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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

A NOVEL APPROACH TO MEASURING TEACHER ENGAGEMENT WITH RESOURCES: USING SOCIAL NETWORK ANALYSIS TO UNDERSTAND TEACHER SATISFACTION AND RETENTION

A dissertation submitted in partial fulfillment of

the requirements for the degree of

DOCTOR of EDUCATION

in

EDUCATIONAL LEADERSHIP AND POLICY STUDIES

by

Jennifer M. Murray

2022

To: Dean Michael Heithaus
College of Arts, Sciences and Education

This dissertation, written by Jennifer M, Murray, and entitled A Novel Approach to Measuring Teacher Engagement with Resources using Social Network Analysis to understand Teacher Satisfaction and Retention, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

_____
Remy Dou

_____
Daniel Saunders

_____
Joshua Ellis

_____
Ethan Kolek, Major Professor

Date of Defense: June 14, 2022

The dissertation of Jennifer M. Murray is approved.

_____
Dean Michael Heithaus
College of Arts, Sciences and Education

_____
Andres G. Gil
Vice-President for Research and Economic Development
and Dean of the University Graduate School

Florida International University, 2022

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DEDICATION

I dedicate this dissertation to my grandmother Helen Chase and my step-grandfather, Milton Chase. My grandmother provided me with a safe space to explore my passions and always ensured that I had what I needed. I watched her battle many obstacles in life, but she never allowed any of them to stand in the way of her kindness and generosity. When she passed away in my junior year in high school, I was devastated. My step-grandfather Milton allowed me to stay with him rather than switching school districts and going back home to my mother. He continued to be a beacon of love for my grandmother, whom he fondly remembered daily. Milton continued to support me through my undergraduate years at Boston College and I always looked forward to our weekly conversations. Milton passed away during my first year in Miami, and my only relief was that he was with my grandmother again and his heart could finally mend. I would not be who I am today without these two individuals, and I would not have authored this dissertation. This one is for you, Nana and Milton!

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I would like to thank Liberty, my wife, for her unconditional love and support during this process. Her continued encouragement, understanding, and patience was integral to my success. Liberty ensured I always had what I needed while typing away in the office and never complained about picking up the slack around the house, well most of the time anyway. I would also like to extend my deepest gratitude to my mother-in-law Patricia Ribera whose support made this dream a reality.

I would be remiss if I did not thank two especially important people in my life, who have consistently been champions and sounding boards for me. I would like to acknowledge my best friend Darien Fleming and my cousin Heidi Lefebvre-McDonald, who really is more like my sister. These two individuals have been consistent forces in my life and have always been willing to listen and provide encouragement and/or reality checks when needed.

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deeply thankful for your advice, support and profound belief in my work and abilities. Lastly, to my fellow Cohort members, your continued advice, willingness to help and overall positive attitude made this process much more enjoyable.

ABSTRACT OF THE DISSERTATION

A NOVEL APPROACH TO MEASURING TEACHER ENGAGEMENT WITH RESOURCES USING SOCIAL NETWORK ANALYSIS TO UNDERSTAND TEACHER SATISFACTION AND RETENTION

by

Jennifer Murray

Florida International University, 2022

Miami, Florida

Professor Ethan Kolek, Major Professor

The purpose of this quantitative survey study was to investigate how teacher engagement with resources at the school-site and district-level predicted teacher satisfaction and intention to stay in the profession. Teachers in Miami-Dade County Public Schools need support as educators in the fourth largest district in the nation. To better understand how teachers engage with resource networks, three measures of interaction were captured, (1) engagement or use of the resource; (2) frequency of interaction with the resources within the network; and (3) the quality of supportiveness of resources within the network. A survey was sent to 967 math (n=523) and social studies (n= 444) teachers at the secondary level in M-DCPS.

The survey consisted of validated instruments used to measure teachers' intent to stay in M-DCPS, a school staffing survey used to measure working conditions, school climate and teacher attitudes and a section that I developed to measure the frequency of participant interaction with resources with a subsequent section that measured the supportiveness of that interaction. I also included basic demographic questions and a section on the impact of COVID-19 with the intention to stay in M-DCPS.

Social Network Analysis was utilized to construct four networks (1) school-site collegial resource network; (2) school-site administrative resource network; (3) district collegial resource network; and (4) district administrative network. Permutated t-tests highlighted differences in engagement, frequency of engagement, as well as the reported quality of engagement dependent on the respective network. Mediation analysis was used to determine whether the association between teachers' engagement with resources and intention to stay is due completely to satisfaction or in part to satisfaction.

The results revealed nine valid mediated models where satisfaction mediated the relationship between teacher centrality or engagement with resources with intention to stay. In my study, it was found that teacher's engagement with resources indirectly predicts intention to stay when mediated through satisfaction. In every model, satisfaction was predictive of intention to stay in M-DCPS. Teachers' engagement with resource networks at the school site and district level undoubtedly predicts teacher satisfaction and subsequently intention to stay in M-DCPS. Social networks are a unique way of understanding how teachers engage with those around them and how this contributes to teacher retention.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

FIGURES PAGE

ABBREVATIONS AND ACRONYMS

AP	Advanced Placement
AICE	Advanced International Certificate of Education
BENCH	Build Excellence in Novice Leaders thorough Challenges and High Expectations
CFA	Confirmatory Factor Analysis
DE	Dual Enrollment
EFA	Exploratory Factor Analysis
ESE	Exceptional Student Education
FDOE	Florida Department of Education
FIU	Florida International University
IRB	Institutional Review Board
MDCPS	Miami Dade County Public Schools
MSO	My School Online
NCES	National Center for Education Statistics
SASS	Schools and Staffing Survey
SNA	Social Network Analysis
SNT	Social Network Theory
PLST	Professional Learning Support Team

Chapter I: Introduction

Brief Background

The education of youth is essential for the continued development of society in a multitude of capacities. To educate the youth, society must retain, develop, and foster the growth of teachers, the very individuals that promote student progress. However, teacher retention is a widespread problem that afflicts schools across the United States. Teacher retention is a global issue that troubles the current educational system (Ingersoll & Strong, 2011; Marker, Mitchall, & Lassiter, 2013; Petty, Fitchett, O'Connor, 2012; Torres, 2019; Wronkowski, 2018). The ASPEN institute reports that 310,000 teachers enter the profession each year; however, an examination across the United States shows that approximately half a million teachers leave their schools each year (Boyd et al., 2011). The large disparity of teachers entering the profession compared to those leaving leaves a considerable and concerning gap. In addition, Raab (2018) writes that almost 50% of teachers leave within the first five years, increasing the destabilization of the profession. Teacher attrition is a major issue confronting public K-12 education and Colson et al. (2017) reiterate these sentiments arguing that sustainability of teachers is paramount for children in the highest poverty, lowest-income schools (p. 67). High rates of teacher turnover have some of the greatest effects on urban and low-achieving schools (Boyd et al., 2005; Education Commission of the States, 2005). Growing attrition rates have sparked discourse amongst researchers on how to stabilize an increasingly unstable profession (Boyd, Lankford, Loeb, & Wyckoff, 2005; Djonko-Moore, 2016; Winters & Cowen, 2013). It is therefore important to find a way to alleviate the growing numbers of teachers who are leaving the profession.

The issue of teacher attrition is a very costly one. The departure of qualified young teachers from the educational landscape is bound to bring huge economic costs to educational

authorities. It is estimated that more than $2billion in the United States alone is spent on replacing teachers who leave the profession (Alliance for Excellent Education, 2005). A significant trend in teacher attrition indicates that attrition is highest within the first five years and even higher among younger teachers (Ingersoll & Smith, 2004), further accentuating the crisis. Glazer (2018) noted that public school teaching is not a long-term occupation for most teachers in the United States and students are paying the price.

Teachers' attrition in Secondary Mathematics is especially concerning, as high school math teachers have the second-highest rate of attrition in the first five years in high poverty schools (Goldring, et al., 2014; Fantilli & McDougal, 2009). Social Studies teachers are not often prioritized in the provision of support, as noted by Hess and Zola (2012) and Swan and Griffin (2013) who explained that the professional development of social studies teachers is rarely a funding priority, leaving teachers of social sciences to seek out their own systems of professional support and development. Without a commitment to proper professional support and development, social science teachers could be more apt to leave the profession further augmenting the issue of attrition.

