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FIVE SCHOOL DISTRICT MENTOR MODELS
FOR SECONDARY MATHEMATICS AND SCIENCE TEACHERS
IN A JOB EMBEDDED UNIVERSITY TEACHER PREPARATION PROGRAM

by

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B. A. Stetson University, 2005
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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the School of Teaching, Learning, and Leadership
College of Education and Human Performance
at the University of Central Florida
Orlando, Florida

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2015

Major Professor: Rosemarye Taylor

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ABSTRACT

Mentoring was a component of the Resident Teacher Professional Preparation Program (RTP³), a Race to the Top (RTTT) program funded project. RTTT funded efforts reward states that have demonstrated success in raising student achievement and have the best plans to accelerate learning in the future (U.S. Department of Education, 2014). Five Florida school districts implemented different variations of the RTP³ mentor model and due to the unique needs of each school district, context differences in effectiveness may have emerged. The purpose of the study was to determine the differences among the five mentor models, the extent to which these differences may relate to variances in mentoring effectiveness, and the impact on persistence of the resident teachers in teaching. School district designee interviews were conducted and mentor and resident teacher surveys were administered. Interview and survey data were analyzed using the grounded theory approach (Glaser & Strauss, 1967) and open coding (Strauss & Corbin, 1990) to determine mentor and resident teacher perceptions of the effectiveness of the RTP³ mentoring support.

The findings of the research suggest that the decisions of the five partner school districts to add additional targeted supports to their mentor models had an impact on increased persistence rates and decreased rates of resident teachers leaving the field of teaching. The majority of mentors perceived that common professional learning increased their capacity as a mentor to a moderate or large degree. The findings suggest that resident teachers who had school-based mentors perceived that their mentors were somewhat to very influential in assisting them in being more effective teachers. There were limitations to this study. Five school districts in the state of Florida were used in the study, and the sample of survey and interview participants were

limited. Therefore results may not be able to be generalized to other school districts in Florida or other states. Additionally, the objectivity of survey and interview participants may be questioned because the participants were employees of the school district. However, it was assumed that participant's responses to the survey and interview questions were candid.

Further research is recommended that would examine variations in school district mentor preparation and selection processes. Further recommendations would include evaluating different mentor models within the same context to better examine the impact of specific components of mentoring programs and considering the effectiveness of the mentee based on not only mentee perception of increased effectiveness, but effectiveness as determined by the school district-adopted evaluation system. Another avenue for future research to broaden and support the findings in this study would be to assess whether effective mentoring models differ depending on the context and based on the needs and experiences of the beginning teachers.

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CHAPTER 1 THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction

Ancient Greek civilization inspired achievements that shaped the foundation of Western civilization. The Greeks excelled in physics, astronomy, and mathematics as well as in the fields of art, philosophy, and architecture. The Greeks introduced ideas such as democracy and freedom of speech. The Greeks were also a highly spiritual civilization and it is from Greek mythology that the word “mentor” is derived.

In Greek mythology, Mentor was a loyal friend and adviser to Odysseus, king of Ithaca. Mentor helped raise Odysseus' son, Telemachus, while Odysseus was away fighting the Trojan War. Mentor became Telemachus' teacher, coach, counselor and protector, building a relationship based on affection and trust. (“Mentor Coach,” n.d., para.1-4)

Throughout history, the meaning of the word mentor has not changed much. A mentor is someone who leads by example, serves as an advocate and resource for the mentee, and models analytical and reflective practices (Rutherford, 2005).

Many inspirational and impactful people throughout history have attributed their success, in whole or in part, to the guidance of a mentor. Dr. Martin Luther King Jr. credited Dr. Benjamin Mays, a distinguished African American minister and scholar for taking him under his wing. Dr. King referred to Dr. Mays as his spiritual and emotional father (Inspiring the Inspired, n.d, para 7). Mahatma Gandhi sited Dadabhai Naoroji, an Indian leader who helped to start the Indian Independence Movement in 1857, as his inspiration. In a writing describing their relationship Gandhi stated, “The story of a life so noble and yet so simple needs no introduction

from me or anybody else. May it be an inspiration to the readers even as Dadabhai living was to me” (“Degree Scout,” n.d., para 7).

Problems of high teacher attrition, low teacher efficacy, and a lack of reflection on professional practice have led educational stakeholders to look for solutions. Legislative mandates such as: No Child Left Behind 2001 and the Individuals with Disabilities Education Improvement Act 2004, require a highly qualified teaching force, the use of evidence-based practices, and documentation of student achievement (U.S. Department of Education, 2007). To meet these educational challenges mentoring programs have been needed to support new teachers in becoming reflective practitioners who learn how to make effective decisions about curriculum, instruction, and assessment. Fletcher and Strong (as cited in Mathur, Gehrke, & Kim, 2012) found that “student academic gains were greater for classrooms in which the beginning teacher had access to consistent mentoring supports, but beginning teacher mentor programs do not only benefit the mentee” (p. 154). In their brief review of the literature, Huling and Resta (as cited in Mathur et al., 2012) identified “four benefits of serving as a mentor: improved professional competence, increased reflection on the mentor’s own practice, a reported sense of renewal, and a building of the mentor’s capacity for leadership” (p. 154).

Dating back to the ancient Greeks, great leaders throughout history have relied on the support and guidance of a mentor along the way. If new teachers are going to be successful, mentoring programs in the field of education should be structured to foster a “reciprocal process in which both participants (mentors and mentees) learn, improve in making effective decisions, and grow as teachers” (Mathur et al., 2012, p. 155).

The five partner school districts in this research study affirmed a commitment to investing in teachers and a drive toward improving student achievement through a highly structured and supported mentoring program for mathematics and science Masters of Arts in Teaching (MAT) students in the Resident Teacher Professional Preparation Program (RTP³). A research university in Florida was awarded the RTP³ Race to the Top grant by the Florida Department of Education. The research university, in partnership with five local school districts, prepared graduates with science, technology, engineering, and mathematics (STEM) degrees to teach mathematics and science in Florida middle and high schools. These STEM teachers are referred to as resident teachers and mentees throughout this report of the study. The goals of RTP³ included raising mathematics and science achievement, improving and innovating teacher preparation to increase the number of effective mathematics and science teachers, recruiting, preparing, and supporting teacher candidates. This study addressed the goal of identifying and developing effective mentor teachers to support resident teachers, and incorporating mini-modules, lesson study, and technological simulations (Resident Teacher, 2014).

Conceptual Framework

History of Public Education

Most schools in the United States are public institutions, funded by local, state, and federal governments, and function to serve all children in our society. The tradition of schooling in the United States, however, has been far different. In the early 18th century, education was privately run and typically religiously affiliated. These early schools served mostly the sons of

white middle class families, and wealthy families often brought in tutors to educate their children at home. Toward the end of the 18th century there were structures of private-run, religious, and publicly supported schools; however, each structure was strongly tied to certain classes of the population and there were few schooling options for women and minorities (Gallagher, Goodyear, Brewer, & Rueda, 2012).

Between the late 1700s and mid-1800s, cities in the United States were on the rise. Industrialization had brought with it a large population of low skilled and immigrant workers. Along with the growing population cities faced a growing problem as well; an influx of children whose families could not afford to send them to private schools. As crime rates began to increase, a shift in public opinion toward publicly funded schooling for all children gained popularity. Many believed that the role of schools should be to teach children how to become productive members of society (Gallagher et al., 2012).

Teacher Preparation

Teacher preparation schools rose out of a demand for more teachers. The first teacher preparation schools taught pedagogical skills in order to prepare elementary school teachers. Later, colleges started preparing secondary teachers and eventually through scientific research and graduate preparation, colleges professionalized the teaching field. Whereas the focus of teacher preparation was originally on increasing the expertise of experienced teachers, research universities gradually began to offer undergraduate programs to prepare individuals before they ever entered the profession (Feiman-Nemser, 1989).

At the time of the present study, there were variations not only in the type of preparation that pre-service teachers received but also great variances in support once individuals entered the teaching profession. One common type of support teachers often receive in their first years of teaching is the support of a mentor teacher. The idea of mentoring as a support for new teachers is a relatively new idea in education. Mentoring originally began in the 1980s as a means of providing beginning teachers with an enhanced level of support and as a way to increase retention rates (Ingersoll & Smith, 2004).

In a career field where most of teachers' time is spent inside the classroom teaching, it can be difficult for them to find time to interact and engage in meaningful conversations with other teachers, leaving teachers feeling isolated. Mentoring was developed to support beginning teachers and combat the high attrition rates seen in the first three to five years of teachers' careers. Beginning teachers need support; not only so they will remain in education, but to increase their pedagogical knowledge, improve their instructional practice and increase student achievement. Mentoring has provided a way for the education field to support, prepare, and empower beginning teachers (Ingersoll & Strong, 2011; Mutchler, 2000; Stanulis & Floden 2009).

Benefits of Mentoring

One of the most common benefits that mentoring provides for beginning teachers is support; and when beginning teachers feel supported, they are more likely to stay in education (Hattie, 2009; Hobson, Ashby, Malderez, & Tomlinson, 2009). Due to varying factors and supports in education, it is more difficult to assess the direct impact that mentoring has on

teaching skill. More research still needs to be done in order to better assess the effect of mentoring (Hobson et al., 2009). An unexpected benefit of mentoring may be the impact that mentoring has on the mentors themselves. Mentors have reported that they have grown professionally as the result of assisting and supporting beginning teachers. Mentoring also has the power to impact the school culture and climate, fostering high levels of collaboration and lowering attrition rates (Hobson et al., 2009). Additional benefits of mentoring include the following: emotional and psychological support, ability to put difficult experiences into perspective, increased morale, and job satisfaction (Hobson et al., 2009).

Components of Mentoring

Well-developed mentoring programs implemented with fidelity have the ability to greatly impact beginning teachers. Most states now require induction programs, of which mentoring is a component, for all new teachers (Rockoff, 2008). One of the most important factors in developing and implementing mentoring programs is evaluating the contextual support surrounding the program. Discussions must be had surrounding factors such as: time, compensation, school culture, and mentor involvement in the design and evaluation (Hobson et al., 2009).

Once a mentor program is in place many other factors come into play. Forced mentor relationships have proven to be ineffective. Therefore, it is critical to spend the time to ensure that appropriate pairings have been made between mentors and mentees. Some of the traits associated with positive mentor/mentee relationships include the mentor being prepared, supportive, experienced, reflective, communicative, open-minded, collaborative, and sincere

(Hobson et al., 2009). A successful mentor-mentee relationship has clear goals and objectives that are established by the mentor's having a clear understanding of the needs of the mentee. Beginning teachers recognize the following components as being integral to an effective mentor experience: regular meetings, a mentor who teaches the same content, common planning time, willingness to share curricular materials, opportunities to observe each other teach, and the time to meet with a peer support group. Effective mentor programs have the ability to increase the capacity of all teachers. However, programs vary greatly in quality and design, and additional research needs to be conducted in order to understand the true impact that mentoring programs have (Hobson et al., 2009).

Statement of the Problem

The problem studied was that STEM degreed individuals who come to education with no education degree nor education preparation face challenges due to a lack of pedagogical knowledge and a lack of practice in education. This study was conducted to examine the effectiveness of mentor models implemented in five Florida school districts toward meeting these challenges for STEM degreed individuals who began teaching in 2013 and were participants in RTP³

Purpose of the Study

Mentoring is a component of RTP³, a Race to the Top (RTTT) funded program. Five Florida school districts implemented different variations of the RTP³ mentor model and due to the unique needs of each school district, context differences in effectiveness may have emerged.

The purpose of the study was to determine the differences among the five mentor models, the extent to which these differences may relate to variances in mentoring effectiveness, and the impact on persistence of the resident teachers in teaching. In addition, the purpose of this study was to add to the body of knowledge on mentoring and examine its relationship to teacher effectiveness and persistence.

Research Questions

There are four research questions that guided this study. The following research questions relate to the design of the mentor models and perceived effectiveness of the mentors in supporting the resident teachers' success.

1. To what extent did the five partner school districts' mentor model align with the RTP³ mentor model?
2. To what extent, if any, was there a relationship between the mentor model implemented and the persistence rates of the resident teachers in the five partner school districts?
3. To what extent did mentors perceive that common professional learning assisted them in being effective mentors?
4. To what extent did the resident teachers perceive that the mentors assisted them in being effective?

Definition of Terms

The following terms listed were defined in accordance with their significance and context within the study.

Resident teacher effectiveness: Measured on a Likert-type scale and indicate the extent to which the resident teacher perceived that their mentor assisted them in being an effective teacher.

Mentor: Someone who leads by example, serves as an advocate and resource for the mentee, and models analytical and reflective practice.

Persistence rates: The rate at which new teachers entering the field remain in the field of teaching in the same content area and at the same school.

Professional learning: An extended learning opportunity which fosters collaboration among colleagues and focuses on research-based practices to strengthen and refine knowledge.

Race to the Top: A 4.35 billion dollar federal grant that was funded as a part of the American Recovery and Reinvestment Act of 2009. The grant created a competition in which school districts made reforms in order to meet certain educational policies.

Resident Teacher Professional Preparation Program (RTP³): Job-embedded teacher preparation program preparing high-performing graduates with STEM degrees from 2008 to present to teach mathematics and science in Florida's middle and high schools.

Resident teachers (Mentee): Teachers who are enrolled in the Resident Teacher Professional Preparation Program and maintain employment with one of the five central Florida school districts.

STEM: Science, Technology, Engineering, and Mathematics.

Methodology

Research Design

The research design for this study was qualitative. Qualitative and quantitative data were collected through the use of confidential surveys, structured phone interviews, and RTP³ quarterly reports. The data collected included resident teachers' perceptions of the mentoring component of the RTP³ job-embedded teacher preparation program, resident teacher perceptions of effectiveness, and resident teacher persistence rates. In this research study, the researcher did not implement any programs or treat the population of program participants in any way.

Participants

The population for this study was comprised of the resident teachers in the five partner Florida school districts. A total of 140 resident teachers were admitted to the MAT program. The sample included resident teachers who were participants in the RTP³ between 2013 and 2014. A total of 81 resident teachers were enrolled in RTP³ in 2013 through 2014, 61 (75%) participated in the resident teacher survey. Resident teachers were employed as mathematics or science teachers in middle or high schools in the five partner school districts while also enrolled in the Master of Arts in Teaching (MAT), Mathematics Education Program (Middle or Secondary) or MAT Science Education Program (Middle, Biology, Chemistry, or Physics) at the target university.

Instrumentation

RTP³ evaluation data were used and included: RTP³ quarterly reports, interviews with the five partner school district designees, resident teacher persistence data from the five school districts, Mentor Survey results, and Resident Teacher Survey results. The researcher developed survey items for mentors and resident teachers participating in the RTP³. The survey items were reviewed by knowledgeable experts in the field and were edited and revised based on the input of these professionals. The surveys included open-ended and closed-ended questions to provide input on how program effectiveness could be improved. Appendix A contains the Mentor Survey. Appendix B contains the Resident Teacher Survey and the email template used to communicate with resident teachers.

Interview items were developed by the researcher to determine the differences in structure of the mentoring component of the RTP³ in each partner school district. The interview items were reviewed, edited, and revised based on the input of knowledgeable experts (Swan, Godek, Zhou, Coulombe-Quach, & Katzenmeyer, 2012). All school district designee interviews were conducted over the phone, recorded, and later transcribed.

Prior to conducting the school district designee interviews, all school district designees were sent an email which included the school district designee interview items along with the letter of informed consent. These items can be reviewed in Appendix C.

Procedures

School district designees were tasked with structuring and leading the coordination and collaboration between their school district and the central Florida research university. The

school district's RTP³ designee was contacted by the principal investigator to provide information on the structure of the program in that school district and to provide the number of resident teachers who had participated in the program in their district. The researcher then analyzed the models for similarities and differences to create the interview items.

Respondents to the Mentor and Resident Teacher Surveys were assured anonymity. Individual responses to survey items were not shared with the partner school districts. The investigator reviewed all data obtained from participants.

Approval for conducting this research was obtained from the University of Central Florida's Institutional Review Board and can be found in Appendix D. The research participants were not identified or linked to their survey responses in any way. The researcher did not know the identities of the original employees invited to participate, and their responses to the surveys were confidential.

Data Analysis

Advisory Board minutes, presentations, reports, and interviews with the five partner school district designees were analyzed to determine the extent to which the partner school districts' mentor models aligned with the RTP³ mentor model. Resident teacher persistence data from the partner school districts was obtained and analyzed to determine the rate at which the resident teachers remained in the teaching profession in the same content area and at the same school. Interview and survey data were analyzed using the grounded theory approach (Glaser & Strauss, 1967) and open coding (Strauss & Corbin, 1990). Resident teacher survey data, as well as mentor survey data, were analyzed by both the principal researcher and a research assistant.

After individual analysis was concluded, discrepancies were discussed and resolved to generate a single set of themes for each survey item (Morse, Barrett, Mayan, Olson, & Spiers, 2002). Armstrong, Gosling, Weinman, and Marteau (1997), in their discussion of qualitative research methodology, suggested that analysis of qualitative data by two or more researchers to identify themes in the same data set, improves reliability. School district designee interviews were recorded digitally, transcribed, and then coded and analyzed by the researcher as well as a research assistant for common or significant statements. Researchers applied themes to the data independently and discussed disagreements until consensus was met (Morse et al., 2002). Several responses to interview items were coded to multiple themes. Additional details of the methodology used are discussed in Chapter 3. Research questions, follow-up interview questions, and survey items are displayed in Appendix E.

Significance of the Study

Given the variations in quality and structure of mentoring programs and the gaps that currently exist in the literature, this study provides fundamental insight into the impact of mentoring programs which meet an identified set of minimum standards, and will permit for comparisons across districts. Results of this research can be used to assist in evaluation of the mentor program toward meeting the goals of that specific district. Survey and interview responses can assist professional development services in differentiating instruction and preparation for newly appointed teachers who are required to complete a new teacher mentoring program.

The findings of this study can be used to create improved mentor models, methods of delivery, learning environments and implementation strategies to promote effective use of time and resources available to the school district and preparation program. This study sought to add to the body of knowledge on how to improve teacher efficacy, quality, and attrition through mentoring and will serve as feedback to decision makers on both the school district and school administration levels in the further development of new teacher mentoring programs.

Limitations

Limitations of this study include the following:

1. Five school districts in the state of Florida were used in the study. Results may not be able to be generalized to other school districts in Florida or other states.
2. The sample of survey respondents was limited to existing RTP³ employees in the five Florida school districts.
3. By surveying teachers employed in the target school districts, this may bring into question the objectivity of the respondents.

Delimitations

The research was delimited to mentors in the five target school districts and resident teachers with STEM degrees in the Resident Teacher Professional Preparation Program in the target university from 2013 to 2014.

Assumptions

1. It was assumed that participants in the study would respond with truthfulness and accuracy to the questions in the surveys and in structured interviews.
2. It was assumed that participants would understand the content of the questions on the survey instrument.
3. It was assumed that the study participant completing the survey was a school teacher who completed the school district developed mentoring program between the years of 2013 and 2014.

Summary

Mentoring programs, which developed in response to teacher shortages, high attrition amongst new teachers, and greater accountability, can be a powerful tool to improve teacher efficacy. There exists a broad base of support for the idea that beginning teachers, who typically work in isolation from their colleagues for most or all of their day, need an induction program. Practices of school principals and school district administrators to create and implement a mentoring program which supports and develops new teachers is critical to success of the mentoring program. School districts and school leaders have a professional obligation not only to protect the investment that they make when they hire a new teacher but to ensure that all new teachers are provided with the appropriate support, guidance, and feedback to improve their professional practice.

