scott et al., 2012). This allows for the learning to be meaningful which increases the transfer of skill into practice (Zepeda, 2018).

It should be noted that the foundational teaching skill of classroom management must be addressed while ECTs grow in competence because even though all ECTs are on their own path, Buchanan et al. (2013) noted that “ECTs almost universally struggle with the management of the behavior of their classes” (p. 124). The teacher of a well-managed classroom is free to focus on

learning rather than merely surviving the day while navigating an avalanche of student misbehavior.

Mentoring has been shown to be an effective tool for helping ECTs improve their pedagogical skills (Fenwick, 2011; Surette, 2020; Sutchter et al., 2019). Mentor teachers within the same subject area and induction programs that are set up for meaningful discourse between the ECT and mentor teacher provide strong supports for teacher growth (LoCascio et al., 2014). Coaching conversations are also valuable for developing the growth of an ECT (Aarts et al., 2020; Mansfield & Gu, 2019). Coaching is a vehicle for job-embedded professional learning focused on the needs of the ECT as they occur. The structured coaching conversation can be a “lever for improving instructional practice” (Zepeda, 2018, p. 93) that is targeted directly to the most pressing needs of the ECT. Mentoring and coaching provide support for ECTs as they develop their pedagogical skill in real time.

Reflection and resilience are also important skills for the ECT to cultivate alongside of pedagogical skill (Buchanan et al., 2013). Reflective teachers are able to think critically about their practice and adjust to better meet the needs of students. Resilient teachers are able to withstand the challenge the inevitably arises during the novice years of teaching. Damico et al. (2018) purport that mindfulness is a skill that if developed will help ECTs combat the overwhelm of the early years of teaching. Because teaching is an emotional process it is important for teachers to be supported as a whole person and not just in the area of technical skill. Emotionally healthy teachers are more able to focus on developing stronger pedagogical skill and increase their competence as a teacher (Gallant & Riley, 2014; Hobson & Maxwell, 2017).

Autonomy

Empowering early career teachers is a must. ECTs need to direct their own learning and self-discovery. This allows them to solve the problems that they experience in real-time. Empowered ECTs seek the knowledge that they need based on their own class experience, which fuels their growth and learning (Scott & McDonough, 2012). They become active consumers rather than passive listeners of professional learning when they are empowered to find their own way. The ability to self-direct their growth and learning can increase the effectiveness of an induction program by making it an individualized program tailored to the needs of the ECT (LoCascio et al., 2014).

It is interesting to note that empowering early career teachers can lead to building budding teacher leaders that can be forceful agents of change within a school building. The idea of developing ECTs into teacher leaders is one of identity development. Huggins et al. (2017) suggest that framing the idea of leadership to early career teachers who do not see themselves in that light can direct their growth towards that of a leader. Proper administrative support and mentoring can help to develop the mindset of a leader at a critical stage of professional development for new teachers.

The benefits of leader development are two-fold. The school now has excited and eager teacher leaders who are typically ready to embrace change on the one hand. In addition to that, these ECT teacher leaders are also fully engaged as staff within a building and more likely to stay. In essence, building ECTs into teacher leaders feeds the need for relatedness, competence, and autonomy. These three factors feed into a positive sense of well-being for ECTs (Hobson & Maxwell, 2017), which, in turn, builds empowerment that benefits the school and the teacher leader.

Job-embedded Professional Learning

Job-embedded professional learning is a vehicle for creating a supportive culture in a school that fosters the growth of teachers. Job-embedded professional learning allows for increased collaboration among peers, growth in pedagogical skill, and self-directed learning (Zepeda, 2015). It offers support for ECTs in a way that directly impacts their work in the classroom and in a way that recognizes the ECT as a professional. This important characteristic of job-embedded professional learning honors the need of adult learners to be seen as co-partners in the professional learning journey rather than just consumers of professional learning.

By following the principles of adult learning, job-embedded professional learning structures foster a sense of respect for staff and their needs as learners. That respect gives the teachers space to develop their own sense of agency. Calvert (2016) defines teacher agency as *“the capacity of teachers to act purposefully and constructively to direct their professional growth and contribute to the growth of their colleagues”* (p. 4, emphasis in the original). A school of professionals that have developed a strong sense of teacher agency will naturally be supportive of new colleagues that fosters positive collegial collaboration and that taps into the social power of learning (Loughland & Ryan, 2020).

Job-embedded professional learning with colleagues is a critical component for ECTs as they begin to engage deeply in their work (Buchanan et al., 2013). Schools with strong coherent plans for professional learning provide a solid structure of learning for the adults in the building. This structure creates a safe space within which teachers can learn and grow as a community of adult learners deeply reflecting on their practice. Visone (2016) suggests that the sacred knowledge of teacher practice should not just live in administrative evaluation, but rather colleagues should learn from each other. Collegial visits can provide “risk taking, deep

reflection, and learning” (Visone, 2016, p. 68) for teachers and it invites conversation about practice that is often relegated only to administrator/teacher post-conference.

Leaders set the tone for professional learning and also have to attend to the emotional nature of learning for the staff as whole to develop and prosper (Jones & Thessin, 2017). Asking for teacher input into professional learning and anchoring it in their daily work situates the professional learning as proactive. Moreover, these efforts demonstrate that the teacher has value rather than trying to be reactive and fix a broken teacher. Job-embedded learning opportunities become a way to build capacity and to increase agency so that teachers can dig into their work while simultaneously reflecting on the outcomes collaboratively (Loughland & Ryan, 2020; Zepeda, 2019a). Effective professional learning should be “a continuous thread that can be found throughout the culture of the school” (Zepeda, 2019a, p. 20) and that thread should directly tie back to what is actually happening in the classrooms of ECTs to be an effective teacher support.

Leadership

It is obvious that there is not just one right path for ECT support because the issues facing ECTs are multi-faceted. There is evidence that the school leader has an important role in support of ECTs (Ingersoll, 2001; Kim, 2019; Mansfield & Gu, 2019; Perrone et al., 2019).

Early career teachers need intellectual and emotional support to find success within their new profession (Damico et al., 2018). School leaders must remember that pedagogical skills alone will not suffice and must attend to the emotional needs of ECTs. Supportive environments that are conducive to collaboration and growth for the ECT are essential to improve teacher satisfaction and commitment to the profession (Brown & Wynn, 2009).

Role of School Leadership and Early Career Teachers

There are formal and informal ways for school leaders to support ECTs. Research has shown that mentor support, observation, collaboration, and engaging in informal dialogue with peers (Fenwick, 2011; Herbert et al., 2018; Mansfield & Gu, 2019) are all viable ways to support early career teachers. ECTs need time to practice their craft, reflect on their efforts, and collaborate with peers in order to learn and grow. School leaders must create school conditions that allow for these activities. The general climate of the school must be collaborative, but the leader must ensure that the culture of the school is grounded in collaborative, reflective practices. It is not enough to assign mentors to ECTs and evaluate the teachers periodically throughout the year. Thoughtful actions on the part of the school leader can cultivate the growth of ECTs into thriving members of the faculty. Focusing on ECT growth will further shore up the school culture of peers reflecting on their work together to improve their practices.

School leaders must attend not only to the teaching skill of an ECT but also to how they fit into the political climate of the school. A sharp eye to the ECTs position within staff context and political environment can help to create ways for integration instead of alienation. The school leader must create opportunities for ECTs to build relationships within the school to increase the feeling of relatedness which has been shown to be an effective support for ECTs (Bjorklund et al., 2020; Herbert et al., 2018; Skaalvik & Skaalvik, 2011).

Early career teachers often step, unaware, into a political arena when they walk into a school building. The inability to integrate into the political climate and to establish a strong professional identity can be contributing factors to attrition. Enacting and interpreting policies that create positive support for ECTs is essential. School leaders are important policy “interpreters, translators, and enactors” (Sullivan & Morrison, 2014, p. 616). A skillful school

leader can help ECTs move past being just receivers of policy, but instead, show them how to take an active role in policy. An active voice rather than a passive one will allow ECTs to build their own power, which is a key element in navigating the school political climate.

Equally important is empowering ECTs to drive their own learning and growth. School leaders must focus on factors that will increase the retention of teachers (Ingersoll, 2002). Principals and school leaders need to create a culture that is conducive to building relationships among staff, and they must ensure access to supports for ECTs. In many ways, supporting an ECT is a building-wide effort, and the stakes are high as the turnover rate for beginning teachers is remarkably high (Kim, 2019; Perrone et al., 2019; Redding & Henry, 2019).

Importance of School Culture

School culture is a factor in teacher retention (Garcia et al., 2019b; Wynn et al., 2007). Zepeda (2019a) specifically states that “collaboration, trust, and care” (p. 96) are the foundations of a healthy school climate and culture. School climate is the general feeling in the school and described as the environment or the overall health of the school. Culture refers to the unseen rules and organizational behaviors that govern the school and dictates the direction for the future (Hoy, 1999). A strong positive culture promotes a positive work environment which is an important factor in the retention of teachers.

The school leader cannot affect school culture alone. He or she must enlist the other adults in the building as collaborators. As teachers feel empowered to become co-creators of the school culture, then they are more motivated, engaged, and more likely to have more positive student outcomes (MacNeil et al., 2009). Teachers with agency are able to direct their own growth and in turn participate in the development of the growth of their colleagues (Calvert, 2016). A culture that assists in building teacher agency strengthens its faculty which further

solidifies a positive school culture. Teacher agency compliments school culture in a way that fosters a positive environment for ECTs. Teachers who learn to direct their own growth become multipliers who influence other peers to learn to do the same.

School Climate and the Ethos of Care

School culture is the foundation for the school and school climate is the environment of the school. The two largest components of any school are the students and teachers. The perceptive school leader will see that if he/she can create a positive school climate for these constituents then the groundwork is also laid for learning, innovation, and achievement as well as creating a school culture that retains teachers. None of those things is easily fostered in a toxic school climate. It is important to create an ethos of care for teachers as well as students. Principals must consider both groups when trying to improve the overall atmosphere of the school and the core foundation of culture. “Successful principals build cultures that promote both staff and student engagement in learning and raise students’ achievement levels” because they innately understand the interconnectedness (Day et al., 2016). Relationships are the vehicle for teaching and learning and as such, must be attended to for learning to grow for both students and the adults.

Principals can positively influence teacher perceptions of overall school climate when they develop respect, exhibit power, and keep focus on what is best for group (Allen et al., 2015). Keeping all teachers and their well-being in mind shifted to a top school climate priority during the COVID-19 pandemic. New and veteran teachers faced challenges that could dampen school climate without strong leadership. Principals must create a climate that is welcoming of new teachers and supportive of professional growth. Teachers need to feel engaged, appreciated, and that they have a voice during shifting school landscapes (Hanover Research, 2021).

Weiner and Higgins (2017) placed teachers and principals at the center of the impetus for a positive shift in climate. They note that enhancing the environment for teachers in turn enhances the environment for students. This pervasive ethos of care for all parties benefits all that are involved by creating a school where students want to learn and teachers want to teach. Three ways that principals can influence the school climate for teachers is to build trust, build collaboration, and to share leadership.

Building Trust

Trustworthy leadership was closely connected to the factors of school climate as found by Tschannen-Moran and Gareis (2015). Their study showed that schools where teachers felt that they could put their trust in the principal and that he/she was someone to whom they could turn for support in instructional matters showed a more positive school climate. Allen, Grigsby, and Peters (2015) also found that teachers excel when principals take the time to build trust and treat teachers as professionals. The research showed, like research surrounding ECTs, that when teachers feel satisfied with their career and feel connected to other staff and students that they often provide better instruction to students. Trusting relationships between teachers and principals also create opportunities for the school leader to serve as a role model for early career teachers which increases the feeling of support (Ceballos, 2020). These insights from research would suggest that it is beneficial for a principal to take the time to build a culture of trust between administration and staff as first step in improving school climate.

Building Collaboration

A second important way to affect school climate via teachers is to build collaboration. A school leader trying to build a positive climate will make sure that teachers are collaborating in an effective way. This crucial structure will allow for care to develop among staff which supports

the ECT literature that shows how important collegial collaboration can be for the new teacher. Carpenter (2015) states, “school culture is shaped by the way professional learning communities are executed.” (p. 691). The discerning school leader will take the time to lay the proper foundation for collaborative work through professional learning communities so that work enhances school culture rather than distract from it. Creating supportive environments for teachers will create a trickledown effect. A positive relationship has been shown between teachers reporting a positive collaborative environment and student collective emotional engagement (Weiner & Higgins, 2017). Teachers who feel cared for and part of a positive collective group will create similar conditions for their students.

Principals wanting to shift their school culture in the positive direction should pay attention to the research on the effects of a positive collaborative climate and work to grow such a culture in their own schools. It is important to assess the collaborative structures in place in a building to make sure that the collaborative teams are operating to spread positivity and productiveness and not the opposite. Professional learning and an environment supportive of collaboration can encourage teachers and leaders to work together productively (Allen et al., 2015). If the school climate supports collaboration, then slowly the culture of the school will change to a norm where teachers work together for the collective good of the group.

Sharing Leadership

An additional way that principals can improve school climate and build an ethos of care is to share leadership. Sharing leadership helps build trust between leadership and staff and also distributes power (Carpenter, 2015). It allows teachers to feel more positive about their school environment because their principal demonstrates that they are valued as a partner and not just a staff member (Allen et al., 2015). When leaders invite others into the leadership dynamic it

creates a school where teachers influence leaders and leaders influence teachers. This allows both groups to construct knowledge, share decisions, and build a vision together and studies show that this can have a positive effect on achievement (Jarrett et al., 2010). Everyone must work together to shift the culture of the school and sharing leadership shows teachers that they are valued and an integral part of the school. It provides a framework for leading that is inclusive rather than top down and as such invites all stakeholders to be part of the change.

Leading During Disruption and Crisis

Trust, collaboration, and shared leadership are not only foundational characteristics for a positive, caring school climate, but are the bedrock for a school during a time of crisis. Leaders who have cultivated these aspects of school climate are able to deal decisively, empathetically, and creatively with crisis as it arises. Teachers look to the principal and school leaders to guide the way through the challenge and will take the emotional cue from how the leaders face the situation. A strong leader will communicate effectively, stay optimistic, and remain flexible during the situation (Smith & Riley, 2012) which can further strengthen trust between teachers and leaders.

Chapter Summary

The trends of the teaching profession show that teachers are leaving the profession within the first five years of their career (Ingersoll, et al., 2021; Smith & Ingersoll, 2004). Some feel that the teacher shortage problem is one of supply (Black, D., 2016; Garcia, 2019b). Other feel that attrition is likely culprit to high teacher shortage rates (Carver-Thomas & Darling-Hammond, 2019). Ingersoll (2001) described the high attrition as a revolving door. This revolving door of teachers tends to hit high poverty, high needs schools disproportionately. High attrition also plagues some content areas more than other such as math and science.

There are many reasons that early career teachers suffer high attrition rates. Teaching is a career where the first-year teacher and the veteran across the hallway are expected to perform the same tasks. There is little to no transition from the theoretical to the practical. ECTs struggle to figure out who they are as a teacher, how to handle the daily tasks of teaching, and how to improve their skill. All of these challenges can happen simultaneously which can be overwhelming and lead to burnout.

The cost of the burnout can be high for schools and merits the attention of school leaders. Poor instruction, lack of established staff for mentor availability, and an overall dismal climate can be attributed to high turnover. School leaders must find ways to support ECTs so that can grow as a teacher and become a positive contributing member of the school. ECTs need to feel related to the school and its staff (Herbert et al., 2018). The risk of isolation is great and school leaders must intentionally create structures for collaboration and observation to promote the integration of new staff (Mansfield & Gu, 2019).

Intentional mentoring is another way to support ECTs and their growth towards competency. Ultimately, ECTs want to direct their own learning and feel autonomy over their classroom and job-embedded professional learning can help meet this need for ECTs. Learning that is directly tied to the problems that arise in the classroom for the ECT is most impactful and most likely to transfer to future practice (Zepeda, 2019a).

The wise school leader will find ways to support ECTs during their journey towards this autonomy so that the ECT can one day pay it forward as a veteran teacher. School leaders need to build trust, collaboration, and share leadership to create a school climate that is conducive to growing reflective and caring teachers (Allen et al., 2015; Carpenter, 2015). The time and effort poured into building a positive a school climate will pay off tenfold if the revolving door of

teachers can be stopped. The benefits of a collaborative and reflective staff are positive for students and teachers alike (Weiner & Higgins, 2017). The urgency to support ECTs is great, but the dividend of that support is even greater.

Chapter 3 describes the action research methodology, explores data collection methods, and data analysis techniques. This chapter also describes in detail the context of the research site and the interventions of this study.

CHAPTER 3

ACTION RESEARCH METHODOLOGY

Teacher attrition is a problem for urban schools (Djonko-Moore, 2016; Garcia & Weiss, 2019b). Many teachers leave within the first five years of their career (Smith & Ingersoll, 2004). It is critical for school leadership to create conditions of support for early career teachers (ECTs). Peer collaboration, opportunities for observation and feedback, and coaching cycles are all supports that are beneficial to ECTs (Herbert et al., 2018; Sutchter et al., 2019; Zepeda, 2018).

The purpose of this study was to examine the structure and processes of an early-career support group for early career high school mathematics teachers in a large, semi-urban public school as they received just in time professional learning based on their needs as they progressed through the school year. To address the purpose of this action research study, the following research questions guided this inquiry:

1. How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?
2. How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?
3. What are the perspectives of the action research design team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?

Chapter 3 explores the logic model that guided the study, an explanation of the research design, data collection methods, data analysis, and a discussion of the reliability, validity, and trustworthiness of the study.

Rationale for Qualitative Research Design

Qualitative research is used to understand behavior and interactions within the context of the natural setting for the participants. The aim of qualitative research is to understand the meaning that the participants have constructed from the experience (Merriam, 2009). The experience, or focus of study, can only be understood within the context that it exists which requires the researcher to be immersed in the setting. The primary instrument of data collection and analysis is the researcher and as such, adds a layer of bias that is unique to qualitative research (Merriam, 2017).

The rich description characteristic of qualitative research helps to provide an understanding of the subject and the process under review. The descriptive nature of qualitative research helps to paint a picture of the situation rather than proving or disproving a hypothesis. The picture describes how the participants make meaning of the situation (Bogdan & Biklen, 2007). The present study sought to paint a picture about the real-time supports that early-career teachers at a single research site received.

Qualitative research methods are situated within a specific context where “the researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting” (Creswell & Poth, 2018, p. 15). This aligns with the nature of the study of early career teachers. The challenges of an ECT are so complex and intricately tied to their classroom context that qualitative research is necessary to gain a full understanding of their situation so that supports can be extended.

The descriptive case study methodology provided the opportunity to explore processes of support for early career teachers related to fulfilling their varied needs. Action research methodology was used to situate the research within the context of the school site.

Overview of Action Research Methods

Action research is a type of qualitative research that requires the researcher to be both observer and participant. Action research is an approach to problem solving that call for research in action instead of research about action (Coghlan & Brannick, 2014; Glanz, 2014). Action research is designed as a cyclical process that involves action and reflection to create deeper understanding and knowledge about the phenomena of study. Figure 3.1 depicts the action research cycle model used for this study. The model is based on Zepeda's (2019) cycle of reflection that leads to sense-making that is embedded in reflection-in-action, reflection-on-action, and reflection-for-action. While most action research cycles follow a typical pattern with cycles of constructing, planning action, taking action, and evaluating action, Zepeda's emphasis on reflection highlights the personal nature of action research and the importance of thinking critically to make sense and to examine its impact.

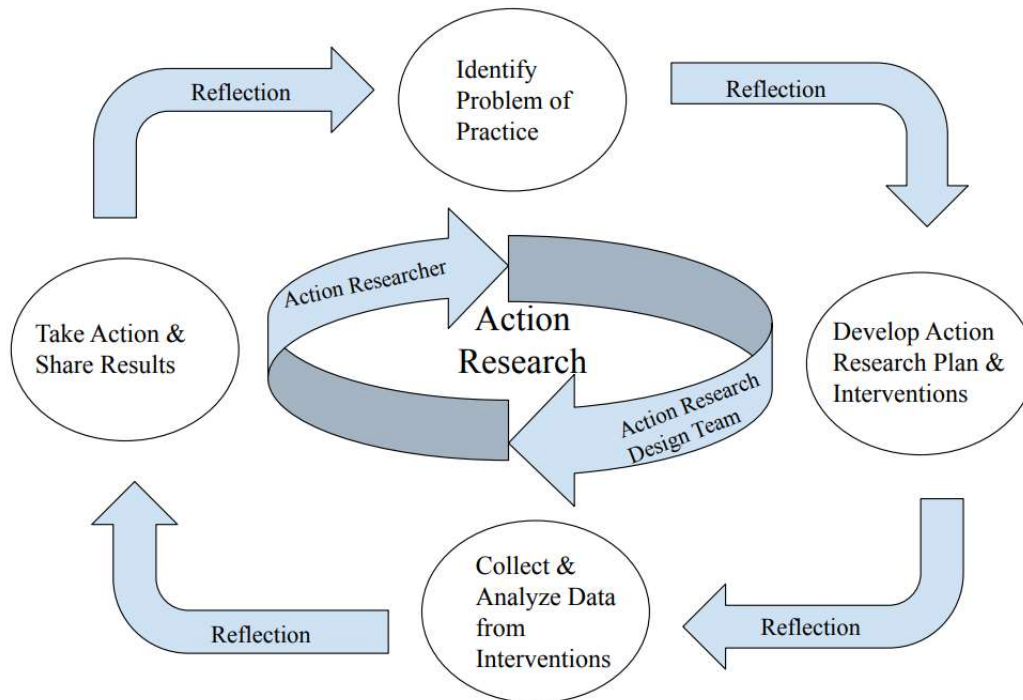
Action is the fundamental principal of action research and therefore the researcher and the action research design team are integral to carrying out the study. At its core, action research is about social learning to bring about change (Bradbury et al., 2019). Action research serves as a natural fit for job-embedded professional learning. Collaboration and reflection are key to both. Inquiry and reflection are elevated when carried out in context and with other professionals seeking to solve problems of practice (Zepeda, 2019).