On a local level, an examination of Miami-Dade County Public Schools (M-DCPS) provides a unique opportunity to delve into issues centered around teacher retention and attrition. M-DCPS is the fourth largest district in the nation, educating over 357,000 students a year and employing 20,484 teachers (5,304 at the secondary level). Seventy-one percent of students are on free and reduced lunch (students from households that meet federal guidelines for lunch priced-reductions and children from households receiving food stamps or foster children) in this A-rated school district. Seventy-two thousand and one hundred ninety-two students are enrolled in school choice and magnet programs, many of which expose students to advanced coursework.

Moreover, 31,092 students participate in Advanced Placement courses, 1,442 in International Baccalaureate Programs, 5,069 in Cambridge AICE programs and another 8,185 in dual enrollment programs. M-DCPS students are afforded numerous opportunities to enhance their high school experiences with a wide range of rigorous coursework that prepares them for the next level of college and career readiness. Therefore, understanding how to retain teachers in this diverse school district will be the focus of this research.

Research Problem

There is no shortage of research that depicts teacher retention as an area of critical concern, especially in high-poverty districts. The growing issue of teacher retention and attrition has fostered an influx of research on the troubling issue worldwide. The consistent rise of teachers who leave the classroom is intensifying the need for policymakers and administrators to act. The growing rates of teacher attrition and problems with retention have been illustrated by a multitude of researchers (Ingersoll & Strong 2011; Marker, Mitchall, & Lassiter, 2013; Petty, Fitchett, O'Connor, 2012; Torres, 2019; Wronkowski, 2018). Teacher attrition is defined as the departure of teachers from their teaching jobs (Skaalvik & Skaalvik, 2011). Teacher retention on the other hand, is defined as teachers returning to their teaching position.

It is explained by several researchers that teachers leave the profession for many reasons. Researchers have identified the following factors as contributing to teacher attrition: job satisfaction (Skaalvik & Skaalvik, 2011; Judge, Thorensen, Bono & Pattonl, 2001); working conditions, school culture, and student characteristics (Boyd et al., 2011; Chiong, Menzies, & Parameshwaran, 2017; Wang, Li, Lou & Zhang, 2020); support (Buchannan, 2010; Lerand, Ertesvag, & Virtanen, 2021; Sparks et al. , 2017) professional development and mentoring

(Bressman, Winter & Efron, 2018); and school administration (Boyd, Grossmman, Lankford, Loeb & Wyckoff, 2011).

Job dissatisfaction has been identified by researchers as one of the major contributors to teacher attrition. Skaalvik and Skaalvik (2011) highlighted that teachers' motivation for leaving the profession is related to overall job satisfaction and levels of emotional exhaustion. When teachers feel supported, have positive relations with parents and administrators, have time to work effectively and when teachers feel a connection with their colleagues, then they feel like they belong and thus are more apt to be satisfied with their job and consequently more likely to stay in the profession. Judge, Thorensen, Bono, and Pattonl (2001), argued that teachers' job satisfaction is directly related to their motivation in the profession. When a teacher is satisfied and motivated, they may be more apt to stay in the profession.

Job satisfaction is often predicated on the amount and level of support that teachers are receiving. Sparks et al. (2017) suggested that there is concern over the amount of support teachers are receiving (p. 63). Buchannan (2010) delved into the issues of teacher attrition and uncovered that "lack of support emerged as the single strongest predictor of a decision to leave the profession" (p. 205). Educators need to feel like they are supported. Lerang, Ertesvag, and Virtanen (2021) emphasized the significance of the disparity in the types and quality of support. Support strengthens their job satisfaction and collegial collaboration. It is also important for teachers to feel they have room to grow professionally and are receiving the support they need to be successful in the classroom. The development of educators is facilitated through systems of collegial support. Sparks et al. (2017) found that mentors find a plethora of benefits in communicating, collaborating, and exchanging ideas with their mentees and proclaimed the significance of developing relationships in the process. Overall, school culture and working

conditions can also impact teacher attrition. Boyd et al. (2011) discussed how working conditions are an area that policymakers and districts can amend, thereby, opening a window for establishing systems of support that alleviate the mental and physical exhaustion that in the past have contributed to rising attrition rates.

A closer look at student characteristics also reveals factors contributing to teacher dissatisfaction and attrition. As noted by Wang, Li, Lou and Zhang (2020), the idea of student characteristics and job satisfaction is well-researched. Naman (2009), added that when high-quality teachers have high rates of low-performing students their level of satisfaction is impacted. Additionally, Skaalvik and Skaalvik (2011) explained that when teachers have students with high levels of discipline issues, teachers are less satisfied. Ingersoll (2011) reiterated this sentiment as schools with fewer discipline problems have lower teacher turnover rates. When teachers have higher rates of high achieving students and well-behaving students, they are less stressed and overall, more satisfied (Feng, 2009). Advanced academic teachers across the nation and within M-DCPS typically have more students who are high achieving due to course pre-requisites. Also, in general higher-achieving students have fewer discipline problems, and thus advanced academic teachers may have more positive experiences as it relates to school characteristics.

School-site and district leadership also play a significant role in a teacher's decision to leave the school or profession. Boyd, Grossman, Lankford, Loeb and Wyckoff (2011) argued that the varying aspects of the school administration and its subsequent decisions play a significant role in why teachers stay or leave the profession (p. 323). Podolsky, Kini, Bishop and Darling-Hammond (2017) also explained that one of the main factors that teachers identify for

leaving the profession is the quality of support that they receive or do not receive from the administration.

While there are numerous contributing factors to teacher attrition, research also suggests ways for schools and districts to potentially combat teacher attrition and stabilize retention rates. Teachers need to experience a certain level of satisfaction to want to remain in the profession. Satisfaction is a strong indicator whether a teacher stays or leaves. Satisfaction, as indicated by Wang, Li, Lou and Zhang (2020), can be influenced by student and school characteristics. School characteristics include leadership styles and school processes whereas student characteristics include achievement levels, behaviors, socioeconomics, and discipline climate (Wang, Li, Lou & Zhang, 2020). Bressman, Winter and Efron (2018) go on to state that "schools need to recognize that learning to teach effectively is a never-ending process and, accordingly, attention to ongoing professional development must be viewed as a key to increasing teacher motivation, efficacy and retention" (p. 163).

Examining more closely school characteristics related to leadership and school processes, professional development opportunities, collegial support and administrative support are essential. Professional development for and mentoring of teachers by colleagues is integral in decreasing teacher attrition rates. Over the course of the last few decades, research has shown teachers must be provided with opportunities to engage in lifelong professional development and learning that shifts over the course of one's career (Day, 1999; Kelchtermans, 1993; Merchie, Tutyens, Devos & Vanderlinde, 2018). The development of educators is facilitated through systems of collegial support. Sparks et al. (2017) found that mentors find a plethora of benefits in communicating, collaborating, and exchanging ideas with their mentees and proclaimed the significance of developing relationships in the process. Buchannan (2010) postulated that support

is essential to keeping teachers in the profession, and support that assists with classroom management is important (p. 208). Teachers need to be supported from the inception of their careers until the end and work in an environment that fosters collegiality. In addition, the relationship that a teacher has with his or her principal can be predictive of whether a teacher remains at his or her school (Urick, 2015, p. 435). Each of the aforementioned factors contributes to the overall satisfaction and stabilization of teacher attrition rates.

One way to better understand systems of support and factors contributing to satisfaction (administration, school characteristics, professional development) is to examine teacher engagement with varying networks. In this study, engagement with networks will be understood and calculated through measures of centrality and when centrality is measured, I am looking at how engaged teachers are in the school-site or district network based on both direct and indirect connections with the resources, whether social or materialistic. Moreover, while there is a depth and wealth of information available on the significance of the need for support systems for educators, there is still a considerable gap in understanding how engagement with networks affects teacher satisfaction and teacher retention. However, some researchers have begun to examine how to mitigate attrition in the educational realm by understanding teachers' participation in networks. Hansen (1999) found evidence that the very essence of networks are mediums in which individuals can solve problems and coordinate solutions regardless of the level and or complexity of the information being presented. Coburn et al. (2015) explained that while researchers have studied the impact of social networks via a value-added model, more research is necessary to understand the impact of social networks on teachers' experiences. Polizzi et al. (2019) echoed a similar sentiment and explained that a greater examination of the "range of teacher networks" at varying levels may contribute to a larger understanding of

“spheres of influence and teacher leadership capacity” (p. 51). Polizzi et al. (2019) studied teacher leadership development programs using social network analysis (SNA) and highlighted how the leveraging of contacts (networks) can have positive impacts on a school site (p. 51).