CHAPTER 2 REVIEW OF THE LITERATURE

Introduction

This chapter presents the grounds for conducting research on the RTP³ mentor models to determine the differences among the five mentor models, and the extent to which these differences may relate to variances in mentoring effectiveness and the impact on persistence of the resident teachers in teaching. Educational researchers have studied various components of mentoring for decades with mixed conclusions. A review of the research by Hobson et al. (2009) suggested that the potential of mentoring to positively influence mentees, mentors, and schools is unrealized. This study sought to build on the current body of research through the analysis of unique mentor models. The research was undertaken to aide educational leaders in creating improved mentor models, methods of delivery, learning environments and implementation strategies to promote effective use of time and resources available to school districts and preparation programs.

The researcher conducted a review of the literature using scholarly journal articles, reports, and texts related to mentoring, through the University of Central Florida's (UCF) online library and databases. With the assistance of library resources at UCF, a variety of databases were searched including: ERIC, Science Direct, Springlink, Web of Science, PsychINFO, and Dissertations & Theses Full Text. In addition, a selection of books containing information relevant to the research topic and research questions were also reviewed and referenced throughout the literature review. Information collected from journal articles, reports, and texts

were gathered and sorted by findings. This chapter provides a synthesis of the literature reviewed.

This literature review begins with a discussion of American educational reform followed by the history of teacher shortage in the United States and the effort to recruit and select highly qualified teachers. Thereafter, the literature review has been organized into the following sections and sub-sections: teacher preparation, teacher growth and development, professional development, induction, and mentoring, benefits of mentoring, components of effective mentor programs, retention and mobility, and teacher effectiveness. The last section summarizes the research on mentoring in education and its effects.

Quality Education for All Children

Every hour in the United States, 400 students drop out of high school (Children's Defense Fund, 2001). The April 1983 report, *A Nation at Risk*, commissioned by President Ronald Reagan marked a pivotal point in American educational reform. The report's findings suggested that American schools were failing and not adequately preparing our nation's students for the competitive workforce. Critiques of this report highlighted issues with the actual data used to substantiate the findings of the report, but little attention was paid to these critiques. Among the findings, several concerns were expressed explicitly regarding mathematics and science teachers, and many of the same concerns remained 30 years later. The report stated: (a) severe shortages of mathematics and science teachers existed; (b) there were shortages of mathematics teachers in 43 States, critical shortages of earth sciences teachers in 33 states, and of physics teachers everywhere; and (c) half of the newly employed mathematics, science. . .

teachers were not qualified to teach these subjects; and fewer than one-third of U. S. high schools offered physics taught by qualified teachers (National Commission on Excellence, 1983).

The No Child Left Behind Act of 2001, a reauthorization of the Elementary and Secondary Education Act originally authorized in 1965 by Lyndon B. Johnson, set the expectation that by 2014 every child in the United States would test on grade level in both reading and mathematics. Despite this mandate, the Children's Defense Fund (2014) reported that 66% of all public school eighth graders are unable to read or compute at grade level. Fifty years after the launch of the War on Poverty, major disparities in educational opportunities based on race and income (Children's Defense Fund, 2014) continued to be reported. The National Center for Education Statistics [NCES] (2001) reported that the richest school districts spend 56% more per student on average than the poorest school districts.

Teacher Shortages

Darling-Hammond & Baratz-Snowden (2005) and Howard (2007) predicted the need for over two million teachers to be hired to serve students in both the traditional and online teaching environments. The Council of American Private Education (2000) wrote:

The shortage of teachers hurts all of our children regardless of the type of school they attend, public or private. It spans the breadth of education in the United States and threatens to deprive the children of all races and social classes, in rural, urban, and suburban communities, of the quality education they will need. (p. 1)

Despite the need for quality teachers, there has been no indication that the pool of quality teachers is increasing. NCES (2001) found that college students who ranked in the highest

quartile, based on the Scholastic Assessment Test (SAT) and the American College Testing (ACT) scores, were the least likely to become teachers (p. 69). The Milken Foundation (1999) found that students entering college had strong negative opinions about the teaching profession. Only 4% of 10th-grade students nationwide indicated teaching as their expected profession leading to concern over who would fill the projected teaching vacancies over the next 10 years.

Of even greater concern than the lack of students entering college who plan to go into the teaching profession, has been the academic strength of the students who are choosing to enter the teaching profession. The NCES (2001) reported the following:

- Students with top quartile rankings were most likely to major in mathematics/computer/ natural sciences (37%), humanities (31%), or a social science (26%). They were least likely to major in education (14%).
- Private schools (33%) were more likely to have top scorers than public schools (15%). Public schools (26%) were more likely to have bottom scorers than private schools (18%).
- Graduates who taught at the secondary level (25%) were more likely to be in the top quartile than graduates who taught at the elementary level (14%).
- Top-quartile teachers (27%) were more likely to leave the profession than bottom-quartile teachers (19%).
- Teachers who did not originally major in education were more likely to be a top scorer (35%) than those who did prepare for teaching (14%) (p. 3).

It is well documented that beginning teachers, both graduates of traditional education programs and those who received alternate certification, report feeling unprepared to meet the

needs of all learners (Brownell, Hirsch & Seo, 2004; McLeskey, Tyler, & Flippin, 2004). School districts along with teacher preparation programs have been charged with redesigning current teacher preparation and induction programs to meet this need so that teachers enter the profession feeling equipped to effectively meet the demands of their jobs. Strong support for teachers in their formative years in the classroom can help teachers to feel supported, increase self-efficacy, and enhance the likelihood that teachers remain in the profession (Alliance for Excellent Education, 2004; Ingersoll & Kralik, 2004).

The goal of providing competent, highly qualified teachers to all students of all levels has repeatedly fallen short. The National Commission on Teaching and America's Future (NCTAF, 1996) reported:

Teacher recruitment and hiring are distressingly ad hoc, and salaries lag significantly behind those of all other professions. This produces chronic shortages of qualified teachers and the continual hiring of large numbers of people as "teachers" who are unprepared for their jobs. (p. 5)

Teacher shortage is a complex issue that goes beyond quantity. Murphy, DeArmond, and Guin (2003) argued that the quality of teachers, and not quantity, should be the focus when addressing the issue of teacher shortage. It has been widely recognized that teacher quality is one of the most important factors when it comes to student achievement (Darling-Hammond, 2000; Ingersoll, 1999), yet there is no clear consensus on what constitutes quality (Murphy et al., 2003).

Research on improving education in the United States has continued to focus around improving the quality of the nation's teachers (Goodlad, 1990; Lewis, 1993; Task Force on

Teaching as a Profession, 1986). Regardless of the supply of qualified teachers, schools must fill vacancies, often causing school districts to hire teachers who are not highly qualified or placing a substitute teacher in the classroom in place of a professional teacher. Ingersoll reported in 1999 that roughly four million secondary students were being taught by teachers who did not have either a major or minor in the field they taught and that the situation was even more grave in high-poverty schools where students were more likely to be taught by a less qualified teacher.

STEM Teacher Shortages

Across the United States school districts have faced critical shortages of science, technology, engineering and mathematics (STEM) educators. The challenge for school districts across the United States is two-fold: they must not only recruit, but also retain highly qualified STEM teachers in classrooms across the nation. The lack of mathematics and science ability of students in the United States has been attributed to the lack of certified STEM teachers, the inability to retain certified STEM teachers once they are hired, as well as to a deficiency in the professional development that is provided to STEM educators (National Academy of Sciences, 2006; National Research Council, 2002; U.S. Department of Education, 2002).

In 1999, Ingersoll wrote that over 50% of 12th-grade students in public schools were currently being taught physical science by a science teacher who had neither a major or minor in chemistry, physics, or earth science. The National Commission on Mathematics and Science Teaching for the 21st Century (2000) has called mathematics and science education in the United States unacceptable. The NCMST (2000) stated that the way to improve mathematics and

science education was through the hiring of highly qualified mathematics and science teachers, noting:

Evidence of the positive effect of better teaching is unequivocal; indeed, the most consistent and powerful predictors of student achievement in mathematics and science are full teaching certification and a college major in the field being taught. (pp. 7-8)

In NCMST's 50-page report, which was published on September 27, 2000, the Commission laid out the following four reasons why the nation's children need to achieve competency in mathematics and science: (a) the workplace is increasingly demanding mathematics and science related knowledge and ability; (b) mathematics and science is used in everyday decision making; (c) knowledge of mathematics and science is linked to national security interests; and (d) mathematics and science are primary sources of learning and will foster progress of our civilization.

The NCMST (2000) has also laid out three goals to address the national need for high quality mathematics and science teachers. These goals require effort and alignment at the federal, state, and local level and are based on the notion that high quality teacher education, in conjunction with needs-specific professional development, will significantly increase teacher quality and in turn, student achievement. Goal 1 focused on offering high quality professional development based on teacher needs. It also required leadership training for those providing the professional development. Goal 2 focused on ways to increase both the quantity and quality of mathematics and science teachers through innovative programs and methods. Goal 3 addressed improving the work environment through improved beginning teacher induction programs,

establishing partnerships between school districts and businesses, monetary incentives for teachers, and increases in salaries.

K-12 teachers make up 4% of the civilian work force, making teaching one of the largest occupations in the United States. Movement between schools for mathematics and science teachers is rampant. Ingersoll and May (2010) stated that in the 2004-2005 school year, “About 51,400 mathematics and science teachers--equivalent to 103% of those who entered schools at the beginning of the year--departed their public schools” (p. 21). Job transitions in the fields of mathematics and science have been extremely high with roughly one-third of mathematics and science teachers transitioning to different jobs each year. This leaves job openings across the country year after year (Ingersoll & May, 2010).

The dearth of research when it comes to the specific costs of teacher turnover in the education field has just begun to be addressed. In a study conducted by Ingersoll and Perda (2010), the data showed that schools have a more difficult time staffing mathematics and science teachers than teachers in any other field. Although the supply of mathematics and science teachers has kept up with increases in student enrollment as well as retirement, the supply is tighter in covering preretirement teacher turnover than in other subject areas. Because the cushion of new teachers in mathematics and science in relation to preretirement turnover is tighter, this often leads to staffing problems, especially at schools that experience high turnover rates (Ingersoll & Perda, 2010).

There are a variety of costs associated with employee turnover, including the loss of human capital, investment in professional development, the cost of rehiring and retraining new employees, and the disruption of production (Price, 1989). The National Commission on

Mathematics and Science Teaching for the 21st century (2000) recognized a significant need for STEM teachers over the next 10 years, prompting discussion and recommendations on how the nation should address this need. Much of the discussion surrounding this issue revolves around recruitment and retention of certified STEM teachers.

Recruitment and Selection

Recruitment and selection of STEM candidates for teaching positions typically targets individuals in one of the following three categories: (a) individuals who are certified to teach STEM-related content but decided not to enter the teaching field upon graduation, (b) individuals with STEM-related degrees who work in the private sector, or (c) individuals who have just graduated with an undergraduate degree in a STEM field. Recruitment and preparation of these individuals can take place through school districts, colleges/universities, or private venues. Recruitment strategies vary and often include, but are not limited to, some of the following methods: employment fair, social or print networks, the internet, career counseling, special certification programs, or corporate career fairs attracting retirees from the corporate world or workers who have experienced a reduction in force (Hutchison, 2012).

A key component of the recruitment process is the selection of candidates. The shortage of STEM teachers over the second decade of the 21st century not only calls for the recruitment of more STEM teachers but the recruitment of quality STEM teachers. Alternative or special certification programs should establish high standards. STEM teachers who complete programs where high standards for admission and program completion were established have been determined to have longer careers, be more effective teachers, be acknowledged as committed

professionals, and have strong content knowledge (Baskin, Ross, & Smith, 1996; Haberman & Post, 1998; Sachs, 2004; Spencer, 2005).

Teacher Preparation

Before the mid-1800s, little thought was given to teacher preparation. The first teacher preparation schools were known as normal schools. These schools rose out of an increased demand for teachers and taught pedagogical skills to prepare graduates to become elementary teachers. Liberal arts colleges then began to prepare students to become secondary teachers and by the turn of the century educators sought to professionalize teaching through scientific research and graduate preparation. Teacher preparation programs at modern research universities initially focused on graduate programs for experienced teachers. The scope of these teacher preparation programs eventually expanded to undergraduate programs which now train and prepare students with no prior teaching experience to enter the profession (Feiman-Nemser, 1989).

As graduates of teacher preparation programs receive their degrees and enter into the field as new teachers, the support that they receive has varied greatly, depending on the school, school district, or state where they work. Wang, Odell, and Clift (2010) stated, “both formal structures and workplace cultures have an impact upon new teachers’ socialization, learning, and development” (p. 47). One intervention, which schools have begun to implement to improve the socialization, learning, and development of new teachers, is mentoring programs.

Hobson et al. (2009) defined mentoring in the following way:

. . . the one-to-one support of a novice or less experienced practitioner (mentee) by a more experienced practitioner (mentor), designed primarily to assist the development of

the mentee's expertise and to facilitate their induction into the culture of the profession and into the specific local context. (p. 207)

Mentoring is a relatively new concept in education. As described by Ingersoll and Strong (2004), school-based mentoring programs began as a means to support new teachers and improve retention rates around the 1980s.

The percentage of beginning teachers who report that they participated in some kind of induction program in their first year of teaching has steadily increased over the past two decades--from about forty percent in 1990 to almost eighty percent in 2008. (p. 6)

Mentoring programs developed in response to teacher shortages and high attrition among new teachers. According to Mutchler (2000), a study of teacher recruitment and retention among graduating teachers showed that “twenty two percent of teachers leave in their first years in the classroom, and nearly thirty percent have left the profession by the five year mark” (p. 2). There is a broad base of support for the idea that beginning teachers need an induction program as a means to increase persistence rates, improve instructional practice, and elevate student achievement. Unlike many other professions teachers typically work in isolation from their colleagues for most or all of their day. This type of environment has the potential to make new teachers feel unsupported and unprepared to handle the challenges and responsibilities that they will face in their first few years in the classroom (Ingersoll & Strong, 2011). Stanulis and Floden (2009) stated “Beginning teachers need targeted support to overcome the many challenges in learning to teach” (p. 113).

Teacher Growth and Development

The National Board for Professional Teaching Standards (NBPTS) has developed a framework detailing what teachers should know and be able to do. The NBPTS has identified the following competencies as being integral to teacher growth and development: in-depth knowledge of their subject area, ability to organize content, understanding of how to teach to diverse learners, a commitment to all students, knowledge of how to best engage students in learning, the capacity to assess how students process information, the ability to think systematically and continuous reflection on practice. Along with possessing these traits and skills, effective educators need to work in concert with other teachers and administrators and be active participants in improving the educational landscape (NBPTS, 2005).

Professional development needs vary greatly depending on where teachers fall on the continuum of learning. Though teachers in all phases of their careers need to grow professionally, they have different needs and require various supports to assist them in their growth. Beginning teachers are working to develop their identity as a professional and at the same time striving to understand their curriculum, align assessments and instruction with standards, manage their classroom, understand the social and cultural climate of their new work environment, increase pedagogical knowledge, and familiarize themselves with the logistics of meeting professional job requirements. The needs of veteran teachers are different. Experienced teachers need opportunities to expand their content knowledge, refine their instructional practices to meet the needs of all learners, increase their repertoire of understanding as it relates to the integration of technology, and have opportunities to take on leadership roles. For beginning teachers, mentoring provides the critical support and guidance they need. For experienced

teachers, mentoring provides the opportunity to not only take on a leadership role but to refine their instructional practice as well (Feiman-Nemser, 2001, Loucks-Horsley, Love, Stiles, Mundry, & Hewson, 2003; Mundry, Spector, Stiles, & Loucks-Horsley, 1999).

In 1986, Shulman identified the two major factors that contributed to teacher effectiveness. The first factor was teachers' understanding of the content they teach and the second contributing factor was the understanding of how to best teach that content. Since then, a multitude of studies have been conducted investigating the role that content knowledge plays in teacher effectiveness. In the areas of mathematics and science, the Math and Science Partnership (MSP, 2007) and the Knowledge Management and Dissemination (KMD) projects have expanded upon Shulman's work, identifying three elements for understanding teacher content knowledge: (a) teachers should understand the content they teach--at both the student-level and several levels beyond what the student is expected to know; (b) teachers should know how knowledge is generated in their areas of study; and (c) teachers should have an understanding of the content which is deep enough to break down concepts and make pedagogical decisions based on this (MSP, 2007).

Fennema and Franke (1992) and Friel and Bright (2001) created similar theoretical frameworks which break down areas of teacher content knowledge. Both frameworks underscore the importance of not only teacher knowledge of the curriculum but also knowledge of how students think, misconceptions students may hold, and how to appropriately plan instruction based on this knowledge. Their findings illustrate that it is a combination of both pedagogical content knowledge combined with subject-area specific knowledge that results in a positive impact on instruction. The combined research of Fennema and Franke (1992), Feiman-

Nemser (2001), Friel and Bright (2001), Loucks-Horsley et al. (2003), MSP (2007), Mundry et al. (1999), NBPTS (2005), and Shulman (1986) categorizing the knowledge needed for effective instruction should guide the decisions states, school districts, and school administrators make when it comes to professional development.

Professional Development, Induction, and Mentoring

A review of the literature on professional development, induction and mentoring reveals many parallels. According to Feiman-Nemser et al. (1999) successful induction and mentoring programs incorporate almost all of the same elements of well-designed professional development. Although induction and mentoring go beyond professional development we must consider how professional development principals apply when developing professional learning opportunities for beginning teachers (Feiman-Nemser et al., 1999).

Professional development, induction and mentoring should assist teachers to increase their knowledge and skills and improve their practice. Induction and mentoring go beyond professional development in that the specific needs of beginning teachers; emotional, pedagogical, and content-specific needs, all need to be taken into consideration when developing professional learning opportunities (Luft, Roehrig, & Patterson, 2002). In addition, mentoring affords beginning teachers the opportunity to learn, practice, and deepen knowledge through sustained structured interactions with highly successful and knowledgeable mentor teachers (Britton et al., 2000; Luft, Bang, & Roehrig, 2007). At the same time mentors benefit from the professional development they receive and are provided the opportunities to grow their capacity as a mentor and leader (Loucks-Horsley et al., 2003). The ensuing sub-sections provide brief

background information on professional development, induction, and mentoring in education and include specific connections to mathematics and science instruction.

Professional Development

In order to see gains in teacher effectiveness and student achievement, significant changes to teacher knowledge and practice must take place (NCES, 1998). Professional development is one way to support teachers in this growth process. Guskey (2000) defined professional development as, “processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students” (p. 16). The teaching profession suffers from high turnover percentages for new teachers within their first five years in the profession, therefore making it essential to have an effective induction and professional development plan in place (Halford, 1998; Ingersoll, 1999; Merrow, 1999).

Professional development that is driven by policy makers, district or school administrators and is not connected to teachers’ classroom practices has historically been shown to be ineffective (Corcoran, 1995). In order to gain teacher buy-in, professional learning opportunities must take into account teachers’ values, background and views (Darling-Hammond & McLaughlin, 1995). Effective professional development should mirror best practices in teaching and, therefore, teacher learning should be developed in a way that allows teachers to build on their prior knowledge and experiences (Corcoran, 1995). Additionally, effective professional development should engage teachers in activities and experiences which afford them the opportunity to read, reflect, analyze, collaborate and practice (Darling-Hammond &

McLaughlin, 1995). The following subsection provides an overview of the literature on content-based professional development in the fields of science, technology, engineering, and mathematics.