Systematic, self-inquiry is an important characteristic of action research. Figure 3.1 depicts both the cycles that the researcher and action research design team take, and it also illustrates the tenets of action research. Altrichter et al. (2002) squarely rest the foundation of action on three ideas:

1. action research is about people reflecting upon and improving on their own practice;
2. by tightly inter-linking their reflection and action; and,
3. making their experiences public to other people concerned by and interested in the respective practice. (p.128)

Figure 3.1

Action Research Model



Note. Adapted from the works of Glanz (2005; 2014); Zepeda (2015, 2019).

Action research was the chosen method because of the natural fit with the constructivist theories that guided the study. The intent of action research is not to generate new knowledge, but rather it is a method of inquiry used to improve practice (Stringer & Aragón, 2020). Action research is carried out by those most directly impacted by the problem to be studied. The problem itself arises from the day-to-day work of the participants and action research provides a way gain a deeper understanding of complex associated with the problems (Glanz, 2014). Elliott (1994) describe action research as a way for teachers to be “knowledge generators rather than appliers of knowledge generated by outsiders” (p. 133). Generating knowledge creates a type of authentic learning that is more transferable and likely to last.

Lasting learning is an important aim of action research since the focus of the research is to shed light on a problem, develop, and study interventions as a way to change practices. As defined by Elliott (1994), action research is a process that allows educators to generate and test new forms of action and through reflection and the analysis of data participants will be able to reconstruct their practices. Glanz (2014) referred to action research as “reflection in action” (p. 25) which makes it a key tool for educators to examine and then change their practices based on data.

Coghlan and Brannick (2014) also suggest that action research should be interactive and conducted in real time. Action research is also collaborative and flexible making it a valuable real-time instrument (Somekh, 1995). All of these characteristics make action research an appropriate vehicle to investigate ECT support through real-time interventions because it allowed for the ECT to refine their practice as they progressed through their experiences.

Action Research Design

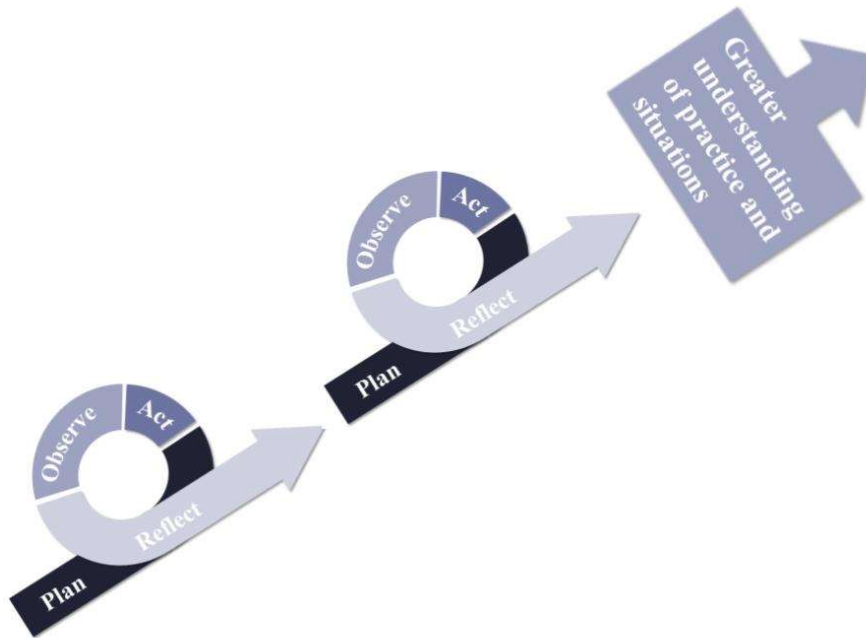
The design of action research is unique because the researcher pursues change and understanding at the same time. As understanding develops, the actions required will also shift slightly. The shift in action will spur new cycles of action and reflection which will lead to new understandings. Kemmis et al. (2014) note that the new cycles of action are referred to as the spirals of action research. The work of Kemmis et al. over time has led them to adjust the idea of the action research spiral to a more fluid definition. Because action research is conducted in context with change and understanding occurring in real-time, the process does not always follow a clear path. Kemmis et al. (2014) suggest that the focus for participants should be on an authentic “evolution of their *practices*, their *understandings* of their practices, and the *situations* in which they practice” (p. 19, emphasis in the original).

The Spiraling and Iterative Nature of Action Research

Action research at its core is collecting information and then actively reflecting on that information (Mertler, 2017). Active reflection then spurs the need to adjust and collect more information to then actively reflect upon. The spiraling nature of action research as envisioned by Kemmis et al. (2014) is depicted in Figure 3.2. The design of action research should be such that researcher and participants are spiraling through self-reflection as their understanding progresses. Figure 3.2 illustrates this idea as upward path toward deeper understanding. The iteration of plan, act, observe, reflect propels the research forward. The cycles for this study were defined by the logic model and provided structure for the researcher and participants.

Figure 3.2

The Spiraling Nature of Action Research



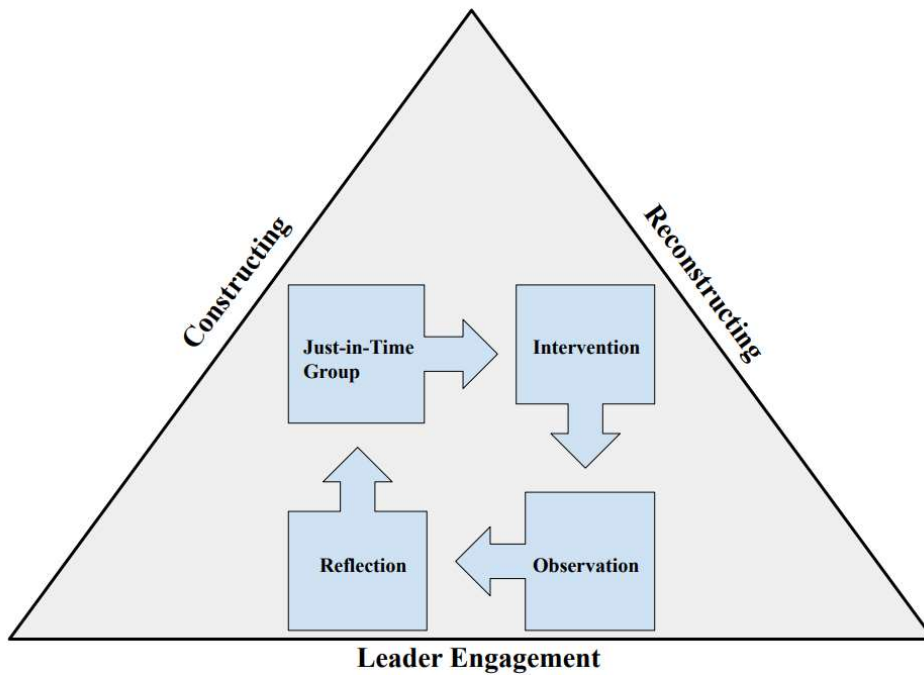
Logic Model

The logic model for this study was built on the theory that support for ECTs must be situated firmly in their experiences so that they can construct meaningful learning that transfers to their practice. Figure 3.3 illustrates the model used for the study. Leader support was necessary to create conditions that allowed for self-directed learning, observation, and reflection within the just-in-time group support structure. This logic model allowed for group support as teachers constructed and reconstructed knowledge around their teaching or classroom practices. Constructivism as described by Piaget (1967), Vygotsky (1978), and Bruner (1966) informed the theoretical framework for the teacher engaged in constructing learning. This framework established that teachers needed to experience the problems of their practice and then reflect on the solutions through collaboration and observational learning. The constructivist ideas dictated

that the logic model for this study should revolve around teacher generated problems, collaboration, observation, and reflection.

Figure 3.3

Logic Model



Theory of Change

Undergirding the logic model is the theory of change premised on the tenets of constructivism. People make sense of their world through experience. Knowledge is gained by building on prior knowledge and experiences (Stringer & Aragón, 2020). The active engagement of teachers examining their own teacher generated problems allows for the new knowledge to shift their perspective to bring about change. Action and reflection that are situated within the teachers' context are conditions that are favorable to create transfer into daily practice. The idea that people have to construct their own knowledge to create lasting change marries well with the nature of job-embedded professional learning. This study capitalized on the characteristics of

job-embedded professional learning such as observation, collaboration, and reflection to create and sustain change for the early career teachers (Zepeda, 2019).

The Case

The context of this study is a single high school. The research was bundled as a case of the experiences of the ECTs as they participated in just-in-time professional learning as needs were identified through reflection on their practice. The description and analysis of this particular situation allowed for deeper understanding of the needs of ECTs and how school leaders can support them through the first years of their career. Case studies provide an in-depth look at a social phenomenon that is bounded by context (Merriam, 2017). A case study allows for an explanation of how and why through the lens of the contextual conditions (Baxter & Jack, 2008). Binding the case keeps the focus narrow and explicitly defines the setting for the study. A variety of data sources are used to piece together a complete picture of the phenomena and the interventions as experienced through the context of the study.

The case for this study was the just-in-time support group for early career teachers (ECTs) at Thomas Point High School. The group was comprised of teachers within their first five years of teaching. The overall aim of the research was to see how a school leader can use the structure of a just-in-time support group to meet the needs of ECTs as they progress through the school year. Observations, field notes, and interviews provided an in-depth look at how the structures and processes facilitated the leader support and how the ECTs perceived the support.

Action Research Design Team

The action research design team was comprised of school personnel that included the researcher, school leaders, and the districts secondary mathematics coordinator. Table 3.1 lists the members of the team and describes their role in the research.

Table 3.1*Action Research Design Team Members*

Team Member	Primary Role at Thomas Pointe High School	Action Research Role
Primary Researcher	Assistant Principal	Leads and conducts all research with the action research design team, for the purpose of data analysis. Brings eight years of previous coaching experience to the team.
Dr. Steven Houghton	Principal of Thomas Pointe High School	Provides context and charge for school-wide leadership team, as well as perspective for action research. Brings 12 previous years of administrative experience, including 6 as a principal.
Mrs. Linda Hutchinson	District Secondary Math Coordinator	Provides expert knowledge in coaching and teacher support, has 40+ years of educational experience.
Mrs. Alisha Sampson	Mathematics Instructional Coach at Thomas Pointe High School	Provides experience from over 7 years of teaching high school mathematics at almost every content level.
Ms. Nadia Gray	Algebra I Team Leader	Provides 4 years of experience on the Thomas Pointe High School Algebra I team.

The primary researcher served as an assistant principal at Thomas Pointe high school and had a vested interest in examining how best to support ECTs. The principal also served on the action research design team to provide a whole-school perspective. Mrs. Hutchinson was a retired instructional coach with over 30 years of experience. She returned to the Thomas Pointe school district as a half-time Secondary Mathematics Coordinator during the 2021-2022 school year. Her vast knowledge base of sound instructional practices was critical in the development of

the interventions. The Algebra I team leader, Ms. Gray, provided the teacher leader perspective to the team as well as the perspective an early career teacher.

The approach of the action research study is that it is participatory and embedded within a school or district. An integral part of the study includes the action research design team. The action research design team was chosen for their leadership and instructional experience. The action research design team supports the development of interventions to address the identified area of challenge embedded in the problem of practice. The team works in tandem with the researcher to develop interventions aimed at finding solutions associated with the problem of practice.

Action Research Implementation Team

The Action Research Implementation team was comprised of the researcher, TPHS mathematics instructional coach, and the ECTs. The ECTs on the implementation team were asked to participate via a letter at the end of the 2020-2021 school year or before the beginning of the 2021-2022 school year. The aims of the research were outlined as well as the potential benefit to the teachers. The ECTs comprised the Just-in-Time Support group and were chosen based on their years of experience and had no more than 5 years of teaching experience.

Research Plan and Timeline

The timeline for the research followed what Glanz (2014) described as reflective action. He suggests that sustained improvement only comes from continuous reflection and action. The timeline in Table 3.2 outlines the cycles of reflection and action that were used in the study. The timing for the interventions, interviews, and the focus group meetings are also indicated. The entire timeline took place in the fall of the 2021-2022 school year and it should be noted that TPHS follows a block schedule so an entire course is taught within one semester.

Table 3.2

Action Research Timeline

Date	Action Research Activity
April 2021	Action Research Design Team Meetings/new teacher end of year survey; (Initial consent to participate in research explained by the researcher);
August 2021	Bi-weekly Action Research Design Team Meeting; Initial meeting of just-in-time support group; Initial individual teacher interviews conducted;
September 2021	Bi-weekly Action Research Design Team Meeting; Action Research Cycle 1 and intervention implemented;
October 2021	Bi-weekly Action Research Design Team; Action Research Cycle 2 and intervention implemented; mid-study interview conducted with ECTs;
November 2021	Bi-weekly Action Research Design Team Meeting; Action Research Cycle 3 and intervention implemented;
December 2021	Bi-weekly Action Research Design Team Meeting; final individual interviews conducted with ECTs; Action Research Design Team Focus Group.

The research plan and timeline are situated in the specific context of the research. The context of Thomas Point High School is unique and influences all areas of this study. It is important that the action research is bounded by the characteristics and attributes of the school and its community of teachers and students. The human element brings the timeline and research plan to life.

Context of the Study

The Thomas Town School District, located 50 miles east of a major southern city, serves 14,000 students in 21 schools. There are 14 elementary school, 4 middle schools, and 3 high schools. Two of the high schools are traditional comprehensive high schools and one provides an alternative educational setting. There are two specialty programs in the district, the Early Learning Center, which serves Pre-K students and the Thomas Community Career Academy which allows high school students to explore various post-secondary options. This very diverse district is 49% Black, 25% Hispanic, and 20% White. The district employs 1,158 teachers and the teaching force does not reflect the districts diversity with approximately 73% of the teacher are White. While 63% of the teachers have advanced degrees, the average years of experience is only 6.5 years.

Thomas Pointe High School is a semi-urban public high school and is one of the two district's comprehensive high schools that serves approximately 1850 students. Enrollment has risen steadily in the last five years when a renovated building was opened. Thomas Pointe is comprised of a unique mix of students, grade 9 through grade 12, who come from varied backgrounds and life experiences. The racial makeup of the school is approximately 43% black; 24% Hispanic; 27% white; and 6% other.

Thomas Pointe is situated right between many of the county's housing complexes that are a part of the local area Housing Authority and the state flagship university that resides in the same town. Its physical location pulls students from some of the poorest areas as well as from the some of the most affluent areas of the city. The district participates in the USDA Community Eligibility Provision, which allows each school to offer free lunch and breakfast to every student in districts residing in low-income areas.

The school district is also considered a Title I school district. Title I is a federal program that provides financial assistance to school and districts with a high percentage of children living in low-income families. The Title I funds are given to the district and then distributed among schools. Thomas Pointe uses the funds to offer additional academic support and opportunities to students who might not otherwise have that access to such programs as well as fund academic support staff such as instructional coaches to help teachers meet the academic needs of all students.

Student Body Characteristics

The diverse student body is a strength of the school. There are a variety of student interests ranging from a Bass Fishing team, a Step Team, a LGBT support club, the Black Culture club to a nationally recognized journalism program. There seems to be something for everyone and if not, students readily start clubs that hold their interest. The variation of students is also found in the classroom with 14% of the population served through special education, 22% of students have been identified as gifted, and 6% of the students are English Language Learners (ELL). The Governor's Office of Student Achievement reports that the 4-year graduation rate is 83.7%. Diversity, while a strength, also comes with disparity.

A closer examination of the graduation rate illustrates the challenges that arise with a diverse population. The graduation rate for the various groups shows a stark contrast. White students have a graduation rate of 93%; Black students graduate at a rate of 83%; while students with a disability have a rate of 73% and ELL students' graduation rate is 54%.

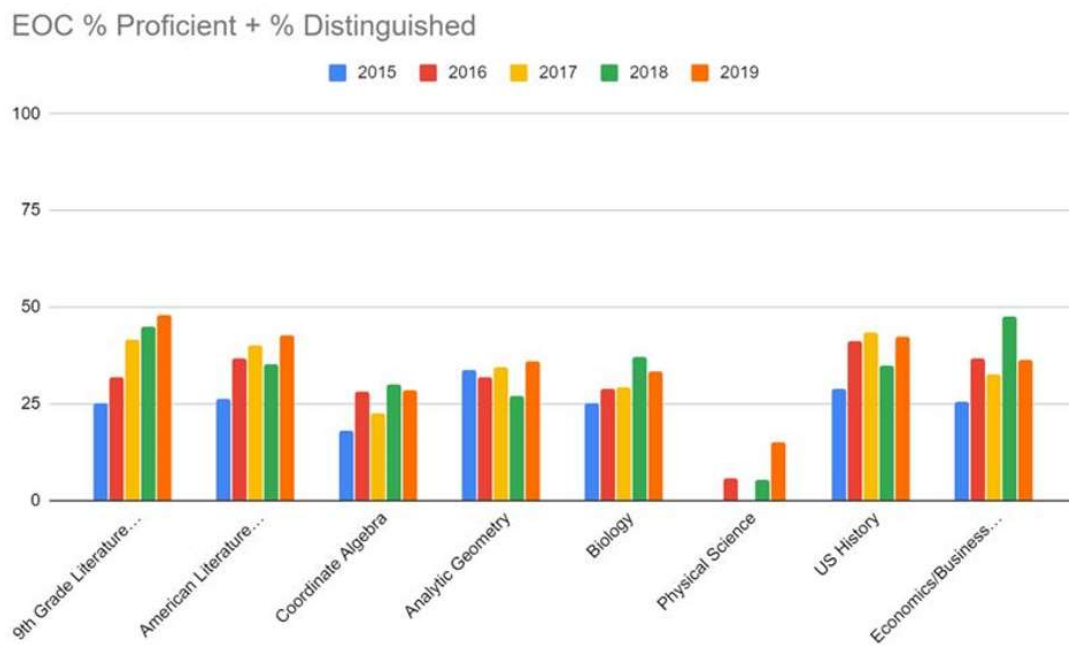
Academic Achievement

Academic achievement has been a point of focus for the school in the landscape of school accountability. The College and Career Ready Performance Index (CCRPI) scores for Thomas

Pointe were 68.6 in 2018 and 71.4 in 2019. The variance in results of the Georgia Milestones End-of-Course (EOC) assessments can be seen in Figure 3.4. English shows the most consistent growth over time. English and social studies tend to outperform science and mathematics courses; however, no test has reached 50% or more of students scoring Proficient and Distinguished combined as illustrated in Figure 3.4.

Figure 3.4

Scores as reported by the Governor’s Office of Student Achievement



Staff Characteristics

The staff at Thomas Point High school is comprised of the administrative team, counselors, instructional coaches, teachers, and other certified support staff. The utilized four instructional coaches. Each one served a major content area like English, mathematics, science or social studies. Additionally, the coaches each were responsible for an elective are like Fine Arts, World Languages, etc. The other certified support staff hold positions such a Family Engagement Specialist, Behavior Specialist, and Special Education Team Leader.

Teaching Staff

There are 112 teachers at Thomas Pointe High School. The make-up of the teaching staff does not mirror that of the student body. The majority of the teachers, at 71%, are White and 22% of the teachers are Black. The staff is 54% female with an average of 12 years of teaching experience. Three quarters of the staff has fewer than 20 years of experience. The staff, on the whole, has pursued advanced degrees and are certified with 71% having a master's degree or higher, and only 7% of the teachers are provisionally certified, signaling that the candidate is in the process of completing the certification process. For the 2020-2021 school year, 18 teachers are new to the building which is approximately 16% of the staff.

Leadership

The school's leadership team consists of a principal, an associate principal of instruction, associate principal of operations, and two assistant principals. Three members of the team are female and two are male. Two members are white and three are black. Three members of the team have been with the school in some capacity for over a decade each, and two of the members are in the first or second year with the school. The leadership team has focused their efforts on the levers of school climate, instructional leadership, and collaborative planning. Supporting teachers through the trials of teaching and learning through COVID-19 has also been on the forefront of the administrative priorities for TPHS.

Impact of COVID-19

March of 2020 forever changed schooling. COVID-19 entered the United States and a global pandemic effectively shut the world down. Students and staff at Thomas Pointe High School unknowingly left on March 4, 2020 for spring break never to return to face to face instruction for the remainder of the school year. Learning was moved to the virtual space and the

2019-2020 school ended with students and teachers trying to cope and to survive the new normal. With two months to go in the school year, teachers reviewed and remediated old content while prioritizing the safety and well-being of students.

The 2020-2021 school year opened virtually as the virus transmission rate continued to soar in the state and in Thomas Town. The start date was pushed back so that teachers could have six additional weeks to plan for virtual instruction as leaders worked diligently to plan for student and teacher needs, academically, physically, and emotionally. Students remained virtual until March of 2021, when they were able to return by choice on a limited basis. Teachers were then asked to teach face-to-face students and virtual students simultaneously. The experiences of teaching and learning were altered many times over the course the year as teachers and students had to adapt to changing situations.