Teachers' participation in networks can be further defined and understood as social networks (people) or physical networks (material items) as will be explained and examined throughout this research. I will discuss networks further from a conceptual perspective, and whether a teacher engages with a particular person or people or accesses material items from a network, I will consider all networks resource networks in this study. Engagement with resource networks is a significant medium that can impact a teacher's experience. Attbery and Byrk (2010) argued that “social networks play a key role in understanding the degree of success schools experience in terms of improvements for teachers and students” (p. 73). Therefore, examining teachers' engagement at the school-site and district level as well as whether a teacher is a math or social studies teacher or teaches high-achieving (advanced academic) students may provide a unique contribution to network analysis, teacher satisfaction and teacher retention.

A deeper examination of advanced level teachers highlights an additional level of potential support garnered from resource networks. Polizzi, Ofem, Coyle, Lundquist and Ruston (2019) noted in their study on social networks and leadership development that connections beyond an immediate school-site can be beneficial. When teachers expand their networks, they create opportunities for shared expectations and engagement that foster positive relationships (Uzzi, 1997). With an increase in positive collegial relationships, teachers may be increasingly satisfied. Polizzi et al. (2019) showed that support garnered from networks allows Advanced Placement (AP) educators an opportunity to “broker information between organizations” (p. 48). Access to larger networks of educators fosters additional opportunities for support that teachers

can tap into and leads to greater self-efficacy and improved satisfaction within the profession. A deeper exploration of resource networks beyond the school-site and within M-DCPS provided a deeper understanding of research on social networks.

Purpose

The purpose of this quantitative survey study was to investigate how teacher engagement with resources at the school-site and district-level predicted teacher satisfaction and intention to stay in the profession. Teachers in Miami-Dade County Public Schools need support as educators in the fourth largest district in the nation. To better understand how teachers engage with resource networks, two measures of interaction were captured, (1) engagement or use of the resource; (2) frequency of interaction with the resources within the network; and (3) the quality of supportiveness of resources within the network. The frequency of interaction was defined as any interaction between a teacher and resource in the network whether it is face-to-face, phone, e-mail, or text. The quality of supportiveness was based on how supportive teachers found any interaction with a resource to be. Understanding the frequency and quality of engagement of teachers with varying resources across different networks also contributed to a greater understanding of overall teacher satisfaction and intention to stay. This research garnered a deeper knowledge of social network analysis in the educational domain by examining resource networks at the school-site and district level and both at the collegial and administrative level. A teacher's engagement or interaction with resources in the network was measured by centrality, a SNA concept of measurement that I will explain in detail in Chapter 3, methods. This research study provides a greater understanding of the characteristics of a teacher's centrality as measured through degree, and weighted degree within a school-site or district resource network in relation to their satisfaction and intention to remain in the profession. Finally, I examined how these same networks shaped teacher's intention to stay in the profession while accounting for

satisfaction and background characteristics that include, subject area, years of experience, gender and being an advanced teacher or not.

Research Questions

This study sought to answer the following five research questions:

1. How are characteristics of resource networks different across school-site and district resources?
2. To what extent are the characteristics of a teacher's centrality within a *school-site collegial resource network* related to their satisfaction and intention to remain in M-DCPS?
3. To what extent are the characteristics of a teacher's centrality within a *school-site administrative resource network* related to their satisfaction and intention to remain in M-DCPS?
4. To what extent are the characteristics of a teacher's centrality within a *district collegial resource* network related to their satisfaction intention to remain in M-DCPS?
5. To what extent are the characteristics of a teacher's centrality within a *district administrative resource network* related to their satisfaction intention to remain in M-DCPS?

Statement of Significance

I examined how teachers' engagement with resources at the school site and/or district level predicted their level of satisfaction and/or intention to stay in M-DCPS. I gleaned that satisfaction was significant to my study because satisfaction was a direct predictor of intention to stay. In addition, while engagement with resources was not directly predictive of intention to stay it was indirectly predictive when mediated by satisfaction, while also controlling for subject area being taught, achievement level of students, gender, and years of experience, in either the

permutated t-tests or in subsequent regressions. The ability to understand how engagement in different networks contributed to satisfaction and subsequently intention to stay may have future implications on how to create, develop and sustain systems of support at the school-site and district level. Policy makers at the federal and state level, as well as administrators at district and school-sites, will benefit from the results and conclusions of this study. This research contributed to the established body of literature that calls for a shift in the way that change strategies are conceptualized and enacted within a school district (Daly et al., 2010, p. 361). Daley et al. (2010) explained that in order "to increase the likelihood of successful and sustainable efforts at reform, educational leaders at the district and school level may benefit from a deep consideration of existing teacher networks prior to and during the implementation phase of reform" (p. 382). Furthermore, Thomas et al., (2019) argued, "further unravelling the social side of the teacher induction period can lead us to valuable input for both practice and policy, with the ultimate aim of supporting BTs (beginning teachers), their colleagues, and the children they teach" (p. 178). This research expounded upon previous research on networks and examined the resource networks that high math and social studies engaged with and accounted for level of courses taught across school-site and district collegial and administrative networks across M-DCPS.

In summation, it is extremely important to find a way to alleviate the growing numbers of teachers who are leaving the profession. An examination across the United States, shows that approximately half a million teachers leave their schools each year (Boyd et al., 2011). To foster the growth of youth, teachers are necessary and the need for highly qualified teachers is even more prevalent in diverse urban districts like Miami-Dade County Public Schools. As Battle and Looney (2003) argue "Teachers who enjoy teaching and see it as important, who view it as

useful, and who associate low financial and emotional costs with the profession, are likely to remain in it" (p. 375).

Finally, because satisfaction is predictive of intention to stay, and mediates the relationship between teacher engagement with resources and intention to stay, M-DCPS could direct some resources into enhancing the satisfaction level of teachers. Satisfaction is influenced by perceived support both at the school site and district level. Moreover, it is also extremely important to provide teachers with an ability to collaborate and support one another whether at the school or the district regardless of the years of experience. The district may also want to re-align support systems for math teachers as they were less satisfied in some the networks, depending on the quality of supportiveness. Results from this research may have immediate impacts for M-DCPS by providing a shift in practice about the resource networks established for teachers with a focus on the frequency and supportiveness of those networks. Alternatively, even when the study did not yield a positive association of resource networks and teacher retention (engagement and frequency of engagement in district administrative network and engagement in the school site administrative network), this study does propose questions on the rationale for certain systems of support and how the district is ensuring teachers are satisfied in the profession. In addition to providing potential implications for M-DCPS this study may also be applicable to other large urban public-schools districts.

Delimitations/Assumptions of Study

Throughout the course of this study, several assumptions and delimitations undergird this study. One of the first fundamental assumptions I made was that there is a relationship between teachers' intention to remain in the profession as reported in a survey and their actual behaviors. I assumed that all respondents completed the survey honestly and that all respondents could

remember whom they interacted with noting both the frequency and supportiveness of that interaction. Another assumption that I had going into this study is that the more connections that a teacher has in the field of education, the more likely a teacher is to be satisfied and to remain in M-DCPS. This was an assumption that I tested and will later report the results in Chapter 4. Moreover, before I began, I also assumed that satisfaction is positively associated with intention to remain in the profession, and this confirmed true after testing this assumption in my study. Delimitations of the study include a focus on advanced academic teachers and regular secondary math and social studies teachers in high schools – the study did not examine elementary or middle school resource networks and their impact on a teacher's decision to stay in the profession. Another delimitation was the selection of resources that were chosen to be a part of each network. While the resources were chosen based on the input of many educators in the profession and across the United States, other resources may have created differing results. As previously noted, because I assumed all respondents would be honest, as an administrator collecting data, my job title may have also been a potential delimitation. Teachers may feel like there is an ulterior motivation behind the questions, especially when trying to engage intention to stay in M-DCPS and satisfaction**.**

Definitions

As part of my research throughout this study, I used several key terms that provide a clearer understanding of important terms and are presented below. The first set of terms explained relate specifically to social network analysis and the construction of networks used in this study.