Professional Development: STEM Teachers

A review of the literature on professional development for STEM teachers shows that effective programs have the following elements in common: they are intensive and sustained, content-specific, and focused on pedagogical skills. The development and delivery of professional development is done by those who are both well-trained and have strong content-knowledge. Programs are aligned with teachers' goals, programs are supported by school, district, and state policies and include opportunities for active learning. They are collaborative in nature, and they provide a pathway for professionals to develop their leadership capacity (Banilower, Boyd, Pasley, & Weiss, 2006; Cohen & Hill, 2000; Corcoran, 1995; Darling-Hammond & McLaughlin, 1995; Garet, Porter, Desimone, Birman, & Yoon, 2001; Hill & Ball, 2004; Loucks-Horsley et al., 2003, MSP, 2007;). Teacher quality has been shown to improve when professional learning opportunities are content-specific and incorporate best practices. Improvements in teacher quality ultimately lead to gains in student achievement over time (Banilower et al., 2006; Cohen & Hill, 2000; Guskey & Sparks, 2002, Garet et al., 2001, MSP, 2007).

Induction and Mentoring

Although often used interchangeably or in conjunction with one another, induction and mentoring are not synonymous terms. Induction programs were introduced in the 1980s as a means to support new teachers and improve retention rates. Mentoring is the most frequently encountered component of comprehensive induction programs and provides a critical support to new teachers entering the profession (Smith & Ingersoll, 2004). Along with the mentoring component, the contextual environment is another factor that influences whether or not new teacher induction programs are likely to be effective (Hobson et al., 2009). Induction programs vary in both scope and their program elements. Although program variations are vast, induction programs have been shown to decrease teacher attrition while accelerating the professional development of new teachers and, therefore, have become the primary method for improving teacher retention (Ingersoll & Kralik, 2004; Kapadia, Coca, & Easton, 2007; Portner, 2005; Smith & Ingersoll, 2004; Strong, 2005).

According to Easterby-Smith and Malina (1999),

Mentoring is a learning relationship between an experienced professional and an individual who is entering a new experience and who is ready to learn a new craft, disseminate this new craft effectively, seek assistance often, ask questions to assist with growth, and achieve data-driven and noticeable results. (p. 77)

School-based mentoring programs began in the 1980s as a component of larger induction programs aimed at retaining and building the capacity of beginning teachers. Porter (2005) noted that “One out of every two new teachers will quit teaching within five years; however,

studies show that comprehensive induction programs can slash attrition rates in half and dramatically accelerate the professional development of new teachers” (p. xxii).

Induction and Mentoring - Mathematics and Science Teachers

Literature related to mentoring and induction in general is vast. However, only a few studies have focused on content-based mentoring of teachers of mathematics and science. Several research studies have been conducted on a university associated, content-based mentoring program in Arizona, Alternative Support for Induction Science Teachers (ASIST) (Luft & Patterson, 2002; Luft et al., 2002, Luft, Roehrig, & Patterson, 2003). These studies were structured around the idea that science teachers needed different types of supports and that mentoring and induction programs should be developed keeping these supports in mind, as well as the stages in which beginning teachers transition. In order to help beginning science teachers develop student-centered instructional practices they need the following supports: logistical, instructional, conceptual, psychological and philosophical (Luft & Patterson, 2002; Luft et al., 2002, 2003).

New teachers first need logistical and instructional support. These types of supports include: locating materials, writing lesson plans and deconstructing standards. Next, mentoring programs should not be one size fits all, they should recognize the content support needs of beginning teachers and meet them where they are at (Luft et al., 2007). Ample professional development opportunities should also be offered for beginning teachers that allow them to participate in standards-based active learning experiences. Mentoring programs should work to

connect universities, school districts, and experienced teachers in a collaborative effort to retain quality teachers through well-designed mentoring programs (Luft & Patterson, 2002).

The goal of the ASIST program was to ease the transition into the teaching profession. The components of the ASIST induction program included: content-specific mentoring, Saturday meetings, electronic communications, classroom visits by project staff or peers, and a trip to a state or national teacher conference. Of the participants in the ASIST project, 90% reported that they were more confident in their ability to teach science and that they improved their ability to use inquiry based instruction. A total of 75% of the participants claimed that the program challenged their thinking about science instruction (Luft & Patterson, 2002).

A follow-up study, conducted by Luft et al.(2003), compared teachers who participated in the ASIST program with beginning science teachers in school-based induction programs and those with no formal induction. Teachers in the ASIST program developed significantly more student-centered inquiry lessons than their peers. Luft et al.'s (2003) findings supported how powerful collaborations between school districts and universities can be on the practices of beginning science teachers.

Friedrichsen, Chval, and Teuscher (2007) were also interested in the appropriate supports for beginning mathematics and science teachers. In an effort to support beginning mathematics and science teachers, the researchers developed the Beginning Teacher Institute (BTI). Spurred by discontent among BTI participants over state mandated support programs, Friedrichsen et al. conducted a qualitative study of 18 teachers in order to investigate the support structures being used by beginning mathematics and science teachers.

An analysis of the data showed that teachers had mixed mentoring experiences. Beginning teachers viewed mentors as supportive who; initiated regular meetings, taught the same content area as themselves, had the same planning time, and shared curriculum materials. Beginning teachers also found content-specific professional development to be more useful. Other factors that beginning teachers reported as helping them to be successful in their first years of teaching included: teaching the same course as the previous year and frequent interactions with teachers in their building who taught the same content. Beginning teachers also noted that communication with other beginning teachers provided them with emotional and social support (Friedrichsen et al., 2007).

Britton, Raizen, Paine, and Huntley (2000) also conducted research in order to better understand the characteristics of successful mentoring and induction programs for mathematics and science teachers. Britton et al. (2000) used a comparison approach reviewing and identifying elements of effective mentoring programs both in the United States and abroad. In the report by Britton et al. to the National Commission on Teaching Mathematics and Science in the 21st Century, the authors reported on mentoring and induction practices across fifteen countries. Countries were selected based on their performance in the Third International Mathematics and Science Study.

Based on their findings, Britton et al. (2000) made the following recommendations regarding beginning teacher mentoring programs for mathematics and science teachers: beginning teachers should be provided content-specific support, support should focus on professional skills, mentors who support beginning teachers should be selected carefully and receive sufficient training, beginning teachers should observe other teachers, beginning teachers

should have more favorable schedules, beginning teachers should have peer support groups, mentoring programs should be systematic, connections between pre-service teaching and professional development should be made, adequate resources should be provided, and both formative and summative program evaluations should be conducted in order to ensure that the mentoring or induction program in place continues to meet the needs of beginning teachers.

Benefits of Mentoring

More school districts have begun to embrace induction programs which include mentoring as a component as a means of retaining new teachers and improving teacher quality. The research on the benefits of these programs and how they are being implemented across the country is still evolving (Kapadia, Coca, & Easton, 2007). Ingersoll and Smith (2004) stated, “Strong induction programs that provide opportunities for teachers to be involved in decision making and that have strong administrative support along with support to develop strong classroom management can keep teachers in the profession” (p. 29). Despite the enthusiasm and support for induction programs and the fact that the majority of states require induction programs for new teachers, according to Rockoff (2008), “We know little about the magnitude of the benefits they have received or how the impact of mentoring varies across different types of programs” (p. 4).

All induction programs are unique and each is implemented with varying levels of fidelity. The research thus far has been mixed on the benefits of these programs. To realize the actual benefit of these programs, the characteristics that all induction programs should have must be identified. Rutherford (2005) discussed attributes that all induction programs should have:

. . . induction programs should include orientations, professional development, personal and professional support, opportunities for new teachers to observe best practice in teaching and learning, and feedback for mentees on their work in light of student achievement data and district performance criteria. (p. 5)

Because mentoring programs grew out of a desire to increase persistence rates (the rate at which new teachers entering the field remain in the field of teaching) as well as to support teachers and improve instructional practice, the research was also reviewed in terms of its ability to achieve those goals. According to two meta-analyses of 74 studies including over 10,000 people, Hattie (2009) found the overall effect size, or d , of mentoring to be .15, which was considered a low effect (p. 188). When the data were further analyzed, mentoring was shown to have even less of an effect on performance outcomes, $d = .08$; however, its effect on satisfaction was .6, which is considered to be a high effect size (Hattie, 2009, p. 188). In light of the original objectives that mentoring programs were intended to achieve, these two meta-analyses indicated that mentoring had a high effect on teacher satisfaction and was likely to assist in accomplishing the first goal of increased persistence rates among new teachers and the second goal of supporting beginning teachers. However, the effects of mentoring were mixed when it came to measuring achievement of the third goal of improved instructional practice (Hattie, 2009).

The way in which mentoring was defined and implemented in the studies within the meta-analyses calls attention to why the research may indicate such a low effect size on performance outcomes. Hattie (2009) defined mentoring by stating that mentoring “assumes that supportive relationships with older people are important for personal, emotional, cognitive, and psychological growth. Mentoring usually involves little, if any teaching and is more an

apprentice model based on social and role model experiences” (pp. 187-188). This definition varies greatly from that of Hobson et al. (2009) who emphasized that one of the roles of the mentor was to assist the mentee in developing expertise (p. 207). Rutherford (2005) also shared a very different perspective on the essential characteristics that mentoring programs should include, saying that “Not only should they provide new teachers with support but further, they should provide professional development as well as opportunities for teachers to observe best practice in teaching and learning and receive feedback on their performance” (p. 5). A qualitative study conducted by Hudson (2012), used surveys, questionnaires, and interviews to examine new teachers and found that these teachers needed more support than just being informed about school culture and infrastructure. They also needed help with pedagogy and behavioral management. Mentors who modeled practices and provided feedback were found to be critical in the induction process.

Although the research on new teacher induction programs has continued to evolve, there are some trends in the research on the potential benefits of these programs. Hobson et al. (2009) identified the most common benefit of mentoring as being “related to the provision of emotional and psychological support, which has been shown to be helpful in boosting the confidence of beginner teachers, enabling them to put difficult experiences into perspective, and increasing their morale and job satisfaction” (p. 209). The research has also shown benefits in improving the time management skills and classroom management ability of new teachers. As well, mentors have benefitted mentees by assisting them in adapting to the culture and expectations of the school. The area where the research has remained somewhat limited has been in the

mentor's ability to help in the development of the mentee's teaching skill. Hobson et al. discussed the lack of evidence as to the direct impact of mentoring on teaching skill:

Evidence for the direct impact of mentoring on beginning teachers' development, especially their teaching skill, is somewhat limited. This results partly from the difficulties of researching this area and of differentiating between the simultaneous effects of different potential contributors to beginner teachers' development, and partly from the restricted ways in which mentoring has sometimes been employed. (Hobson et al., p. 209)

An unintended benefit of new teacher induction programs may be the impact that mentoring has not only on the mentee, but on the mentor. Hobson et al. (2009) stated, "A wealth of evidence, based predominately upon the accounts of mentors themselves, suggests that mentoring beginning teachers may have a positive impact on the professional and personal development of mentors" (p. 209). One study of mentor perceptions reported, "70% of mentors claim to have benefitted professionally from mentoring" (Hobson et al., p. 209). Another impact may be the effect that mentoring has on the school and educational system. If mentoring new teachers leads to higher persistence rates and creates a more supportive and collaborative environment, schools will experience less turnover and a culture of collaboration will be fostered (Hobson et al.).

Components of Effective Mentor Programs

There are several conditions that have the most influence on whether or not new teacher induction programs are likely to be effective: the contextual environment within which they are

implemented, how the program's mentor selection and pairing process works, what mentoring strategies are used, and what preparation and support is provided to the mentor (Hobson et al., 2009). When it comes to contextual support the most important factors that contributed to a successful mentoring program were found to be the following: mentors had time to prepare for their role, time was allotted during the school day for mentors and mentees to meet, mentors received some incentive for their work, mentors were involved in the design and evaluation of the program, and the school in which the mentoring took place was characterized by a collegial and learning culture (Hobson et al., 2009). Next, the selection and pairing process in new teacher induction programs was most effective when the mentor teacher was experienced and effective, when the mentor taught the same subject as their mentee, and when they possessed the necessary qualities of a mentor and had a sincere interest in wanting to mentor beginning teachers. The research has shown that mentor relationships that are forced are not effective (Hobson et al., 2009).

Additionally, mentors and mentees should establish goals and objectives for the mentoring relationship and the mentor should be receptive to the needs of the mentee. The following four mentoring approaches have shown to be the most effective: the mentor should provide support for the mentee and make them feel included, the mentor should make time for the mentee, the mentor should allow the mentee a certain degree of autonomy, and the mentor and mentee should observe each other's lessons followed by an analysis of the process (Hobson et al., 2009).

Finally, appropriate preparation and support must be provided for both the mentor and the mentee. The biggest factor in poor mentoring is poor mentor preparation. The most effective

means to implement an effective induction program is to build the capacity of mentors. Hobson et al. (2009) noted “several studies have suggested that mentors are more likely to be able to employ effective mentoring strategies where they have undertaken an appropriate program of mentor preparation” (p. 212). Hobson et al. suggested the use of seminars to prepare mentors:

Participation in seminars organized around the practice of mentoring, together with other teacher-mentors and university-based teacher educators. Such seminars could operate as affinity groups, helping to overcome mentor isolation, facilitating the development of a shared discourse for mentoring, and enhancing mentors’ skill development through conversations about mentoring practice and pedagogy. (p. 212)

The research on mentoring has been found to be overwhelmingly positive, but its effect has varied greatly depending on the structure and fidelity with which each individual program is implemented. Mentoring has the capacity not only to impact the mentor and mentee but the school, the district, and the educational system as a whole. However, some researchers have pointed out the problems associated with mentoring. The research has highlighted the following problems associated with mentoring: negative consequences for the learning of the mentee because of poor mentor practice, mentors are often unavailable and do not provide the necessary support to mentees, mentors increase the work load of new teachers and cause them anxiety, mentors do not provide mentees with sufficient autonomy, and mentors tend to focus on practical issues and less on pedagogical ones (Hobson et al., 2009).

Despite some of the problems that have been associated with mentoring the preponderance of the literature reviewed suggested that “a well-developed mentoring program for new teachers can contribute to the quality of their practice, not merely their retention in the

profession” (Mutchler, 2000). The practice of mentoring in education is relatively new and the literature continues to grow. The research reviewed at the time of the present study suggested that mentoring has the potential not only to help mitigate the problem of teacher retention but improve teacher skill, student achievement, benefit the mentor, enhance the school environment and culture, and impact the district and educational system by creating a professional environment where the capacity of all its professionals is increased through collaboration and reciprocal teaching.

Although there are accounts of flawed implementation and existing gaps in the literature, mentoring programs have been shown to have a positive impact overall. In order to realize the full impact of induction programs, further research needs to be conducted in the following areas where research is either lacking or conflicting: cost-effectiveness of mentoring compared to other interventions, mentees’ willingness to be mentored, the impact of mentoring on the learning of the mentor and the mentee’s students, and to what extent mentoring programs enhance teacher retention in the profession. Other topics that could be addressed are the impact of different kinds of mentor preparation programs on mentor effectiveness, how mentors and mentees should be paired, mentor strategies, e.g., which mentor strategies promote which specific outcomes, should assessment and support functions be separated, and what are the merits and demerits of formal vs. informal mentoring (Hobson et al., 2009).

New teacher preparation programs vary greatly in quality and structure and therefore it is not surprising that there have been reports of poor mentoring practices and inconclusive research as to the how impactful this type of professional development can be. However, a review of the research suggested that the potential of mentoring to positively influence mentees, mentors, and

schools has been unrealized. An advocate for new teacher induction programs should seek to compare the effectiveness of mentoring programs which meet an identified set of minimum standards to that of programs that do not adopt these standards in order to gain further insight into the gaps that still exist in the literature on mentoring (Hobson et al., 2009).

Retention and Mobility

The STEM teacher shortage goes beyond the recruitment and selection of qualified STEM teachers. It requires a systematic plan to retain these teachers once they have entered into the profession. Nearly one-third of teachers leave the profession in their first two years, with teacher attrition reaching even higher in urban areas. Merrow (1999) compared the approach the nation has taken regarding the teacher shortage to pouring more water into a leaking swimming pool, stating:

You wouldn't expect that pouring more and more water into the pool would in time fix the leak, but that's precisely the approach we are taking to the so-called teacher shortage. Everyone's noticed that the teaching "pool" is low . . . and getting lower . . . Yet the pool keeps losing water because no one is paying attention to the leak. That is, we're misdiagnosing the problem as "recruitment" when it's really "retention." Simply put, we train teachers poorly and then treat them badly—and so they leave in droves.

(Merrow, 1999, pp. 1-2)

Ingersoll and May (2010) discussed the turnover levels for mathematics and science teachers:

high poverty, high minority, and urban public schools have among the highest mathematics and science turnover levels. In the case of cross-school migration, the data shows there is an annual asymmetric reshuffling of a significant portion of the mathematics and science teaching force from poor to not poor schools, from high-minority to low-minority schools, and from urban to suburban schools. (p. 1)

High attrition rates raise questions about the impact teacher turnover has on student achievement (Hutchison, 2012). Induction programs have been developed as a way to address the issue of teacher attrition and were established based on the widely accepted belief that a steep learning curve exists for teachers in their first years in the profession (Birkeland & Feiman-Nemser, 2012).

NCES (1997) reported that 20% of public school and 28% of private school teachers left because of job dissatisfaction; including reasons such as insufficient support, lack of recognition from administration, and poor salary. According to Spector's (1997) analysis of longitudinal research, the relationship between satisfaction and turnover was causal, stating; "It seems certain that the correlation is causal--job dissatisfaction leads to turnover, increased satisfaction decreases turnover" (p. 62).

Parker, Ndoye, and Imig (2009) studied the relationship between the mentoring support beginning teachers received and their intention to stay in the teaching profession. The sample consisted of 8, 838 teachers who received mentoring support for the first two years of their careers. To determine the quality of mentor support and its relationship to teachers' intentions to stay in the profession, the following variables were analyzed: mentor matching, degree of support, and frequency of interactions. The researchers found that beginning teachers were more

likely to remain in the teaching profession than their peers who had received less support when their mentors taught the same grade level and when the beginning teachers met with their mentors at least once monthly for the specified activities.

Additionally, a multivariate analysis completed by Ingersoll and May (2010) showed that certain school conditions and characteristics played a role in teacher turnover, and the reasons for teacher turnover were slightly different for mathematics teachers than they were for science teachers. For mathematics teachers, “Classroom autonomy, useful professional development, and student discipline were the greatest factors; while salary, student discipline, and useful professional development were the greatest factors for science teachers” (p.1). It is worth noting that both mathematics and science teachers cited not just professional development but useful professional development as one of the three strongest factors that played a role in their either staying or leaving a school. Smith and Ingersoll (2004) noted that mentoring was one of the key components of induction programs, providing critical professional development for teachers entering the profession.

Just as mathematics and science teachers vary in their reasons for leaving the teaching profession, they also vary in the type of induction programs they require in order to support them in their beginning years of teaching. Luft et al. (2003) investigated three different programs for secondary science teachers. One induction program was content focused, the other was a general support program, and the third provided no formal support. The findings in this study reinforced the importance of induction programs, specifically, content-focused induction programs. Mentees in the science-focused induction program implemented more student-centered inquiry instruction and experienced fewer barriers to teaching. These findings are significant because

most induction programs take a one-size-fits-all approach to new teacher induction, neglecting any content-focused support.

Although research surrounding the mobility and attrition of mathematics and science teachers has provided increasing insight, gaps in the literature remain as to the magnitude of the problem when it comes to the mobility and attrition of mathematics and science teachers. Questions also remain surrounding where teachers go if they leave the profession or move to a different school. If teachers do choose to leave the profession, the reasons why they do so are still in question. It has been hypothesized that mathematics and science teachers leave at a higher rate than other teachers because they have greater professional opportunities outside of the education field than teachers in other subject areas (Murnane, Singer, Willett, Kemple, & Olsen, 1991; Rumberger, 1987). In their study, Ingersoll and May (2010) found that there was a lack of evidence to support these hypotheses, and that mathematics and science teachers were no more likely to work in private business or industry than teachers in any other field.