Teaching during a pandemic was difficult for any teacher, but the early career teacher was found themselves in a unique position. They were changing and adjusting a craft as they were still learning and perfecting their practice. The massive adaptations that the ECTs have undergone during the first formative years of their career further bolster their need for school leader support. The experiences of the ECT at this point in time are rich and unique given the context within which they entered their career and they will provide an interesting perspective as a data source.

Data Sources

The change in schooling at Thomas Point High School because of COVID-19 increased the urgency of support for ECTs. The purpose of the study was to examine the perspectives of ECTs as they participate in just-in-time professional learning with support from school

leadership. Varying data sources were used to be able to gain a holistic view of early career teachers and their just-in-time learning.

Participants

The early career teachers at the time of the study at TPHS were in a unique position. Teachers who entered the 2021-2022 school year with two or fewer completed years of experience spent a great deal of their teaching time using a virtual medium. The 2021-2022 school year would serve as the first complete year for these ECTs to have a full classroom of face-to-face students. While virtual teaching is hard in its own right, some normal classroom challenges are mitigated in the virtual environment such as student misbehavior. The ECTs, even those with three or four years of experience, had more exposure to problems of curriculum and instruction than that of problems of classroom management going into the 2021-2022. While these ECTs might not have felt new to the profession in essence their direct exposure to students was minimal and that created interesting support needs for them.

Selection Criteria

Given the nature of the study, selection of participants was purposeful and targeted. The link between criterion and the problem to be studied is important in purposeful selection (Merriam, 2009). The specific nature of the criterion allowed for the most in-depth investigation of the problem. Mathematics teachers with less than five years of experience were invited to participate. The sample size was dependent on the number of teachers that met the criteria and were willing to participate. It should be noted that the teachers in this data selection were unique because of COVID-19.

Teachers who were first year teachers during the 2019-2020 school year did not teach the entire year because of school shutdowns. Teachers who were first year teachers during the 2020-

2021 school year taught in a predominately virtual setting at Thomas Point High School. These two groups have more than one year of experience on paper, but experience with a full classroom of face-to-face students makes leadership support even more important. The ECTs will provide rich data sources given the unique circumstances in which they entered the profession.

Data Collection Methods

A qualitative approach to data collection and analysis was used in this study. Qualitative data are gathered from what people say and what people observe (Merriam, 2009). The method of data collection should be guided by the theoretical framework of the study, the purpose, and the research questions. The data collected should narrate the findings of the study and are obtained from various methods such as observations, interviews, journals, and artifacts (Mertler, 2017). The various methods of data are important to contribute to the robust description that is necessary for a qualitative approach.

Data collection for this study incorporated numerous qualitative methods. These methods included:

1. Individual interviews with the early career teachers at the beginning, middle, and end of the research process;
2. Focus group conducted with the action research design team at the end of the study for the purposes of gaining perspectives about the progress of the early career teachers;
3. Observations of meetings conducted by the Algebra I team and the Thomas Pointe High School mathematics instructional coach;
4. Researcher journal notes based on observations during early career teacher support meetings and observations during the action research design team meetings;

5. Documents, including teaching artifacts, provided additional context about the focus of the study, and these documents were used to corroborate observations and other data.

The researcher analyzed the qualitative data generated from the various data collection methods using a coding scheme, examined these codes to look for overall patterns, and then generated themes based on the patterns. The data was analyzed through the lens of the research questions.

Interviews

Interviews of the ECTs were used to determine the how they describe the impact of the just-in-time professional learning on their practice. Interviews allowed the researcher to directly get the participants' perspective and to dig deeper than what can be observed (Kemmis et al., 2014; Merriam, 2009). Semi-structured interview questions were used to give the participants the freedom to fully articulate their perspective. The interviews were recorded, transcribed and coded for overall themes.

Interview questions were crafted to support gaining a better understanding of the experiences of the ECTs and moreover, centered on the overall research questions. Each round of interviews utilized a slightly different set of questions to gain a deeper understanding of participants' perspectives. As the interviews progressed throughout the study, the participants shared their thoughts more freely. Participants who were hesitant to speak up in the group meetings were much more vocal in the interviews. The researcher used the interviews to probe deeper into the challenges presented by the ECTs in the just-in-time support group and to provide a robust description of the experiences of the ECTs. Table 3.3 illustrates a sampling of interview questions. The full interview protocol can be found in Appendix B for each round of interviews.

Table 3.3

Interview Question Sampling

Research Questions	Interview Questions
Q1: How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?	How do you typically support early career teachers? What do you see as challenges for the ECT? What barriers, if any, are there to support of ECTs?
Q2: How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?	What have been the biggest challenges for you in the classroom? What supports do you feel would help you address those challenges? How do you feel supported by school leaders?
Q3: What are the perspectives of the action design research team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?	How can just-in-time support groups be sustained? What are the advantages of just-in-time support groups? Disadvantages? What are perspectives on how the just-in-time group supported ECTs?

The flexibility of the semi-structured format also allowed the researcher to be responsive to each ECT and their perspective. Glanz (2014) notes that qualitative interviews are best thought of as interactive conversations that reveals participants sense making. Individual interviews were chosen for the early career teachers so that they could be given the privacy to speak freely and to not be influenced by others. The researcher adjusted the questions during

each iteration of the interview based on feedback from the action research design team to best capture the growth and progress of the ECTs. The conversational nature of the interview allowed for deeper probing into the perspectives of the ECTs.

Focus Group

The action research design team participated in a focus group so the researcher could gain their perspective on the impact of the study. A focus group was the chosen method of data collection because the nature of the group. The action research design team was comprised of district, school, and teacher leaders who are accustomed to speaking freely among each other. Individual interviews were not necessary to gather the pertinent information. The focus group structure also allowed the members of the action research design team to elaborate on the opinions of each other which provided a detailed picture of their perspectives. The focus group method allows for the information to be socially constructed and shared which fits with the constructivist nature of the study (Merriam, 2009).

The purpose of the focus group was to obtain the perspectives of the Action Research Design Team on the support of early career teachers. The focus group lasted approximately 45 minutes and was held at the on the last day of the fall semester. A sampling of questions used for the focus group are offered in Table 3.4. The full list of questions is located in Appendix B. The group freely shared about concerns and support for early career teachers and discussed important skills needed for ECTs as well as the skills needed for the leaders who support ECTs. The group brainstormed how the structure of school could change to better serve ECTs. The consensus was that schools should think outside of the box to provide intensive supports to ECTs that allow the teacher to learn and grow as they face the challenges early in their career.

Table 3.4

Focus Group Question Sampling

Area of Interest	Focus Group Questions
Challenges and support of ECTs	What do you see as challenges for ECTs? How do you typically support ECTs?
Implementation of support for ECTs	What barriers, if any, are there to support for ECTs?
Skills to be developed for ECT success	How do you encourage collaboration among peers? How is reflection integrated into the everyday work of teachers?

Observation Notes

The researcher also collected data through observation. The ECTs were observed during the just-in-time group support as well as in the classroom as they implemented the interventions. Each of the four teachers was observed by the researcher upon implementation of each of the three interventions throughout the semester. The observations lasted approximately 20 minutes. The classes were 90 minutes long and the observations occurred at the beginning or midway through the classes. A sampling of observational data is offered in Table 3.5. The data in the table was collected through observations during Action Research Cycle 1. The ECTs were implementing a review lesson that was collaboratively planned to increase student engagement. The researcher focused on the implementation of the lesson during the observation as well as the level of student engagement.

Table 3.5*Observational Sample from Intervention 1*

Teacher	Date and Time	Highlights of Observations
Mr. Taylor	September 16, 2021 8:5 0am	Teacher jumps into activity with students. Students seem eager to try problems and are encouraged by correct answers. Students pop up and run to teacher to get an answer check. Teacher increases engagement by saying “I haven’t seen you in a while” to students who are not actively seeking checks.
Ms. Yates	September 16, 2021 9:17 am	Opposite environment of previous classroom. Students raise hands and teacher goes to them to check the review answers. Moves to a group that is not engaged and encourages them by saying “Why don’t you split up the work? Are you working together?”
Ms. Gray	September 16, 2021 10:29 am	Teacher is prepping students for activity. She offers whiteboards or paper for scratch work. Students ask clarifying questions and then frantically begin working. Most students are actively working and checking. One student complains that they don’t know how to do the problems. The teacher encourages them, “Why don’t you start with one that you are confident about.”
Ms. Johnson	September 16, 2021 10:50 am	Class is quiet and students are politely lined up waiting to get an answer check from teacher. She is giving verbal feedback on incorrect answers. Two students begin arguing over an answer and the teacher reminds them “Mathematical argumentation is good, but make sure to do so politely.” The loud student calms down and is able to convince the other student of the correct answer.

It was important to for the researcher to acknowledge the position of participant and of observer. Careful attention to detail as well as active participation were required of the researcher. Merriam (2009) notes that the participant as observer affects what is being observed,

but that in qualitative research interaction is assumed. Mertler (2017) suggests using a two-column approach to observation so that the researcher can simultaneously record observations as well as preliminary observer comments. The researcher used this method as to highlight emerging patterns and to note areas of interest to be further explored through reflection.

Researcher's Journal

The researcher's reflections and notes were kept in a researcher's journal. The researcher kept notes from meetings with the just-in-time group, meetings with the Action Research Design Team, and also when observing the interventions as they were implemented. The researcher also periodically reflected on the notes and on the progress of the study as a whole. The reflections were used to help the researcher make meaning of the action research and to interpret the rich data that is characteristic of qualitative research (Stringer & Aragón, 2020). The researcher was able to use the journal with some of the Action Research Design Team members to summarize observations and important meetings allowing for even more clarity and analysis of the data.

Reflexive journaling allowed for the researcher to assess and reflect on the action that took place during the study. Such reflection is important for clarity about the context, role of researcher, and findings of the study (Bradbury et al., 2019). The journal allowed the researcher to capture thoughts and ideas related to actions of both the action research design team as well as the ECTs. The journal acted as an annotated timeline for the study. The reflections for one action research cycle led to the beginning of the next action research cycle. Thoughts and ideas that surfaced during data analysis were also kept in the researcher's journal as well as the coding schema and tallies for the analysis.

Table 3.6*Sample Journal Entries for Action Research Cycle 2*

Activity	Date	Journal Entry Sample
Surfacing of ECT Challenge	September 27, 2021	ECTs share that the students are not self-starting. The students seem to engage once they get going, but need the teacher to get them started. ECTs share frustrations that they can't get around to whole class because they get stuck with just a few students.
Planning for Intervention	October 4, 2021	Action Research Design Team meets to discuss challenge. Sampson would like to put focus on what teachers can do instead of what kid won't do. Gray acknowledges that ECTs need some more tools to help them when students don't understand.
	October 11, 2021	Hutchison suggests that the team scripts a lesson to include questions that teachers can use to move students forward in their thinking.
Delivery of Professional Learning	October 18, 2021	Hutchison leads team through the scripting exercise. She guides them to think about the pace of the lesson and to see the lesson in chunks. For each chunk, the teachers scripted questions that will help them start, assess, and advance students.
Observation of Implementation of Intervention	October 22, 2021	Teacher 1 gets off track during first chunk of lesson, does circulate more and has scripted questions in hand, but gets distracted by off task students or doesn't circulate through the whole room. Teacher 2 is also off pace. Does use some questioning but as whole group. Teacher 3 has good one-on-one discussion with a student, but gets stuck there and the rest of the class is off task. Teacher 4 seems more comfortable with material and orchestrates a whole class discussion around a misconception.
Reflection on Implementation	October 25, 2021	ECTs felt that the lesson was really hard for students. They all acknowledged that they quickly got off pace and did not feel that the lesson was very successful. Overall, they liked the process of scripting questions and did find that very helpful even though the lesson itself did not go very smoothly.

Artifacts

Merriam (2009) suggests that documents pair well with interviews and observational data to provide a full picture of the study. Documents were used during the course of the study to convey information. Some documents were created during the planning phase by the action research design team and other documents were created through the just-in-time support group. The documents provide a glimpse of the teacher action that was generated by the study and as well as the thinking and planning that went into the interventions. The documents were analyzed and contributed to the overall findings of the study.

Artifacts were created collaboratively throughout the study by the action research design team and the ECTs. These documents contribute to the story of the overall study and enrich the findings. For example, in Action Research Cycle 3, the Action Research Design Team designed a lesson that combined two lessons from the curriculum that the teachers were using. Ms. Sampson then modeled the lesson for the ECTs and shared her lesson notes with them as a guide for how to think about piecing together two lessons. The ECTs then took her model and incorporated it into their plan for the unit and taught the lesson with her notes as a guide. The artifact itself has both Ms. Sampson's notes as well as the team notes and provides vivid insights into the collaborative process.

Interventions

Interventions, as defined by Glanz (2014), are practices, programs, or procedures that are implemented to “investigate its effect on the behavior or achievement of an individual or group” (p. 64). Kemmis et al. (2014) use the idea of a planned action of change rather than the term intervention. Both interpretations require planning, action, observation, and reflection. The reflection then moves the study toward a new plan of action. This spiral is depicted in Figure 3.2.

Interventions were created to support the ECT’s self-identified real-time needs. Data was collected on the interventions that were developed by the action research design team in order to describe the impact.

The interventions primarily used in this study evolved through the just-in-time support group for ECTs. The literature was clear that support for ECTs must first be tied to the real-time problems in their classroom (Buchanan et al., 2013; Mansfield & Gu, 2019; Scott et al., 2012; Zepeda, 2018). The interventions and associated activities were developed by the Action Research Design Team in response to the problems that arose from the Just-in-Time Group.

Observation and feedback, collaboration with peers, and coaching conversations were all used as to ensure that learning was both job-embedded and occurred in real-time. These just-in-time interventions listed in Table 3.7 were implemented as the needs arose from the group and as a part of the continuous cycle of improvement.

Table 3.7

Interventions for Study

Action Research Cycle	Intervention	Monitoring Strategy
1	Review game developed to increase student engagement	Observation, feedback to teachers, and whole group reflection
2	Group scripts teacher questions for a lesson that will push students forward if they seem to be stuck	Observation, feedback to teachers, and whole group reflection
3	Instructional Coach models a lesson plan and lesson for the team with a focus on pacing and chunking important elements	Observation, feedback to teachers, and whole group reflection

The interventions were selected to correlate to the literature surrounding ECTs and their needs. The literatures suggest that ECTs need ties with peers to discuss instruction, opportunities to watch solid instruction, as well as opportunities for feedback about their own performance (Aarts et al., 2020; Fenwick, 2011; Gallant & Riley, 2014; Mansfield & Gu, 2019; Surette, 2020; Sutcher et al., 2019; Zepeda, 2018).

During and after data collection, the gathered data were analyzed using data analysis methods suitable for a qualitative study. The data analysis led to the development of themes, patterns, and thick descriptions of the case.

Data Analysis Methods

Data analysis starts at the point of collection in qualitative methods and is ongoing (Glanz, 2014). Merriam (2009) notes that collection and analysis are intertwined and describes them as “recursive and dynamic” (p. 169). Likewise, Mertler (2017) suggests that qualitative data should be viewed from a holistic perspective and that collection circumstances such as setting and participants make the data rich and unique.

Coding

The vast amount of qualitative data must be categorized and sorted while looking for themes and patterns. The large quantities of data dictate that analysis should be ongoing and focused by the purpose and questions of the study (Merriam, 2009). Data analysis was broken into three phases as defined by Glanz (2014). The data were organized, analyzed for patterns, and interpreted. The research questions guided the inductive process.

Coding and categorization were used to identify emerging themes and patterns. Mertler (2017) describes this process as one of continuous reflection and also introspection. The reflection allowed for sense making and interpretation and introspection allowed the researcher

to step back and look at the big picture of the data from an open-minded perspective. Both perspectives are needed to gain accurate and meaningful insights. A sampling of codes, the meaning, and data examples are offered in Table 3.8.

Table 3.8

Code Sampling for Data

Code	Meaning	Data Sample
T	Time	“Time is a barrier. I should have observed my peers more, but we have the same planning so there wasn’t time.” –Ms. Gray reflecting on barriers to support in Focus Group
P	Planning	“What can question could you ask at this point in the lesson to help a student who raises their hand to ask for help?” –Ms. Hutchison, notes from lesson template with scripted question prompts for teacher
SE	Student Engagement	Teacher increases engagement by saying “I haven’t seen you in a while” to students who are not actively seeking checks. – observational notes in researcher’s journal
PS	Peer Support	“I had such a great amazing team helping me to know what to do and what lessons should look like.” – Ms. Yates, final interview

Thematic Analysis

Through coding, the researcher can move to a higher level of analysis leading to the development of thematic analysis. In this study, the researcher followed the phases of thematic analysis and procedures to establish validity and reliability in the findings, as illustrated in Table 3.9 (Nowell et al., 2017).

Table 3.9*Phases of Thematic Analysis and Establishing Trustworthiness*

Phases of Thematic Analysis	Means of Establishing Trustworthiness
Phase 1: Familiarizing yourself with your data	<ul style="list-style-type: none"> • Prolong engagement with data • Triangulate different data and collection modes • Document theoretical and reflective thoughts • Document thoughts about potential codes/themes • Store raw data in well-organized archives • Keep records of all data field notes, transcripts, and reflexive journals
Phase 2: Generating initial codes	<ul style="list-style-type: none"> • Researcher triangulation • Reflexive journaling • Use of a coding framework • Audit trail of code generation
Phase 3: Searching for themes	<ul style="list-style-type: none"> • Researcher triangulation • Diagramming to make sense of them connections • Keep detailed notes about development and hierarchies of concepts and themes
Phase 4: Reviewing themes	<ul style="list-style-type: none"> • Researcher triangulation • Test for referential adequacy by returning to raw data
Phase 5: Defining and naming themes	<ul style="list-style-type: none"> • Researcher triangulation • Documentation of theme naming
Phase 6: Producing the report	<ul style="list-style-type: none"> • Describing process of coding and analysis in sufficient details • Thick descriptions of context • Description of the audit trail • Report on reasons for theoretical, methodological, and analytical choices throughout the entire study

Adapted from Nowell et al. (2017).

Because the researcher is the instrument of analysis in qualitative research methods, it is important to use a system for coding and finding themes to reduce researcher bias and to improve the trustworthiness of the study. The process of coding and identifying themes based on Table 3.9 aids in the triangulation of data which will strengthen the reliability and validity of the study.

Reliability, Validity, and Generalizability

The nature of qualitative research demands an evaluation of rigor that is different from quantitative research. The questions of trustworthiness and authenticity are central to the evaluation of rigor (Lincoln & Guba, 1986). Techniques such as prolonged engagement, persistent observation, triangulation, and thick description all aid in the credibility of the findings (Lincoln & Guba, 1986; Merriam, 2009; Mertler, 2017). It is important to be able to trust qualitative research and feel confident in the results (Glanz, 2014; Merriam, 2009). To ensure the trustworthiness of data, rigor should be developed as the study is developed and not just analyzed at the end. Morse et al. (2002) proposed that verification strategies such as methodological coherence, appropriate sampling, and collecting and analyzing data concurrently were all ways to build in methods of reliability and validity. Nowell et al. (2017) offer that deliberate care should be taken with the analysis of data to further strengthen trustworthiness.

The present study was designed with care to allow for reliability and validity through rigorous application of the research methods. Multiple data sources and types as well as appropriate analysis allowed for consistent findings which increased reliability and credibility. Triangulation based on method of collection as well as method of analysis to the research questions is presented in Table 3.10. Triangulation provided a measure of internal validity and credibility (Glanz, 2014). Prolonged exposure with the study and carefully selected research participants further validated the findings by strengthening credibility.

Table 3.10*Connecting Data Collection to the Research Questions*

Research Question	Method of Data Collection	Method of Analysis	Approximate Timeline
Q 1: How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?	Focus Group	Coding/Analysis of Themes	August 2021 December 2021
	Researcher Journal Notes	Researcher Reflection	Ongoing through December 2021
	Participant Observations	Researcher Reflection	Ongoing through December 2021
Q2: How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?	Individual Interview Protocol	Coding/Analysis of Themes	August 2021 December 2021
	Researcher Journal Notes	Researcher Reflection	August 2021 December 2021
Q3: What are the perspectives of the action design research team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?	Focus Groups	Coding/Analysis of Themes	August 2021 December 2021
	Researcher Journal Notes	Researcher Reflection	Ongoing through December 2021
	Document Analysis	Coding/Analysis of Themes	Ongoing through December 2021

While this study is context specific and not generalizable to all contexts, a thick description was provided so that others can determine the transferability. Care was taken to triangulate the data and rigorous analysis methods were used to mitigate researcher bias. The researcher's perspective should also be explored since the researcher is the instrument of analysis and is inextricably linked to the findings of the study (Coghlan & Brannick, 2014).

Researcher's Perspectives

At the time of the present study, the researcher was an assistant principal in a school district that serves mostly minority students. The researcher's background is in mathematics, and she spent 12 years teaching middle and high school math. The researcher then worked for 5 years as mathematics instructional coach and at the time of the study had completed 2 years as an assistant principal. Of particular interest to the researcher was the needs of early career teachers given her experiences as an early career teacher in the same district. Collaboration and reflection were key tools introduced to the researcher by a mentor early on in her career. Those early experiences impacted her practice and led the researcher to seek ways to support ECTs as a school leader.