Throughout this research, I refer to teacher retention and teacher attrition. ***Teacher Retention*** refers to those teachers who remain in the educational profession. ***Teacher Attrition***

on the other hand refers to those teachers who leave the educational profession. Additionally, because this study is situation in Miami-Dade County Public Schools, this study focuses on Urban Schools. ***Urban School***s refer to schools located in a major city with many students eligible for Free and Reduced Lunch. Urban schools are often diverse and inclusive of a majority of racially minorized students. This research also looks at a specific group of teachers in M-DCPS. ***Regular Secondary Core Teachers*** are educators who teach in one of the four core areas at the secondary level, English, Math, Science or Social Studies. ***Advanced Academic Teachers*** are teachers who teach at least one course at the Advanced Placement (AP), Dual Enrollment, Cambridge or IB Level.

The next set of definitions relates to ideas centered around social networks. In the 1930s, the study of social networks was coined by Jacob Moreno as *Sociometry* and from there, the theory of social networks began. **Social Network Theory** is a study of how people and organizations interact with others inside of their network. According to Borgatti and Ofem (2010) in a network perspective, relationships between **actors** (individuals) are at the center of the theory. In a network view, individuals consider the web of relationships that the actors or individuals are embedded in. Network theorists ultimately not only examine the attributes of the individuals, but it is also about the relationships that impact or influence the individuals (Borgatti & Ofem, 2010). Another term for actors within a network is a **node,** and a node also relates to the individuals that are within a network. The network itself pertains to a group of actors who are connected to one another through a set of different relations or ties (Daly, 2018). **Social Network Analysis (SNA)** is the toolbox that researchers use to quantify the various aspects of relational structures that result from those interactions (Dou & Zwolak, 2019). Thus, a social network consists of a set of actors or nodes who are connected to one another in some type of

relation which are also referred to as **ties**, **links** or **edges**. The network itself can either be **a one-mode network** or it can be a **bipartite** or **dual mode network**. In a one mode or unimodal network, the nodes are the same type of node (e.g., everyone is teacher). Whereas, in a bipartite network there are two sets of nodes (e.g., teachers and resources) and the ties indicate a relationship by one set of nodes with another set of nodes.

Every network has a differing set of outcomes both for the individual and the network. The characteristics of networks can be explained by examining the density -- the proportion of ties present. **Density** is calculated by taking the ratio of the edges and dividing them by the total possible number of edges, producing a percentage of ties within an identified network. The next important network statistic to understand are the centrality measures of a network. ***Centrality Measure*s** indicate how central a node or actor is to the network and can be measured by degree, closeness and betweenness. ***Degree Centrality*** assigns a number based on the number of links held by each node. Degree centrality indicates how many direct connections that each node has to other nodes within the network. ***Betweenness Centrality*** measures how many times a node lies on the shortest path between other nodes in the network. Betweenness centrality reveals which nodes act as bridge between other nodes in the network and will inform researchers which nodes influence the network. ***Closeness Centrality*** assigns a score to each node based on their closeness to all the other nodes in the network and informs researchers on which nodes are the best placed to influence the entire network most quickly.

The provided definitions until this juncture have provided general and widely accepted definitions pertaining to social network analysis. The next set of definitions affiliated with social network analysis are specific to this research. When discussing networks in this study, the constructed networks will be considered resource networks. ***Resource Networks*** are the informal

or formal interactions that teachers engage with at district or school-site level. Interactions may be social (with people) or material (social media and shared physical items). ***Collegial Resource Networks*** are networks that include school site (colleagues in department, colleagues outside of department, department head, instructional coach) and district colleagues (M-DCPS colleagues, AP, DE, AICE Colleagues, M--DCPS Workplace colleagues, MDCPS Microsoft Team Colleagues). ***Administrative Resource Networks*** are networks that include school-site (Assistant Principal and Principal) and district administrators (Instructional Supervisor, Curriculum Support Specialist, and Assigned Mentor). Within each of these networks I examine the frequency and supportiveness of each network. ***Frequency is*** a way to understand relationship characteristics in a network. Frequency characteristics examine how often a teacher accesses a resource within the network. ***Supportiveness*** measures how helpful a resource network is to a teacher in their respective positions and career paths

Personal Reflection

Over the course of the last nineteen years, I have held several positions in the educational field and across Miami-Dade County Public Schools: from an advanced academic social studies teacher to high school athletic director, assistant principal, vice-principal, and currently as an Executive Director in the Office of Educational Equity Access and Diversity. I have witnessed countless issues that educators face across all levels and positions. I have seen many people during this time leave M-DCPS because of the experiences and adversities that they have had to endure.

As I began to reflect more deeply about my time as an advanced academic social studies teacher and administrator over mathematics, I was curious why some teachers stayed and some left. I also began to think about all the relationships I established with individuals at the school-

site and district and outside of MDCPS. I realized that over the course of the nineteen years that I have been employed with the district, it is the people that have mattered the most to me. Moreover, I also thought about relationships with varying administrators, and while my personal experience has always been positive, I know other teachers were frustrated by their interactions with administrators and were much less satisfied with the profession than I was. Some of the individuals left and others stayed and just waited for a new administration. Also, as a teacher and administrator in a Title I school with some records of low performance, support was provided by the district on a consistent basis. Those systems of support are perceived very differently from teacher to teacher and undoubtedly impact teacher satisfaction. As a result of these experiences, I decided it would be worthwhile to think about how engagement with these individuals, who I will refer to as "resources," predict a teacher's level of satisfaction and their intention to stay in M-DCPS.

Summary

In further reflection what is currently not known, I do not know how perceived support at the school-site and district-level impacts M-DCPS teachers' level of satisfaction and intention to stay in the profession. I know and have experienced the importance of collaboration and access to resources, but never thought about how the frequency and supportiveness of these resources impact myself or fellow colleagues. I also never really thought about how disparate systems of support within the school site and across the district impacted teachers' perception of support differently. Therefore, the purpose of this study is to develop a nuanced understanding of how a teacher's engagement with resources predicts satisfaction and their intention to stay in M-DCPS.

In chapter 2, I discuss the numerous researchers who have examined teacher retention as a critical concern not only on the national level, but on a global level. The recruitment of math

and social studies are also examined, as these are the subjects that my study focused on, due to my personal connection. Boyd, Grossman, Hammerness, Lankford, Loeb, Ronfelt, Wyckoff (2012), contended that there is a continual shortage of qualified math teachers in the United States. Additionally, while social studies may not be a critical area of staffing, social studies teachers often have trouble obtaining proper training and support, as the subject area is not always prioritized in districts. Moreover, research showed that engaged teachers were more apt to stay in the profession. Runhaar, Sanders and Konermann (2013) argue that because employees who are engaged perform well and are more enthusiastic, it is important for organizations to understand what engages employees. Further examination of resource engagement, Skaalvik and Skaalvik (2018), found that job resources "moderately predicted" a higher well-being of a teacher which in turn made teachers want to stay in the profession. Podolsky, Kini, Bishop and Darling-Hammond (2017) explain that one of the main factors that teachers identify for leaving the profession is the quality of support that they receive or don't receive from the administration. A more holistic review of engagement with resources from a network perspective is then examined. Hansen (1999) found evidence that the very essence of networks are mediums in which individuals can solve problems and coordinate solutions regardless of the level and or complexity of information being presented. Finally, the importance of understanding resource engagement is used to understand how engagement with these resources impacts teacher satisfaction and intention to stay in the profession. Collie and Martin (2017) postulate that when teachers have positive and supportive relationships with colleagues at the school then the level of job satisfaction is increased leading to a lower level of burn-out. When an educator has a lower level of burn-out they are less likely to leave the profession.