Research conducted by Flecher and Strong (2009) focused on how mentoring impacts student achievement. These researchers looked at beginning teachers who were provided either full-release or site-based mentoring in a large urban school district. Full-release mentors were released from teaching and mentored full time whereas site-based mentors mentored beginning teachers at their site in addition to their teaching responsibilities. Mentors received the same training, but they differed in caseload and release time. There were greater gains in classes where the teachers were in the full-release group. The researchers noted that the demographic characteristics of the classrooms would have led to opposite predictions.

Teacher Effectiveness

Although beginning teachers who are provided a mentor have often reported being more effective as a result of their experiences with their mentors, most studies addressing the relationship between mentoring new teachers and the effectiveness of those new teachers have relied on either the perception of the mentor or mentee. The difficulty in establishing a relationship between mentoring and teacher effectiveness is two-fold: (a) there is no clear definition of teacher quality or effectiveness; only characteristics of effective teachers; and (b) the topic of professional development encompasses so many components it is nearly impossible to isolate mentoring as the determining factor in teacher effectiveness. Fenstermacher and Richardson (2005) stated, “Perhaps we cannot define quality teaching, but we know it when we see it” (p. 186).

Due to the complexities involved in the evaluation of teacher effectiveness, most teacher evaluation models use visible characteristics to assess teacher effectiveness. Polk (2006) listed the following characteristics as being common of effective teachers: “Good prior academic performance, communication skills, creativity, professionalism, pedagogical knowledge, thorough and appropriate student evaluation and assessment, self-development or lifelong learning, personality, talent or content area knowledge, and the ability to model concepts in their content area” (p. 26). Numerous researchers have supported the notion that effective teaching goes beyond being a content expert and that effective teachers are able to make connections for students, present content in a meaningful way, motivate and listen to students, and be reflective in their teaching practice (Berry, 2001; Darling-Hammond, 2005; Sindelar, Daunic, & Rennells, 2004). In fact, in Torff and Session’s 2006 study, principals reported lack of content knowledge

as a minimal concern as it related to teacher ineffectiveness. Ranking high on the list of principal concerns were (a) classroom management, (b) lesson planning and implementation, and (c) teacher/student relationships. Berry (2001) noted, however, that there is an exception in the fields of mathematics and science, where content knowledge has been linked to teacher effectiveness. Wise and Leibbrand (2000) also remarked that the public expects that teachers should have a command of content they teach and believe this knowledge directly impacts student achievement.

Teacher Effectiveness - Alternative Certification Teachers

A review of the research provided mixed conclusions regarding the effectiveness of alternatively certified teachers (Darling-Hammond, 2001; Ding & Sherman, 2006; Milanowski, 2004; Rockoff, 2004). Berry (2001) found that alternatively certified teachers were not prepared to develop lessons and deliver content in a way that enhanced student learning. Johnson-Leslie (2007) found a minimum of three years of classroom experience was necessary to become an effective teacher, suggesting that alternately certified teachers, who enter with no student teaching experience, are at a disadvantage compared to traditionally certified teachers. However, Torres (2006) found alternatively certified teachers performed their jobs as well or better than traditionally trained teachers. Additionally, in an evaluation of the Dallas Independent School District, Mahatha (2005) found that principals rated alternatively certified teachers higher than those who were traditionally certified. Due to a lack of teacher training and classroom experiences support systems such as mentoring are critical for new, alternatively certified teachers to be effective (Darling-Hammond, 2005).

Summary

Each year mathematics and science teachers enter classrooms underprepared to meet the needs of the students they serve. In order to see gains in student performance in mathematics and science, improvement in mathematics and science teaching must occur. Improving instruction will require focused professional development, which incorporates support programs such as induction training and mentoring in order to develop and cultivate teacher capacity. Designing mentoring programs for mathematics and science teachers is a complex task, which requires consideration of multiple variables and a comprehensive plan for how those variables will work together (NCMST, 2001). Well-designed mentoring programs implemented with fidelity provide more support for teachers, help them to grow professionally, increase their pedagogical and content knowledge, and foster high levels of collaboration leading to increased job satisfaction and an improved likelihood that teachers will stay in education (Hattie, 2009; Hobson et al., 2009).

CHAPTER 3 METHODOLOGY

Introduction

The primary goal of this study was to determine the differences among the five mentor models, the extent to which these differences may relate to variances in mentoring effectiveness, and the impact on persistence of the resident teachers in teaching. Independent instruments were used to measure these variables. Four research questions were formulated to focus the study. These questions and the sources of data used in the analysis of data are displayed in Table 1.

Table 1

Research Questions and Sources of Data

| Research Questions | Sources of Data |
|---|--|
| 1. To what extent did the five partner school districts' mentor model align with the RTP ³ mentor model? | Interviews with the five partner district designees and RTP ³ quarterly reports |
| 2. To what extent, if any, was there a relationship between the mentor model implemented and the persistence rates of the resident teachers in the five partner school districts? | RTP ³ quarterly evaluation reports |
| 3. To what extent did mentors perceive that common professional learning assisted them in being effective mentors? | Mentor Survey results |
| 4. To what extent did the resident teachers perceive that the mentors assisted them in being effective? | Resident Teacher Survey results |

The methodology used to test these research questions is presented in this chapter. The chapter has been organized into the following six sections: (a) context, (b) selection of participants, (c) instrumentation, (d) procedures, (e) data collection, and (f) data analysis.

Context

This study was conducted in one large research university in Central Florida and five surrounding and distinct central Florida public school districts. The RTP³ was designed by the central Florida research university and school district partners to create an innovative job-embedded program to prepare STEM degreed individuals to teach in Florida's middle and high schools. The university implemented this program in collaboration with five surrounding central Florida school districts. School District A was a statewide public virtual school serving over 122,000 students. School District B was a central Florida public school district serving over 41,000 students. School District C was a large urban public school district in central Florida which served over 177,000 students, making it the 10th largest school district in the nation. School District D was a public school district in central Florida serving over 65,000 students. School District E was a central Florida public school district serving over 61,000 students and employing over 3,800 teachers. Each of the five school districts was guided by the minimum requirements of the mentoring model established by the RTP³ mentor model work group. All of the partner school districts added additional components to their mentor models. The distinctions between mentor models in each school district are outlined in Chapter 4.

Selection of Participants

The population for this study was comprised of the resident teachers in five Florida school districts. The sample included resident teachers who were enrolled in RTP³ between 2013 and 2014. Participants were employed as mathematics or science teachers in middle or high schools in these school districts while also enrolled to the Master of Arts in Teaching (MAT), Mathematics Education Program (Middle or Secondary) or MAT Science Education Program (Middle, Biology, Chemistry, or Physics) at the target university. The entirety of the population of the 2013-2014 cohort of resident teachers were selected as participants in this study so as to ensure the most reliable results (Krathwohl, 2009).

Instrumentation

The researcher developed survey items for mentors and resident teachers participating in the RTP³. Internal validity of the survey was supported through the writing of survey items that were short, clear, and unbiased (Ritter & Sue, 2007). The researcher used open-ended survey items, on both the Resident Teacher Survey and Mentor Survey with the exception of a single closed-ended, ordinal scale question posed on each of the surveys. Open-ended questions were used predominantly to allow for the most freedom in responses (Dillman, Smyth & Christian, 2009). The survey items were reviewed by knowledgeable experts in the field and were edited and revised based on the input of these professionals.

Mentor Survey

In an email survey, mentors were first asked about the extent to which they believed their participation in common mentor professional learning assisted them in becoming a more effective mentor teacher. Response categories included: to a very small extent, to a small extent, to a moderate extent, to a large extent, and to a very large extent. This question was followed by three open-ended response questions as to their actions as a result of participation in mentor professional learning. Queries addressed (a) what they did differently as mentors, (b) what they did differently as teachers, and what they recommended to be considered as future similar mentor models were developed to assure effectiveness. The Mentor Survey is displayed in Appendix A.

Resident Teacher Survey

In an email survey, resident teachers were first asked about the extent to which they believed that their RTP³ mentor influenced them in becoming more effective teachers. Response categories included: extremely influential, very influential, somewhat influential, not at all influential, and I did not have another school-based mentor. This question was followed by three open-ended response items eliciting (a) specific examples of how their RTP³ mentor assisted them in becoming a more effective teacher, (b) specific examples of what they wished their RTP³ mentor had done to assist them in being a more effective teacher, and (c) what recommendations they had for future similar mentor models to assure effectiveness. The Resident Teacher Survey is displayed in Appendix B.

School District Designee Interview Guide

Interview items were developed by the researcher for use in telephone interviews conducted with school district designees to determine the differences in structure of the mentoring component of the RTP³ in each partner school district. An open-ended question format was chosen in order to gather the richest data (Dillman et al., 2009). Probing questions were asked to follow-up on interviewees' responses and to clarify the researcher's understanding. The interview items were reviewed by knowledgeable experts in the field and were edited and revised based on the input of these professionals (Swan et al., 2012). Respondents were queried as to (a) whether their school district had added additional components to the RTP³ mentor model, (b) if their school district had amended the RTP³ mentor model and the considerations that went into making that decision, (c) if they thought the decision made enhanced the mentoring component of the RTP³, and (d) what recommendations they might make to someone who had a similar project in the future to assure an effective mentor model. The School District Designee Interview Guide is displayed in Appendix C.

Procedures

The following procedures and time frames established were met for the successful completion of this study. After the revision of the survey and interview items, and development of the proposal by the researcher, all were approved on February 19, 2014 by the researcher's dissertation committee. The University of Central Florida's Institutional Review Board (IRB) on June 10, 2014 (Appendix D). No research activities were initiated prior to obtaining IRB approval. In the third week of June, the school district designees were emailed the informed

consent letter (Appendix C) along with the school District Designee Interview Guide. In the fourth week of June, all school district designees were contacted via phone, informed consent was obtained, and the interviews were conducted. All interview questions were recorded to document consent as well as for coded analysis purposes.

Data Collection

Survey Data Collection

The researcher developed two email surveys: a survey for mentors participating in the RTP³ and a survey for resident teachers participating in the program. The survey items were reviewed by knowledgeable experts in the field and were edited and revised based on the input of these professionals (Swan et al., 2012). Respondents to the survey were assured anonymity, and individual responses to survey items were not shared with the partner school districts. The investigator reviewed the data obtained from participants, and findings were reported in aggregate, not individually. The research participants were not identified or linked to their survey responses in any way. Though the researcher knew the identities of the original employees invited to participate, she did not know the identities of specific respondents. Thus, responses to the surveys were anonymous.

Interviews

The school district's RTP³ designee was contacted by the principal investigator to provide information on the structure of the program in that district and to provide the number of resident teachers who had participated in the programs in their districts. The researcher then

analyzed the models for similarities and differences. Informed consent was obtained from interviewees prior to the telephone interviews. As a courtesy, the structured interview questions were e-mailed to the interviewees prior to the telephone interview for review. The interviewer asked one question at a time, and all interviewees were given the opportunity to respond before proceeding to the next question (Dillman et al., 2009).

To ensure confidentiality in regard to school district designee interviews, participants were assigned codes in place of their names. This random code was used to identify interviewed respondents for all activities linked to the study. The link connecting participants' names to the random code was destroyed after the completion of the study. Aggregated data were available for review by the researcher, members of the researcher's dissertation committee, and the target school district designee.

Data Analysis

The data sources for each research question included: school district designee interview responses, RTP³ quarterly reports, Mentor Survey results, and Resident Teacher Survey results. For the structured interview portion of the research, school district designee interviews were digitally recorded and later transcribed. The transcripts were then coded and analyzed for common or significant statements.

Information from the interviews was used to identify common statements, phrases, and words. Data were analyzed by both the principal researcher and a research assistant. Using the transcribed summary reports of the responses of all interviewees to each of the interview questions, the researcher counted common words and/or phrases shared by respondents in

answering each of the four interview questions and follow-up questions using the constant comparison method (Elliott & Lazenbatt, 2005). The common words and phrases identified in the reports were grouped based on their relative closeness to educational industry standard terminology and concepts. The common words and phrases were then reviewed to arrive at themes that emerged in the responses of the teachers interviewed. After individual analysis was concluded, discrepancies were discussed and resolved to generate a single set of themes for each survey item (Morse, et al., 2002).

The same method was used to analyze open-ended survey items on both the Resident Teacher Survey and the Mentor Survey. Responses were grouped into themes and supporting statements were selected, providing evidence of the themes identified in the study.

An analysis of archival data from RTP³ quarterly evaluation reports along with the school district designees responses to interview items were used to determine the extent to which the five partner school districts' mentor models aligned with the RTP³ mentor model. Archival data included: advisory board minutes, presentations, and descriptions of the mentor models from the five partner school districts. Resident teacher persistence data for the five school districts' resident teachers were obtained through the RTP³ annual summative evaluation report, and persistence rates were reported using a frequency table.

Summary

This chapter provided a description of the mentoring component of the RTP³, a restatement of the purpose of the research, and a review of the research questions. The targeted population was reviewed, and the selection of participants was discussed. The instrumentation

used for the qualitative data collection included archival data and a researcher-designed Resident Teacher Survey, a Mentor Survey, and a District Designee Interview Guide. The instrumentation section described the validity of the surveys and interview questions as well as other sources of data. Processes and procedures used in gathering survey and interview data were discussed, and the methods of analysis for both the surveys and interview data were presented. Chapter 4 contains the results of the analysis of the data used to answer the research questions which guided the study.

CHAPTER 4 PRESENTATION AND ANALYSIS OF DATA

Introduction

This chapter presents the results of the analyses of data obtained from five central Florida school district designee interviews, mentor surveys, resident teacher surveys, archival data, and resident teacher persistence data. This chapter has been organized to review the procedures used in identifying the sample. Second, descriptions of each school district's unique mentor models are presented. Next, reports of interviews and the themes that emerged are highlighted. The remainder of this chapter provides a summary of the data analyzed organized in response to each of the four research questions that guided this study.

Resident Teacher Professional Preparation Program (RTP³)

Introduction

In the 2011 Project Application to the Florida Department of Education, a large central Florida research university applied for funds to support the following job embedded teacher preparation program: Resident Teacher Professional Preparation Program (RTP³). The intent of this program was to prepare content experts in the STEM fields to teach middle and high school students and was developed based on the 10 design principles for clinically based teacher preparation. Students who were selected to participate in this program worked throughout five surrounding Florida school districts while at the same time earning their Master of Arts in Teaching (MAT), Mathematics Education Program (Middle or Secondary) or MAT Science Education Program (Middle, Biology, Chemistry, or Physics) at the target university. The

purpose of RTP³ was to create an innovative job-embedded program to prepare STEM degreed individuals to teach in Florida's middle and high schools (Florida Department of Education Project Application, 2011).

Program Goals and Objectives

The initiative was developed to meet the following stated goals of the Resident Teacher Professional Preparation Program (RTP³). They were:

1. To raise mathematics and science achievement and career/college readiness of all 6-12 students by increasing the effectiveness of teacher preparation programs to better prepare teacher candidates through job-embedded preparation and induction, and
2. To improve and innovate teacher preparation content, delivery, and performance measures in order to increase the number of effective mathematics and science teachers who are eligible for employment.

The initiative was developed to meet the following stated objectives of the Resident Teacher Professional Preparation Program (RTP³). They were:

1. Recruit, prepare, and support teacher candidates in mathematics and science to be effective during and after their induction.
2. Identify and develop effective mentor teachers through professional learning, independent modules, and train the trainer model for sustainability.
3. Redesign the Central Florida Research University's MAT teacher preparation program to include: a) integrated courses/mini modules, b) ongoing lesson study as reflective practice/professional learning (see objective 6), and c) use of existing and

- emerging technological solutions such as game/simulations for teaching and learning and incorporating TeachLIVE™ and experiential/service learning experiences (see objective 4-5).
4. Develop, pilot, evaluate, and revise game/simulations for independent teacher resident learning/practice in such areas as: classroom management, science and mathematics pedagogy, teaching diverse learners including those with special needs and those whose first language is not English.
 5. Develop, pilot, evaluate, and revise game/simulations for middle and high school student learning in mathematics and science in such areas as: lab safety, integration of mathematics and science concepts, mathematical modeling.
 6. Develop and implement the RTP³ lesson study model that has specific components and allows for flexible implementation in diverse contexts: online, small, large, rural, etc. (Florida Department of Education Project Application, 2011).

Resident Teachers

The Resident Teacher Professional Preparation Program (RTP³) consisted of 140 teachers, 59 teachers from cohort 1 and 81 teachers from cohort 2. In order to be considered for the program, candidates had to hold a degree in mathematics, science, engineering, or a related field, and their degrees must have been earned in 2008 or later in order to be eligible. RTP³ targeted candidates were those who had shown success in their undergraduate careers and also expressed an interest in teaching. In order to be accepted into the RTP³, at minimum, candidates had to have met the following requirements: an overall undergraduate GPA of 3.0 or higher,

passing score on the general knowledge test of the Florida Teacher Certification Examination, and have participated in an interview screening. In order to receive their MAT degrees, resident teachers had to pass the Subject Area Examination in the summer they were enrolled in the program and pass the Professional Education Test prior to graduation. RTP³ established targets for the number of resident teachers to be hired in each participating school district. Along with the recruitment of resident teachers, RTP³ also outlined that 70 highly effective mentor teachers would be selected throughout the five partner school districts and be matched with the resident teachers participating in RTP³. The partner school districts in collaboration with the university determined the criteria for selection and placement of resident teachers as well as selection and pairing of mentor teachers (Florida Department of Education Project Application, 2011).

The number of resident teachers employed varied across the five partner school districts. School District A employed 10 resident teachers in cohort 1 and 9 resident teachers in cohort 2. School District B employed 3 resident teachers in cohort 1 and 7 resident teachers in cohort 2. School District C employed 18 resident teachers in cohort 1 and 37 resident teachers in cohort 2. School District D employed 11 resident teachers in cohort 1 and 18 resident teachers in cohort 2. School District E employed 4 resident teachers in cohort 1 and 5 resident teachers in cohort 2. Table 2 contains the total number of resident teachers hired by each of the partner school districts, the number of resident teachers hired by each school district for Cohort 1 and Cohort 2, and the total percentage of resident teachers hired by each school district (Swan et al., 2014).

Table 2

Resident Teachers Employed by Participating School Districts

| School District | Resident Teachers Employed | | | Percentage Hired by School District |
|-----------------|----------------------------|----------|-------|--|
| | Cohort 1 | Cohort 2 | Total | |
| A | 10 | 9 | 19 | 15.5 |
| B | 3 | 7 | 10 | 8.2 |
| C | 18 | 37 | 55 | 45.1 |
| D | 11 | 18 | 29 | 23.8 |
| E | 4 | 5 | 9 | 7.4 |
| Total | 46 | 76 | 122 | 100.0 |

Program Design and Implementation

Candidates who were selected to participate in the RTP³ could earn a Master of Arts in Teaching in one of the following six tracks: Mathematics Education (Grades 5-9), Middle School Mathematics Education (Grades 5-9), Middle School Science Education (Grades 5-9), Science Education (Biology), Science Education (Chemistry), Science Education (Physics). The first cohort of candidates who were selected to enter the RTP³ were admitted in the summer of 2012 and subsequently hired by one of the five partner school districts in the fall of 2012. All resident teachers had to remain employed with one of the five partner school districts in order to participate in the RTP³. In the summer of 2013, the second cohort of resident teachers was admitted and subsequently hired by the five partner school districts in the fall of 2013 (Florida Department of Education Project Application, 2011).