Limitations

The limitations of the study arose from the nature of qualitative research and also from the context of the study. The researcher served a participant and an observer which increased the amount of researcher bias. The two roles cannot be separated and thus the researcher influenced the findings of the study to a degree. The researcher also held a position of power within the school which limits the findings. To combat this, participation on the part of the ECTs was completely voluntary. The researcher also worked to establish an open forum free from evaluation to make the participants feel comfortable expressing their thoughts and ideas.

Case studies inherently have limitations, but also are ideally suited to study complex social units (Merriam, 2009). The real-life phenomena of ECT support was well suited for an action research case study despite the limitations because the findings illuminate the needs of an ECT as well as offer insight into possible avenues of support.

Chapter Summary

This chapter described the methods of data collection and analysis for this action research study. Action research was the preferred qualitative method because of the iterative focus on action and reflection. School leaders and ECTs worked together to identify problems, enact solutions, and reflect on their practice. Interviews, observational data, focus groups, and researcher reflections were used as data sources. The interviews with the ECTs were predominantly used to capture their perspectives of the just-in-time support group and how they felt school leaders could support them through their journey. The focus group's purpose was to gather the perspectives of the school leaders on how they can support ECTs and also on the process of the just-in-time group. The researcher journal was used to capture the ongoing data analysis throughout the study. All of the data collected were coded and analyzed for themes and patterns as it related to the just-in-time support for the early career teachers.

The next chapter presents the findings of the study at Thomas Point High School. The case study within in the context of the just-in-time support group for early career mathematics teachers is described in detail. The interventions and cycles of action are also detailed.

CHAPTER 4

FINDINGS FROM THE ACTION RESEARCH CASE

The needs of early career teachers (ECTs) are great and the challenges presented to ECTs in light of COVID-19 are even greater. Teacher shortage remains a problem and dictates the urgency of concentrated teacher support (Carver-Thomas et al., 2021). The purpose of this study was to examine the structure and processes of an early-career support group for early career high school mathematics teachers in a large, semi-urban public school as they received just in time professional learning based on their needs as they progressed through the school year. To address the purpose of this action research study, the following research questions guided this inquiry:

1. How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?
2. How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?
3. What are the perspectives of the action research design team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?

Chapter 4 explores the context of the study and the findings from this unique case. The context includes a description of the school as well as an overview of the academic needs, the

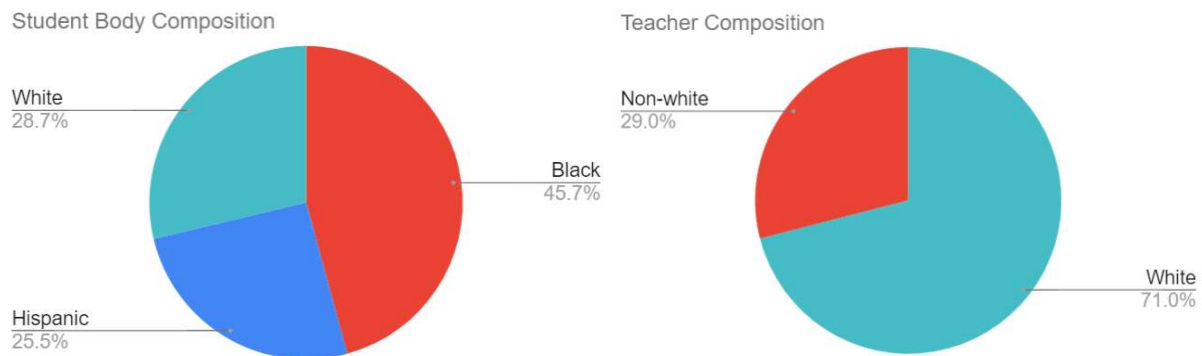
impact of COVID-19 on the school and teachers, and the problem-framing in the context of Thomas Pointe High School, the site of this action research dissertation. The findings from the case are presented in terms of the action research cycles and from the perspective of the action research design team. The findings are punctuated by the voices of the participants to present a complete picture of the case.

Context of the Study

Thomas Pointe High School (TPHS) is a diverse school in a semi-urban southern city. Situated between the campus of a large premiere state University and one of the city’s public housing sites, the physical location is a mirror to the vast and varied population of the school. Thomas Pointe serves approximately 1850 students in grades 9-12. This comprehensive high school is high poverty, high needs high school. The racial make-up of the school is in stark contrast to the racial make-up of the faculty as shown in Figure 4.1. There are approximately 115 teachers and a 45% of the teachers are considered inexperienced by the Governor’s Office of Accountability (2021).

Figure 4.1

Demographic Comparison of Students and Teachers as Reported by Governor’s Office of Student Achievement



The 2021-2022 school welcomed 19 new teachers to the building which matches the trend of 16% turnover every year. The cohort of new teachers was not complete. The school was unable to hire five positions. The positions that were unfilled match the national trend of shortages of teachers in world languages, mathematics, and science. In addition to the unfilled mathematics position at the start of 2021-2022 school, there was a previous unfilled mathematics from the previous school year as well. The ripple effect of not filling all positions has great impact in classrooms. For mathematics specifically, it meant larger class sizes in a content area that already struggles with achievement. The Mathematics Department at Thomas Pointe High School has been plagued with much higher turnover rates than the rest of the school. Only 7 of the 12 mathematics teachers were teaching at Thomas Pointe 3 years ago and only 5 of the teachers were at Thomas Pointe 5 years ago.

Drilling further into the context of the study, the impact of COVID-19 on teachers and students must be examined. School went completely virtual in March of 2020. Thomas Pointe High School started virtual for the 2020-2021 school and remained fully virtual until March of 2021. At that time, teachers and part of the student body returned to school for a reduced day. Approximately 600 students chose to remain virtual which required teachers to execute a hybrid teaching model for the remainder of that school year.

The hybrid model necessitated dual teaching of face-to-face and remote students at the same time. The 2021-2022 school year saw a return to in person learning. Masks were mandated for staff and students, but social distancing measures were not feasible given student body size and physical constraints of the building. The number of cases dictated a pause at the beginning of September 2021, and students returned to virtual learning for a week.

While the physical impact of COVID-19 is more tangible, the social and mental impact could be arguably greater. The 9th and 10th grade cohort of students had never experienced “normal” high school. The students in these grades missed the milestone development that happens in 8th and 9th grade for students. Half of the student body was new to Thomas Pointe High School for the 2021-2022 and with them came an uptick in student misbehavior. Students missed a full year of adult guidance in school where there are constant reminders of how to act and behave in a school setting. There has also been an uptick in mental health referrals for students during the pandemic. Both the increased student misbehavior and students who are in crisis create a different landscape for teaching and learning at Thomas Pointe High School.

Teacher growth was stunted by the pandemic and virtual learning. Teachers who were in their second year of teaching during the 2021-2022 did not experience a robust first year of teaching since most of the school year was virtual. Teachers who were in their third year of teaching had only completed three-fourths of a pre-COVID school year. Just as students missed out on growth, so have early career teachers. In essence, teachers with three or fewer years of experience were operationally all first-year teachers and needed the support of such.

This study was designed to examine how school leaders can support early career teachers with just-in-time professional development based on the teacher’s own self-reported needs. The participants were given the option of joining the study and initial interviews were conducted. The action research was designed as three cycles of interventions and reflections. The interventions were designed based on challenges that surfaced for the ECTs from their classroom experiences.

Participants

The participants of the study were selected based on their years of experience and their teaching content. The Algebra I team of Thomas Pointe High School was comprised of all early

career teachers during the 2021-2022 school year. The four teachers all had less than five years of teaching experience which is outlined in Table 4.1. The Algebra I team met twice a week to plan lessons and assessments collaboratively. This expectation was established by school leaders for all content areas.

Table 4.1

Participant Years of Experience

Name	Years of Experience	Type of certification	Highest Degree
Nadia Gray	4	Regular	BS.Ed
Sarah Johnson	2	Regular, student teaching was truncated due to COVID-19	M.Ed
Michael Taylor	2	Regular, student teacher 20 years prior to second year of teaching	BS.Ed
Latosha Yates	1	Regular, student teacher during a virtual school year	BS.Ed

Ms. Gray served as the team leader and all of her previous experience was accrued as a mathematics teacher at Thomas Pointe High School teaching Algebra I. Ms. Johnson started teaching during the 2020-2021 school year at Thomas Pointe where the majority of the year was spent in virtual learning. When the students were allowed back in person, it was on a reduced day schedule and at reduced capacity because almost 700 students chose to remain virtual. Mr. Taylor and Ms. Yates were both starting their first year at Thomas Pointe. Mr. Taylor had 1 year of teaching experience from over 20 years prior, but he then switched careers. After retiring from a 26-year career in the automotive industry, Mr. Taylor decided he would like to teach again. Ms.

Yates had previously served as a paraprofessional in the Thomas Pointe School District. After completing her Bachelor’s degree and certification, she was starting her teaching career as a high school mathematics teacher at TPHS.

Action Research Design Team

The Action Research Design Team (ARDT) helped guide the study and designed the interventions based on feedback from the participants. The ARDT met with the participants during their collaborative planning and then also just as an ARDT to discuss the research cycles and the interventions. The composition of the team is outlined in the Table 4.2. The primary researcher, Mrs. Sampson, and Ms. Gray served as the core of the ARDT. They met weekly with the team to reflect together on the challenges that the Early Career Teachers (ECTs) presented during the research cycles. The core team shared the data with Mrs. Hutchinson, and they developed interventions with her guidance and input. Dr. Houghton was updated throughout the study.

Table 4.2

Action Research Design Team Members

Team Member	Primary Role at Thomas Pointe High School	Years of Experience
Primary Researcher	Assistant Principal	20 years; 13 years of classroom experience
Dr. Steven Houghton	Principal of Thomas Pointe High School	26 years; 9 years of classroom experience
Mrs. Linda Hutchinson	District Secondary Math Coordinator	41 years; 26 years of classroom experience
Mrs. Alisha Sampson	Mathematics Instructional Coach at Thomas Pointe High School	7 years classroom experience, 1 year as instructional coach
Ms. Nadia Gray	Algebra I Team Leader	4 years classroom experience

Findings from the Case

This action research case study examined how school leaders can support early career teachers with just-in-time professional development based on challenges that arose from classroom practice. The ECTs were given the opportunity to opt into the study and initial interviews were conducted. The ARDT then met with the just-in-time group weekly and as challenges arose interventions were planned and implemented with the ECTs. The ECTs met with the ARDT to debrief and reflect after each implementation. The primary researcher interviewed the ECTs midway through the study and then again at the end of the semester. The ARDT participated in a focus group to wrap up the study.

The data tells the story of the ECTs as they make their way through the unusual first semester of the 2021-2022 school year. Their students were returning to a “normal” school year for the first time since virtual school was implemented as a result of COVID-19. Three of the four ECTs had disrupted teacher preparation and were facing many unknowns at the start of the year. The study uncovered many findings. Time for reflection and refinement, development of teaching skill, increase in confidence, and importance of peer and leader support bubbled to the surface as important to the ECTs as they progress through the semester. The findings of each action research cycle will be detailed in the next sections and will expand on these findings.

Action Research Cycle 1

Action Research Cycle 1 started a few weeks into the school year in late August of 2021. Cycle 1 lasted approximately four weeks and was concluded by mid-September. The ECTs met twice a week to plan for their Algebra I content. The core ARDT team met with them each week to listen and to probe for common classroom challenges. During a team meeting, the ECTs lamented that students could not solve a two-step equation. The core ARDT pushed their

thinking and the team uncovered that the root of the problem was student engagement. Mr. Taylor admitted, “I am not actually sure what the students can and can’t do because they won’t attempt the problem.” Similarly, Ms. Johnson agreed, “Students wait for me to come to them and work the problem or they wait it for me to write the answer on the board.” Ms. Gray suggested a reason for the lack of effort, “I often find that my students are scared to make a mistake or to do it wrong so instead they wait.” Field notes indicate that the ECTs were able to push past the idea that students could not solve a two-step equation to the deeper and more complex problem of disengagement.

The students were not engaging with the mathematics so the teachers were unsure of what students could do mathematically. Alisha Sampson observed the ECTs as they taught an opening lesson to review solving equations. Alisha confirmed that students prefer to wait on the teacher to either present the problem whole class or to come and help the student one on one. The team discussed the observational findings in the next meeting and student engagement continued to be a concern in subsequent meetings.

Intervention for Action Research Cycle 1

The rich discussion surrounding student engagement led to a just-in-time problem. The ECTs were planning for their second unit assessment and reflected that very few of their students participated in the review for the first assessment. The student results for the first assessment were poor. The team hypothesized that students struggled to complete the math on an assessment when they refused to engage in the review for the assessment. Field notes indicate that the ECTs felt their approach to review for the first unit assessment was not student focused. The team requested help to design a review that would get students participating in mathematics in preparation for their upcoming assessment.

The ARDT met to research student engagement and develop some ideas for the review that would engage students. The ECTs and the ARDT met and discussed engagement options. Through the discussion, the ARDT members shared Hammond's (2015) framework for culturally responsive teaching with a focus on building intellectual capacity. The team selected a review game that would require the students to actively solve problems to win. The team planned the game collaboratively, selected the questions based on the standards and the upcoming assessment, and set a date for the review.

The primary researcher visited the classrooms while the game was being played to observe and take notes. Observational notes indicate that the game implementation differed in each classroom, but overall student engagement was up. For example, Mr. Taylor's class was the liveliest of all of the classrooms. Both the teacher and students seemed to enjoy the novelty of the game. Students raced to the front to check their answers and one student exclaimed, "Look at me being smart!" when she got the check of approval.

Ms. Yates class took a different approach. She had students work at their seats, and she went over to them to check answers. Ms. Johnson students lined up in an orderly fashion to get their answers checked and the teacher took the opportunity to provide verbal feedback on errors that she noticed in student work. Ms. Gray, the teacher with the most experience out of the ECT group, operated the game with controlled chaos. There was a lot of activity, but she was actively monitoring who was and was not participating. Ms. Gray also took the opportunity to coach her students on how to approach hard tasks. When the students complained that the problems are hard, the teacher suggested "pick one you are confident about first to get you started." The teacher encouragement seemed to motivate students to at least try a problem that they thought they could work.

The team came together to debrief about the activity and the level of engagement of the students. The teacher response to the game was overall positive. All of the ECTs felt that it was hard to manage from the teacher perspective. Ms. Yates reflected that the second time playing the game with a later period went smoother than with her first class of the day. She noted that she would be open to playing it again. Mr. Taylor also course corrected as he taught the lesson throughout the day and he noted that he required a certain number of blocks to be complete to increase participation in his later classes. Field notes indicate that while the introduction of the game arose from a student engagement problem, the teachers were all very reflective of how their moves impacted the implementation of the game and its success.

Initial Interviews

Initial interviews were conducted with the ECTs during the first cycle. The interview process gave further insight into the ECTs struggles in the classroom, what supports they need and want, and provided insight into the impact of the just-in-time group. The one-on-one interview time also provided space for each teacher's personal story which is often overshadowed in the whole group meetings. The dynamic of the group was interesting because everyone was still considered an ECT, but the team as a whole often deferred to Ms. Gray who as the leader had the most experience. The ECTs opened up more about their struggles and needs during the interview time.

The initial interview was conducted in late August 2021 and provided a snapshot of the start of the ECT's journey throughout a school year. Mr. Taylor was the most succinct. He realized that he needed time and space to figure out teaching. He felt most supported by colleagues and recognized that observation and feedback were key components to his growth. Like Mr. Taylor, Ms. Yates, really valued observation and feedback, "I love feedback because I

am always trying to better myself.” She was eager to learn and grow and recognized the need to build her confidence as a teacher. Ms. Yates also touched on the emotional side of being a first-year teacher and how lonely it can be, “It’s a lot being a first-year teacher and I really don’t know what I need to do.” She credits her teammates with helping her learn what to do and in building her confidence.

Time and confidence were also important to the other ECTs. Ms. Johnson, who was in her second year of teaching, also acknowledged time as an important factor. She felt that there was not enough time to reflect given all of the other duties that a teacher had. In light of that lack of time, she recognized that her team was important to help her see classroom struggles in a new light. Ms. Johnson highlighted the importance of school leaders making room for early career teachers to ask questions and challenge the status quo. She saw this as crucial for growth, “You can’t grow if you don’t have a safe space to do so.” Similarly, Ms. Gray noted that school leaders can really boost the confidence of an ECT by being supportive and always providing an open door.

Action Research Cycle 2

The ECTs continued to lament the lack of student engagement in team meetings. In late September 2021, the second action research cycle was started. It lasted about five weeks and was completed by the end of October. The ECTs articulated that students would not self-start on the lesson or problems for the day. The students would still sit and wait for the teacher to work the problems instead of trying anything on their own. The ECTs acknowledged that this problem was similar to the first action research cycle. While they did see some improvement in working problems once they started, they felt that students actually getting started on their own was the bigger problem for this cycle.

Intervention for Action Research Cycle 2

The ARDT met to dive further into the problem and determine professional learning that could help address the identified need. Field notes indicate that the team discussed how the challenges seemed to be student focused versus focused on what the teacher could control. Ms. Gray suggested that the disruption to teacher preparation because of COVID-19 could be a factor. She shared that she learned a lot about her teaching practices and how it impacted student learning from completing the portfolio for student teaching that included videos of teaching and reflections.

The other ECTs were not able to fully benefit from the reflective exercise of watching a videotaped lesson because of the impact of COVID-19 on their student teaching. Teaching a lesson virtually does not present the same challenges as teaching a lesson in the classroom. The ARDT decided to push the focus back on teacher moves that could ignite student engagement. The team decided to script a lesson with the ECTs where teacher moves/questions are written in to help students engage with the math if they feel stuck.

Mrs. Hutchinson led the professional learning with the ECTs. She stopped them at crucial points of the lesson, and together, they scripted questions aimed to push students to think the mathematics without depending on the teacher for all of the answers. She continually pushed the teachers to refer to the standards to help them understand the key takeaways that students should have. For example, the lesson document that was used for planning indicate that Mrs. Hutchinson stressed that students needed to understand the parts of the exponential model used for compounding interest. She made sure that teachers were clear about the definition of the individual elements of the whole expression. The ECTs actively participated and thought deeply about their role in student learning. As the session progressed, it became clear that the ECTs had

to first understand mathematics and the purpose of the lesson to develop questions that would push student learning forward.

Mrs. Hutchinson was able to model the role of questioning for the teachers throughout the professional learning as she guided the ECTs through the complicated lesson. The impact of the professional learning was felt immediately. Mr. Taylor emailed the next day to share appreciation for the “useful training and feedback” from the professional learning. Ms. Yates was appreciative of the time spent looking deeply into the lesson, “I definitely love those types of planning meetings where we talk about how to teach the lesson. It increases my confidence.” Field notes indicate that Ms. Johnson looked forward to using the process again. She stated, “I would like to do this in the spring when we revise our lessons from the fall.” Mr. Taylor expressed gratitude for the “thoughtful look at the lesson and especially the scripted components were very helpful.”

The researcher and the instructional coach observed the lessons as they were taught. The ECTs seemed to use the questions at the beginning of the lesson, but student questions and off task student behaviors derailed the lesson quickly in most classes. For example, observation notes indicate that both Mr. Taylor and Ms. Yates got stuck answering questions from one or two vocal groups while the rest of the class quickly got off task. The team debriefed and reflected about student learning and the implementation of the lesson. The ECTs did not feel that the implementation of the lesson was successful, but they still praised the professional learning that supported them to look “deeply” at the lesson. Mr. Taylor stated, “Even though the lesson wasn’t great, I was able to take the cues and questions we discussed and applied them to the next day’s lesson.” They all felt that the process of lesson planning was beneficial and they would like to

continue that practice in the future. Ms. Yates summed it up nicely, “I feel like the more that we do this then the more I will get out it.”

Mid-Study Interviews

The second round of interviews came at the end of the second action research cycle. Field notes indicate that the team was starting to struggle collectively with the daily grind of teaching and the interview records support this. Time, or lack of time, was mentioned by each of the ECTs. The pace of the semester was fast and it left little time for reflection or refinement. Both Ms. Johnson and Ms. Yates mentioned that they would like time for in-depth planning for the lessons like they experienced in Action Research Cycle 2, but the pace of the class did not allow for that. Ms. Yates lamented, “I don’t have time to look at the lesson that we just taught because have to move on to the next one.” Ms. Gray felt the urgency to dive into the meat of the lessons for the whole team, but acknowledged “there’s just not time, we’re going so fast.” An entry in the researcher’s journal also noted this:

There are two things at play, on one level there is a big macro challenge for the teachers (engagement and creating independent learners). At the micro level though there are the day-to-day needs of the teachers that moves at breakneck speed. They have to have lessons and activities designed and ready to go very quickly, so we have to move fast to keep up with that pace.

Support for teachers requires time, and the data illustrated that time was in short supply for everyone.

A new challenge was brought to light during this second round of interviews. Ms. Johnson, Mr. Taylor, and Ms. Yates all mentioned classroom management as a new hurdle at this point in the year. The consensus from the ECTs was that they all loosened up too soon and the

students were taking advantage of that. Reflecting on what could be different, they each mentioned that they would remain strict for longer. Interestingly, Ms. Gray did not see classroom management as an issue; she saw a mid-semester calming of her students which speaks to her experience as a four-year veteran. She explained that she knew if she stayed consistent with her rules and management that the students would eventually respond. The other teachers were all able to reflect on the wisdom of her system and the desire to implement it during their next semester.