The methodology used in this quantitative survey study is explained in Chapter 3. I begin Chapter 3 with an overview of the selection of participants utilized to complete this study from a list file of demographic information provided to from the district. After providing a detailed overview of the actual participant sample, I then discuss the development of the survey utilized for this study. The survey was a combination of a homegrown instrument as well as scales utilized by previous researchers. I adapted the four question Likert Scale from an Intent to Stay Scale from Price and Mueller (1986) survey so participants could think about their intention to remain part of M-DCPS and the teaching profession. To ascertain teachers' satisfaction, I used survey items from The National Center for Education Statistics (NCES) who administered a Schools and Staffing Survey (SASS) seven times between 1987 and 2011. The survey also asked several control and demographic variables that included level of courses taught, type of school., race/ethnicity, etc. Finally, the survey contained a section where participants were asked how the COVID 19 pandemic affected their intention to stay in the profession and M-DCPS, using a. multi-ordinal scale (Strongly agree to Strong Disagree).

The findings of my study are reported in Chapter 4, which details the results of this quantitative study which measured teacher engagement with resources using social network analysis. I provide network descriptives for each of the four networks examined, school site collegial, school site administrative, district collegial, and district administrative. I then moved into an examination of cumulative scores for satisfaction and intention to stay that were calculated after running exploratory factor analysis followed up with confirmatory factor analysis. I finish Chapter 4, by reporting results from permutated t-tests for each network and report differences in the ways that teachers engage with identified resources across teacher subject area, course level (advanced or regular), and gender. After running a series of mediated

models, I report which mediated models are valid and indicate that satisfaction mediates teacher's centrality and intention to stay. A summary of all centrality measures, predictions, p-values, F statistics and R2 values are then reported for each network.

After reviewing the results from all the networks and each model, I then discuss a summary of my findings as well as implications of the study and implications of my research in Chapter 5.

Chapter II: Related Literature

As discussed in my introduction, there is no shortage of research that depicts teacher retention as an area of critical concern, especially in high-poverty districts. The growing issue of teacher retention and attrition has fostered an influx of research on the troubling issue worldwide. The teaching profession has high turnover rates, and teachers typically leave within the first five years of teaching (Grissmer & Kirby, 1987; Hafner & Owings, 1991; Ingersoll, 2003; Ingersoll & Strong, 2011). My literature review will address the issue of teacher attrition and potential avenues to augment retention. Teacher attrition is understood as anyone who leaves the profession regardless of years worked. Teacher retention, on the other hand, is understood by teachers who are retained in the profession, although they may move between school sites. Researchers have examined a plethora of factors that contribute to teacher attrition (working conditions, satisfaction, support, administration, student achievement levels and school characteristics) to highlight a few.

I begin this literature review with research that examines teacher attrition and retention as a broad problem across the United States. A comprehensive review of literature on teacher retention indicates how critical this area of educational research is to not only M-DCPS but to the nation. I then examine teacher retention as it relates specifically to math and social science teachers. I then narrow my focus into satisfaction and retention, as satisfaction is a major predictor of teacher retention and will be reinforced throughout this study. I then begin to focus even more closely on how teachers' engagement with varying resources impacts satisfaction and teacher retention. Moreover, it is also important to delineate that a teacher's engagement with resources can be both material and/or social (colleagues, peers, and administrators) and will be discussed accordingly. Additionally, although resources may be available, a teacher's perception

of these resources or groups of resources may not foster the same type of sentiment and some resources may be perceived as adverse to satisfaction.

Teacher Attrition and Retention

Globally, researchers explain that teachers leave the profession for myriad reasons. Schools face extreme challenges retaining qualified teachers, especially within the first five years, where attrition is at its highest (Ingersoll & Smith, 2003). Working conditions and job satisfaction are at the forefront of teacher attrition and retention. Ingersoll and Smith (2003) augmented previous findings and stated that working conditions contributed to high attrition rates across the United States. Boyd, Grossman, Lankford, Loeb and Wyckoff (2011) argued that the varying aspects of the school administration and its subsequent decisions play a significant role in working conditions and why teachers stay or leave the profession (p. 323). Hughes (2012) noted that many teachers leave the profession because of dissatisfaction. Watson, Harper, Ratliff and Singleton (2010) discussed the impact of stress on teachers and how higher levels of stress contribute to a decrease in job satisfaction. In this study, satisfaction will be examined closely to see how teachers' satisfaction is influenced by engagement with resources and subsequently how both variables predict teacher retention.

While administrative support is linked to overall school-site working conditions, many researchers discuss the role of administration much more specifically. Boyd, Grossman, Lankford, Loeb and Wyckoff (2011) defined administrative support as "the extent to which principals and other school leaders make teachers' work easier and help them improve their teaching" (p.307). Borman and Dowling (2008) defined administrative support as "the school's effectiveness in assisting teachers with issues such as student discipline, instructional methods, curriculum, and adjusting to the school environment" (p. 308). Hirsch and Emerick (2007),

discussed the varying forms that administrative support can take, including but not limited to professional development opportunities and protections from district mandates. Teachers want to work in schools with higher levels of administrative support and where expectations are communicated (Hughes, 2012). Littrell, Billingsley, and Cross (1994) noted that administrators can potentially add to teacher stress by not providing sufficient teacher support. Wynn, Carboni and Patall (2007) reinforced this notion when they explained principals have a considerable influence over the support teachers receive and can therefore influence teacher retention.

While administrative support is undoubtedly significant and important to teachers, it is also important to note that teachers need to feel supported by their colleagues and district leaders. Fox and Wilson (2015) explained that a crucial influence on teachers' attitudes toward their job and whether they stay, or leave is their professional relationships and support from colleagues. Rippon and Martin (2006) stated that without support teachers, especially beginning teachers, leave the profession. Gersten, Keating, Yovanoff and Hraniss (2001) explained that support that allows cooperative work time for planning and classroom management suggestions is integral for teacher success. On the other hand, Smethen (2007) explained that support is evidenced in the mentoring opportunities that help teachers adjust to the school-site as well as the teaching profession. Mercieca and Kelly (2017) explained the idea of support more broadly and stated that support provided by colleagues can be understood by the formal structures in place at the school (like mentoring programs) or as the informal structures in place like having a passing conversation between classes. In a diverse school district like M-DCPS, it is important to understand how the support that teachers receive from both administrative and collegial support systems impacts teacher satisfaction and subsequent teacher retention rates.

Teacher attrition and retention rates are also impacted by student achievement levels and school characteristics. Ingersoll and Smith (2003) noted the importance of teachers believing that they have a positive influence on their students. Johnson and Birkeland (2003) reiterated this finding and argued that teachers must feel like they are effective with their students. The content area that a teacher decides to teach may also impact a teacher's decision to stay (Hughes, 2012). Hughes (2012) explored additional issues contributing to attrition and explained that teachers want to help students and students who are not motivated and have discipline problems have teachers question their professional choices and contribute to them leaving the profession. Borman and Dowling (2006), explained that schools with higher-achieving students often retain more teachers. Certain subject areas and levels of student achievement greatly impact a teacher's decision to stay in the profession.

Many factors have been introduced that contribute to attrition and retention of teachers across the United States. Moreover, while many factors may contribute to teacher attrition, for the purpose of this study, I will focus on the following factors: satisfaction, course type (advanced or regular), subject, gender and support (administrative and collegial). This study is consistent with prior research on identifying these areas of critical importance when trying to alleviate growing attrition rates.

Retention of Math and Social Studies Teachers

The retention of math and social studies teachers provides a subject-specific perspective of teacher attrition across the United States and in M-DCPS**.** The recruitment of high school math teachers is extremely difficult. In an article on recruiting effective math teachers, Boyd, Grossman, Hammerness, Lankford, Loeb, Ronfelt, and Wyckoff (2012), contended that there is continual shortage of qualified math teachers in the United States. With this continued shortage

it is important to retain and develop the teachers currently in the profession. Feng and Sass (2018) noted that the United States is experiencing a chronic and critical shortage of teachers in high need areas like mathematics. Fisher and Royster (2016), echo this sentiment and examined the impact of fewer students majoring in mathematics at the college level, eliminating pools of mathematics teachers. They further cited evidence that shows that up to one third of students in grades 7-12 do not have a current instructor who has a major or minor in mathematics. Teacher retention in general is an issue, but teacher retention in areas that are difficult to staff is even more eye opening and perpetuates the staunch need to alleviate attrition issues (Fisher & Royster, 2016).