Characteristics of the Five Partner School Districts

School District A

School District A is a statewide public virtual school serving over 122,000 students. The learning model implemented in School District A provides students the flexibility to learn at their own pace. School District A employs over 1,000 full time teachers, roughly 400 of which are mathematics and science teachers. Student enrollment in School District A rises each year, increasing the need for qualified teachers. This is especially true in the areas of mathematics and science because such a high percentage of the courses School District A offers have a STEM focus. Although the number of qualified teachers in this district has consistently increased, the turnover rate for teachers has remained extremely low, at less than 1%. Teacher success is measurable, and teacher evaluation in School District A has been based in part on student completion numbers along with student and parent satisfaction surveys. School District A has previously partnered successfully with the Central Florida Research University to provide pre-service teachers with internship opportunities (Florida Department of Education Project Application, 2011).

School District B

School District B is a public school district serving over 41,000 students in the central Florida area. Combined, the district employs over 320 mathematics and science teachers at the secondary level. For the 2010-2011 school year, School District B experienced a turnover rate of 8.4%. Data reviewed over a three-year period, between 2008 and 2011, show that each year

roughly 15% of the total number of secondary science teachers are new hires and 19% of the total number of secondary mathematics teachers are new hires. A review of the data revealed that the percentages of new teachers needed in the STEM fields were higher than the needs in any other grade level and content area. State science scores in School District B were lower than the state average across all three tested grade levels. Although School District B has shown some progress on state mathematics assessments, it still falls below the state average at four grade levels and only above the state average at one grade level (Florida Department of Education Project Application, 2011).

School District C

School District C is a large urban public school district which serves over 177,000 students, making it the 10th largest school district in the nation. School District C has 180 schools, 130 of which earned an A or B grade in 2010. School District C has been an ‘A’ district for three consecutive years. Despite its success, however, School District C has a 77% graduation rate. With 23% of students not graduating and sizeable gaps in achievement among subgroups, School District C has areas of need. Targeted schools across the school district have consistently performed below grade level in both mathematics and science (Florida Department of Education Project Application, 2011).

School District D

School District D is a public school district serving over 65,000 students. School District D has 69 schools, and 41% of the population served are eligible for free or reduced meals. Data

reviewed over three years reveals that of the new mathematics and science teachers hired each year, between 3.4% and 5.6% hold only temporary teaching certificates. Roughly 4.0% of new mathematics and 8.5% of new science teachers hired are out of field. Data from School District D underscores the need in this district for a greater pool of highly qualified teaching applicants in the areas of mathematics and science (Florida Department of Education Project Application, 2011).

School District E

School District E is a large public school district in central Florida serving a diverse population of over 61,000 students. A total of 16% of students in School District E receive exceptional student education services, 5% of students are English language learners, and over 53% of students are eligible for free or reduced meals. School District E has a graduation rate of 79%. Although School District E has no schools in the district which received an 'F' grade, the district's performance on state assessments in secondary mathematics has been consistently below the state average. Data from School District E reveals the need for new and innovative ways to improve both teaching and learning in the area of mathematics (Florida Department of Education Project Application, 2011).

Mentoring Support

School District Level RTP³ Mentoring

Each of the five partner school districts provided a support team to coordinate and support the professional learning of the resident teacher. There were some variations among

school districts for how RTP³ mentoring was carried out, but all provided the resident teachers with (a) a peer mentor to offer face-to-face feedback and assistance throughout the learning experience; and (b) an evaluating administrator to observe instruction and provide support and feedback. In accordance with Swan et al.'s (2014) recommendation, each partner school district's RTP³ budget included a stipend for each year for mentors, but amounts, dates of payments, and requirements to receive payment varied by school district.

School District A

In addition to the instructional leader (principal) support, School District A provided: a four-day annual staff conference, access to on-demand professional learning opportunities, and weekly schoolhouse meetings. In addition, each resident teacher was paired with an exemplary mentor teacher. Each potential mentor was interviewed to determine knowledge of best mentoring and coaching practices, problem solving ability, and ability to deal with difficult discussions in mentoring. Based on the interview, teachers were accepted into a pool of potential mentors. Once RTP³ resident teachers were hired, mentor teachers were selected based on their match to the subject of each RTP³ resident teacher. Each RTP³ resident teacher was matched one-on-one with a mentor teacher teaching the same subject. Mentor qualifications included:

- three or more years of experience as a successful virtual teacher,
- clinical educator certification,
- exceed expectations on the Communications and Intra-Personal Skills component on their annual evaluation, and
- a recommendation from instructional leaders.

Each resident teacher attended Transformations (School District A's Employee Onboarding) to prepare them for their role at School District A. Transformations was two-weeks in duration and included a structured five-day practicum experience for teachers. This preparation also included weekly follow up of all resident teachers for their first three months by a school assigned mentor. This was in addition to their RTP³ mentors (Swan et al., 2014).

Resident teachers worked virtually with their mentors in their classroom at first. Mentors followed a weekly schedule of skills and activities designed to give the resident teachers the experience needed to prepare them for their own classroom. Mentor teachers were required to submit a weekly log on the progress of their resident teachers; each resident teacher was also required to submit a weekly log. The resident teachers were assigned their own students once the instructional leader and mentor determined the resident teacher was prepared. Weekly reporting of mentoring continued after this point using web-based tools (Swan et al., 2014).

School District B

School District B had five instructional coaches in the Staff Development Department who were available for observations and feedback for all new hires. The first priority for these coaches were teachers with temporary certificates, and this included the resident teachers. School District B peer mentors were encouraged to attend an online mentoring class as well as a peer-coaching class provided by the school district (Swan et al., 2014).

After the RTP³ resident teachers were hired, principals were contacted for recommendations for the mentors. All of the mentors were matched one-to-one with their mentees. All taught in the same school and in the same content area as the resident teachers they

were mentoring. In addition, mentors were required to submit a reflection at the end of the school year. The reflection piece included lessons learned along with a description and evidence of resident teacher growth (Swan et al., 2014).

School District C

In addition to the New Teacher Induction program in School District C, which occurs each year, resident teachers in this school district had mentoring support from a school-based peer mentor and administrator. They also had an RTP³ peer-mentor and a school district-level mentor from Professional Development Services who were assigned to support them.

RTP³ peer-mentors were selected to participate through one of the following: participation in lesson study, effective and reflective practice, and/or recommendation by administrators or district personnel. When matching mentors and resident teachers, content area and work location were considered. If the resident teacher was unable to be matched with someone in a like content area at the same work location, a match was found in the same learning community. Because most of these mentors were not in the same school, they were encouraged to use remote observations to enhance their interactions. The school district contact provided an agreement that described the mentors' responsibilities (Swan et al. 2014).

In addition to attending the RTP³ mentor professional learning, mentors attended a school district-level meeting in September to learn more about the Florida Educator Accomplished Practices (FEAPS) and Marzano's Learning Framework with their resident teachers. This was provided to encourage a common language between the Central Florida Research University and School District C. Mentors and resident teachers were also given technology tips on how to

incorporate their iPads for communication and observation using FaceTime. In November, resident teachers and their mentors attended a follow-up school district technology professional learning event. Based on the needs of new teachers, School District C also created Interactive Notebook Professional Learning opportunities. RTP³ mentors were required to maintain a learning log/reflection journal of experiences with their mentees. Twice during the year the journals were collected, and the mentors were given feedback using the scale on the agreement (Swan et al., 2014).

School District C started off the school year with a Meet and Greet for RTP³ resident teachers and mentors. During this time, teachers and mentors talked about expectations for the first week of school and how to prepare. RTP³ mentors were invited to participate in multiple professional learning experiences with the RTP³ resident teachers and school based mentors throughout the year (Swan et al., 2014).

School District D

Resident teachers and their individual mentors were governed by the Induction Program requirements set forth by School District D in addition to the RTP³ requirements. These requirements were given to each mentor in the form of the Mentoring Portfolio Guide found in the RTP³ Mentoring Handbook that each received during the initial School District D RTP³ Mentor Training in early August. School District D explained the requirements and expectations of the individual mentors while reviewing the Mentoring Portfolio Guide during that meeting. In addition, School District D addressed the RTP³ mentoring objectives. School District D mentors met early in the school year for an extensive professional learning about the RTP³, discussions

about first-year teacher concerns, implementation of technology in mathematics and science classes, and classroom management issues (Swan et al., 2014).

School District D RTP³ resident teachers had many levels of support within the school district. Each resident teacher was assigned an individual mentor who taught not only at the same school but also in the same content area and many times the same course. The individual mentors worked directly with the resident teachers providing assistance. All public schools in School District D also provided a school mentor who supported all new teachers who were participating in the Induction Program within their school. These school mentors supported the RTP³ resident teachers in conjunction with their individual mentors by providing guidance in the culture and administrative requirements of the school and any recordkeeping and bookkeeping requirements associated with teaching. These school mentors also helped by supporting the individual mentors as well by providing coaching in instructional practice and classroom management as needed (Swan et al., 2014).

The RTP³ Program Manager and RTP³ District Mentor/Mathematics Specialist in School District D were the next level of support for the RTP³ resident teachers. These mentors assisted the school mentor and the individual mentor in supporting the resident teachers by providing peer observations, instructional practice and classroom management coaching and modeling, along with professional development opportunities to support professional growth (Swan et al., 2014).

The final level of support for the professional development of the RTP³ resident teachers was provided by university internship coordinators. These coordinators provided valuable evaluation and feedback that aimed to increase the professional proficiency of the resident

teachers. The suggestions given by the university's RTP³ Internship Coordinators was used by the school district mentor, school mentor, and individual mentor as they worked cohesively to provide the most individualized and beneficial support possible to ensure the professional success of the resident teachers (Swan et al., 2014).

School District D had a set of procedures used for identification, intervention, and monitoring of any concerns with the resident teachers' performance. The RTP³ Mentor Support Program and an RTP³ Mentoring Handbook were developed by the School District D designee to help to ensure that each mentor was informed about RTP³, its requirements, and the tools available to meet those requirements (Swan et al., 2014).

School District E

For School District E, in addition to the assigned school district-level Peer Assistance and Review (PAR) evaluating mentor and school-based PAR teacher, resident teachers were assigned to an RTP³ peer mentor. Two resident teachers in the same school shared the same school-based mentor. The other two teachers in the district had one-on-one RTP³ peer mentors who were not in their schools. These two mentors were district level teachers on assignment and had flexibility to provide face-to-face mentoring. School District E RTP³ mentors and resident teacher pairs were encouraged to meet at least weekly and complete a collaborative log at the end of each mentoring session, but this was not a requirement (Swan et al., 2014)

RTP³ peer-mentors were selected to participate through principal or supervisor recommendation. The mentors were provided with the school district's set of procedures (School District E's System for Empowering Teachers [VSET] and the teacher's Deliberate

Practice Plan [DPP]) for identification of, interventions for, and monitoring of concerns with the resident teachers' performance. This information was used to improve teaching and decision making throughout the program (Swan et al., 2014).

Demographics of Resident Teacher Survey Participants

A total of 81 resident teachers were enrolled in RTP³ in 2013 through 2014, and 61 (75%) participated in the resident teacher survey. Resident teachers were employed as mathematics or science teachers in middle or high schools in the five partner school districts while also enrolled in the Master of Arts in Teaching (MAT), Mathematics Education Program (Middle or Secondary) or MAT Science Education Program (Middle, Biology, Chemistry, or Physics) at the target university. Table 2 provides information as to the total number of resident teacher who responded to each survey item.

Table 3 reveals varied response rates for each of the four resident teacher survey items. For Survey Item 1, a total of 59 (96.7%) of resident teachers responded and 2 (3.33%) skipped the survey item. For Survey Item 2, a total of 51 (83.6%) of resident teachers responded and 10 (16.7%) skipped the survey item. For Survey Item 3, a total of 60 (98.3%) of resident teachers responded and 1 (1.7%) skipped the survey item. For Survey Item 4, a total of 57 (93.4%) of resident teachers responded and 4 (6.7%) skipped the survey item. Of the four resident teacher survey items, the closed-response item elicited the highest response rate amongst the resident teachers.

Table 3

Frequencies and Percentages of Resident Teacher Survey Responses: (N = 61)

| Survey Item | Respondents <i>f</i> (%) | Non-respondents <i>f</i> (%) |
|--|-----------------------------|---------------------------------|
| 1. Provide specific examples for how your RTP ³ mentor assisted you in becoming a more effective teacher. | 59 (96.7) | 2 (3.3) |
| 2. Provide specific examples for what you wish your RTP ³ mentor had done that you believe would have assisted you in being a more effective teacher. | 51 (83.6) | 10 (16.7) |
| 3. To what extent do you believe that your RTP ³ mentor influenced you in becoming a more effective teacher? Select the most appropriate response. | 60 (98.3) | 1 (1.7) |
| 4. What recommendations, if any, do you have for future similar mentor models to assure effectiveness? | 57 (93.4) | 4 (6.7) |

Demographics of Mentor Teacher Survey Participants

There were 54 mentor teachers throughout the five partner school districts who were paired with resident teachers to provide them with face-to-face feedback and assistance throughout the resident teachers' learning experiences. Each of the partner school districts was responsible for identifying and recruiting mentor teachers within their school districts.

Table 4 provides information as to the frequency and percentages of mentor teachers who responded to each survey item. For Survey Item 1, a total of 54 (100%) of mentor teachers responded and 0 (0%) skipped the survey item. For Survey Item 2, a total of 47 (87%) of mentor

teachers responded and 7 (13%) skipped the survey item. For Survey Item 3, a total of 45 (83.3%) of mentor teachers responded and 9 (1.7%) skipped the survey item. For Survey Item 4, a total of 44 (81.5%) of mentor teachers responded and 10 (18.5%) skipped the survey item. Of the four mentor teacher survey items, the closed-response item elicited the highest response rate among the mentor teachers; the same held true with the closed-response item on the resident teacher survey.

Table 4

Frequencies and Percentages of Mentor Teacher Survey Responses (N = 54)

| Survey Item | Respondents <i>f</i> (%) | Non-respondents <i>f</i> (%) |
|---|-----------------------------|---------------------------------|
| 1. To what extent do you believe that your participation in common mentor professional learning assisted you in becoming a more effective mentor teacher? | 54 (100.0) | 0 (0.0) |
| 2. As a result of participation in the mentor professional learning, what did you do differently as a mentor? | 47 (87.0) | 7 (13.0) |
| 3. As a result of participation in the mentor professional learning, what did you do differently as a teacher? | 45 (83.3) | 9 (1.7) |
| 4. What do you recommend to be considered as future similar mentor models are developed to assure effectiveness? | 44 (81.5) | 10 (18.5) |

Demographics of Interview Participants

Five interviews were conducted via phone with the school district designee from each of the partner school districts. School district designees were tasked with structuring and leading the coordination and collaboration between their school districts and the Central Florida Research University. The researcher spoke with one school district designee from each district, with the exception of School District C, where the researcher conducted a phone interview with two designees from the school district. School district designees received the informed consent and interview questions via email prior to the phone interview. 100% of school district designees responded to the four school district designee interview items as well as the follow-up questions that were posed during the interview.

Analysis of the Data

Research Question 1

To what extent did the five partner school districts' mentor model align with the RTP³ mentor model?

The first research question was developed in order to examine the similarities and differences among mentor models across the five partner school districts and the extent to which school district leadership added additional supports to the RTP³ mentor model. It should be noted that the total *n* for the five partner school districts was 76 and did not equal the *n* for the RTP³ due to the five resident teachers who were accepted into cohort 2 but were not hired by one

of the five partner school districts. Table 5 provides an illustration of the components of each mentor model by school district.

Table 5

Components of Mentor Models: Resident Teacher Professional Preparation Program (RTP³) and Five Partner School Districts (N = 81)

| Mentor Model Components | School Districts (n) | | | | | |
|--|--------------------------|----------|----------|-----------|-----------|----------|
| | RTP ³ (81) | A (9) | B (7) | C (37) | D (18) | E (5) |
| Peer Mentor | X | X | X | X | X | X |
| Evaluating Administrator | X | X | X | X | X | X |
| Professional Development (Mentor and Mentee) | X | X | X | X | X | X |
| Annual Stipend for Mentors | X | X | X | X | X | X |
| Clinical Educator Certification | X | X | X | X | X | X |
| Mentor Teaches the Same Content Area as Mentee | | X | X | | X | |
| Mentor Teaches the Same Subject as Mentee | | X | | | | |
| Mentor Teaches at the Same School as the Mentee | | X | X | | X | |
| Three Years of Successful Teaching Experience | | X | | | | |
| Mentor and Mentees are Paired One-to-One | | X | X | X | X | |
| Learning Log/Reflection Journal (Mentor and Mentee) | | X | | | | |
| School Assigned Mentor (First Three Months) | | X | | | | |
| Mentor and Resident Teacher Co-Teach Until Resident Teacher is Prepared for Their Own Students | | X | | | | |
| Reflection Log at the End of the Year (Mentor Only) | | | X | X | | |
| School Based Mentor in Addition to RTP ³ Mentor | | | | | | X |
| District Level Mentor in Addition to RTP ³ Mentor | | | X | X | X | X |
| Developed an RTP ³ Mentor Support Program | | | | | X | |
| Developed an RTP ³ Mentoring handbook | | | | | X | |

The researcher conducted interviews with six partner school district designees to gather information on the mentor models by school district and gain insight into their decision making process in structuring their mentor models. The researcher asked the following four interview

questions along with follow-up questions in an effort to clarify interviewees' responses and the researcher's understanding.

1. To what extent did the five partner school districts' mentor model align with the RTP³ mentor model?
2. To what extent did the resident teachers in the partner school districts have greater persistence rates, and less mobility, depending upon the mentor model implemented?
3. To what extent did mentors perceive that common professional learning assisted them in being effective mentors?
4. To what extent did the resident teachers perceive that the mentors assisted them in being effective?

Telephone interviews were recorded and transcribed and subsequently analyzed using the constant comparison method offered by Elliot and Lazenbatt (2005). Interviewee responses were themed and are presented in tabular form and include example comments. Six school district designees were interviewed, one each from four of the partner school districts and two designees from one of the partner school districts. The themes that emerged from the analysis of interview data are displayed in Tables 6-9.

Interview Question 1

The first school district designee interview question examined whether the five partner school districts added additional components to the RTP³ mentor model. Table 6 shows whether or not components beyond the RTP³ minimum were added by school district. School district designees from School Districts A, C, D, and E responded that their mentor models did contain

components beyond what was required by the RTP³ mentor model. The school district designee from School District B responded that she did not believe that any additional components were added, but after examination of School District B's mentor model, the model did contain additional components not required by the RTP³ model. Table 6 lists the additional components added to each school district's mentor model beyond the minimum required by RTP³.

Table 6

Additional Components Added to the Resident Teacher Professional Preparation Program (RTP³) Mentor Model (N = 6)

| School District | Yes/No | Additional Mentor Model Components Added |
|-------------------|--------|--|
| School District A | Yes | Mentor and mentee taught the same content; mentor and mentee taught the same subject; mentor was matched one-to-one with mentee; mentor and mentee taught at the same school; mentor had a minimum of three years successful teaching experience; mentee was provided weekly follow up for the first three months from a school assigned mentor; mentees co-taught with their mentor and were not assigned their own students until the mentor determined they were ready; and the mentor and mentee submitted weekly reflection logs. |
| School District B | Yes | Mentor and mentee were located in the same school; mentor/mentee taught the same content; mentors submitted a reflection log at the end of the year; mentees had the support of a school district level coach; mentor was matched one-to-one with mentee. |
| School District C | Yes | Mentees had the support of a school district level mentor; mentors were required to maintain a reflection log; mentors were matched one-to-one with a mentee. |
| School District D | Yes | Mentor and mentee taught the same content; mentor was matched one-to-one with mentee; mentees had the support of a school district level mentor; mentees had a school-based mentor in addition to their RTP ³ mentor; mentor and mentee were located in the same school; school district developed a RTP ³ mentor support program; and developed a RTP ³ mentoring handbook. |
| School District E | Yes | Mentees had the support of a school district level peer assistance and review mentor; mentees had the support of a school-based peer assistance and review mentor. |

Interview Question 2

The second interview item asked school district designees what considerations went into amending the RTP³ mentor model. Two themes emerged and are listed in order of importance: (a) components were added to the RTP³ mentor model in order to comply with current district policy; and (b) school districts wanted as much support as possible for resident teachers.