Teaching practices were also a common thread throughout the interviews. Ms. Yates questioned, “Do my students understand what I am giving them?” She seemed to really like the time that the team spent discussing how to teach certain math concepts. Ms. Gray recognized that the team was feeling more comfortable in seeking support. She stated, “I think that the members of our team feel more comfortable with our leaders and are not scared to ask for help like if they are unsure of how to approach a lesson.” Ms. Johnson liked that people were more willing to share because it allowed her to “reflect on what I am doing by seeing it from a different angle.” Mr. Taylor liked to get advice from peers and school leaders about how to present information because it helped him “understand how they [students] think a little better.”

The instructional concerns were evident for every ECT, but so was the feeling of support from their just-in-time team. Each ECT referred to their teammates as very supportive and key components for their growth at that particular point in the school year. Ms. Gray felt the need to “understand each team member and satisfy their unique needs during planning.” Ms. Yates liked “getting the knowledge and advice from the people I am working with now.” Mr. Taylor expressed gratitude for the team’s organization, “The thing I like about them is they are exactly what I am not and I like to get feedback from them about the structure of teaching.” Ms. Johnson

enjoyed hearing the various teaching perspectives of the team, “It helps me reflect on what I do in my own classroom.”

Action Research Cycle 3

November 2021 brought Action Research Cycle 3 as well as the closing out of the first semester. As the end of the semester approached and the state mandated end of course assessment, the ECTs surfaced a new challenge. Time for lessons was running out, and the team had to decide how to best implement the adopted curriculum while simultaneously focus on state standards in preparation for the standardized test. The ECTs were struggling with which parts of the lessons to keep or cut and how to create a flow that keeps the standards and learning targets at the forefront. The ARDT met and discussed appropriate professional learning for this challenge. The ECT team leader, Ms. Gray, suggested that a model lesson would help her team. She wanted them to see a streamlined lesson in action to help them visualize how to focus on the important components of the lesson.

Intervention for Action Research Cycle 3

The ARDT planned an upcoming lesson that needed to be edited to better address the mathematics standards for the course. The team created the lesson as well as a script to continue the learning from the previous cycle. The time planning with the ARDT also served as professional learning for Ms. Gray. She was able to work closely with school mathematics leaders and she was able to discuss her challenges as the team leader of such a brand-new team. Ms. Gray felt a heavy reliance on her during planning meetings and sought feedback on how to better engage her team. The more experienced ARDT members gave Ms. Gray some suggestions for how to draw her team mates into active participation, and she would observe for that in the next planning session. Her insight as an ECT was also invaluable, and she suggested many

modifications to the lesson that would help the other ECTs keep the standards and purpose of the lesson at the forefront of their efforts.

Mrs. Sampson then modeled the lesson for the team during the next collaborative planning meeting. The ECTs engaged and asked clarifying questions about both the lesson structure/delivery as well as the content. Then the team was able to collaboratively plan the next lesson using the same structure and model that Mrs. Sampson demonstrated. The field notes indicate that the participation and discussion was more equally distributed during this planning session versus the team relying solely on the team leader. Ms. Gray was pleased with the session and everyone's participation at the end when the ARDT debriefed about the professional learning.

The researcher and instructional coach observed the delivery of the lesson later that week. The lesson implementation was similar to the implementation that occurred during Action Research Cycle 2. The lesson focused on factoring quadratics when the constant term was negative. Factoring was a new skill for the students and it was a difficult one. Again, the lesson delivery veered from the plan rather quickly. The researcher and instructional coach did note that they heard and saw questions and phrasing from the lesson planning session even though the implementation did not match the plan exactly. Field notes indicate that Ms. Johnson did circulate and ask questions of students to push them forward independently. The researcher questioned her about this at the end of the lesson, and Ms. Johnson stated that the presence of the researcher helped her remember to ask those types of questions.

The ECTs and ARDT came back together to debrief and to reflect on the cycle as a whole. The ECTs again expressed that the lesson planning was helpful even though the lesson implementation was not as successful. Ms. Yates stated, "Talking it through in planning helped

me think about what to say in the actual lesson;” although, she did find that looking back at her lesson was cumbersome while teaching the lesson. She reflected that it would have helped if she had memorized it. Mr. Taylor was able to reflect that there was too much teacher talking during the implementation of the lesson and that students did not get the chance to practice with the mathematics on their own long enough to become proficient.

Final Interviews

The final interviews for the ECTs came at the very end of the semester. Each teacher expressed relief at making it to the end of the first semester given the challenges that they had experienced. All of the teachers were able to discuss the impact of the support in a positive light. Mr. Taylor wisely noted that early career teachers come in with a limited capacity. He shared that it “would have been good if I had been ready for more support earlier” when discussing the support that he received throughout the semester. Ms. Johnson acknowledged that accessibility of school leaders was integral to her feeling supported. Both Ms. Johnson and Ms. Yates noted that the modeling of a lesson and the in-depth planning were very beneficial and had great impact on their practices.

The team structure of the just-in-time group was highlighted by all of the ECTs. While they all indicated that leader support was important, their most talked about support was from each other. Ms. Gray noted that the accessibility of the team was key. While she appreciated the leader support, she acknowledged “that there is nothing like a teacher next door to offer support.” Ms. Yates mentioned that she knew that she had grown throughout the semester because she did not have to reach out to her peers as much. More than one ECT was thankful that their leader, Ms. Gray, was an ECT herself because they felt that she really could understand their plight as new teachers. Mr. Taylor summed it up, “So I think that it being part of a team

made it less of a burden, at least emotionally, than being on my own and allowed me to compare how my kids did to the rest of the classes.”

The interventions employed during the study were all received positively by the participants. Ms. Johnson stated, “I like when we broke down how we should teach this section, but left it open enough for each of us to still be ourselves because we each teach differently.” Ms. Yates concurred, “The meetings where it was more broken down were the best meetings for me so that I could see what the lesson should actually look like.” Mr. Taylor really enjoyed the scripted questions, “Having those ready, the prompting questions, was great because it helped me in the moment with students.”

The shared challenges and the interventions were the backdrop for the collaborative conversations that were described as high value during the final interview. Each ECT described how important their peers were in their own development as a teacher. The just-in-time team structure allowed space for conversations about common challenges. These conversations gave the ECTs a glimpse into the other classrooms allowing them to compare and contrast their own practice. The honesty and trust created in the team were vital conditions for conversations that stimulated growth.

Action Research Design Team

The Action Research Design Team (ARDT) was integral to this study. The ARDT met to debrief after each meeting with the ECTs. The ARDT listened as challenges were presented from those meetings and sought professional learning solutions to aid in the just-in-time issues that teachers surfaced. The ARDT planned the interventions and participated in the delivery of those interventions. The team made sure that the study moved forward and that the ECTs were offered the support that they needed throughout the semester.

Individual Roles

A key component to the ARDT was the inclusion of Ms. Gray who as the team leader also served as an ECT with just four years of experience. She served as the role model for her team mates and also gave the ARDT insight into the needs of the ECTs. Her interview transcripts provide evidence that she alternated between her own ECT struggles and the struggles of being a leader for a team full of early career teachers. Ms. Gray was able to exercise her leader voice while recognizing that she still had room for growth as a teacher. Her interpretations of the challenges presented by the ECTs and her perspective of the interventions were invaluable to team.

Mrs. Sampson served as the mathematics instructional coach for Thomas Pointe High School. She walked step-by-step with the researcher throughout the process as the school-based support for the mathematics ECTs. Mrs. Sampson was critically important in the just-in-time meetings to hear the challenges that the ECTs voiced. She then would immediately debrief with the researcher to develop a plan of action for the intervention. Field notes indicate that the ECTs often expressed gratitude for her support in team meetings and actively sought feedback and advice from Mrs. Sampson. She participated in observations of the teachers and was able to share with the ECTs a whole group perspective about the challenges and effectiveness of interventions.

Mrs. Sampson's accessibility to the team and to the researcher meant that she was able to analyze data and give feedback as the study progressed. She was vital in the shifting and sorting of data throughout the process in real-time. Mrs. Sampson's perspective as a teacher was also valued and provided another lens through which to view the challenges presented and the interventions that were designed. The researcher used Mrs. Sampson's perspectives to make

sense of the data almost immediately after being collected. The researcher and mathematics instructional coach had the most direct contact with the ECTs and the collaboration between the two school leaders was a key component to the interventions and support provided to the ECTs.

The vast experience and expertise of Mrs. Hutchison was critical to the ARDT. With over 40 years of experience in mathematics education and leadership, her sage advice and wisdom anchored the ARDT. Mrs. Hutchison, as a district-level support person, was not in the school every day, but she provided a sounding board for the team. She was often used in a consultative role to help the ARDT make sense of the data and the challenges that the ECTs were presenting. She also offered suggestions of resources and interventions that would provide support for the ECTs based on her own extensive work with mathematics teachers in the district. For instance, during Action Research Cycle 1, the ECTs challenge was first presented as skill problem.

The consensus of the ECTs was that the students could not solve a two-step equation. In a debrief conversation with Mrs. Hutchison, she suggested that the ARDT push deeper on that idea. To drive deeper, Mrs. Sampson observed the ECTs and students in the next lesson and shared the notes from those observations in the next team meeting. That deeper conversation led the ECTs to develop the idea that the lack of skill is the surface to a deeper problem of not engaging in the mathematics. The theme of lack engagement then was carried throughout all of the Action Research Cycles.

Mrs. Hutchison's expertise was also shared directly with the ECTs. She delivered the professional learning for intervention in Action Research Cycle 2. She modeled the process that the ECTs need to undertake when thinking about teaching a lesson. The process of scripting questions to drive student thinking during a lesson forces the ECT to reflect on student behaviors and student knowledge while thinking about a lesson instead of solely focusing on teacher

actions and behaviors. Reflection on students is a key skill that teachers need to develop and Mrs. Hutchison deftly modeled that for the teachers and laid the groundwork for a lesson planning model that can be used with future lessons. Mrs. Hutchison's experience in designing and creating professional learning for mathematics teachers was invaluable to the study. She served as a model for the ECTs, but she also served as a model of an instructional leader for the members of the ARDT as well.

Dr. Houghton, as principal of the school, debriefed with the researcher periodically throughout the study. His role was to push the idea of how school leaders could support ECTs to the school level. Dr. Houghton and the researcher engaged in dialogue around the needs of ECTs throughout the school and what supports were in place at Thomas Pointe High School. He provided a supportive environment for the research to be conducted and encouraged active support of the mathematics ECTs.

Focus Group

The ARDT participated in a focus group at the end of the study. The goal was to reflect on the semester of learning driven by ECT needs, address the implementation challenges and successes, and discuss implications for future work and roles of other school leaders in this type of work. The group met often throughout the study to devise the professional learning and supports needed for the ECTs and the focus group was an opportunity to reflect on the process and the results. The interview protocol for the focus group is in Appendix B.

The ARDT acknowledged the importance of supporting ECTs and that it should be an individualized approach. Mrs. Hutchison suggested a "tiered model of supports based on individual needs." Mrs. Sampson agreed that support is most useful if the need originates from the ECT. Given Ms. Gray's unique position as an ECT herself, she suggested that the leaders

who support ECTs actually need support for themselves. In a school with high turnover, a teacher with four years of experience is considered a veteran on a team with other ECTs. Ms. Gray instinctively modeled the support she received by “making sure they knew I was available and that all questions were welcome.” Her team responded by actively seeking her support throughout the semester. Mrs. Hutchison noted that not all teachers have that leader instinct and would need to support to prepare them to help ECTs.

The ARDT discussed barriers to implementation. They identified time and proximity as two significant barriers. Strong support takes time. Time for observation, feedback, reflection, and time to try again. They noted that it was important to create space and time for classroom observations and reflection. Observations allowed ECTs to see and learn from others, to gain new ideas, and to see that their challenges are also felt by their peers.

Reflection was an important act to refine teaching and that time for reflecting had to be purposeful because it was not a skill that ECTs engaged in naturally. Ms. Gray said it best, “when you are just trying to survive, you are literally just moving to the next day.” She noted that she had to be shown how to reflect by her mentor teacher because during that first year just getting to the end of the day was the goal. Time for the ECTs to slow down and think about their practices was a vital skill that leaders needed to help them “do that.”

The team also noted that the job of a school leader is vast and often unpredictable which can take them away from providing sustained support outside of the preplanned meetings. The lack of proximity of a school leader to the ECT can be a barrier, but Ms. Sampson noted that the teacher leader can help fill that proximity gap which makes them crucial to the support of ECTs. She suggested that having time built into the teacher leader’s day to support ECTs would be beneficial for all.

The team praised the structure of the just-in-time support group for creating spaces for collaborative conversations. They noted that intentionally focusing on common challenges and trying to solve them together as a team kept the conversations focused on instructional practices and moving forward. Ms. Gray suggested that part of what made the team work in this study was that they were all ECTs and were willing to try new things. Mrs. Hutchison echoed this and said that she found new teams often were more open and flexible. Mrs. Sampson felt that that each team member and their contributions were valued and that this type of spirit fostered collaboration. Having an intentional focus on instruction was a necessary component to the growth of the ECTs.

Overall, the ARDT felt that relationships, time, and focused structures are important to support ECTs. Ms. Gray acknowledged that the ECTs overall felt very supported, but that they did not always know what they needed to get better. Mrs. Hutchison echoed this idea that ECTs needed guidance. Mrs. Hutchison shared, “They have to be led in that direction. They need someone who is going to push them to actually move away from talking about the students to talking about what we did with the students.” Furthermore, Mrs. Hutchison suggested a model for schools to consider. She suggested a model where an ECT is paired with a veteran teacher for at least one class. That pairing would create time for feedback and observation, time for modeling, and time for focused reflection for the early career teacher.

Chapter Summary

The study sought to address the needs of ECTs as they progressed throughout a semester of teaching. The just-in-time support group met weekly to plan for common lessons and assessments and during these meetings, the researcher and design team were able to pinpoint challenges that the ECTs were facing in the classroom. Each of the three research cycles were

based on a challenge surfaced by the ECTs. The interventions were designed by the ARDT to address these specific challenges.

The findings reported in this chapter were gleaned from several sources of data that included observations of lessons tied to the interventions, interviews with the ECTs, and focus group meetings with the ARDT. Field notes and notations from the researcher's journal helped to corroborate other forms of data. Following the action research model, each cycle ended with a whole group debrief and reflection. The data painted a picture of early career mathematics teachers with just-in-time learning.

The data were analyzed and coded. The findings reported in this chapter led to the development of emerging themes. The thematic findings are addressed in the next chapter as they relate to the purpose of the study, the research questions, the logic model, and the theoretical framework.

CHAPTER 5

ANALYSIS OF FINDINGS FROM THE ACTION RESEARCH CASE

The purpose of this study was to examine the structure and processes of an early-career support group for early career high school mathematics teachers in a large, semi-urban public school as they received just in time professional learning based on their needs as they progressed through the school year. To address the purpose of this action research study, the following research questions guided this inquiry:

1. How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?
2. How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?
3. What are the perspectives of the action research design team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?

This chapter presents the themes that emerged from data collection and subsequent findings throughout the action research cycles. The themes and analysis relate to the purpose of the study, the research questions, the logic model, and the theoretical framework.

The action research cycles that followed the interventions and the data collected were described in detail in Chapter 4. Data collection took place during the fall semester of 2021-2022

school year at Thomas Pointe High School. The action research study involved school leaders who supported a group of early career mathematics teachers with just-in-time learning based on teacher generated challenges. Three action research cycles were completed, and data were gathered through observational notes, interviews, focus groups, artifacts, and the researcher's journal.

The theoretical framework of the study was based on constructivist theory. Constructivism as a theoretical framework for this action research situated the early career teacher (ECT) as a learner who was actively seeking to make sense of their new profession. This theory led to the development of a logic model that guided the study. The just-in-time support group provided interventions via job-embedded professional learning for the ECTs paired with observation and reflection to complete the cycle. The ECT constructed and reconstructed knowledge based on practice and refinement of practice as guided by active leader engagement through the action research cycles.

The findings were identified in Chapter 4 for each action research cycle. Analysis of the findings was derived through systematic coding of the data collected. The coding was tallied and analyzed through an overall lens and then also by research question. Themes in the data emerged related to each research question. A summary of the emergent themes connected to the research questions is illustrated in Table 5.1.

Table 5.1

Summary of Themes Connected to Research Questions

Research Questions	Themes
1. How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?	Theme 1: Reflective Conversations Matter
2. How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?	Theme 2: Time and Proximity Are Key Theme 3: Connection Supports Learning
3. What are the perspectives of the action design research team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?	Theme 4: Is Just-in-Time Enough?

Given that the experiences of the early career teacher are about self-learning just as much as they are about teaching students, it is no surprise that the emergent themes reflect characteristics of the construction of knowledge. The themes also align to Vygotsky’s Zone of Proximal Development where collaboration and social learning increase sense-making for an individual. The next section of this chapter includes an analysis of each thematic finding aligned to the research questions that guided the study.

Research Question 1

The first research question articulated further the purpose of the study. How can school leaders support early career mathematics teachers based on teacher articulated challenges? The data show that ECTs needed various supports such as observations, feedback, modeling of lessons, and collaboration. The heart of all of these supports was not the support itself, but rather the reflective conversations.

Reflective Conversations Matter

The ECTs were asked directly via interview questions what supports they needed and their answers all were rooted in reflective conversations. Ms. Johnson noted, "...the conversations we have in our professional learning where we're like this is what I'm seeing from my students and someone shares this is what I'm trying helps me feel better." She valued the conversation about practice and welcomed the viewpoints of others on her team. Mr. Taylor asked repeatedly for "brutally honest feedback." He even noted that he wondered if "was getting the feedback that I deserve because maybe people are being too nice." He showed that he was ready for deep reflection on his practice. Ms. Yates wanted more support on "what a lesson looks like." She wanted to go deeper than just what should be taught. She was ready for the how and the why. Ms. Gray wanted "time to reflect with a veteran teacher to really understand how best to teach the math to kids." She understood the importance of learning from peers.

The ECTs were also asked what they thought of the interventions of the study. Ms. Yates specifically praised the modeling intervention because it helped her "see" what a lesson should look like. Mr. Taylor was appreciative of the looking at a lesson through a questioning lens because it helped him a build a skill that he could use in future lessons. Ms. Johnson felt the observations helped by "giving her that one step that I could take further" through the feedback.

She noted that it was “hard to self-reflect in the moment” and valued what the observer noted. Ms. Gray enjoyed the contributions of the leaders to the team meetings because “there is someone there who has done it before and can walk me through it.”

All of the supports that the ECTs asked for and acknowledged were useful are rooted in targeted, specific, reflective conversations. The support in and of itself was not as important as the growth from the conversation. The findings in Chapter 4 note that not every intervention led to a successful classroom implementation, but that each teacher still valued the reflective conversation around the intervention. The refinement of practice came from small steps of reflection that were embedded throughout the action research cycle.

The logic model was built on the idea that the teachers would construct and reconstruct knowledge of their practices and that was achieved through critical examination of practices. The school leaders actively sought to help the ECTs “slow down” and to reflect more intently on what they were learning and how what was being learned impacted their practices. The ECTs had to learn how to reflect.

Reflection was not instinctual for the participants. Direct questions about reflection made this clear. Ms. Yates admitted in one interview that she “hadn’t really thought about reflection since the last time I was asked about it.” Mr. Taylor asked for clarification about a question on how reflection on his practice has changed throughout the semester. It was clear that reflection was skill that needed to be built as part of the support for ECTs. Ms. Gray valued the skill of reflection that she learned from her mentor teacher. Similarly, Ms. Johnson acknowledged that her reflection had “gotten a little more in depth because we’ve been having more conversations about what we’re doing in the classroom.”

The overall theme for Research Question 1 was that any support given to ECTs needed to have a reflexive component to activate the ECTs personal sense making and learning. Professional learning around a teaching skill or content matter needed a structure that would push the ECTs to think more deeply about their practices.

Research Question 2

Can support be considered support if it is not received? That is the central idea to Research Question 2. How do ECTs describe the impact of the just-in-time professional learning? The data collected from the ECTs were clear around impact. While they described feeling appreciative and positive about the supports they were given they each lamented the lack of time to really dive deep into their practices. The data also indicate that praise for collegial support was high. These two indicators led the researcher to deduce that time and proximity are important components of ECT support.

While time and proximity are important, the data also revealed a related emotional impact on the ECTs. Their connection to each other helped propel their learning forward even during challenging times. The emotional connection of the just-in-time group emerged as another important theme for Research Question 2.

Time and Proximity are Key

The ECTs in general were positive and appreciative of the supports received during the action research cycle. Given that the researcher also served as assistant principal of the school, their responses were not surprising. It is natural that the ECTs would speak positively about supports from an administrator to that administrator. Their comments, though, reveal two key takeaways around the impact of support. Time is critical and proximity is crucial.

As the semester progressed, time, or the lack thereof, began to show up in the interviews. The lack of time hindered the growth process for the ECTs. Ms. Johnson noted, “I wish I had better time management...then I would have more time to look at questions and prepare the way that I want to be prepared.” In the same vein, Ms. Yates stated, “I don't have time to even go back and look at the lesson we just taught. You have to move on to the next one.” There was little time to reflect and improve practice. The pacing of the lessons and the demands on the teachers did not leave enough space for them to reflect and change as much as they would like.