The inclusion of social studies teachers in this study was a personal decision because I was a social studies teacher in M-DCPS. Additionally, examining social studies teachers seemed to me like a good contrast with math teachers, given the priorities given to math. In examining the current literature there are not many studies in general that examine social studies teachers and teacher attrition or retention. Moreover, while social studies may not be a critical area of staffing, social studies teachers often have trouble obtaining proper training and support, as the subject area is not always prioritized in districts. Thacker (2017) argued that informal learning experiences are important to social studies teachers and that for many teachers due to budget restrictions they must find their own ways of soliciting support. Attempts to build self-efficacy in social studies appear to be a limited priority for many districts and could contribute to teacher attrition.

Retention and High-Achieving Students

As previously noted in both the introduction and the beginning of this literature review, student characteristics can be a determining factor in increasing teacher retention rates. When

teachers are exposed to students who do well in school and do not have a plethora of discipline problems, teachers are more apt to stay at the school and stay in the profession. As noted by Boyd, Lankford, Wyckoff, Grossman and Loeb (2009), teachers are more apt to stay in schools where the school and students have higher achievement levels. It is further explained that teachers of lower-performing students within the first two years of teaching at a school may decide to leave (Boyd, Lankford, Wyckoff, Grossman, & Loeb, 2009). Goldring, Tie and Riddles (2014) reinforced these ideas when they argued that teachers more often leave urban and low income and low performing schools than any other type. However, other studies suggested that working conditions at the school-site impacted a teacher's decision to leave rather than the students that they teach (Allensworth, Ponisciak, & Mazzeo, 2009, Boyd et al., 2011; Buckley, Schneider, & Yi, 2004; Johnson & Birkeland, 2003). On the other hand, Ramos and Hughes (2020) explained that there is a growing belief that discipline concerns that impact teaching and learning create job dissatisfaction which potentially leads to teacher turnover. Rieg, Paquette, and Chen (2007) also highlighted that student discipline is a major factor related to attrition. Moreover, as stated previously, students enrolled in advanced academic courses typically are higher achieving and have fewer discipline problems. Understanding how advanced academic teachers respond to factors contributing to teacher retention adds an additional level of analysis in this study and the disparate findings on achievement levels and intention to stay.

Teacher Satisfaction

Research has shown that job satisfaction is an extremely important factor related to retention. Several studies have posited that a teacher's level of job satisfaction impacts their intention to persist or leave (Gersten, Keating, Yovanoff & Harniss, 2001; Singh & Billingsley, 1996, Shreeve, Norby, Griffith, Stueckle, De Michelle, & Midgley, 1988). As explained by Evans (1997), job satisfaction overall is understood as the level of happiness comfort and

overfull fulfillment of one's need daily. Skaalvik and Skaalvik (2011), further explained that teacher satisfaction is related to work with students, collegial and parental interactions, or the successful implementation of an engaging lesson. Other studies had focused on demographics and retention. Lui and Ramsey (2008) argued that student make-up contributed to teacher satisfaction, whereas Stewart and Robles-Pina (2008) focused on school location as a factor impacting satisfaction. Teachers at suburban schools have higher job satisfaction and teachers at urban schools have lower job satisfaction (Perie & Baker, 1997).

Furthermore, school site and district working conditions are also often associated with satisfaction. Workplace conditions include variables such as administrative support, school discipline, collegial relationships, class size, overall quality of facilities, compensation and assigned roles (Horng, 2009; Liu & Ramsey, 2008; Staufer & Mason, 2013). A deeper understanding of the factors that contribute to satisfaction and dissatisfaction are necessary to discover ways to keep teachers in the profession. Stockard and Lehman (2004) conclusively found that teachers' satisfaction when compared to other tested variables had the greatest influence on retention decisions. They further argued that any study that examines teacher retention should also look at satisfaction (Stockard & Lehman, 2004). Emphasizing this notion, Ladd (2011) found that job satisfaction had a substantial relationship with teachers' intentions to leave.

In addition to working conditions, one of the most cited factors contributing to job satisfaction or job dissatisfaction is administrative support. Ingersoll and Smith (2003) discovered that teachers who were dissatisfied with their jobs identified lack of administrative support as a main cause. Perie et al. (1997) also linked teacher satisfaction to a teacher's

perception of administrative support. Shann (1998) emphasized the importance of school administration working toward increased job satisfaction for their teachers.

The correlation of support and satisfaction is also heavily researched as it relates to collegial support (Billingsley, 1993; Dedrick, Lee, & Smith, 1990; Perie & Baker, 1997). Dedrick, Lee, and Smith (1991) further studied how the organization of schools impacted not only teacher efficacy but teacher satisfaction and found that principal leadership and communal school organization were connected. In a similar study McLaughlin and Talbert (2001) found that professional communities in high schools undoubtedly influence teacher satisfaction. Engagement with other professionals in a school building that are deemed positive and lead to greater efficacy and satisfaction augment a teacher's experience and desire to stay in the profession.

Other researchers have studied satisfaction through an examination of efficacy. Maqbool (2017) examined the relationship between secondary school teachers' efficacy and their job satisfaction in a correlational study and found that both job satisfaction and collective efficacy play a very important role in one's overall commitment and productivity toward the school-site. When teachers feel like their students are achieving their sense of efficacy is increased. While a multitude of researchers have examined efficacy and job satisfaction, most look at overall job satisfaction and the variables that influence job satisfaction. Thus, an improved examination of satisfaction as it relates to the resources that teachers engage with will provide a renewed perspective to understanding teacher satisfaction.

Social Network Theory / Analysis

The next part of this literature review will examine research centered around social network theory and social network analysis. As previously explained, social network theory is a study of how people and organizations interact with others inside of their network. Social network analysis (SNA) on the other hand is the toolbox that researchers use to quantify the various aspects of relational structures that result from those interactions (Dou & Zwolak, 2019). The analysis of the educational realm through the lens of SNT allots researchers the opportunity to glean insight into the complex systems indicative of organizational relations. This is important because human capital is at the forefront of any educational institution, thus fostering an inherent medium in which to highlight the plethora of social phenomena ever present at the school-site and across the district. Dou and Zwolak (2019) used social network analysis to examine physics anxiety in active-learning settings and claimed that SNA can be utilized to assess varying social dynamics. It is also noted in this article that while SNA may reveal informative data results, the power of SNA is also beyond the meaningful connections, SNA may also show that assumed connections (or the importance of those connections) do not exist (Dou & Zwolak, 2019). Froehlich, Van Waes and Schafer (2020) argued that SNA is beneficial in understanding the structural sides of relationships. Zwolak, Dou, Williams and Brewe (2017), argued that network analysis allows researchers to gain insight into communities and can further lead to the identification of patterns of interaction.

In another study, Hansen (1999) found evidence that the very essence of networks are mediums in which individuals can solve problems and coordinate solutions regardless of the level and or complexity of information being presented. A deeper analysis of social networks is evidenced by Coburn et al. (2015), who sought to examine how teachers' choices about whom to seek out for advice, influenced the structure of their social network, while also analyzing two

dimensions of the structure of the networks: *size* of network and *diversity of ties*. In their study Coburn et al. (2015) provided researchers and policy makers with a paradigm and innovative insight for how to develop and sustain network developments, that in theory can stabilize teacher attrition rates.

Other researchers have also studied the impact of social networks within the field of education by considering the role of social networks in a school-based literary initiative and examined more specifically the centrality, connection and commitment amongst school networks. Attbery and Byrk (2010) suggested that there is a strong relationship between network characteristics and how these characteristics interact with change efforts aimed at instructional improvement (p. 52). The study also explored how pre-existing social networks shaped initial reform and whether the networks changed as literacy collaboration was being implemented and deepened (Attbery & Byrk, 2010, p. 52). After collecting and analyzing data from various schools Attbery and Byrk (2010) concluded that "social networks play a key role in understanding the degree of success schools experience in terms of improvements for teachers and students" (p. 73). Perhaps most significant to understanding the effects of social networks is the idea of how social networks at the micro and macro level influence school improvement as well as providing a mode of analysis that examines how schools have changed over a designated period (Attbery & Byrk, 2010, p. 75). Yonezawa et al. (2011) cited that teachers' engagement with healthy learning communities creates an impactful experience for educators and further noted that these communities are not available in schools and all districts. From the research outlined, the significance of social networks both formally and informally and how these resource networks can provide teachers with a system of support and increase the likelihood that they will continue in the profession cannot be overlooked.