Three school district designees (50%) responded that additional components were included in their mentor models because they were already a part of what new teachers in their school district received as a result of their current school district policies. Four school district designees (67%) further noted that when adding components to the model they considered the ways in which they could provide additional support for resident teachers. The school district designee from School District B did not respond to this interview item because she did not indicate that additional components were added. The themes and school district designees' responses are shown in Table 7.

Table 7

School District Considerations in Amending the Resident Teacher Professional Preparation Program (RTP³) Model (N = 6)

| Theme | f (%) | School District Designee Responses |
|-------------------------------|--------|--|
| Support for resident teachers | 4 (67) | <p>“That’s just what's done with all novice teachers coming in. We wanted to make sure we were still following the model for those teachers because there's so much additional professional development pieces tied to it that aren't a part of the RTP³ that were still pertinent to their success in our district their first year so that's why it was left in place.” (School District Designee E)</p> <p>“We added this period where they weren't assigned students initially. Usually a teacher that comes from a background of teaching and gets hired gets students right away but we choose to give them a chance to get accustomed to working with students in a supervised way.” (School District Designee A)</p> <p>“Just making sure that those resident teachers had more than just one person to help them. Spreading them across several people, giving them lots of different people because even though someone may have the content knowledge and we place them together it didn't 100% work out as far as personalities and the way people click when they work together. So we tried not to have that one person be the holder of all the marbles. We needed them to have lots of different people that they could go to.” (School District Designee C)</p> <p>“...whenever we structured up having a district wide mentor as part of this process, it really was the idea that knowing that we were bringing in people with strong content background but with no teaching experience, the fact that they had not had a previous internship etc. we thought they might need an additional level of support beyond their school as well who could give them their dedicated attention throughout the program so that was the decision we made internally.” (School District Designee D)</p> |
| School district policy | 3 (50) | <p>“I think the additional things we required are just things we normally require of any teacher so we kind of put them into the same situation as a regular teacher” (School District Designee A)</p> <p>“We talked about on the front end when we became partners in the grant that we had to meet the requirements that we already have set forth for our new teachers so that's why the school mentor still included the new teachers because we have our own policy in place that dictates our induction program for new teachers. They still had to meet the [School District D] policy of induction.” (School District Designee D)</p> |

Interview Question 3

The third interview item asked school district designees how they thought the decision to add components to their mentor model enhanced the effectiveness of the mentoring component of RTP³. Three themes emerged and are listed in order of importance: (a) the components they added provided resident teachers more support; (b) the added components built resident teacher confidence; and (c) the added components provided mentors with a different perspective.

The most commonly shared response of school district designees was that the components their school districts decided to add provided the resident teachers with additional layers of support (50%). Additionally, school district designees noted that the components that were added helped to build the confidence of resident teachers (17%) and provided mentors with a different perspective than they otherwise would have had (17%). The school district designee from School District B did not respond to this interview item because she did not indicate in the interview that any additional components were added to School District B's mentor model. The three themes and school district designee responses are shown in Table 8.

Table 8

How Additional Components Enhanced Effectiveness of Resident Teacher Professional Preparation Program (RTP³) Mentoring Component (N = 6)

| Theme | f (%) | School District Designee Responses |
|------------------------------------|--------|---|
| Provided more support | 3 (50) | <p>“The choice we made to add the additional piece from the district level I think really provided a conduit for both the mentor and the resident teacher to have someone to help facilitate and help work with them on some logistics, help make sure that provide almost that place where the resident teacher could go if they needed to just have somebody whether to vent with, whether it was get additional information, have somebody come out, and even also just support to where our mentors sometimes went out and would cover the class so they could do modeling lessons back and forth and provide a time component for them to be able to work together.”</p> <p>“Having what we had in place I think it was significant in their success just by having that additional level of support. A lot of times I even acted as a mentor. I checked on them periodically and I made a lot of school visits, helped them with their technology, stuff like that.” (School District Designee D)</p> |
| Built confidence | 1 (17) | <p>“I think it really helped the RTP³ teachers to feel more confident by the time they got students. I think there was for many of them there was a feeling of I am not sure I'm ready initially because there's a lot. I think it's true of any teacher but sometimes I think they just kind of have to go ahead but we had the opportunity to give them that experience of working with another teacher and not having to learn everything right at once. (School District Designee A)</p> |
| Provided mentors a new perspective | 1 (17) | <p>“I had one mentor say to me now that I've worked on this team with her, I know things I can do to help her interact with her team. It wasn't just about the kids. It was also about how I can help her collaborate with the members of her team so that was something that would not have come out if we hadn't done lesson study with the mentor and the beginning teacher together.” (School District Designee C)</p> |

Interview Question 4

The fourth interview item asked school district designees what they would recommend to someone who has a similar project in the future to assure an effective mentor model. Three themes emerged and are listed in order of importance: (a) increased contact with mentors prior to the start of RTP³; (b) increased contact and accountability for mentor and mentee meetings; and (c) locate mentors and mentees at different work sites.

Of the six responding district designees, two (33%) indicated that they would recommend bringing mentors together prior to the start of the program and that they would recommend selecting mentors and mentees who are located at different work locations (33%). Some of their reasons for bringing mentors together before the start of the project included: ensuring that mentors are aware of the commitment and requirements of their participation in the project, and assessing the mentors' personalities in an effort to better match mentors with mentees. Some of the reasons that were given for placing mentors and mentees at different work locations included: lack of formality in meetings when mentors and mentees are located at the same school; selection of mentors should be based on who is the best fit for the mentee and not be restricted by the location of the mentor and mentee. Additionally, it was observed that future projects should put in place a mandatory and more structured meeting schedule for mentors and mentees. It should be noted that the school district designee from School District D had no recommendations for future projects. He commented that the mentor model School District D implemented resulted in resident teacher instructional practice scores of either effective or highly effective and all resident teachers being reappointed. The themes and school district designee responses related to the fourth interview question are shown in Table 9.

Table 9

School District Designee Recommendations for Future Mentor Models (N=6)

| Theme | f (%) | School District Designee Responses |
|---|--------|--|
| Increased contact with mentors prior to the start of RTP ³ | 2 (33) | <p>“The most helpful thing could have been -- I don't know how we could have done it but it would have been really nice if we had been able to have all the mentors selected before the teachers started and meet, have a face to face. I know that [Central Florida Research University] scheduled a meeting in July last year and the year before for the mentors but for the most part we hadn't choose all the teachers yet so we couldn't choose the mentors. It would have been good if they'd all been able to get together and develop -- it was hard to create a sense of unity within the mentors because it was like okay, you're getting a teacher next week or whatever. Then you have to go to a mentor training next month.” (School District Designee A)</p> <p>“I think all things being perfect, we would have an opportunity to meet with the mentors prior to having the mentoring training at [Central Florida Research University] or wherever we decided to do it. So we would have a meeting so that everybody would be on the same page and know the level of commitment and basically know what they were getting into and get them to commit to what they were doing.” (School District Designee B)</p> |
| Mentor/mentee in different locations | 2 (33) | <p>“[Being at the same school] sometimes the [Mentor/Mentee] get dragged into other things so instead of me spending time with my mentor about my instruction, now I'm talking about something that we have to have done at the school by next Wednesday. So it really makes them focus their conversation. [Having an off-site mentor] It's almost like ensuring that they're going to have academic conversations about instruction.” (School District Designee C)</p> <p>“I think the ones [Mentors] that were on site had more of those informal conversations and they're thinking we talk all the time, we're in the same department. This is what we're doing during our PLC time. So I think that's why the conversations were happening but the formality piece may have lessened whereas the ones from the district they had to put it on their calendar. They're coming. This is the day I'm coming. This is the time we're sitting to talk. I think much more gets done the other way, when they're in the same department. There's going to be a lot more overflow of things being able to get accomplished.” (School District Designee E)</p> |
| Increased contact and accountability | 1 (17) | <p>“I would think really look at the meetings that the mentors and teachers were having, to look at the formality of them just to see -- we're all pressed for time and a lot of conversations happen in the hallway but I would like to probably have seen the accountability of those meetings increase with fidelity.” (School District Designee E)</p> |

Research Question 2

To what extent, if any, was there a relationship between the mentor model implemented and the persistence rates of the resident teachers in the five partner school districts?

The second research question was used to examine the persistence rates and mobility of resident teachers in the school district in which they were employed and to determine whether there were differences between school districts based on the additional components added to their mentor models. Resident teachers who were considered to be persistent remained in the same school district and with the same school. Resident teachers who were considered mobile remained in the teaching profession but with another school district or school than originally employed as a resident teacher. Resident teachers who left the teaching profession, “leavers” were recorded accordingly.

Of the 81 resident teachers accepted to Cohort 2 in May 2013, five never gained employment and 13 were either removed or dropped the RTP³ for various reasons. A total of 11 resident teachers were removed from or dropped the RTP³ by the end of the Fall 2013 semester, and two resident teachers were removed or dropped the RTP³ by the end of the Spring 2014 semester.

A total of 63 resident teachers graduated from the MAT. Of the five partner school districts, School District A and School District D had the highest rates of persistence for RTP³ resident teachers employed. Both School Districts A and D added components to their mentor models; however, there were no common mentor components that were shared between School Districts A and D other than the required RTP³ components that were a part of every school

district's mentor model. Table 10 contains the persistence, mobility, and leaver rates for the 63 resident teachers who graduated from the MAT program by school district.

Table 10

Cohort 2 Resident Teacher Persistence, Mobility, and Left Teaching (N = 63)

| School District | Cohort 2 Resident Teachers | Persistence <i>f</i> (%) | Mobility <i>f</i> (%) | Left Teaching <i>f</i> (%) |
|-----------------|----------------------------|-----------------------------|--------------------------|-------------------------------|
| A | 7 | 7 (100) | 0 (0) | 0 (0) |
| B | 3 | 2 (67) | 0 (0) | 1 (33) |
| C | 35 | 24 (68) | 2 (6) | 9 (26) |
| D | 15 | 14 (93) | 0 (0) | 1 (7) |
| E | 3 | 2 (67) | 1 (33) | 0 (0) |
| Total | 63 | 49 (78) | 3 (5) | 11 (17) |

Note. 81 resident teachers were accepted, 5 never gained employment, 13 dropped or were removed from the RTP³.

Research Question 3

To what extent did mentors perceive that common professional learning assisted them in being effective mentors?

The third research question examined the extent to which mentors perceived that common professional learning assisted them in being more effective mentors. The data to respond to the question was gathered from mentor teachers' responses to the first item of the Mentor Survey. The researcher utilized a Likert-type scale to capture the intensity of respondents' perceptions. The values assigned indicated perceived levels of assistance of professional learning toward assisting mentors in becoming more effective and were as follows:

to a very small extent, to a small extent, to a moderate extent, to a large extent, to a very large extent, and no response.

The largest number of respondents indicated that they believed professional learning helped them in becoming more effective to a moderate extent (20, 37%), and the second highest number of respondents (17, 31%) indicated that they believed professional learning helped them in becoming more effective to a large extent. Additional responses were ranked in order from highest percentage to lowest: to a small extent (7,13%), to a very small extent (4, 7%), and to a very large extent (3, 6%). A total of 3 (6%) of those who participated in the survey did not respond to this survey item. The results of the analysis are displayed in Table 11.

Table 11

Professional Learning: Assistance to Mentors in Becoming More Effective (N = 54)

| Interview Question 1/Research Question 3 | <i>f</i> | % |
|---|----------|-----|
| Extent to which professional learning assisted mentors in becoming more effective | | |
| To a very small extent | 4 | 7 |
| To a small extent | 7 | 13 |
| To a moderate extent | 20 | 37 |
| To a large extent | 17 | 31 |
| To a very large extent | 3 | 6 |
| No response | 3 | 6 |
| Total mentors participating in survey | 54 | 100 |

Mentors were presented with three additional related open-ended questions in the survey. The responses to each of the open-ended questions were grouped into themes and are presented in Tables 12-14. The three additional survey items were:

1. As a result of participation in the mentor professional learning what did you do differently as a mentor?
2. As a result of participation in the mentor professional learning what did you do differently as a teacher?
3. What do you recommend to be considered as future similar mentor models are developed to assure effectiveness? Respondents to the survey were assured anonymity and individual responses to survey items were unidentifiable.

The first survey item asked mentors what they did differently as a mentor as a result of their participation in mentor professional learning. Eight themes emerged and are listed in order of importance: (a) listened and guided, (b) improved communication, (c) reflected more, (e) provided additional support, (e) utilized resources, (f) specific feedback, (g) lesson planning, and (h) more confidence.

The largest number of respondents indicated that as a result of participation in mentor professional learning they listened to and guided their mentees (20%). The second most prominent theme that emerged was improved communication (17%), followed by reflected more (15%). Additional themes were ranked in order from highest percentage to lowest: provided additional support (13%), utilized resources (9%), specific feedback (4%), lesson planning (4%), and more confidence (2%). Of those who participated in the survey, five participants indicated that they did nothing different as a result of participation in mentor professional learning and seven participants did not respond to this survey item. Table 12 shows the themes and representative supportive comments of mentors.

Table 12

Result of Participation in Mentor Professional Learning on Mentoring (N=54)

| Theme | f (%) | Examples of Mentor's Comments |
|-----------------------------|---------|---|
| Listened and guided | 11 (20) | <p>"I did more encouraging."</p> <p>"I tried to listen more and provide more support."</p> <p>"I focused on listening to the needs of my mentee, and guiding her in the right direction."</p> <p>"Focused on the supportive emotional needs of a new teacher."</p> <p>"I read the characteristics of her age group so I could better understand what she deemed important."</p> |
| Improved communication | 9 (17) | <p>"As a mentor in my own building I have grown significantly in how to best communicate with those I am mentoring."</p> <p>"I changed the conversation I was having....not as directive as in the past"</p> <p>"I learned the best way to communicate with my mentee. I act as her support. I learned how not to be judgmental."</p> |
| Reflected more | 8 (15) | <p>"The workshops helped me to focus on the mentee's needs and allowed me to help them reflect better on their teaching rather than just telling them what they need to do"</p> <p>"The training event allowed our team to reflect on how we measured learning versus active participation."</p> <p>"I know now how to lead her to self-reflection. I know what questions to ask and how to ask them."</p> |
| Provided additional support | 7 (13) | <p>"I attempted to share more strategies for teaching the content and provide resources that have been helpful."</p> <p>"I really worked on communication and helping with understanding some of the small details that new teachers miss or are not discussed in school. For example: setting up gradebook, other ways at addressing classroom management and setting up your classroom. These are just a few small details that I helped with."</p> <p>"spent more time daily with her"</p> |
| Utilized resources | 5 (9) | <p>"Utilize the Rutherford book as a reference."</p> <p>"I've used the resources that RTP³ gave me to help guide me to be a better mentor. The books were very helpful."</p> <p>"I had resources that I know my mentee had as well, so I could point out pages in specific texts that addressed needs."</p> |
| Specific feedback | 2 (4) | <p>"Provide Specific feedback"</p> <p>"I modified my feedback to him regarding grading."</p> |
| Lesson planning | 2 (4) | <p>"I tried to get ahead of his lessons instead of adjusting them afterwards"</p> <p>"I participated in a lesson study with him."</p> |
| More confidence | 1 (2) | <p>"As a result of participation in the mentor professional learning, I was more secure and confident in my role as a mentor."</p> |

Note. Respondents provided multiple responses.

The second survey item asked mentors what they did differently as a teacher as a result of their participation in mentor professional learning. The following four themes emerged and are listed in order of importance: (a) different teaching, (b) reflected more to improve, (c) improved communication, and (d) increased self-awareness.

The largest number of respondents indicated that as a result of participation in mentor professional learning that they incorporated different strategies or tried new lessons in their own classrooms (24%). The second highest response rate (17%) for survey respondents indicated that they reflected more as a result of participation in mentor professional learning. Additional themes were ranked in order of highest percentage to lowest: improved communication (9%) and increased self-awareness (7%), increased patience (2%), improved organization (2%), and provided students with additional resources (2%). Of those who participated in the survey, five participants indicated that they did nothing different as a teachers as a result of their participation in mentor professional learning; nine participants did not respond to this survey item; and seven participants' responses were unable to be themed either because their response did not answer the question or they were not a teacher. The themes and supportive comments are contained in Table 13.

Table 13

Results of Mentor Professional Learning on Mentors' Teaching (N = 54)

| Theme | <i>f</i> (%) | Examples of Comments |
|---------------------------|--------------|--|
| Different teaching | 13 (24) | <p>“I integrate more interactive strategies into my classroom”</p> <p>“I looked back at when I was a newer teacher and implemented some old ideas that worked for me then, that I had not used in a while.”</p> <p>“I have learned to use more technology and strategies to keep students engaged.”</p> <p>“As an experienced teacher, sometimes I would get complacent in some of the lessons that I was teaching. Having a mentee gave me a new sense of initiative to try new things. The mentee that I worked with had a lot of new and great ideas to do in the classroom, which I did, and it was like a revival in my classroom.”</p> |
| Reflected more to improve | 9 (17) | <p>“Reflect more; work really hard at looking at prior knowledge and expectations for my students.”</p> <p>“Reflected more on my practices and strategies.”</p> |
| Improved communication | 5 (9) | <p>“I increased my communications with non-working students to weekly calls.”</p> |
| Increased self-awareness | 4 (7) | <p>“I think it made me think more about what and why I was doing some things. After 10 years some things are just second nature so I had to be able to express the how and why to my mentee.”</p> |

Note. Respondents provided multiple responses.

The third survey item asked mentors what they recommend to be considered as future similar mentor models are developed to assure effectiveness. Six themes emerged and are listed in order of importance: (a) increased contact time, (b) differentiate professional learning, (c) teach same course, (d) provide support, (e) expand timeframe, and (f) plan ahead.

The largest number of respondents indicated that they would recommend increasing the contact time between mentors and mentees (41%). Recommendations included incorporating team-teaching, aligning the mentor and mentees schedule, having required scheduled monthly meetings, having more face-to-face meetings, and placing mentors and mentees at the same school or within close proximity. Additional themes are ranked in order from highest percentage to lowest: differentiate professional learning (7%), teach same course (6%), provide support (6%), expand timeframe (6%), and plan ahead (4%). Additionally, one mentor recommended that the work load of the mentor be lightened and stated, “slightly lighten the mentor teacher's load so that more time can be invested in the mentee, especially at the beginning of the program when there is so much modeling, teaching, and coaching required. It was extremely stressful to try and keep my own metrics good with such a huge student load all the while providing the full level of support my mentee needed.” Of those who participated in the survey, three participants indicated that they had no recommendations for future mentor models; 15 participants did not respond to this survey item; and one participant’s response was unable to be themed because it did not pertain to the question. The themes and supportive comments are shown in Table 14.