Field notes indicate that time came up often in the Action Research Design Team (ARDT) meetings. The team recognized that the new teachers were not able to slow down and reflect on their practice. Ms. Gray understood the importance of reflection, but she could not find ways to fit it into their team meetings. She stated, “I want to know how to do it without adding more onto somebody's plate.” The ARDT members agreed with her and discussed the time barrier and its impact on reflection for the new teachers. ECTs begin their career with only so much capacity because of the challenges they face. ECTs must have time to develop and grow and that capacity will build over time, but they are limited at beginning. Mr. Taylor expressed this precisely, “I don't know if I could have handled more [support] at the beginning.” He instinctively knew that he needed more time to grow.

When time is in short supply, proximity becomes even more valuable. ECTs face any number of challenges every day as they learn their new profession. Support for those challenges often comes from those closest to the ECT. Repeatedly in the interviews, the ECTs credited the just-in-time team as supportive and important for their own growth as a teacher.

Ms. Gray stated, “My other team members all come from different backgrounds, and they see the problems differently and that's helped me see the problems differently.” Likewise, Mr.

Taylor offered, “They’ll give me feedback about how it’s going for them and I can compare myself to them.” Ms. Johnson echoed, “Hearing other teachers’ points of view helps me feel better and have more patience with my own students.” Hearing from colleagues and having the time to discuss issues with colleagues was a high value support to the ECTs.

The collaborative conversations that the teachers refer to happened sometimes during planned meetings, but also happened spontaneously as they gathered in the hall between classes or during lunch for quick chats. Ms. Yates illustrates, “I think I’m very supported. I have a lot of people coming in, checking in on me. There are a lot of people on this hallway that come in and help and see what I need help with.” The key element is proximity.

The ECTs learned the most from the people that were closest to them in proximity and in setting. Everyone was grateful for the leader support, but the ECTs spoke the most eloquently when talking about the support that they received from their peers who taught right alongside of them. The shared space in the school and also the shared classroom experience naturally brought them together to support one another through the minutiae of the day-to-day life of teaching.

As the participants described the impact of the just-in-time support group on their teaching practice, it was evident that they yearned for more time to learn and grow. It was also evident that they felt the most supported by the teachers closest to them. The leader created structures like the just-in-time support were key and appreciated, but could not replace the value of the peers that were closest to the ECTs.

Connection Supports Learning

The context of this study was quite unique given the impact of COVID-19 on the educational system. The beginning years of teaching for the ECTs had all been disrupted by virtual learning due to COVID-19 and that meant often teaching in isolation from home. The

emotional connection was highlighted throughout the data. That connection is important highlights the social nature of learning and the constructivist theoretical framework. The connection supported the ECTs as they refined their practice and was a critical layer of support that allowed the teachers to be vulnerable with each other.

The teachers often remarked about how their team made them feel. Ms. Gray noted, “I feel positive after every meeting, I feel like I’m ready to go do something.” In the same vein, Ms. Yates agreed, “They [the team] has been very supportive, very encouraging. They always tell me that I’ve got this and it gives me confidence.” Mr. Taylor wisely noted that the team structure helped him carry the heavy lift of a first-year teacher, “I think that it being part of a team made it less of a burden, at least emotionally than being on my own.” Ms. Johnson was able to share the universal first-year teacher experience of feeling overwhelmed and how the team picked her up:

I could add that I have cried twice already this year...I have gotten so overwhelmed. And I had people here to be like, it's okay to break down. We've all done that. We're here to hold your hand until you pull yourself back together for third period. The team does that and it is wonderful. We're always checking in on each other so they are definitely good for my mental health.

Feeling overwhelmed, emotionally drained, not confident with teaching skills, unsure of how what to do next are very real and very common barriers for ECTs. Alone the challenges would have been crippling, but the connection of the team allowed each member to overcome the obstacles and to keep pushing forward.

The emotional connection was just not between team members in that the data also revealed that the team felt connected to their school leaders. That connection allowed the ECTs to feel open and safe with the leaders. Ms. Gray indicated that feeling safe with school leaders

was an important component to support, “The team feels more comfortable with our leaders now, and are not so scared of asking for help.” Being unafraid to ask for help can lead to personal growth. Ms. Johnson recognized the benefit of speaking freely with a school leader, “[the Assistant Principal] always make sure to get to the bottom of what I'm actually asking which I really appreciate because I'm not always good at really articulating what is exactly going on in my head.”

Mr. Taylor sent a note of appreciation to the school leaders during the study saying, “I appreciate the effort that you put into the support and feedback for us.” Ms. Yates felt that the observations and feedback from the leaders specifically helped her grow. She noted that she was “scared at first”, but eventually felt more comfortable with the leaders and “learned a lot from the conversations” that were held with the group. All of the ECTs recognized and welcomed the contributions of the leaders. The connection between teacher and leader allowed for a supportive partnership.

The idea of connection was significant because of the theoretical framework for the study was grounded in constructivism. Social interaction is a driver for cognitive development based on Vygotsky’s Zone of Proximal Development (Vygotsky, 1978). Based on Vygotsky, culture influences learning and embedded in the case of this study, the culture of the team—both participants and leaders—was key to the level of support received by the ECTs. The teachers had to connect to each and to the leaders to learn and grow together as they progressed through the challenging beginning years of teaching.

Research Question 3

The Action Research Design Team (ARDT) was critically important to the study. The team members analyzed the data and acted as thought partners to the researcher throughout the

study. Research Question 3 sought to understand the ARDT perspective on the implementation and the design of the study. The field notes and focus group transcription show that while the team thought the supports provided were important and valuable, the team also wondered if it was enough to fully support the ECTs.

Is Just-in-Time Enough?

While the participants generally felt positive about the support they received throughout the study, field notes and observational notes indicate that the implementation of the lessons after the interventions were not always successful. The ARDT pondered this in their meetings and during the focus group and began to wonder if just-in-time support was enough for ECTs. The tenets of just-in-time support focused on providing solutions to problems that the ECTs surfaced. The solution or intervention was offered and implemented and then because of pacing, the ECTs moved on to the next thing. The ARDT recognized that reflection and regular feedback were missing when trying to focus on the problem of the moment. Mrs. Hutchinson used her district perspective to articulate the problem. “We have so many competing initiatives at the district level and our teachers are the ones that are trying to implement all of this. There is no room for reflection because we are trying to do so much.” The fast pace did not allow for deep and thoughtful reflection on practice.

Just-in-time solutions also do not present a structure of open observation for the sake of learning. Most of the observations were targeted to assess the success of the intervention. The ECTs were able to benefit from the feedback, but they did not observe others. Ms. Gray shared how important observation of other teachers was to her growth. “I learned the value of observing from student teaching. I remember how much I learned from being in someone else’s classroom. Because if you don’t have it how do you know you are missing it?” The ECTs all mentioned at

various points that they would have liked to see how others were teaching, and they were always appreciative of discussions about the teaching practices of others.

The idea that the teacher does not know what they are missing is also a downside of just-in-time learning because it is dependent on teacher generated problems. Mrs. Sampson noted during the focus group that the ECTs tended to “reflect on student issues and not reflect on their actual teaching.” Ms. Gray took it even further:

They [ECTs] sometimes don't know what their issues are. I saw it in their faces when we would pinpoint the issues in the meetings. Their eyes would light up like ‘Yes! That's the thing I need.’ They just didn't know what to do to get better.

The ARDT agreed that reflection and inquiry about practice was not automatic for ECTs and needed to be attended to as part of any support offered to new teachers.

The overall theme from the ARDT when discussing the implementation and impact was that just-in-time learning does serve a purpose, but is not enough to help ECTs grow and flourish in the teaching profession. Just-in-time support paired with structures for regular observation and feedback and for deep reflection are needed to help the ECT progress through the early years of teaching.

Chapter Summary

There were four overall themes throughout the data that relate to one of the research questions. Research Question 1 investigated how school leaders can support ECTs with just-in-time problems. While there are many ways to support teachers, the emergent theme was that reflexive conversations matter. The teachers benefited from the collaborative conversations as much as the interventions themselves.

Research Question 2 focused on how the ECTs described the impact of support. Two themes emerged through the data. First, time and proximity matter. The ECTs all spoke of time as a barrier to support. They felt that there just was not enough time to slow down and dig deep into the refinement of their practice. Because of the lack of time, the ECTs felt most supported by those closest to them both in a physical sense and in an emotional one. Peer support was praised again and again. The ECTs were able to lean on each other because peers were readily available and also shared in the same daily struggles. This led to the second emergent theme that connection supports learning. The ECTs felt connected to each other and to the school leaders and that connection helped to foster their growth.

Research Question 3 sought the perspectives of the ARDT related to the design and implementation of the study. The team members acknowledged that just-in-time learning was useful to ECTs; however, the team also wondered if just-in-time learning was enough. Merely solving the problem of the moment might help the ECT survive the next day, but the team felt that more was needed to help ECTs refine their practices. Regular observations, feedback, and structures for reflection were all necessary to promote personal growth for the ECTs.

Chapter 6 presents the conclusions of the study as well as discussing the implications and the connections to future leadership practices.

CHAPTER 6
CONCLUSIONS, IMPLICATIONS, AND CONNECTIONS TO LEADERSHIP
PRACTICES

The purpose of this study was to examine the structures and processes of an early-career support group for early career high school mathematics teachers in a large, semi-urban public school as they received just in time professional learning based on their needs as they progressed through the school year. To address the purpose of this action research study, the following research questions guided this inquiry:

1. How can school leaders support professional learning for early career mathematics teachers related to their needs as they progress throughout the year in one urban, high-needs high school?
2. How do early career mathematics teachers describe the impact of professional learning and the framework of support related to their teaching practices in one urban, high-needs high school?
3. What are the perspectives of the action research design team about the impact of the design and implementation of the professional learning support for early career mathematics teachers in one urban, high-needs high school?

This chapter presents the propositions of the researcher to school and system leaders, implications for policy, and suggested areas of further research. The propositions and implications are based on the themes that emerged from the findings of the study.

Summary of the Study

This action research case study began in the fall of the 2021-2022 school year at Thomas Pointe High School (TPHS). The research was designed based on a qualitative case study approach to examine how school leaders can assist early career teachers (ECT) of mathematics with just-in-time support based on the challenges presented by the ECTs themselves. The study was grounded by a constructivist approach so that the ECTs could make sense of their learning and refinement of their teaching practices through the help of their peers and school leaders. The Action Research Design Team (ARDT) aided the researcher in the development of interventions and the on-going analysis of the findings.

COVID-19

The study was situated during a unique time in contemporary education. The COVID-19 pandemic disrupted teaching and learning during the spring of 2020. Across the nation, schools transitioned to virtual instruction that spring. Thomas Pointe High School remained in virtual instruction throughout most of the 2020-2021 school year, only returning to a reduced day in-person learning with three months left in the school year. Early career teachers entering the 2021-2022 school year had at most one full school year of experience and at worst had virtual student teaching and very little interaction with in-person learning prior to the start of the school year.

Even though TPHS returned to in-person learning during the 2021-2022 school year, it cannot be said that the return was normal. Students and teachers alike struggled to navigate school given the pressures that came with the COVID-19 pandemic. COVID-19 exacerbated the challenges of ECTs and increased the need for support for those teachers. The urgency of that

support was apparent in educational circles as schools faced staffing challenges that were unprecedented due to the effects of the pandemic.

Action Research Study

The Algebra I team at Thomas Pointe High School was comprised of four ECTs. The researcher served as an assistant principal of TPHS at the time of the study. The ARDT included the researcher, the mathematics instructional coach for TPHS, the Algebra I team leader, the district 6-12 mathematics coordinator, and the TPHS principal. The study was comprised of three action research cycles. The cycles began with a challenge surfaced by the ECTs. The ARDT then developed an intervention that was shared with the ECTs through job-embedded professional learning. The researcher and mathematics instructional coach observed the implementation of the interventions in the ECTs classrooms. The team then came together to debrief and reflect. As another challenge surfaced, the cycle was repeated to address it.

The ECTs were interviewed three times during the study to help discern the impact of the professional learning and framework of support. The ARDT participated in a focus group at the end of the study to ascertain their perspectives on the design and implementation of the support for the ECTs. Data were also collected through the researcher's journal, observation notes, and artifacts. The analysis of the data revealed themes that were threaded throughout the study and the data and that also echoed the literature surrounding early career teachers as presented in the discussion.

Theoretical Framework and Theory of Change

Constructivist theory was the foundation of the study. Situating the ECT at the center of the learning surrounded by support from peers and school leaders meant that that ECT could benefit from the zone of proximal development as they refined their teaching practice. The social

nature of learning was also considered and the just-in-time support group was a critical component of the learning of the study. ECTs participated in discovery learning that was tied directly to their classroom practice and then experienced collaboration and leader support through the implementation of the interventions.

The idea that the ECTs must construct their own learning was the foundation of the design of the logic model. The cycle of the just-in-time support group surfacing a problem, collaboratively designing a solution paired with observation and reflection around the learning creates opportunities for the ECTs to construct and re-construct knowledge of their practice. The logic model was supported by the theory of change based on the zone of proximal development. Leader support provided a firm foundation for construction and reconstruction of teacher knowledge. The presence of the leader support allowed the ECTs to stretch to higher levels of learning, to consider new ideas, and to grow in their practice.

Discussion of the Findings

The research study was guided by three research questions. The questions focused on how school leaders can support ECTs with job-embedded professional learning, how the ECTs describe the impact of that support, and school leader perspectives on the impact and design for the study. Through analysis of the qualitative data, themes emerged connected to each research question and generally support the findings in the literature.

Discussion of Findings from Research Question 1

The survival instinct is great during the first few years of teaching. Support from others becomes an important driver to help the ECT shift from surviving to managing (Lawrence et al., 2019). The question of how school leaders can best support early career mathematics teacher was integral to this study. The findings indicated that reflective conversations matter in that teachers

were able to critically examine their own practices so that they may refine and grow. Equally as important is conversation because that indicates the presence and connectedness to others.

The path toward managing is not just about the skill of teaching. Buchanan et al. (2013) noted that reflection and resilience are just as important for ECTs as pedagogical skills. For the participants in this study, collegial conversations about practice and refinement of practice were the vehicle for serious reflection for ECTs. The teachers are so new to the profession that the support of peers and leaders is necessary to act as a mirror for reflection. The ECTs need support to remind them to slow down and to reflect. It is easy to get caught up in attending to the daily tasks of teaching without pausing to critically analyze practice (Aarts et al., 2020; Buchanan et al., 2013; Schuck et al., 2018).

The support of others is also needed to help them handle the emotionality of reflecting on novice's practices throughout the early stages of teaching. Reflection is emotional work and Redding and Henry (2019) pointed out that the emotional needs of teachers must first be met to help build effective teachers. The connectedness to others through the reflective conversations shores up the emotional needs of ECTs so that they can feel safe and connected enough to reflect and grow. The connection to others while tackling the emotional work of teaching helps to build resilience needed so that ECTs can feel ready to face the challenges that await.

Discussion of Findings from Research Question 2

The shift from theory to practice presents a barrage of challenges for ECTs that dominate their time and attention (Aarts et al., 2020). Support is needed for the ECTs to tackle the tasks, but the support must be viewed as help and not another task for the ECTs. The impact of support is central to Research Question 2. How did ECTs receive the support that was offered and what

was the impact on their practice? The voices of the ECTs were clear throughout the findings. Time and proximity were important and connection with others supports learning.

ECTs need time. Time for learning and time for practice. Time for reflection and growth. Time to internalize the supports that are offered enough to use them in the classroom. The pace of teaching is frantic for the early career teacher and the demands to perform often overshadow the need to take time to pause, reflect, and grow. Time to relate to others and to grow in confidence help ECTs become more effective teachers (Hobson & Maxwell, 2017). The participants of the study instinctively knew this and all lamented for more time.

The emotional needs of ECTs must be met before they can flourish in their work (Gallant & Riley, 2014). Because time was in short supply for ECTs, proximity mattered. Peers that were close to them in physical space and also close as in a shared content functioned as just-in-time supports as well as the just-in-time interventions. The ECTs described the impact of the support from their peers as beneficial as the interventions of the study. The idea that people closest to the ECTs served as support rings true to the focus in the literature on ECT emotional well-being (Gallant & Riley, 2014; Hobson & Maxwell, 2017; Redding & Henry, 2019; Zepeda, 2018). As ECTs try to move from merely coping to managing, it is natural that they seek those nearest to them for support (Lawrence et al., 2019).

The literature is clear that connection and collaboration are key for ECT support (Fenwick, 2011; Gallant & Riley, 2014; Mansfield & Gu, 2019; Podolsky et al., 2016; Redding & Henry, 2019; Schuck et al., 2018). The themes of time and proximity logically lead to the overarching theme that connection supports learning. ECTs must feel connected and supported for growth to occur. The findings of the study mirror the literature. The just-in-time support group provided not just interventions to overcome challenges, but created a space where school

leaders and teachers could connect. The connection and collaboration increased the sense of belonging for the ECTs and allowed a safe space for ECTs to reflect and grow (Bjorklund et al., 2020; Skaalvik & Skaalvik, 2011; Zepeda, 2018).

Discussion of Findings from Research Question 3

An important characteristic of learning for ECTs is that skills are developed as issues arise in the classroom (Buchanan et al., 2013; Mansfield & Gu, 2019; Scott et al., 2012). The just-in-time nature of that learning allows for more transfer of skill into practice (Zepeda, 2018). While the purpose of the study was to investigate just-in-time school leader supports for ECTs, the question arose whether just-in-time was enough.

The literature shows that there are many ways to support ECTs such as mentoring, observation, collaboration, and engaging in informal dialogue with peers (Fenwick, 2011; Herbert et al., 2018; Mansfield & Gu, 2019). While just-in-time interventions are necessary, the study showed that observations, collaboration, and time for inquiry and reflection are also important components of ECT support. The interventions were often not successfully implemented by the ECTs, but they found value in the planning and discussion of the interventions and craved more time for those collaborative conversations.

Implications for School and District Leaders

The findings of the study mirror findings established in the literature. The findings also point to some clear propositions for school and district leaders. Collaboration, reflection, and connection are important supports for ECTs. Teacher leaders are also key to ECT development because of their proximity and availability to ECTs and require leader support.

Collaboration and Reflection

Collaboration and reflection arose as propositions based on projections from the findings of the study. It is proposed that school leaders find ways to create spaces for collaboration among peers and leaders. Collaboration among peers and among ECTs and leaders emerged as key to learning and growth for an ECT. Within those spaces, thoughtful and intentional structures for reflection and inquiry into practice should be established. Collaborative structures that allow for dialogue around practice, observation and feedback between peers and also from leaders, and time for self-reflection could help ECTs tackle the challenges that they face in the classroom as well as foster their own personal growth as a teacher.

Connection

The study's findings also illuminate that the school climate that fosters connections between staff and leaders is also beneficial to ECTs. The emotional well-being of ECTs is an important factor in growth. Feeling connected to others allows for the vulnerability needed to examine practice. Connection tethers staff to each other and to their leaders creating a sense of belonging. The feeling of belonging to the group creates a safe space to question and learn. It is proposed that school leaders seek to create those safe spaces for teachers just as leaders wish for teachers to create the same sort of spaces for students. Learning requires relationships and that premise can modeled from the top down in a school.

Importance of Teacher Leaders

Teacher leader support also emerged from the findings. It became apparent that the teacher leaders need the attention of school leaders. Teacher leaders are closest in proximity to their more novice peers and can be crucial to the support of ECTs. Teacher leader development

is a way to shore up support for ECTs since the teacher leaders will be the ones leading the collaborative teams that are critical for connection and reflection for the ECTs.

Early career teachers are an important component of a school. The ECTs will either become established faculty, or they will leave and open up a hole that is likely to be filled by another ECT. School leader support is needed to help ECTs transition to established faculty. The researcher offers propositions for that support to school and district leaders based on the themes from the study. While the study looked closely at just-in-time support for ECTs, it was clear that more is needed to help ECTs flourish in their new roles. The findings of the study suggest that structures for collaboration that include time for reflection and inquiry into practice are key supports for ECTs. Connection is important for the emotional well-being of ECTs and is necessary to allow ECTs to face the challenges of those early years. Teacher leaders are close in proximity to ECTs and require leader support to help them as they serve as resources for ECTs. The findings of the study suggest that local attention must be given to ECTs, but there is also a need for attention at a higher level.

Implications for Policy

Support for ECTs is often the topic of state, district, and school policy. National policy like the Every Student Succeeds Act of 2015 (ESSA) gives provisions and recommendations about teacher support. States then direct money to local school districts based on those recommendations and district leaders earmark funds for local programs related to teacher support. Ultimately, the school leaders are left to interpret and enact the policy in their building and have the most direct impact on ECTs in terms of policy. The findings of the study illuminate that it is time to think outside of the box in terms of ECT support. The participants themselves

suggested a policy change that would pair an ECT with a veteran teacher for one period to provide real just-in-time support.

Structures that Allow for ECT/Veteran Teacher Pairings

The idea that early career teachers crave feedback and guidance as they navigate their new profession as well as connection and collaboration were strongly suggested throughout the findings of the study. Policy related to ECTs could benefit by taking these factors into account so that structures within schools can foster such supports. One way to establish a structure for built-in connection, observation, and feedback would be to pair a veteran teacher with an ECT for one class or for part of the day. The two teachers would co-teach allowing for just-in-time supports like feedback, modeling, observation, and on-the-spot reflection for the ECT. Co-teaching with an established teacher for even just one period could give the ECT confidence and skills that extend throughout the rest of the school and will positively impact all students of the ECT and not just the ones who experience two teachers.