Teachers often collaborate with individuals in the profession, and they often are influenced by the informal and formal networks that they engage in, whether those influences are deemed positive or negative. At any given school site, the professional relationships between teachers, support staff, and administration can either enhance school-wide or district initiatives, or they can make them very difficult to implement. School site staff form relationships and bonds with individuals that they interact with on a consistent basis. The relationships that emerge from informal interactions can be extremely useful. The use of social network analysis allots researchers the opportunity to uncover the "organic" networks that exist and emerge between teachers rather than just examining the formal structural or organizational arrangements in a school (Cole & Weinbaum, 2015, p. 80). The emergence of these organic networks contributes to the overall climate and culture of a school. Cole and Weinbaum (2015) illustrated that there is a significant amount of evidence that highlights the influence of social tenets on attitude development amongst teachers (p.93). The overall social dynamics of a school setting can be very telling to researchers and educators alike. Additionally, as delineated by Cole and Weinbaum (2015), peer to peer interaction has significant and measurable influences on teachers and cannot be underestimated. Augmenting findings by Cole and Weinbaum, Grunspan, Wiggins and Goodreau (2014) concluded in their study that the even the most simplistic networks provide a very robust method to examining school communities and provide researchers with a unique way to examine schools.

Teacher Engagement with Resources

The examination of school communities can be understood by studying how teachers engage with resources within and outside of that community. Stoll and Seashore Louis (2007) argued that communities can be developed through professional learning communities and collaborative structures. Other researchers have suggested that the informal social structures

within a school create unique opportunities for information exchange (Ahuja, 2000; Tsai & Ghoshal, 1998). Rigano and Ritchie (2003) noted that teachers who collaborate and utilize individual and collective resources are more embedded within their professional networks.

Other studies have examined how job resources have contributed to a teacher's well-being or level of satisfaction. Baker and Demerouti (2007) explained job resources as "those physical, psychological, social or organizational aspects of the job" (p. 309). In a study conducted by De Cooman, Stynen, Broeck, Sels, and De Witte (2013), they argued that job resources promote psychological fulfillment for teachers that contributes to their level of effort. When teachers put forth greater effort typically, they are more satisfied with their work. In a study on job demands and job resources and how these variables act as predictors of teacher motivation and well-being by Skaalvik and Skaalvik (2018), found that job resources "moderately predicted" a higher well-being of a teacher which in turn made teachers want to stay in the profession (p. 1251). In further review of job resources that stem from supportive relations with colleagues Skaalvik and Skaalvik (2018) argued that positive and supportive engagement with job resources will act as a buffer against burnout and other negative effects and as argued that may increase a teacher's level of resilience.

Teacher Engagement with Resources (Network Perspective)

In further understanding of the literature centered around teacher engagement with resources, it is important to examine literature containing a network perspective of engagement with resources. In a review of teacher engagement with networks in a Philadelphia high school, Schiff, Herzog, Farley-Ripple and Thum lannuccilli (2015), found that the importance of networks went beyond their "expressive functions" and were important to teachers for their value in in creating friendships and improved school cultures (p.9). They expanded this idea and

emphasized that teachers' satisfaction was tied to the networks which teachers belong and this related to a teachers' intention to remain at the school and/or in the field of education (Schiff, Herzog, Farley-Ripple & Thum lannuccilli, 2015). One of the participants in their study further reflected,

> "It's amazing how isolated you can be as a teacher. Even though we're right next to each other, I can go through my whole day without seeing another teacher. So, it's nice to just sit down around a table and debrief…just to see other people and recognize common problems and find common solutions" (Schiff, Herzog, Farley-Ripple & Thum lannuccilli, 2015, p. 10).

Moreover, according to the findings by Moolenar and Sleegers (2015), the establishment of social networks foster a sense of belonging amongst stakeholders, thereby, inspiring workers to take risks that they normally would not take, thus contributing to an improved climate where individuals can feel comfortable and engage in work-related experimentation without fear of retaliation or ridicule (pp. 111-112). Baker-Doyle and Yoon (2011) stated that the informal networks in a building are countless and can happen in everyday happenings like walking in the hallway or doing informal lunch-time meetings. Penuel, Riel, Krause and Frank (2009) also argued that organic networks can take place informally with other teachers in the hallway.

On the other hand, teachers who have smaller support networks often feel isolated at school and are more prone to negative attitudes concerning their teaching career, which in turn may lead to teacher attrition (Anhorn, 2008; Cole, 1991). Thomas et al. (2019) further explained that a greater understanding of the type of networks in the profession can undoubtedly provide a platform in which to understand how to influence teachers to stay (p. 164). Spillane and Louis

(2002) argued that teachers that connect with other individuals, whether at the school-site or outside of it are more likely to be engaged in the profession.

Teacher Engagement with School-Site Collegial Resources

A deeper examination of teacher engagement with collegial resources at the school-site or district level reveals increasing significance to teacher satisfaction and retention. Cole and Weinbuam (2015) hypothesized that "an essential element in shaping teachers' attitudes about reform is the attitudes of their colleagues in the organization" (p. 79). Thus, as one begins to understand teacher retention, the information presented seems to present an argument that cannot ignore the relationships at a school-site and or district. Teachers need teachers. Teachers need administrative leaders. Administrative leaders need other administrative leaders. Researchers have sought to understand the impact of social organizations or professional learning communities at the school level (Dedrick & Smith 1991). McLaughlin and Talbert (2001) highlighted the importance of professional communities in high schools and how these associations lead to high levels of satisfaction. Social organizations or networks at the school level may consist of whole school-level networks, department level networks, or grade level networks (Schiff, Herzog, Farley-Ripple & Thum lannuccilli, 2015).

Educators must feel connected with those around them, once again, whether formally or informally at the school-site or district level. The re-shaping of professional learning communities in the educational domain creates an inherent medium in which to rethink how relationships at the school-site are fostered. Moolenar and Sleegers (2015) stressed the importance of strong professional communities for teachers' professional development, collective learning and educational change and emphasized its significance in educational research (p. 97). As further noted by Daly (2015), cohesive subgroups may be an important

starting point for change efforts, but the actual connections between groups are equally important (p. 267).

Teachers' relationships with colleagues are extremely important as most teachers do not work in isolation as they consistently seek collaboration and teamwork (Schiff, Herzog, Farley-Ripple & Thum lannuccilli, 2015). A few additional studies also provide strong evidence that relationships amongst teachers is integral for public school improvement (Leana & Pil, 2009). Mackenzie (2013) emphasized that relationship development led to an increase in confidence and helped contribute to a more enjoyable work environment. In his article on influential teachers, Ruddell (1995) explained that influential teachers encourage interactions on a multitude of levels with involved stakeholders (p. 462).

Teacher Engagement with Non-School Site Collegial Resources

I previously noted that teachers do not work in isolation in their school communities and this notion can also be applied outside of a school site. Teachers often collaborate with stakeholders in their communities, district leaders and colleagues within the profession. (Niesz, 2007). A teacher's engagement with peers, as previously mentioned, may happen more organically or informally but still contribute to a teacher's expansive resource network. Teachers who might feel isolated at their school may reach out to individuals in different environments to form relationships with and seek support from (Niesz, 2007). Teachers often seek support from and build relationships with others in the profession regardless of their school site. In addition to school sites and community networks, teacher networks are also expanding outside of the physical school environment into more virtual spaces, which are growing in popularity and usefulness (DeJong, 2013; Quentin & Bruillard, 2013).

Other researchers have noted that well-connected teachers have a stronger sense of self-efficacy and overall are more satisfied (Moolenar, Sleegers & Daly, 2012). "Collegial" out-of-school networks can be equally important to educators and can provide differing perspectives from individuals not at their school-site. As noted by Schiff, Herzog, Farley Ripple and Thum lannuccilli, (2015), when teachers access these out-of school networks they have the potential to broaden a teacher's perspective differently than in-school networks and cited interactions as "inspirational and key for teacher engagement." They further expanded on the idea that out-of-school; networks can be especially significant for novice and more experienced teachers as they have the potential to "reinvigorate interests" (Schiff, Herzog, Farley Ripple & Thum lannuccilli, 2015).