Table 14

Mentor's Recommendations for Effective Mentor Models (N=54)

| Theme | f (%) | Mentor's Example Comments |
|-------------------------------------|---------|--|
| Increased Contact | 22 (41) | <p>“Increased contact time in classroom setting.”</p> <p>“More required face-to-face seminars, Lesson Studies, Rounds, and meet and greets.”</p> <p>“Mentors and mentees should ideally be located on the same campus.”</p> <p>“Build in required monthly meetings, so that participants in the program can meet and reflect on their practices.”</p> <p>“set times.. monthly .. to meet .. not <i>when convenient</i>”</p> <p>“I would say it would be more effective to have the mentor and the mentee teach at least one common course and have the same plan period.”</p> <p>“team teaching with mentor in morning and afternoons, they are on their own with their classes. Would reduce their workload and give them actual working time with mentor instead of just discussions.”</p> |
| Differentiate professional learning | 4 (7) | <p>“Quality workshops based on actual needs of mentors/mentees. Productive use of time during time together. Separate meetings/late arrivals for those who already have the basics down, etc.”</p> <p>“Implementation of virtual meetings in place of expensive face to face trainings.”</p> <p>“Mentor PD in the beginning of the year.”</p> |
| Teach same course | 3 (6) | <p>“It would have been a better experience for my mentee if he had a mentor who was teaching the same subject, so they could collaborate more effectively on every aspect of the classroom experience.”</p> |
| Provide support | 3 (6) | <p>“Please continue to provide the training...each training I have attended I have felt like I have benefited from the time spent there.”</p> |
| Expand timeframe | 3 (6) | <p>“I would like to see the program offered over a longer time period, and not have the students feel so rushed.”</p> |
| Plan ahead | 2 (4) | <p>“Be sure to give the full schedule ahead of time. I am a parent of 3 children and had a difficult time attending some meetings because required trainings were changed or were added.”</p> |

Note. Respondents provided multiple responses.

Research Question 4

To what extent did the resident teachers perceive that the mentors assisted them in being effective?

The fourth research question was used to determine the extent to which resident teachers perceived that their mentors assisted them in becoming more effective teachers. Table 15 shows the extent to which resident teachers perceived that their mentors assisted them in being more effective teachers. The researcher utilized a range on a Likert-type scale to capture the intensity of respondents' perceptions. The response values assigned indicated perceived levels of assistance toward helping resident teachers to become more effective and were as follows: I did not have another school-based mentor, not at all influential, slightly influential, somewhat influential, very influential, and extremely influential.

The largest number of respondents indicated that they did not have another school-based mentor (49%). Of those who had a school-based mentor, the highest number of respondents (9, 15%) indicated that they believed their mentor was somewhat influential in helping them become a more effective teacher. The second highest response rate (8, 13%) indicated that they believed that their mentor was very influential in assisting them in becoming a more effective teacher. Additional responses are ranked in order from highest percentage to lowest: slightly influential (6, 10%), extremely influential (5, 8%), and not at all influential (2, 3%). One (2%) of those who participated in the survey did not respond to this survey item. Table 15 displays the frequencies and percentages of the extent to which resident teachers perceived that their mentors assisted them in becoming more effective teachers.

Table 15

Resident Teachers' Perceptions: Mentors Assistance in Becoming More Effective Teachers (N = 61)

| Interview Question 1/Research Question 4 | <i>f</i> | % |
|--|----------|----|
| Extent to which mentors assisted resident teachers in becoming more effective teachers | | |
| Not at all influential | 2 | 3 |
| Slightly influential | 6 | 10 |
| Somewhat influential | 9 | 15 |
| Very influential | 8 | 13 |
| Extremely influential | 5 | 8 |
| No response | 1 | 2 |
| I did not have another school based mentor | 30 | 49 |
| Total resident teachers participating in the survey | 61 | |

Resident teachers were presented with three additional related open-ended questions in the survey. The responses to each of the open-ended questions were grouped into themes and are presented in the Tables 16-18. The three additional survey items posed to resident teachers follow:

1. Provide specific examples for how your RTP³ mentor assisted you in becoming a more effective teacher.
2. Provide specific examples for what you wish your RTP³ mentor had done that you believe would have assisted you in being a more effective teacher, and
3. What recommendations, if any, do you have for future similar mentor models to assure effectiveness?

The first survey item asked resident teachers to provide specific examples as to how their RTP³ mentors assisted them in becoming more effective teachers. Five themes emerged and are

listed in order of importance: (a) instruction, (b) support, (c) planning, (e) feedback, and (e) professional responsibilities.

The majority of respondents indicated that their mentors assisted them in being effective by assisting them with instruction (64%). The second highest way in which resident teachers said that their mentors assisted them in becoming more effective was through support (36%). Help with lesson planning (21%), providing feedback (20%), and professional responsibilities (7%) were also perceived by the resident teachers as helping them to become more effective teachers. Of those who participated in the survey, three participants indicated that they had no examples of how their mentor assisted them in becoming a more effective teacher, and three participants did not respond to this survey item. The themes and supportive comments are presented in Table 16.

Table 16

Mentors' Assistance to Resident Teachers in Becoming More Effective Teachers (N = 61)

| Theme | <i>f</i> (%) | Resident Teacher Example Comments |
|-------------------------------|--------------|---|
| Instruction | 39 (64) | <p>“The time we met in the hall we talked about questioning techniques. This was very helpful to me and I implemented what we talked about immediately.”</p> <p>“I was able to visit her classroom and school”</p> <p>“She taught me some strategies for engaging my students”</p> <p>“He showed me how I could better control the classroom and how to scaffold instruction with inquiry based labs”</p> |
| Support | 22 (36) | <p>“She supports me and makes me feel comfortable to approach her with questions, problems etc.”</p> <p>“I can come to her with my problems in regard to teaching and she is always willing to give input on how to resolve problems with students, parents, and student learning.”</p> <p>“He gave me a fresh perspective and supported or constructively helped with various ideas/issues”</p> |
| Planning | 13 (21) | <p>“Reviewed lesson plans with me and helped me feel more confident in my lesson I came up with for my formal observation.”</p> <p>“Instructed me on how to handle my first day, shared lesson plans the first few months, allowed me to ask any questions about materials/planning, management, etc.”</p> <p>“My RTP³ mentors have reviewed my lesson plans and given feedback”</p> |
| Feedback | 12 (20) | <p>“...gave concrete feedback on classroom engagement.”</p> <p>“My mentor gave me specific feedback on how to improve. She was honest, yet tactful, and truly let me know if my ideas had merit.”</p> <p>“She has given me lots of feedback, which includes ideas of how to improve. This has really helped me, especially with my questioning techniques”</p> |
| Professional Responsibilities | 4 (7) | <p>“A student had cheated on an exam and I needed to talk to her and her parents. My mentor assisted me by showing me how to turn it into an opportunity to help her learn the material.”</p> |

Note. Respondents provided multiple responses.

The second survey item asked resident teachers to provide specific examples of what they wished their RTP³ mentor had done that they believe would have assisted them in being more effective teachers. Seven themes emerged and are listed in order of importance: (a) more observations, (b) instructional planning, (c) support, (d) instructional models, (e) taught the same content, (f) located at the same school, and (g) provided more feedback.

The highest number of respondents indicated that they wished that they would have had more opportunities to observe and be observed (16%). Next, resident teachers indicated that they wished they would have had more support with instructional planning (16%). Additional themes are ranked in order from highest percentage to lowest: support (12%), instructional models (5%), taught the same content (3%), were located at the same school (3%), and provided more feedback (3%). Of those who participated in the survey, 24 participants indicated that they had no suggestions of any specific mentor actions that could have been taken, and 10 participants did not respond to this survey item. The themes and supportive comments are shown in Table 17.

Table 17

Resident Teachers' Beliefs: How Mentors Could Have Helped Resident Teachers to Become More Effective (N = 61)

| Theme | f (%) | Resident Teacher Example Comments |
|----------------------------|---------|---|
| More observations | 10 (16) | <p>“I wish she had observed me more often”</p> <p>“I do wish there were opportunities for more face to face observations”</p> <p>“I wish I could have had more time observing them.”</p> <p>“Instructed a lesson to my class.”</p> <p>“Observe me more and her more”</p> |
| Instructional planning | 10 (16) | <p>“Go through lesson plans w/ me and help me improve them and come up w/ good ideas/activities/etc.”</p> <p>“Help with lesson plans”</p> <p>“Some planning. Go over Marzano’s map and how to move from DQ2 to DQ3 to DQ4.”</p> <p>“Sat down to plan a unit together, or at least part of a unit.”</p> |
| Support | 7 (12) | <p>“I wish she was a little more understanding about the type of students that I have vs. hers.”</p> <p>“Share experiences teaching Physics”</p> <p>“I wish she spent more time with me at the beginning of the year to help me prep for my first few weeks of teaching”</p> <p>“If nothing else, checking in to make sure how I was doing”</p> |
| Instructional models | 3 (5) | <p>“Shared lesson plans and specific strategies and activities for some of the more abstract concepts.”</p> <p>“Providing more examples of quality lesson plans”</p> <p>“Sent tests or activities”</p> |
| Taught the same content | 2 (3) | <p>“I wish she was in my content area because I was the only chemistry teacher at the school and felt very lost.”</p> |
| Located at the same school | 2 (3) | <p>“I would have been nice to have him in my school”</p> <p>“Being at the same school would have been better”</p> |
| Provided more feedback | 2 (3) | <p>“Possibly provide more constructive criticism after evaluating me.”</p> <p>“I wish she could’ve looked at my lessons or come to my class and given me more feedback.”</p> |

Note. Respondents provided multiple responses.

The third survey item asked resident teachers what recommendations, if any, they had for future similar mentor models to assure effectiveness. Six themes emerged and are listed in order of importance: (a) positive communication, (b) same content/course, (c) proximity, (d) increased contact, (e) match mentor/mentee personalities/interests, and (6) planning.

The highest number of respondents indicated that mentors in future mentor models need to be carefully selected, ensuring that mentors are positive communicators (34%). Next, the resident teachers recommended that mentors and mentees teach in the same content area (33%). The resident teachers also recommended that mentors and mentees be located within close proximity to one another (28%), and that there be increased contact between mentors and mentees (21%). The remaining two themes are as follows: match mentor-mentee personalities/interests (5%) and planning (3%). Additional recommendations included providing instructional models. One mentee commented that mentors should, “provide examples of lessons (ppt, lab, worksheets, and activities) for the mentee to utilize in the classroom.” Another mentee recommended that the program be needs-based, suggesting “mentors should have flexibility to design their own training program for a new teacher.” Of those who participated in the survey, five participants indicated that they had no recommendations, and four participants did not respond to this survey item. The themes and supportive comments are shown in Table 18.

Table 18

Mentee's Recommendations for Future Mentor Models (N = 61)

| Theme | f (%) | Mentee Example Comments |
|---|---------|---|
| Positive Communication | 21 (34) | <p>“Always stay positive and most important sit back and listen; sometimes that is all we need.”</p> <p>“Do not make your mentee feel like a burden for coming to you. I was made to feel that way at times and it can be very isolating.”</p> <p>“Focus on strategies, you hear a lot of complaining, this is okay, but don't forget a solution is possible. This is what my mentor did that helped me a lot; gave me solutions and examples of solutions.”</p> <p>“Be real, tell it how it is. Encourage, don't criticize. Be positive.”</p> <p>“Be there for support, not judgment.”</p> |
| Same content/course | 20 (33) | <p>“I believe all mentors if possible should be of the same content area.”</p> <p>“Have mentor teach same subject”</p> <p>“In-subject mentors are paramount to being effective.”</p> |
| Proximity | 17 (28) | <p>“Having my mentor be someone in my schoolhouse was great, but I believe we could have benefitted from also being in the same pod as well.”</p> <p>“They should be selected from the same school as the resident teacher.”</p> |
| Increased contact | 13 (21) | <p>“Ensure that mentor-mentee have appropriate amount of time to meet at least weekly.”</p> <p>“Have beginning teachers observe their mentors to see modeled behavior.”</p> <p>“Somehow ensure that they are in contact with the mentee enough to make sure they are not alone.”</p> <p>“Require reciprocal observations”</p> |
| Match mentor-mentee personality and interests | 3 (5) | <p>“Mentors should share similar interests with their mentees (I had trouble relating to my mentor)”</p> |
| Planning | 3 (5) | <p>“Should probably have different planning periods so it's easier to observe each other.”</p> <p>“Having a mentor in the same subject and grade level was helpful because we could plan together and were able to reflect in our PLC”</p> |

Note. Respondents provided multiple responses.

Ancillary Analysis

The data presented in Table 19 contains the themes related to the recommendations of school district designees, mentors, and resident teachers for future mentor models. Data were collected from school district designee interviews, mentor surveys, and resident teacher survey data.

Increased contact emerged as the common theme across all three respondent groups. Examples of increased contact include, but were not limited to more face-to-face meetings between mentors and mentees, more observations, common planning time, and team-teaching.

An additional theme that was common among both mentors and resident teachers was that mentors and mentees should teach the same content and courses. One conflicting theme emerged between school district designees and resident teachers. Although close proximity was a recommendation of the resident teachers, school district designees indicated that mentors and mentees being in close proximity to one another increased the formality of interactions between the two. The themes presented in Table 19 are listed in order of importance for each of the three groups: school district designees, mentors, and resident teachers.

Table 19

Recommendations for Future Mentor Models: Themes Across Respondent Groups

| School District Designees | Mentors | Resident Teachers |
|---|---|--|
| Increased contact with mentors prior to the start of RTP ³ | Increased contact between mentors and mentees | Positive communication |
| Increased contact and accountability for mentor and mentee meetings | Differentiate professional development | Teach same content/course |
| Mentor-mentee in a different location | Teach same content/course | Proximity |
| | Provide Support | Increased contact between mentors and mentees |
| | Expand timeframe | Match mentor-mentee based on personalities and interests |
| | Plan ahead | Planning |

Summary

The chapter began with an introduction to RTP³ including its goals and objectives, minimum requirements for RTP³ resident teachers, and details about the program’s design and implementation. The characteristics of the five partner school districts were explained, and the mentoring support required by the RTP³ mentor model and the specific mentor models by school district were discussed. Demographics of resident teacher survey participants were provided as well as demographics of mentor teacher survey participants and school district designee interview participants.

The results of the analysis of archival data concerning the unique mentor models by school district were presented in tabular form and discussed. The results of the five partner school districts' persistence data were analyzed, reported in tabular form, and explained. Closed response questions for both the Resident Teacher Survey and Mentor Survey were reported in tabular form and explained. Analysis of the responses to the open-ended questions obtained from the Mentor Survey and Resident Teacher Survey were analyzed using the concept of inter-rater reliability to ensure reliability and validity of themes. After individual analysis was concluded, discrepancies were discussed and resolved to generate a single set of themes for each survey item (Morse et al., 2002). Themes for both the Mentor Teacher Survey and Resident Teacher Survey were presented in tabular form and discussed.

Chapter 5 contains a summary and discussion of the results of the analysis of data to answer the four research questions. Implications for practice and recommendations for future research are offered in a concluding section of the chapter.

CHAPTER 5 SUMMARY, DISCUSSION, AND IMPLICATIONS

Introduction

This chapter contains a restatement of the purpose of the study, a summary and discussion of the findings, implications and recommendations for practice, and recommendations for future research. The purpose of this chapter was to expand on the findings in the preceding chapters in an effort to provide further clarity of the potential of mentor models to increase teacher effectiveness and persistence. A summarizing paragraph is provided to capture the substance and scope of this research study.

Purpose of the Study

Five Florida school districts implemented different variations of the Resident Teacher Professional Preparation Program (RTP³) mentor model and due to the unique needs of each school district, context differences in effectiveness may have emerged. The purpose of the study was to determine the differences among the five mentor models, the extent to which these differences may relate to variances in mentoring effectiveness, and the impact on persistence of the resident teachers in teaching. The study was guided by the following four research questions:

1. To what extent did the five partner school districts' mentor model align with the RTP³ mentor model?
2. To what extent, if any, was there a relationship between the mentor model implemented and the persistence rates of the resident teachers in the five partner school districts?

3. To what extent did mentors perceive that common professional learning assisted them in being effective mentors?
4. To what extent did the resident teachers perceive that the mentors assisted them in being effective?

Summary and Discussion of the Findings

Research Question 1

To what extent did the five partner school districts' mentor model align with the RTP³ mentor model?

Analysis of the five partner school district mentor models revealed that school district leadership in each of the five partner school districts added components to the RTP³ mentor model. Additional required components included the following: mentor teaches the same content area as mentee, mentor teaches the same subject as mentee, mentor teaches at the same school as the mentee, mentor must have had three years of successful teaching experience, mentor and mentee paired one-to-one, mentor and mentee complete a learning log/reflection journal, school assigned mentor for the first three months, mentor and resident teacher co-teach until the resident teacher is prepared for their own students, mentor completes a reflection log at the end of the year, school-based mentor in addition to RTP³ mentor, and a district level mentor in addition to RTP³ mentor.

The components added by the five partner school districts were supported by numerous researchers. Stanulis and Floden (2009) stated, “Beginning teachers need targeted support to overcome the many challenges in learning to teach” (p. 113). Pairing mentors one-to-one with mentees who teach the same content area and subject provides resident teachers with more targeted support. The research of Luft et al. (2007) also supported the addition of these components to the mentor model, indicating that mentoring programs should not be one size fits all. Rather, they should recognize the content support needs of beginning teachers and meet them where they are.

Several of the partner school districts added components to their mentor models which required the mentors and/or mentees to complete learning/reflection logs. Darling-Hammond & McLaughlin (1995) found that effective professional development should engage teachers in activities and experiences which afford them the opportunity to read, reflect, analyze, collaborate and practice. Having mentors and mentees co-teach until mentees are ready for their own students has been supported by Britton et al. (2000), whose research revealed that beginning teachers should observe other teachers. Building in a time period where mentees can observe and teach alongside their mentors is in line with these research findings.

Rutherford (2005), noted that personal and professional support are a critical component of mentor programs. This observation supports the partner school districts’ decisions to add additional personnel to support resident teachers, i.e., a school-based mentor and/or district mentor in addition to the mentee’s RTP³ mentor. Additionally, placing mentors at the same schools as their mentees is a way of trying to ensure more contact between mentors and mentees, and, therefore, an effort to provide more support as well.

When the six school district designees who were interviewed were asked the reason why they decided to add additional components to the RTP³ mentor model they indicated that they did so because their model had to meet the required components that were already laid out for beginning teachers in their school district as a part of their district policy. The responses of the school district designees revealed that their school districts had already created a strong support model for beginning teachers based on the most current research on supporting beginning teachers. The second theme that emerged from this district designee interview question was that the school district added components in an effort to provide as much support as possible for the newly hired resident teachers in their school districts. One school district designee noted,

We added this period where they weren't assigned students initially. Usually a teacher that comes from a background of teaching and gets hired gets students right away but we choose to give them a chance to get accustomed to working with students in a supervised way.

The responses of the school district designees indicated a strong desire to support resident teachers in a variety of ways in order to provide resident teachers with the best possible opportunity to be successful.

Research Question 2

To what extent, if any, was there a relationship between the mentor model implemented and the persistence rates of the resident teachers in the five partner school districts?

An analysis of the data shows that of the five partner school districts, School Districts A and D had the highest persistence rates and the lowest mobility rates. In addition to the required

components of the RTP³ mentor model, School District A required: (a) mentors and mentees to teach the same content and the same subject; (b) mentors to be matched one-to-one with a mentee; (c) mentors to have a minimum of three years successful teaching experience; (d) mentees to have a weekly follow-up meeting for the first three months of teaching from a school assigned mentor; (e) mentees not be assigned students until the mentor determined that the mentee was ready; and (f) mentor and mentee to keep weekly reflection logs. Of the additional components added to the RTP³ mentor model, three were unique to School District A. First, School District A required weekly reflection logs to be kept by both the mentors and mentees. Although two other school districts required learning logs, it was not a weekly requirement and was not required of both the mentor and mentee. Second, School District A was the only school district to provide the mentees with the time to observe and co-teach alongside their mentors before they were given their own students to teach. Finally, School District A provided an additional school-based mentor for the first three months of the school year to follow-up with the mentor on a weekly basis.