Induction is the cornerstone to introducing new teachers to the profession, district, and school. Acclimating ECTs to the profession and to the school itself is important work for districts and schools. Policy around induction helps to create standard structures so that all ECTs are supported throughout a district or school. The themes of this research study focused on support of early career mathematics teachers and offers some propositions for policy related to ECT support. Mentoring is foundational to policy related to support of ECTs and the findings of this study push mentoring one step further. The proposed idea to pair a veteran teacher with an ECT even if just for part of the day has the potential to provide the space for just-in-time support in real-time. On-the-spot feedback and collaboration around issues as they arise in the moment

could be job-embedded professional learning in its purest form and is an idea worth considering to improve the effectiveness and retention of ECTs.

Implications for Further Research

A recurring theme for this research study was one of collaboration and reflection. Both are integral for the support for ECTs. The literature surrounding ECTs establish that collaboration and connection are vital for teachers who are surviving their early years in the profession. An area of further research could look at the role of reflection on ECT growth. What structures in schools help promote reflection? How does reflection aid in the transfer of skill to practice? How do leaders champion the reflection process and create space for it during the hectic business of school? Does pairing reflection with observation and feedback strengthen the coaching cycle for ECTs? All are valid questions that should be considered for future research.

Concluding Thoughts

Teacher shortages have been a topic of concern for decades. There is a steady dwindle in supply and no one is refilling the ranks. Retention and support of teachers is of utmost importance to school leaders which elevates the needs of early career teachers. Supporting teachers as they enter the profession and helping them grow in effectiveness is vital to staffing schools that are equipped to successfully educating children. Strong collaboration that is focused on instruction and the challenges of classroom can aid the ECT as they navigate their new profession. Prioritizing time for collaboration is a wise investment for the school leader, but time alone will not suffice. Structures for observation, feedback, and critical inquiry are needed to make collaboration effective job-embedded professional learning.

Equally as important is the time built into the school for teacher reflection. Teachers who can learn to reflect on their practices and refine those practices are teachers who will continue to

grow in effectiveness as their career progresses. Reflective teachers are empowered to act as agents of change because they look inwardly to see how to best serve students. They seek ways to improve their own practice instead of lamenting what students can and cannot do. A reflective teacher also influences peers in a positive manner as they model the practice of inquiry with and for others.

Given the changing landscape of education, support for teachers, especially early career teachers, is more important than ever. The investment in collaboration, connection, and reflection will pay dividends for school leaders and their schools as a whole as early career teachers become valuable veteran teachers in the school. If done well, the ripple effect from supporting an early career teacher can be felt for years to come.

References

- Aarts, R., Kools, Q., & Schildwacht, R. (2020). Providing a good start. Concerns of beginning secondary school teachers and support provided. *European Journal of Teacher Education, 43*(2), 277-295. <https://doi.org/10.1080/02619768.2019.1693992>
- Adnot, M., Dee, T., Katz, V., & Wyckoff, J. (2017). Teacher turnover, teacher quality, and student achievement in DCPS. *Educational Evaluation and Policy Analysis, 39*(1), 54-76. <https://doi.org/10.3102/0162373716663646>
- Allen, N., Grigsby, B., & Peters, M. L. (2015). Does leadership matter? Examining the relationship among transformational leadership, school climate, and student achievement. *International Journal of Educational Leadership Preparation, 10*(2), 1–22. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1083099>
- Altrichter, H., Kemmis, S., McTaggart, R., & Zuber-Skerritt, O. (2002). The concept of action research. *The Learning Organization, 9*(3/4), 125-131. <https://doi.org/10.1108/09696470210428840>
- Aragon, S., & Education Commission of the States. (2016). *Teacher shortages: What we know. Teacher shortage series*. Education Commission of the States. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED565893>
- Bailey, J.P., & Schurz, J. (2020). *COVID-19 is creating a school personnel crisis*. American Enterprise Institute. <https://www.aei.org/research-products/report/covid-19-is-creating-a-school-personnel-crisis/>
- Bandura, A. (1977). *Social learning theory*. New York: General Learning Press.

- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544.
<https://nsuworks.nova.edu/tqr/vol13/iss4/2/>
- Bjorklund, P., Jr., Daly, A. J., Ambrose, R., & van Es, E. A. (2020). Connections and capacity: An exploration of preservice teachers' sense of belonging, social networks, and self-efficacy in three teacher education programs. *AERA Open*, 6(1).
<https://doi.org/10.1177/2332858420901496>
- Black, D. W. (2016). *Averting educational crisis: Funding cuts, teacher shortages, and the dwindling commitment to public education*. *Washington University Law Review*, 94(2), 423–483.
- Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theories and methods*. Pearson.
- Bowling, A. M., & Ball, A. L. (2018). Alternative certification: A solution or an alternative problem? *Journal of Agricultural Education*, 59(2), 109-122.
<https://doi.org/10.5032/jae.2018.02109>
- Boyd, D., Goldhaber, D., Lankford, H., & Wyckoff, J. (2007). The effect of certification and preparation on teacher quality. *Future of Children*, 17(1), 45-68.
<https://www.jstor.org/stable/4150019>
- Bradbury, H., Lewis, R., & Embury, D.C. (2019). Education action research: With and for the next generation. In C. A. Mertler (ed.), *The Wiley handbook of action research in education* (pp. 7-28). John Wiley & Sons, Inc.

Brown, K.M., & Wynn, S.R. (2009). Finding, supporting, and keeping: The role of the principal in teacher retention issues. *Leadership and Policy in Schools*, 8(1), 37-63.

<http://doi.org/10.1080/15700760701817371>

Bruner, J. S. (1966). *Toward a theory of instruction*. Belknap Press of Harvard University.

Bruno, J. E. (1986). Supply–Demand model of teacher shortage in large urban school districts. *Journal of Education Finance*, 11(4), 447. www.jstor.org/stable/40703515

Buchanan, J., Prescott, A., Schuck, S., Aubusson, P., Burke, P., & Louviere, J. (2013). Teacher retention and attrition: Views of early career teachers. *Australian Journal of Teacher Education*, 38(3). <http://ro.ecu.edu.au/ajte/vol38/iss3/8>

Burnette II, D., & Will, M. (2020, July 14). Thousands of educators laid off already due to COVID-19, and more expected. *Education Week*.

<https://www.edweek.org/ew/articles/2020/07/14/thousands-of-teachers-laid-off-already-due.html>

Calvert, L. (2016). The power of teacher agency: Why we must transform professional learning so that it really supports educator learning. *Journal of Staff Development*, 37(2), 51–56.

<http://learningforward.org/publications/jsd/jsd-blog/jsd/2016/05/09/jsd-april-2016-literacy#.VzS5M4QrLZ4>

Carpenter, D. (2015). School culture and leadership of professional learning communities. *International Journal of Educational Management*, 29(5), 682–694.

<http://www.emeraldinsight.com/doi/abs/10.1108/IJEM-04-2014-0046>

Carver-Thomas, D., Leung, M., & Burns, D. (2021).

Carver-Thomas, D., & Darling-Hammond, L. (2019). The trouble with teacher turnover: How teacher attrition affects students and schools. *Education Policy Analysis*

Archives, 27(36). <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1213629>

- Ceballos, M. (2020). Mentoring, role modeling, and acculturation: Exploring international teacher narratives to inform supervisory practices. *Research in Educational Administration & Leadership*, 5(3), 640–680. <https://doi.org/10.30828/real/2020.3.2>
- Coghlan, D., & Brannick, T. (2014). *Doing action research in your own organization* (4th ed.). Sage Publications.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design : choosing among five approaches* (Fourth ed.). SAGE Publications, Inc.
- Damico, N., McKinzie Bennett, C., & Fulchini, A. (2018). 'Show me what it's supposed to look like': Exploring mindfulness-based support for early career teachers in an era of neoliberal reform. *Policy Futures in Education*, 16(6), 828-847. <https://doi.org/10.1177/1478210318765322>
- Darling-Hammond, L. (1990). Teaching and knowledge: Policy issues posed by alternate certification for teachers. *Peabody Journal of Education*, 67(3), 123. <https://www.jstor.org/stable/1492803>
- Day, C., Gu, Q., & Sammons, P. (2016). The impact of leadership on student outcomes: How successful school leaders use transformational and instructional strategies to make a difference. *Educational Administration Quarterly*, 52(2), 221–258. <http://dx.doi.org/10.1177/0013161X15616863>
- Djonko-Moore, C. M. (2016). An exploration of teacher attrition and mobility in high poverty racially segregated schools. *Race Ethnicity and Education*. 19(5), 1063–1087. <https://doi.org/10.1080/13613324.2015.1013458>

- Elliott, J. (1994). Research on teachers' knowledge and action research. *Educational Action Research*, 2(1), 133-137. <https://doi.org/10.1080/09650799400200003>
- Elliott, J. (2015). Educational action research as the quest for virtue in teaching. *Educational Action Research*, 23(1), 4-21. <http://dx.doi.org/10.1080/09650792.2014.994017>
- Erwin, B. (2020, August 26). Layoff projections and shortages create teacher workforce challenges. *EdNote*. <https://ednote.ecs.org/layoff-projections-and-shortages-create-teacher-workforce-challenges/>
- Fenwick, A. (2011). The first three years: Experiences of early career teachers. *Teachers & Teaching*, 17(3), 325-343. <https://doi.org/10.1080/13540602.2011.554707>
- Flannery, M.E. (2020, August 14). *Safety concerns over COVID-19 driving some educators out of the profession*. National Education Association. <https://www.nea.org/advocating-for-change/new-from-nea/safety-concerns-over-covid-19-driving-some-educators-out>
- Flower, A., McKenna, J. W., & Haring, C. D. (2017). Behavior and classroom management: Are teacher preparation programs really preparing our teachers? *Preventing School Failure*, 61(2), 163. <https://doi.org/10.1080/1045988X.2016.1231109>
- Fuller, F. F. (1969). A concern of teachers: A developmental conceptualization. *American Educational Research Journal*, 6(2), 207-226. <https://doi.org/10.3102/00028312006002207>
- Gallant, A., & Riley, P. (2014). Early career teacher attrition: New thoughts on an intractable problem. *Teacher Development*, 18(4), 562-580. <http://dx.doi.org/10.108013664530.2014.945129>
- Garcia, E., Weiss, E., & Economic, P. I. (2019a). *The teacher shortage is real, large and growing, and worse than we thought. The first report in "the perfect storm in the teacher*

- labor market" series*. Economic Policy Institute.
<https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED598211>
- Garcia, E., Weiss, E., & Economic, P. I. (2019b). *Challenging working environments ("school climates"), especially in high-poverty schools, play a role in the teacher shortage. The fourth report in "the perfect storm in the teacher labor market" series*. Economic Policy Institute. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED598207>
- Gray Streeter, L. (2021, October 18). Why so many teachers are thinking of quitting: Seven educators on how the pandemic drove them to finally say enough is enough. *Washington Post*. <https://www.washingtonpost.com/magazine/2021/10/18/teachers-resign-pandemic/>
- Glanz, J. (2005). Action research as instructional supervision: Suggestions for principals. *NASSP Bulletin*, 89(643), 17-27. <https://doi.org/10.1177/019263650508964303>
- Glanz, J. (2014). *Action research: An educational leader's guide to school improvement*. Rowman & Littlefield.
- Goldhaber, D., & Theobald, R. (2020). *The COVID-19 crisis and teacher layoffs: Research on how to mitigate harm*. American Institutes for Research/CALDER.
<http://caldercouncil.org/wp-content/uploads/2020/06/CALDER-Policy-Brief-20-0620.pdf>
- Governor's Office of Student Achievement. (n.d.). *Downloadable Data*.
<https://gosa.georgia.gov/dashboards-data-report-card/downloadable-data>
- Griffith, M. (2020, April 30). The impact of the COVID-19 recession on teaching positions. *Learning Policy Institute*. <https://learningpolicyinstitute.org/blog/impact-covid-19-recession-teaching-positions>
- Hammond, Z. L. (2015). *Culturally responsive teaching and the brain*. Corwin Press.

Hanover Research. (2021, March 16). *4 Strategies proven to increase teacher retention*.

<https://www.hanoverresearch.com/reports-and-briefs/4-strategies-proven-to-increase-teacher-retention/>

Henson, K., Stephens, C., Hall, T., & McCampbell, C. (2015). *The 2015 Georgia public P-12 teacher workforce: A status report*. Georgia Professional Standards Commission.

https://www.gapsc.com/Commission/research_publication/downloads/2015%20Status%20Report.pdf

Herbert, L. P., Allen, J. M., & McDonald, C. V. (2018). Exploring the influence of multi-field classroom observations on early career teachers' professional practice. *Teaching and Teacher Education*, 73, 192-202. <https://doi.org/10.1016/j.tate.2018.04.005>

Hobson, A. J., & Maxwell, B. (2017). Supporting and inhibiting the well-being of early career secondary school teachers: Extending self-determination theory. *British Educational Research Journal*, 43(1), 168-191. <https://doi.org/10.1002/berj.3261>

Holmes, A. G. (2019). Constructivist learning in university undergraduate programmes. Has constructivism been fully embraced? Is there clear evidence that constructivist principles have been applied to all aspects of contemporary university undergraduate study? *Shanlax International Journal of Education*, 8(1), 7-

15. <https://doi.org/10.34293/education.v8i1.819>

Hong, J., Day, C., & Greene, B. (2018). The construction of early career teachers' identities: Coping or managing? *Teacher Development*, 22(2), 249-266.

<https://doi.org/10.1080/13664530.2017.1403367>

- Hord, S. M. (2009). Professional learning communities: Educators work together toward a shared purpose. *Journal of Staff Development*, 30(1), 40–43. Retrieved from <https://learningforward.org/store/jsd/>
- Hoy, W. K. (1990). Organizational climate and culture: A conceptual analysis of the school workplace. *Journal of Educational & Psychological Consultation*, 1(2), 149. https://doi.org/10.1207/s1532768xjepc0102_4
- Humphrey, D. C., Wechsler, M. E., & Hough, H. J. (2008). Characteristics of effective alternative teacher certification programs. *Teachers College Record*, 110(1), 1-63. <https://www.sri.com/wp-content/uploads/pdf/effective-alt-cert-programs-characteristics.pdf>
- Ingersoll, R. M. (1997). Teacher turnover and teacher quality: The recruiting myth of teacher shortages. *Teachers College Record*, 99(1), 41-44. Retrieved from <https://www.tcrecord.org/>
- Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, 38(3), 499-534. <https://doi.org/10.3102/00028312038003499>
- Ingersoll, R. M. (2003). The teacher shortage: Myth or reality? *Educational Horizons*, 81(3), 146. <http://www.jstor.com/stable/42926477>
- Ingersoll, R. M., & Perda, D. (2010). Is the supply of mathematics and science teachers sufficient? *American Educational Research Journal*, 47(3), 563–594. <http://www.jstor.com/stable/40928347>

- Ingersoll, R. M., & May, H. (2012). The magnitude, destinations, and determinants of mathematics and science teacher turnover. *Educational Evaluation and Policy Analysis*, 34(4), 435-464. <http://www.jstor.com/stable/23357022>
- Ingersoll, R., Merrill, L., & May, H. (2012). Retaining teachers: How preparation matters. *Educational Leadership*, 69(8), 30-34. <http://www.ascd.org/publications/educational-leadership/may12/vol69/num08/abstract.aspx>
- Ingersoll, R., May, H., & Collins, G. (2019). Recruitment, employment, retention and the minority teacher shortage. *Education Policy Analysis Archives*, 27(37). <http://dx.doi.org/10.14507/epaa.27.3714>
- Ingersoll, R. M., Merrill, E., Stuckey, D., & Collins, G. University of Pennsylvania, Consortium for Policy Research in Education (CPRE). (2018). *Seven trends: The transformation of the teaching force. Updated October 2018. CPRE research report # RR 2018-2*. Consortium for Policy Research in Education.
- Ingersoll, R. M., Merrill, E., Stuckey, D., Collins, G., & Harrison, B. (2021). The demographic transformation of the teaching force in the United States. *Education Sciences*, 11(234), 234. <https://doi.org/10.3390/educsci11050234>
- Jacobs, S. (2021). *In demand: The real teacher shortages and how to solve them*. FutureEd. https://www.future-ed.org/wp-content/uploads/2021/10/FutureEd_EdCounsel_Teacher_Shortages.pdf
- Jarrett, E., Wasonga, T., & Murphy, J. (2010). The practice of co-creating leadership in high- and low-performing high schools. *International Journal of Educational Management*, 24(7), 637-654. <http://dx.doi.org/10.1108/09513541011080011>

- Jiang, X., & Perkins, K. (2013). A conceptual paper on the application of the picture word inductive model using Bruner's constructivist view of learning and the cognitive load theory. *Interdisciplinary Journal of Teaching and Learning*, 3(1), 8-17. <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1063072>
- Jones, C. M., & Thessin, R. A. (2017). Sustaining continuous improvement through professional learning communities in a secondary school. *Journal of School Leadership*, 27(2), 214-241. <https://doi.org/10.1177%2F105268461702700203>
- Kelly, N., Sim, C., & Ireland, M. (2018). Slipping through the cracks: teachers who miss out on early career support. *Asia-Pacific Journal of Teacher Education*, 46(3), 292-316. <https://doi.org/10.1080/1359866X.2018.1441366>
- Kim, J. (2019). How principal leadership seems to affect early career teacher turnover. *American Journal of Education*, 126(1), 101-137. <https://doi.org/10.1086/705533>
- Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The action research planner : doing critical participatory action research*. Springer.
- Kwok, A. (2017). Relationships between instructional quality and classroom management for beginning urban teachers. *Educational Researcher*, 46(7), 355-365. <https://doi.org/10.3102/0013189X17726727>
- Lachlan, L., Kimmel, L., Mizrav, E., & Holdheide, L. (2020). *Advancing quality teaching for all schools: Examining the impact of COVID-19 on the teaching workforce*. Center on Great Teachers & Leaders at American Institutes for Research. https://gtlcenter.org/sites/default/files/Examining_Impact_COVID19_Workforce.pdf

- Lawrence, D. F., Loi, N. M., & Gudex, B. W. (2019). Understanding the relationship between work intensification and burnout in secondary teachers. *Teachers and Teaching: Theory and Practice*, 25(2), 189-199. <https://doi.org/10.1080/13540602.2018.1544551>
- Le Cornu, R. (2013). Building early career teacher resilience: The role of relationships. *Australian Journal of Teacher Education*, 38(4). <http://ro.ecu.edu.au/ajte/vol38/iss4/1>
- Lincoln, Y. S., & Guba, E. G. (1986). But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Program Evaluation*, 1986(30), 73–84. <https://doi.org/10.1002/ev.1427>
- LoCascio, S. J., Smeaton, P. S., & Waters, F. H. (2016). How induction programs affect the decision of alternate route urban teachers to remain teaching. *Education and Urban Society*, 48(2), 103–125. <https://doi.org/10.1177/0013124513514772>
- Lock, J. V. (2006). A new image: Online communities to facilitate teacher professional development. *Journal of Technology & Teacher Education*, 14(4), 663-678. <https://www.learntechlib.org/primary/j/JTATE/v/14/n/4/>
- Loughland, T., & Ryan, M. (2020). Beyond the measures: The antecedents of teacher collective efficacy in professional learning. *Professional Development in Education*, 1-10. <https://doi.org/10.1080/19415257.2020.1711801>
- Lortie, D. C. (1975). *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.
- Ludlow, C. (2013). Alternative certification pathways: Filling a gap? *Education & Urban Society*, 45(4), 440-458. <https://doi.org/10.1177/0013124511413916>
- Lutz, S. T., & Huitt, W. G. (2004). Connecting cognitive development and constructivism: Implications from theory for instruction and assessment. *Constructivism in the Human*

- Sciences*, 9(1), 67-90. Retrieved from
<https://sites.google.com/site/constructingworlds/journal>
- Mansfield, C., & Gu, Q. (2019). "I'm finally getting that help that I needed": Early career teacher induction and professional learning. *Australian Educational Researcher*, 46(4), 639-659.
<https://doi.org/10.1007/s13384-019-00338-y>
- MacNeil, A. J., Prater, D. L., & Busch, S. (2009). The effects of school culture and climate on student achievement. *International Journal of Leadership in Education*, 12(1), 73–84.
<https://doi.org/10.1080/13603120701576241>
- Maxouris, C., & Zdanowicz, C. (2022, February 5). Teachers are leaving and few people want to join the field. Experts are sounding the alarm. *CNN*.
<https://www.cnn.com/2022/02/05/us/teacher-prep-student-shortages-covid-crisis/index.html>
- Merriam, S.B. (2017). *Qualitative research in practice: Examples for discussion and practice*. Jossey-Bass.
- Merriam, S.B. (2009). *Qualitative research: A guide to design and implementation*. Jossey-Bass.
- Mertler, C.A. (2017). *Action research: Improving schools and empowering educators*. SAGE Publications, Inc.
- McCann, T. M., & Johannessen, L. R. (2004). Why do new teachers cry? *The Clearing House*, 77(4), 138. <https://doi.org/10.3200/TCHS.77.4.138-145>
- McCormack, A., Gore, J., & Thomas, K. (2006). Early career teacher professional learning. *Asia-Pacific Journal of Teacher Education*, 34(1), 95-113.
<https://doi.or/10.1080/13598660500480282>

- Mirra, N., & Rogers, J. (2020). The overwhelming need: How the unequal political economy shapes urban teachers' working conditions. *Urban Education, 55*(7), 1045-1075.
<https://doi.org/10.1177/0042085916668952>
- Morettini, B. (2016). Mentoring to support teacher retention in urban schools: Reenvisioning the mentoring services offered to new teachers. *Teacher Education and Practice, 2*(2), 259.
<https://link.gale.com/apps/doc/A552850208/AONE?u=uga&sid=AONE&xid=c0c7c335>
- Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods 1* (2). <https://doi.org/10.1177/160940690200100202>
- Morse, T. C., & Mujtaba, B. G. (2008). The challenge of recruiting and retaining teachers in the United States: Is this a compensation or demand issue? *Contemporary Issues in Education Research, 1*(3), 110.
<https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1056384>
- National Commission on Excellence in Education. (1983). *A nation at risk: Imperative for educational reform*. Washington, DC: U.S. Government Printing Office.
- Newton, K. J., Fornaro, E., & Pecore, J. (2020). Program completion and retention of career changers pursuing alternative teacher certification: Who drops, who commits, and why? *Journal of the National Association for Alternative Certification, 15*(1).
<https://files.eric.ed.gov/fulltext/EJ1258648.pdf>
- Nichols, S. L., Schutz, P. A., Rodgers, K., & Bilica, K. (2017). Early career teachers' emotion and emerging teacher identities. *Teachers and Teaching: Theory and Practice, 23*(4), 406-421. <https://doi.org/10.1080/13540602.2016.1211099>

- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16, 1-13. <https://doi.org/10.1177/1609406917733847>
- Owens, S.J. (2015). *Georgia's teacher dropout crisis: A look at why nearly half of Georgia public school teachers are leaving the profession*. Georgia Department of Education. <https://www.gadoe.org/External-Affairs-and-Policy/communications/Documents/Teacher%20Survey%20Results.pdf>
- Professional Association of Georgia Educators. (2022). *Views from the schoolhouse: Insights from Georgia educators on the education profession and supporting students*. <https://www.pagelegislative.org/2022-legislative-survey-summary>
- Papay, J. P., Bacher-Hicks, A., Page, L. C., & Marinell, W. H. (2017). The challenge of teacher retention in urban schools: Evidence of variation from a cross-site analysis. *Educational Researcher*, 46(8), 434–448. <https://doi.org/10.3102/0013189X17735812>
- Piaget, J. (1967). *Six psychological studies*. (A. Tenzer & D. Elkind, Trans.). Random House. (Original work published 1964).
- Perrone, F., Player, D., & Youngs, P. (2019). Administrative climate, early career teacher burnout, and turnover. *Journal of School Leadership*, 29(3), 191-209. <https://doi.org/10.1177/1052684619836823>
- Pillen, M., Beijaard, D., & Brok, P. d. (2013). Tensions in beginning teachers' professional identity development, accompanying feelings and coping strategies. *European Journal of Teacher Education*, 36(3), 240-260. <http://dx.doi.org/10.1080/02619768.2012.696192>
- Podolsky, A., Kini, T., Bishop, J., & Darling-Hammond, L. (2016). *Solving the teacher shortage: How to attract and retain excellent educators*. Palo Alto, CA: Learning

- Policy Institute. https://learningpolicyinstitute.org/sites/default/files/product-files/Solving_Teacher_Shortage_Attract_Retain_Educators_REPORT.pdf
- Pogodzinski, B. (2014). Collegial support and novice teachers' perceptions of working conditions. *Journal of Educational Change*, 15(4), 467-489. <https://doi.org/10.1007/s10833-013-9221-x>
- Redding, C., Booker, L. N., Smith, T. M., & Desimone, L. M. (2019). School administrators' direct and indirect influences on middle school math teachers' turnover. *Journal of Educational Administration*, 57(6), 708-730. <https://doi.org/10.1108/JEA-10-2018-0190>
- Redding, C., & Henry, G. T. (2019). Leaving school early: An examination of novice teachers' within- and end-of-year turnover. *American Educational Research Journal*, 56(1), 204-236. <https://doi.org/10.3102/0002831218790542>
- Reitman, G. C., & Karge, B. D. (2019). Investing in teacher support leads to teacher retention: Six supports administrators should consider for new teachers. *Multicultural Education*, 27(1), 7-18. <https://files.eric.ed.gov/fulltext/EJ1250205.pdf>
- Rentauli, M. S. (2019). Understanding Vygotsky's zone of proximal development for learning. *Polyglot: Jurnal Ilmiah*, 15(2), 169-186. <https://doaj.org/article/4fe5c705c6f645c0bdbcd399249d1bdd>
- Ronfeldt, M., Loeb, S., & Wyckoff, J. (2013). How teacher turnover harms student achievement. *American Educational Research Journal*, 50(1), 4-36. <http://www.jstor.com/stable/23319706>
- Schuck, S., Aubusson, P., Buchanan, J., Varadharajan, M., & Burke, P. F. (2018). The experiences of early career teachers: New initiatives and old problems. *Professional*

Development in Education, 44(2), 209-221.

<https://doi.org/10.1080/19415257.2016.1274268>

Scott, A., Clarkson, P., & McDonough, A. (2012). Professional learning and action research: Early career teachers reflect on their practice. *Mathematics Education Research Journal*, 24(2), 129–151.

Simon, N. S., & Johnson, S. M. (2015). Teacher turnover in high-poverty schools: What we know and can do. *Teachers College Record*, 117(3).

<https://www.tcrecord.org/Content.asp?ContentId=17810>

Skaalvik, E. M., & Skaalvik, S. (2011). Teacher job satisfaction and motivation to leave the teaching profession: Relations with school context, feeling of belonging, and emotional exhaustion. *Teaching and Teacher Education*, 27(6), 1029–1038.

<https://doi.org/10.1016/j.tate.2011.04.001>

Smith, L., & Riley, D. (2012). School leadership in times of crisis. *School Leadership & Management*, 32(1), 57–71. <http://dx.doi.org/10.1080/13632434.2011.614941>

Smith, T. M., & Ingersoll, R. M. (2004). What are the effects of induction and mentoring on beginning teacher turnover? *American Educational Research Journal*, 41(3), 681-714. <http://www.jstor.com/stable/3699442>

Smylie, S. (2020, December 15). 'A very isolating experience:' First-year teachers seek support through unprecedented year. Chalkbeat Chicago.

<https://chicago.chalkbeat.org/2020/12/15/22175480/illinois-first-year-teachers-school-unprecedented-year-covid-19>

- Somekh, B. (1995). The Contribution of Action Research to Development in Social Endeavours: A Position Paper on Action Research Methodology. *British Educational Research Journal*, 21(3), 339–355. <https://www.jstor.org/stable/1501651>
- Somekh, B., & Zeichner, K. (2009). Action research for educational reform: Remodeling action research theories and practices in local contexts. *Educational Action Research*, 17(1), 5-21. <https://doi.org/10.1080/09650790802667402>
- Sorensen, L. C., & Ladd, H. F. (2020). The hidden costs of teacher turnover. *AERA Open*, 6(1). <https://doi.org/10.1177/2332858420905812>
- Stringer, E.T., & Aragón, A. O. (2020). *Action research* (5th ed.). Sage Publications, Inc.
- Struyve, C., Daly, A., Vandecandelaere, M., Meredith, C., Hannes, K., & De Fraine, B. (2016). More than a mentor. *Journal of Professional Capital and Community*, 3, 198. <https://doi.org/10.1108/JPCC-01-2016-0002>
- Sullivan, A. M., & Morrison, C. (2014). Enacting Policy: The Capacity of School Leaders to Support Early Career Teachers through Policy Work. *Australian Educational Researcher*, 41(5), 603-620. <https://doi.org/10.1007/s13384-014-0155-y>
- Surette, T. N. (2020). Influence of mentoring and professional communities on the professional development of a cohort of early career secondary mathematics and science teachers. *School Science & Mathematics*, 120(3), 175-188. <https://doi.org/10.1111/ssm.12392>
- Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2019). Understanding teacher shortages: An analysis of teacher supply and demand in the United States. *Education Policy Analysis Archives*, 27(35). <http://dx.doi.org/10.14507/epaa.27.3696>

- Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2016). *A coming crisis in teaching? Teacher supply, demand, and shortages in the U.S.*. Palo Alto, CA: Learning Policy Institute.
- Tschannen-Moran, M., & Gareis, C. R. (2015). Faculty trust in the principal: An essential ingredient in high-performing schools. *Journal of Educational Administration*, 53(1), 66–92. <http://dx.doi.org/10.1108/JEA-02-2014-0024>
- United States Census Bureau. (2020, August 9). *Quick Facts*.
- Veenman, S. (1984). Perceived problems of beginning teachers. *Review of Educational Research*, 54(2), 143. <https://www.jstor.org/stable/1170301>
- Visone, J. D. (2016). A learning community of colleagues enhancing practice. *Kappa Delta Pi Record*, 52(2), 66-70. <https://doi.org/10.1080/00228958.2016.1156511>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard University Press.
- Warner-Griffin, C., Noel, A., Tadler, C., National Center for Education Statistics, (ED), & Insight, P. R. (2016). *Sources of newly hired teachers in the United States: Results from the schools and staffing survey, 1987-88 to 2011-12*. NCES 2016-876. National Center for Education Statistics.
- <https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED569202>
- Weiner, J. M., & Higgins, M. C. (2017). Where the two shall meet: Exploring the relationship between teacher professional culture and student learning culture. *Journal of Educational Change*, 18(1), 21-48. <http://dx.doi.org/10.1007/s10833-016-9292-6>
- Wynn, S. R., Carboni, L. W., & Patall, E. A. (2007). Beginning teachers' perceptions of mentoring, climate, and leadership: Promoting retention through a learning communities

- perspective. *Leadership and Policy in Schools*, 6(3), 209-229.
- <http://doi.org/10.1080/15700760701263790>
- Zahner, W., Chapin, S., Levine, R., He, L., & Afonso, R. (2019). Examining the recruitment, placement, and career trajectories of secondary mathematics teachers prepared for high-need schools. *Teachers College Record*, 121(2). Retrieved from <https://www.tcrecord.org/>
- Zeichner, K. M., & Schulte, A. K. (2001). What we know and don't know from peer-reviewed research about alternative teacher certification programs. *Journal of Teacher Education*, 52(4), 266-282. <https://doi.org/10.1177/0022487101052004002>
- Zepeda, S. J. (2015). *Job-embedded professional development: Support, collaboration, and learning in schools*. Routledge.
- Zepeda, S. J. (2017). *Instructional supervision: Applying tools and concepts* (4th ed.). Routledge.
- Zepeda, S. J. (2018). *The job-embedded nature of coaching: Lessons and insights for school leaders at all levels*. Rowman & Littlefield.
- Zepeda, S. J. (2019a). *Professional development: What works* (3rd ed.). Routledge.
- Zepeda, S.J. (2019b). Job-embedded professional learning: Federal legislation and national reports as levers. In M.L. Derrington & J. Brandon & (Eds.), *Differentiated teacher evaluation and professional learning: Policies and practices for promoting teacher career growth* (pp. 173-195). Palgrave Publishing.
- Zepeda, S. J., & Lanoue, P. D. (2021). *A Leadership Guide to Navigating the Unknown in Education*. Routledge.

Zhang, G., & Zeller, N. (2016). A longitudinal investigation of the relationship between teacher preparation and teacher retention. *Teacher Education Quarterly*, 43(2), 73-92.

<https://www.jstor.org/stable/teaceducquar.43.2.73>

APPENDIX A

Empirical Findings Table

Author(s), Date	Title	Purpose	Method(s)	Sample	Result(s)	Conclusions	Implications(s)
Ingersoll, R.; Merrill, E.; Stuckey, D.; Collins, G.; Harrison, B. (2021).	The demographic transformation of the teaching force in the United States.	Ongoing study to summarize the most prominent trends and changes in the US teaching force.	Secondary analysis of the School and Staffing Survey	The survey questions 40,000-50,000 teachers and 9,000-11,000 administrators. The latest cycle was completed in 2017-2018.	There are 7 trends that describe the US teaching force: <ul style="list-style-type: none"> • Larger • Older • Less experienced • More female • More diverse, by race/ethnicity • Consistent in academic ability • Unstable 	The teaching force has become a large, predominantly female, young, and inexperienced body of teachers who do not stay long in the profession. It has also become more racially diverse and has not suffered any decline in academic ability.	The trends in the workforce have massive implications for school districts in terms of cost and also in terms of human capital. A young and inexperienced workforce in education will also have an educational impact as well as a potential negative impact on the professionalization of the career.

<p>Buchanan, J., Prescott, A., Schuck, S., Aubusson, P., Burke, P., & Louviere, J. (2013).</p>	<p>Teacher retention and attrition: Views of early career teachers.</p>	<p>The aim of this study was to understand more fully the ways in which beginning teachers negotiate the transition from university to school environment and to better understand why they stay or leave the profession</p>	<p>Longitudinal qualitative research study based on situated theory used interviews and tracking surveys to ascertain novice teachers' thoughts about the profession. The interviews utilized images to serve as a metaphor for where the teacher was on the journey.</p>	<p>The 2006 graduating cohort of New South Wales teacher education program. A total of 329 teachers agreed to participate.</p>	<p>Six broad categories were identified as how the ECT saw their teaching experience:</p> <ul style="list-style-type: none"> • Collegiality and support • Student engagement and behavior management • Working conditions and teaching resources • Professional learning • Workload • Isolation <p>One common characteristic of teachers that stayed was a feeling of improvement with their practice.</p>	<p>Professional learning tied to classroom experience and feedback and collegial support were supports that kept ECTs in the profession. ECTs who stayed were either supported stayers or resilient stayers.</p>	<p>Preparation for teaching should include resilience and skills that will prepare teachers for what they will face in the classroom. This study also highlights the need for support during the early years of the teacher's career.</p>
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<p>Schuck, S., Aubusson, P., Buchanan, J., Varadharajan, M., & Burke, P. F. (2018).</p>	<p>The experiences of early career teachers: New initiatives and old problems.</p>	<p>This study explores the stories told by beginning teachers in NSW about their experiences in their first three years of teaching, at a time when these policy initiatives were being put in place to create supportive school environments for ECTs.</p>	<p>This study grounded in socio-cultural theory examined the responses of early career teachers through an online survey where respondents could share their thoughts on staying in the teaching profession and challenges of the profession.</p>	<p>The early career teachers were in their first three years of teaching in New South Wales, Australia. There were 237 responses.</p>	<p>Four themes emerged from the responses: mentoring; executive support; collegial support; and workload. The complex realities of micro-political contexts for the ECTs within the school were also exposed.</p>	<p>ECTs must navigate the socio-political climate of schools while also developing their own teacher identity. Schools that were deemed as supportive featured collaborative environments and fostered feelings of empowerment for ECT.</p>	<p>Leaders can create a culture of collaboration among peers in order to promote a positive and welcoming environment to ECTs. The collegial collaboration also provides the needed support for ECTs as they grow professionally.</p>
<p>Mansfield, C., & Gu, Q. (2019).</p>	<p>"I'm finally getting that help that I needed": Early career teacher induction and professional learning.</p>	<p>The aim of this study was to investigate the professional learning activities of ECTs and the perceived</p>	<p>The study used a mixed methods approach, gathering data through baseline and follow-up surveys and twelve</p>	<p>Over 300 teachers were invited to complete the pre and post surveys. Survey 1 was completed by 225 teachers</p>	<p>The most reported professional learning activity was informal conversations with peers. Informal dialogue and in</p>	<p>Engaging and authentic professional learning is important for ECTs. This learning must prioritize relationships and</p>	<p>The researchers recommended that school leaders set up specific structures to foster collaborative conversations between peers as well as mentoring</p>

		impact of these on their professional development.	telephone interviews with ECTs.	and 69 completed the second one. Thirty-four teachers with up to 3 years of experience completed both surveys and all of the teachers were participating in an induction program. Twelve teachers were interviewed for the qualitative portion of the study.	class coaching had the highest perceived impact for the ECTs.	context to best support the growth of the ECT.	and coaching opportunities for ECTs.
Gallant, A., & Riley, P. (2014).	Early career teacher attrition: New thoughts on an intractable problem.	The aim of the research was to discover what nine beginning teachers required to	A phenomenological approach was chosen and allowed the complexity of interrelated issues to become apparent and	The research was based on data gathered from nine beginning teachers who left classroom teaching within five years of	The major finding of this study was that early career exit from teaching is a drawn-out process. ECTs who experienced arrested development, or	Lack of emotional support from school leaders led to feelings of isolation. School cultures that were not welcoming	School leaders must take care to facilitate personal and professional growth of ECTs and to foster collegial support as pervasive element

		remain in the classroom.	explored. Data collection involved semi-structured interviews and then also the participants wrote leaving stories without any prompts.	entering and within three years of exit.	lack of growth, ended up leaving and the factors that often led to that were lack of emotional support, and school cultures that impede growth.	and supportive could lead to the feeling of arrested development.	in the school's culture.
Kim, J. (2019).	How principal leadership seems to affect early career teacher turnover.	This study examines how principal leadership might affect ECT turnover by using a large-scale, nationally representative data set, the Beginning Teacher Longitudinal Survey (BTLS).	The researcher applied a discrete time survival analysis to integrate longitudinal data on principal leadership with teacher turnover information. A secondary analysis was also performed that examined how three specific aspects of principals' leadership may affect ECT turnover (i.e., instructional	The researcher drew on five years of data from a nationally representative data set collected by the National Center for Education Statistics (NCES): the Beginning Teacher Longitudinal Study (BTLS).	The study found that principal support was more important than expected. The researcher also identified what constituted support from the principal and found that principal leadership related to student behavior management is one of the most important.	A supportive leader is an important variable in the experience of ECTs. Managing student behavior is a common problem for ECTs so principal support in this area has great value to the ECT.	Supportive school leadership can impact teacher attrition. More research is needed on how leaders can support ECTs.

			leadership, leadership related to managing student behavior, and leadership related to fostering a supportive school culture).				
Perrone, F., Player, D., & Youngs, P. (2019)	Administrative Climate, Early Career Teacher Burnout, and Turnover	This study investigated how administrative climate is related to early career teacher burnout and subsequent career decisions	This study used survey data from the Michigan Indiana ECT (MIECT) study to examine administrative climate's direct association with ECT burnout and career decisions. The data was analyzed using a linear regression model.	The overall sample consists of 185 ECTs working in 77 schools located within 10 districts (5 Michigan districts, 5 Indiana districts). Sample districts were chosen because of their medium-to-large sizes and the	Administrator–teacher relations did significantly predict teacher burnout but not to the magnitude that administrative duty, workload, or time resources did individually or as a combined measure.	This study showed a link between burnout for ECTs and their decisions to leave. The administrator-teacher relationship was not as large as a factor as workload perception and time resources.	There is a gap in the research on teacher well-being in the US and the role burnout plays in mobility. A better understanding of burnout is needed especially in the era of accountability.

				variance in student populations among them.			
Aarts, R., Kools, Q., & Schildwacht, R. (2020)	Providing a good start. Concerns of beginning secondary school teachers and support provided.	This study focused on what beginning teachers actually experience of induction programs in schools and whether the programs and activities fit the teachers' individual needs.	The researchers used qualitative methods to investigate the concerns of beginning teachers and the support that they are offered. The teachers participated in support activities and then answered questions about that support.	The participant group was comprised of 19 teachers in their first year of teaching and 16 in their second year. All taught secondary school in the Netherlands.	The responses indicated that the main concern for the beginning teachers was primarily focused on their role as a teacher and the instruction and workload. The support that received the most favorable responses included coaching conversations, working in practice, reflection, and using video.	First year teachers get the most support and that support dwindles as teachers move to the 2 nd and 3 rd years of their careers. Not all support directly matches the concerns of the beginning teachers which could make it less effective.	An induction program needs to extend at least to teachers in their 2 nd year and the support should match up with the concerns that the teachers have.

APPENDIX B

Interview Protocols

Early Career Teacher Interviews Round 1

1. What have been the biggest challenges for you in the classroom? RQ2
2. What supports do you feel would help you address those challenges? RQ1, RQ2
3. How do you feel supported by school leaders? RQ1, RQ2
4. What role does observation play in the refinement of your practice? RQ2
5. How would you describe your process of reflection on your practice? RQ2
6. What role do your colleagues play in your growth as a teacher? RQ2
7. What impact has the just-in-time support group had on your growth as a teacher? RQ2
8. What impact have school leaders had on your growth as a teacher? RQ1

Early Career Teacher Interviews Round 2

1. What have been the biggest challenges for you in the classroom? RQ2
2. What supports do you feel would help you address those challenges? RQ1, RQ2
3. Has reflection changed for you over the past couple of months? RQ2
4. How have you grown from the beginning of the semester? RQ2
5. What area would you like to grow in further? RQ2
6. Looking back to beginning of the year until now is there anything you wish would be different? RQ1
7. How do you feel supported by your school leaders? RQ1

8. How has collaborative planning team impacted your growth? RQ1, RQ2

Early Career Teacher Interviews Round 3

1. What have been the top three concerns you have had this semester? RQ1, RQ2
2. What has been your biggest takeaway from our learning together? RQ2
3. Think back over the semester and all that we accomplished together. In terms of support, what do you wish there had been more of for you? Less of? RQ1, RQ2
4. Can you describe the impact that the just-in-time group has had on you and your teaching? RQ2
5. Do you have any advice for school leaders about how best to support early career teachers? RQ1

Focus Group Interviews

1. What do you see as challenges for the ECT? RQ1, RQ3
2. How do you typically support early career teachers? RQ1
3. What barriers, if any, are there to support ECTs? RQ1
4. How do you encourage collaboration among peers? RQ3
5. How do you encourage observation among peers? RQ3
6. How is reflection integrated into the everyday work of teachers? RQ3
7. What impact has the just-in-time support group had on the growth of the teachers? RQ3