In addition to the required components of the RTP³ mentor model, School District D required the following: (a) mentors and mentees to be located at the same school; (b) mentors and mentees to teach the same content area; (c) mentors to be matched one-to-one with mentees; (d) mentees to be provided an additional school mentor to support them in getting acclimated to the school culture. Of the additional components added to the RTP³ mentor model, two were unique to School District D. First, the school district developed an RTP³ mentor support program and RTP³ mentoring handbook, and mentees also had a school district mentor. Second,

in addition to the RTP³ professional development, the school district provided an additional mentor professional learning at the beginning of the program.

Of the additional components that were added to each school district's mentor models, five unique components emerged: three components were exclusive to School District A and two components were exclusive to School District D. In addition to School Districts A and D having a mentor model which contained components that were unique across all five of the partner school districts, they also added the most additional components of any of the school district mentor models. The analysis of the mentor models by school district suggested that in addition to adding the most additional support to their mentor models, School Districts A and D added components which not only provided mentees with more support but also provided mentors adequate time to prepare for their roles. Hobson, et al. (2009) noted that mentors should make time for their mentees and provide them with support, and that one of the biggest factors in poor mentoring was poor mentor preparation. School District A added components to ensure that their mentor model provided multiple layers of support for mentees, and School District D created a model which ensured that mentors were fully prepared to take on their roles as mentors.

Research Question 3

To what extent did mentors perceive that common professional learning assisted them in being effective mentors?

All mentors were required to attend the mentor professional learning and expected to attend the science, mathematics, and lesson study professional learning. An analysis of data gathered in the Mentor Survey indicated that a total of 68% of the 54 mentors who participated

in the Mentor Survey found that their participation in mentor common professional learning assisted them in being an effective mentor to either a moderate extent (37%) or to a large extent (31%). An additional 6% of survey respondents indicated that their participation in common professional learning assisted them to a very large extent. These findings are consistent with findings of other researchers. Britton et al. (2000) made the following recommendation regarding beginning teacher mentoring programs for mathematics and science teachers: mentors who support beginning teachers should be selected carefully and receive sufficient training. Loucks-Horsley et al. (2003) stated that mentor professional learning provides mentors with the opportunities to grow their capacity as mentors and leaders.

When mentors were asked what they did differently as a mentor as a result of mentor professional learning, the most common theme was that they improved their communication (17%). One mentor responded, “As a mentor in my own building I have grown significantly in how to best communicate with those I am mentoring.” Another mentor responded, “I changed the conversation I was having. . . not as directive as in the past.” When mentors were asked what they did differently as a teacher as a result of mentor professional learning, the most common theme was that they incorporated different strategies or new lessons into their teaching practice (24%). One mentor teacher responded,

As an experienced teacher, sometimes I would get complacent in some of the lessons that I was teaching. Having a mentee gave me a new sense of initiative to try new things. The mentee that I worked with had a lot of new and great ideas to do in the classroom, which I did, and it was like a revival in my classroom.

Researchers have found that an unintended benefit of mentoring programs is the benefit that mentoring has on the mentor. Mentoring beginning teachers has been shown to have a positive impact on the professional and personal development of mentors and create a more supportive and collaborative educational environment, leading to higher persistence rates and less turnover (Hobson et al., 2009).

When mentors were asked to provide recommendations for future similar mentor models, 41% indicated that they would build in more time for mentors and mentees to spend together. Sample mentor responses included: “increased contact time in classroom setting”, “more required face-to-face seminars, lesson studies, rounds, and meet and greets”, and “build in required monthly meetings, so that participants in the program can meet and reflect on their practices, set times monthly to meet, not when convenient.” In a qualitative study, Hudson (2012) found that new teachers needed more support than just informing them about school culture and infrastructure. They need help with pedagogy and behavioral management. Hudson noted that mentors who modeled practices and provided feedback were critical in the induction process. These various types of critical supports require extensive contact time between mentors and mentees and support the recommendations made by the mentors in this research study.

Research Question 4

To what extent did the resident teachers perceive that the mentors assisted them in being effective?

The analysis of data from the Resident Teacher Survey revealed that the majority of the resident teachers believed that their mentors were somewhat influential (15%) in assisting them

in being more effective teachers. An additional 31% of survey respondents indicated that their mentors were one of the following: very influential (13%), slightly influential (10%), and extremely influential (8%). Only 3% of respondents believed that their mentor had no influence at all in assisting them in becoming a more effective mentor. These findings are aligned with that of numerous researchers who have indicated that mentoring programs provide a critical support to new teachers entering the profession (Smith & Ingersoll, 2004).

When asked how their mentors assisted them in being more effective, the most common themes that emerged were: instructional resources/strategies (62%) and encouragement/support/availability (36%). In reference to the theme, instructional resources/strategies, one respondent commented; “The time we met in the hall we talked about questioning techniques. This was very helpful to me and I implemented what we talked about immediately.” This theme was supported by the research of Britton et al. (2000), who noted that beginning teachers need to be provided adequate resources. In response to the theme, encouragement/support/availability, one survey respondent replied; “I can come to her with my problems in regard to teaching and she is always willing to give input on how to resolve problems with students, parents, and student learning.” This is in line with the research which indicates that mentors should provide support for mentees and make them feel included; the mentor should make time for the mentee (Hobson et al., 2009).

Additionally, when the resident teachers were asked to provide examples of how their mentors could have better helped them, the two most dominant themes were: more observations/modeled instruction (16%) and review lessons/plan together (16%). Luft et al. (2007), indicated that some of the critical supports for beginning teachers included the following:

locating materials, writing lesson plans, and deconstructing standards Hobson et al., (2009) supported mentors' and mentees' observations of each other's lessons followed by an analysis of the process.

When resident teachers were asked for their recommendations for future similar mentor models, they overwhelmingly responded that ensuring mentors were supportive, positive, and available was the best recommendation that they could provide (34%). One resident teacher commented, "Always stay positive and most important sit back and listen; sometimes that is all we need." Another resident teacher commented, "Do not make your mentee feel like a burden for coming to you. I was made to feel that way at times, and it can be very isolating." These recommendations have been supported by researchers who have indicated that mentor selection is a critical component of any mentoring program. Hobson et al. (2009) highlighted the same problems, indicating that there are negative consequences for the learning of mentees because of poor mentor practice and mentors being unavailable to provide the necessary support to mentees.

Discussion of Ancillary Analysis

Data collected from school district designee interviews, mentor surveys, and resident teacher surveys demonstrated that all three respondent groups believed that increased contact time between mentors and mentees should be considered when developing future mentor models. Examples of increased contact included, but were not limited to: more face-to-face meetings between mentors and mentees, more observations, common planning time, and team-teaching. Friedrichsen et al. (2007) noted that frequent interactions with teachers in their building who

taught the same content provided them with emotional and social support. An additional theme that was common to mentors and resident teachers was that mentors and mentees should teach the same content and course. Hobson et al., (2009) noted the importance of the selection and pairing process in new teacher induction programs, and that the most effective pairings happened when the mentor teacher was experienced and effective, and when the mentor taught the same subject as their mentee.

One conflicting theme emerged between school district designees and resident teachers. Although close proximity was a recommendation of the resident teachers, school district designees indicated that mentors and mentees being in close proximity to one another decreased the formality of interactions between the mentors and mentees and suggested that it was perhaps better, or not an obstacle, that mentors and mentees were not within close proximity of one another. Increased contact time emerged from all three respondent groups as a means of better supporting mentees. School District Designee E supported the notion of having mentors and mentees within close proximity, indicating that “we're all pressed for time and a lot of conversations happen in the hallway.” The findings of this research were supported by Rutherford (2005) who noted that personal and professional support were critical components of mentor programs.

Emergent Themes

The research conducted in this study has shown that persistence rates among beginning teachers varied across school districts, depending on the mentor model that was implemented within a given school district. The data revealed that certain unique components were added to

the mentor models of the school districts with the highest persistence rates. Several common themes spanned across school district designee interviews, Mentor Survey results, and Resident Teacher Survey data.

Support was a common theme across interview and survey data. School district designees stated that they added components to their mentor models in an effort to provide as much support to the resident teachers as possible. Mentors indicated that, as a result of their participation in mentor professional learning, they were better able to support, encourage, and guide their mentees. Resident teachers responded that one of the most important things their mentors did which helped them to become more effective teachers was to encourage, support, and be available to them as needed. When asked what recommendations they had for future mentor models, the resident teachers emphasized the importance of selecting mentors who were supportive and positive.

Another common theme across interview and survey data was that there needed to be more required and structured time built in for mentors and mentees to spend together. When school district designees were asked what recommendations they had for future similar projects, their responses included that there should be more face-to-face meetings between mentors and mentees. When mentors were asked for their suggestions for future mentor models, they indicated that there should be more built in time for mentors and mentees to spend together. Similarly, when resident teachers were asked for their recommendations for future mentor models, they wanted more time with their mentors in the form of face-to-face meetings, observations, lesson planning, etc.

The data revealed that the two school districts with the highest persistence rates added unique components which addressed either the need for more support for the resident teachers, built in more structured interactions between mentors and mentees, or both. Mentor model data across school districts, along with interview and survey data revealed that beginning teacher persistence rates and effectiveness have the potential to be influenced by targeted mentor supports which address the needs laid out by school district designees, mentors, and resident teachers as evidenced through the input they provided in interview and survey responses.

Implications and Recommendations for Practice

School districts have been faced with considerable challenges in leveraging resources to create the most effective and comprehensive induction programs for beginning teachers. With greater accountability in education, school districts must closely examine their financial resources and consider the most efficient and beneficial ways to spend these dollars. At the time of the present study, school districts across the United States were facing critical shortages of science, technology, engineering and mathematics (STEM) educators. The challenge for U.S. school districts is two-fold: they must not only recruit but also retain highly qualified STEM teachers in classrooms across the nation (National Academy of Sciences, 2006; National Research Council, 2002; U.S. Department of Education, 2002).

For educational administrators, this study offers insight into how to structure mentor models in a way that can have the greatest impact on teacher effectiveness and persistence. It can also give administrators a good idea of the essential components of effective mentoring programs from the perspective of mentors, mentees, and school district designees. It is clear

that, in light of the most current research on mentoring including this research, school districts need to closely evaluate their current school district policies as they relate to the support and induction of beginning teachers. They need to make adjustments to their models in order to build in the maximum amount of structured time for mentors and mentees to spend together as well as investigate all the ways they can provide the greatest possible support to beginning teachers through careful selection and preparation of mentors. The findings of this study provide data and information on programs, procedures, and practices to assist brick and mortar school districts, as well as virtual school districts, in enhancing their new teacher induction programs.

Recommendations for Future Research

1. Future researchers should examine the impact of building in a residency for beginning teachers which allows them the opportunity to learn side-by-side with their mentors until it is determined that they are ready for their own students.
2. Future researchers should examine variations in school districts' mentor preparation and selection processes.
3. Future researchers should examine the effectiveness of building in a progress monitoring component to mentor models such as weekly reflection logs for both mentors and mentees.
4. Another avenue for future research to broaden and support the findings in this study would be to assess whether effective mentoring models differ depending on the context. Future researchers should assess whether some types and components of mentor models are better in some settings. For example, does an effective mentor

- model in a virtual school district prove to be as effective in a traditional school district? Do effective mentoring models differ for affluent, suburban school districts and low-income, urban districts?
5. Future researchers should examine the specific impact of the particular components within this research study which arose as unique components across all of the school district mentor models.
 6. Future researchers in this subject area should identify how the needs of beginning teachers vary. For example, will the same mentoring model be as effective for a beginning teacher with an education degree as for a beginning teacher with no formal preparation in the field of education? Similarly, will the needs of a mathematics or science teacher be met in the same ways as those of an English or social studies teacher in a beginning teacher mentor program?
 7. Future researchers should evaluate different mentor models within the same context. For example, implement two different mentor models in the same school or district and analyze their effectiveness.
 8. Future researchers should not only consider the resident teachers' perceptions of increased teaching effectiveness but should examine effectiveness as evidenced by teachers' ratings on their school district approved evaluation model.
 9. Future researchers should examine whether there is a connection between the proximity of mentors and mentees and the level of support that is provided.
 10. Future researchers should evaluate not only specific components of mentoring programs but the amount of time delegated to those components within specific

mentoring programs. For example, a mentor model may incorporate team-teaming as a part of the mentor model but only require it once at the beginning of the mentoring program. Future researchers should assess single instances or sparse integration of mentor components and their effect on the overall success of the mentor model as opposed to frequent and continuous integration of particular components.

11. Future researchers should evaluate the attrition rates of mentees over a longer period of time in order to examine how mentees' persistence and mobility compare to the current attrition rates for beginning teachers.

Summary

This study has added to the body of knowledge on mentoring and its relationship to the effectiveness and persistence of beginning teachers through a comprehensive mentoring program. This study has also provided school district leaders in the partner school districts with an assessment of their mentoring models and their ability to retain their resident teachers and increase their instructional capacity as compared to the other partner school districts. High attrition rates for beginning teachers, along with the shortage of mathematics and science teachers, requires educational leaders to develop mentoring programs which best support the needs of both mentors and mentees while at the same time achieving the school district's goal of preparing and retaining a highly effective teaching force. For this to take place, educational leaders must look critically at the components of their mentoring programs to assess their effectiveness in their quest to lower the attrition rates of beginning teachers.

APPENDIX A
MENTOR SURVEY

RTP³ Spring 2014 Mentor Experience Survey

1. To what extent do you believe that your participation in common mentor professional learning assisted you in becoming a more effective mentor teacher?
- To a very small extent
 - To a small extent
 - To a moderate extent
 - To a large extent
 - To a very large extent

2. As a result of participation in the mentor professional learning what did you do differently as a mentor?

3. As a result of participation in the mentor professional learning what did you do differently as a teacher?

4. What do you recommend to be considered as future similar mentor models are developed to assure effectiveness?

APPENDIX B
RESIDENT TEACHER SURVEY AND EMAIL COMMUNICATION

GENERAL TEMPLATE:

Hello, [mentor Name]!

My name is < NAME> from UCF and I'm helping with the evaluation of the RTP³ grant that you are involved with. I hope that your semester is going well!

In order to get a full picture of the mentoring aspect of RTP³, we would like to get your feedback. Please click on the link below to access a 10-15 minute survey. Your feedback is much appreciated and any suggestions for improvement are welcome.

All responses will be reported in group format and no one will be identified. Please be as open and honest as possible. We are only asking for your name to keep track of who has completed the survey and who has not.

Click on the link below to access the confidential RTP³

Mentor Survey:

<LINK HERE>

*If clicking the above link does not work, please copy and paste the URL into a new window.

Please feel free to contact us with any questions.

<CONTACT INFORMATION>

Resident Teacher End of Project Survey
Mentoring and Support

1. To what extent do you believe that your RTP³ mentor influenced you in becoming a more effective teacher? Select the most appropriate response.

- Extremely influential
- Very influential
- Somewhat influential
- Slightly influential
- Not at all influential
- I did not have another school-based mentor

2. Provide specific examples for how your RTP³ mentor assisted you in becoming a more effective teacher.

3. Provide specific examples for what you wish your RTP³ mentor had done that you believe would have assisted you in being a more effective teacher.

4. What recommendations, if any, do you have for future similar mentor models to assure effectiveness?

APPENDIX C
SCHOOL DISTRICT DESIGNEE INTERVIEW GUIDE AND INFORMED CONSENT

School District Designee Interview Questions

1. Did your school district add additional components to the RTP³ mentor model?
2. If your school district did amend the RTP³ mentor model, what considerations went into making that decision?
3. How do you think the decision enhanced the effectiveness of the mentoring component of the RTP³?
4. What would you recommend to someone who has a similar project in the future to assure an effective mentor model?

Dear Educator,

Thank you for taking the time to participate in this study about your school district's commitment to investing in teachers and your impassioned drive toward improving student achievement through a highly structured and supported mentoring program for STEM students in the Resident Teacher Professional Preparation Program (RTP³). Mentoring is a component of a Race to the Top grant, RTP³. The purpose of the study is to determine the differences among the five models and the extent to which these differences may relate to variances in effectiveness or persistence in teaching of the resident teachers in the program.

Your participation in this study is entirely voluntary. Whether or not you take part, is up to you. You may select to change your mind while in the process of participating in this study. There is no consequence for your acceptance or rejection to participate in the study.

The interview is confidential and your identity will be known only to the researcher. The interview will be recorded but only for the purpose of ensuring that the researcher is accurate in reporting the information resulting from the interviews. The interview data and findings will be reported in aggregate, not individually. The interview is expected to last about 20 minutes.

If you have any questions in regards to this study please do not hesitate to contact me at lj_k_21@knights.ucf.edu. My faculty advisor, Dr. Rosemarye Taylor, may be contacted by phone at (407) 823-1469 or by email at rosemarye.taylor@mail.ucf.edu. Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the UCF Institutional Review Board Office at the University of Central Florida, Office of Research and Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The phone numbers are (407) 823-2901 or (407) 882-2276.

Best Regards,

Lisa Karcinski
Doctoral Candidate, University of Central Florida
727-505-5000
1100 Delaney Ave D21
Orlando, FL 32806

APPENDIX D
UNIVERSITY OF CENTRAL FLORIDA
INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1
FWA00000351, IRB00001138**

To: **Lisa Karcinski**

Date: **June 10, 2014**

Dear Researcher:

On 6/10/2014, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
Project Title: FIVE SCHOOL DISTRICT MENTORING MODELS FOR
SECONDARY TEACHERS IN A JOB EMBEDDED
MATHEMATICS AND SCIENCE TEACHER PREPARATION
PROGRAM
Investigator: Lisa Karcinski
IRB Number: SBE-14-10324
Funding Agency:
Grant Title:
Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 06/10/2014 03:42:00 PM EDT

A handwritten signature in cursive script that reads 'Joanne Muratori'.

IRB Coordinator

APPENDIX E
RESEARCH QUESTIONS, FOLLOW-UP INTERVIEW
QUESTIONS, AND SURVEY ITEMS

Research Questions, Follow-up Interview Questions, and Survey Items

| Research Questions | Data Source | Item |
|---|--|--|
| 1. To what extent did the five partner school districts' mentor model align with the RTP ³ mentor model? | District designee Follow-up Interview | <ol style="list-style-type: none"> 1. Did your school district add additional components to the RTP³ mentor model? 2. If your school district did amend the RTP³ mentor model, what considerations went into making that decision? 3. How do you think the decision enhanced the effectiveness of the mentoring component of the RTP³? 4. What would you recommend to someone who has a similar project in the future to assure an effective mentor model? |
| 2. To what extent, if any, was there a relationship between the mentor model implemented and the persistence rates of the resident teachers in the five partner school districts? | Archival Data | RTP ³ quarterly evaluation reports |
| 3. To what extent did mentors perceive that common mentor professional learning assisted them in being effective mentors? | Mentor Survey | <ol style="list-style-type: none"> 1. To what extent do you believe that your participation in common mentor professional learning assisted you in becoming a more effective mentor teacher? 2. As a result of participation in the mentor professional learning what did you do differently as a mentor? 3. As a result of participation in the mentor professional learning what did you do differently As a teacher? 4. What do you recommend to be considered as future similar mentor models are developed to assure effectiveness? |
| 4. To what extent did the resident teachers perceive that the mentors assisted them in being effective? | Resident Teacher Survey | <ol style="list-style-type: none"> 1. To what extent do you believe that your mentor assisted you in becoming a more effective teacher? (Likert Scale) 2. Provide specific examples of how your RTP³ mentor assisted you in being a more effective teacher. 3. Provide specific examples of what you wish your RTP³ mentor had done that you believe would have assisted you in being a more effective teacher. 4. What recommendation do you have for future similar mentor models to assure effectiveness? |

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