Teacher Engagement with Administrative Social Resources (School-Site and District)

In further examination of a teacher's engagement with resources, it is also important to examine teachers' engagement with administrative resources at the school-site and district level. Podolsky, Kini, Bishop and Darling-Hammond (2017) explained that one of the main factors that teachers identify for leaving the profession is the quality of support that they receive or do not receive from the administration. Urick (2015) noted that a school-site principal has influence over whether a teacher remains at his or her school. Further noted by Urick (2015), is that the perception that a teacher has of the school leadership team is a "well-established predictor of attitudes" (p. 435) and contributed to a teacher's intention to stay or leave.

School-site administration can also affect the experience of a teacher's desire to engage with other resources, expanding their influence beyond just their one-one interaction with a teacher. Pogodzinski (2014) examined the role of school-level administration on mentoring programs for novice teachers. He found that the role and impact of school-level administrators in

shaping mentoring relationships and fostering an environment of support that teachers feel is impactful is significant in augmenting their desire to be engaged with them. As noted by Griffith (2004), the fundamental beliefs and actions of an administrator can either inspire or leave teachers uninspired to engage with resources and enhance their professional growth. Moreover, Torres (2019) found that a teacher's willingness to support school-wide initiatives is directly connected to values promoted by the administration.

When examining teacher engagement with administrative resources from the district similar impacts are evidenced. Firestone and Martinez (2007), noted that, at the extreme, relationships between teachers and the district could be oppositional. Yet, while relationships may be oppositional at the extreme level, Firestone and Martinez (2007), also stated that these relationships can be complementary and in fact, teachers may depend on the district for experiences that might facilitate their work. Gigante (2006), addresses how the district may also affect the relationships that teachers have between one another, especially regarding the monitoring of teaching practices. It is also noted explained by Firestone and Martinez (2007), the district relies on teacher leaders at the school-site to carry out its initiatives, because the district lacks the "personal and informal touch that teacher leaders can offer" (p. 7). In further review of engagement of resources (the district) by teacher leaders Firestone and Martinez (2007), also discussed the relationship of the principal with district and explained that in many schools, it is the principal that is driving the work of the district leaders that enter their school sites. Therefore, if the principal is a driving force, this emphasizes the impact of teacher engagement and subsequent level of satisfaction and intention to remain at the school or on the profession. The study conducted on teacher leaders and the district by Firestone and Martinez (2007) also

found that districts do have more influence over teaching than perhaps researchers previously thought.

Teacher Engagement with Administrative Material Resources

The final area to be explored regarding teaching engagement with resources examines engagement with administrative material resources. Social media platforms and subsequent interactions provide an avenue for teachers to engage with one another and/or retrieve job resources (referred to as material resources). Kelly and Antonio (2016) explained how teachers are more frequently using social network sites to obtain support. Material resources accessed through social media platforms are giving teachers a new arena in which to connect to other teachers (Goodyear, Carvalho, Beetham & Sharpe, 2013). However, as noted by Mercieca and Kelly (2018), limited research is available about what is happening in social media platforms or private social media groups that offer teachers support. Trust, Krutka, and Carpenter (2016) further elaborated and noted that there is potential for the understanding of how social networks can nurture and support teachers as part of an "ecosystem of support" (p.28). It is further explained that these complex systems within the educational setting allow for informal connections as well as systems for "interpersonal connections" (Trust, Krutka & Carpenter, 2016, p. 28). Mercieca and Kelly (2018) found that platforms like Facebook provided a valuable source of peer support that might not otherwise be found in a school. Established educational groups on platforms like Facebook provide a means of sharing resources and ideas that are beneficial to educators (Mercieca & Kelly, 2018).

Summary

Throughout this chapter, I have reviewed research literature on teacher retention and attrition, satisfaction, social network theory, social network analysis, as well as teacher engagement with resources at the school site and district level. Teacher attrition is a problem

that afflicts school systems across the globe. An educator's decision to remain in the profession and M-DCPS can be influenced by opportunities for engagement with resources across a myriad of levels. The impact of collegial and administrative relationships impact educators daily. Moreover, when teachers feel connected and when teachers have access to resource networks their experiences are enhanced. As professional collaborators, teachers want to be connected, they want to feel supported, and this is emphasized in conjunction with social network theory and through the application of social network analysis. Understanding how teachers engage with resources at a particular school site or across the district may have enormous impacts on teachers and their sense of belonging. The influence of collegial relationships and interactions cannot be ignored. Additionally, the impact of administrative and district personnel can have major repercussions on teachers and their level of satisfaction and intention to stay.

CHAPTER III: METHODS

Research Design/Methodology

The literature review in the previous chapter provided a foundation and context for the need to investigate possible connections and subsequent relationships between teachers' participation in and utilization of various resource networks, their level of satisfaction within the profession and their intent to remain in M-DCPS. This chapter is a detailed description of the methods I utilized to conduct this quantitative study and ultimately provides an explanation of the methodological choices I made along the way.

The main goal of this quantitative study was to investigate how teachers' engagement with resources at the school-site and district-level predicted teacher satisfaction and intention to stay in the profession. I used a census of math and social studies teachers in M-DCPS who work at the secondary level to better understand how teachers engage with resource networks. I gathered data through a survey which included items from NCES School Staffing Survey to capture teachers' satisfaction, the Intent to Stay Scale (Price & Mueller, 1986), home grown questions used to measure the frequency of teacher interaction with resources as well as the quality of supportiveness of resources within the network, questions regarding the schools at which participants worked, teaching assignments, years of experience, and demographic information. The survey also contained a section that asked teachers to reflect on how the COVID-19 pandemic affected their decision to remain in the profession which will be further discussed in Chapter 5.

Upon collecting all the data from the cross-sectional on-line survey, I used the tenets of social network analysis to understand how teacher's engagement with certain networks at the school-site level and district level impacted their level of satisfaction and/or intention to stay in the profession while accounting for background characteristics that include years of experience,

subject area (math or social studies). The administration of the on-line survey was the most appropriate way to reach the largest number of participants and the safest as the survey was launched during the COVID-19 pandemic. Finally, data that I was seeking to analyze was not available in any existing database, justifying the need for the survey.

Research Questions

The focus of my study was to examine how teachers engaged with resources at the school-site, and district level, and how engagement was related to their overall satisfaction and consequently their intention to stay in the profession. After reviewing the literature, I determined that a quantitative study would be the most appropriate. The study was guided by the following research questions:

1. How are characteristics of resource networks different across school-site and district resources?
2. To what extent are the characteristics of a teacher's centrality within a *school-site collegial resource network* related to their satisfaction and intention to remain in M-DCPS?
3. To what extent are the characteristics of a teacher's centrality within a *school-site administrative resource network* related to their satisfaction and intention to remain in M-DCPS?
4. To what extent are the characteristics of a teacher's centrality within a *district collegial resource network* related to their satisfaction and intention to remain in M-DCPS?
5. To what extent are the characteristics of a teacher's centrality within *a district administrative resource network* related to their satisfaction and intention to remain in M-DCPS?

Data Sources: Context and Population

Miami-Dade County is the fourth largest district in the nation, educating approximately 357,000 students annually. Of those 357,000, 26,803 are 9th grade students, 27,004 10th grade, 26,237 11th grade and 27,138 are 12th grade students. The demographics for M-DCPS instructional staff overall are: 10,574 (54.8%) Hispanic, 4, 835 (25.1) Black Non-Hispanic, 3,501 (18.1%) White Non-Hispanic and 384 (2.0%) are Other (American Indian or Alaskan Native. Asian or Pacific Islander and Multicultural encompass the category of other in M-DCPS).

The district employs 20,484 teachers and 5,304 are educators at the secondary level. Of those 105, 239 students in grades 9-12, the following enrollment totals are evidenced in varying advanced academic programs: (1) Advanced Placement, 31,092; (2) International Baccalaureate Program, 1,442; (3) Cambridge AICE program, 5,069; and (4) Dual Enrollment, 8,185. These numbers are significant as they highlight the number of students and therefore educators who are within these identified fields of advanced academics.

M-DCPS's Office of Human Resources provided me with a file that contained basic demographic information for instructors throughout the district as well as their e-mail addresses, certification type, areas of certification, hire date, years of experience, school/work locations as well as school regional centers and a few other data points. Upon presenting the information to the Institutional Review Board (IRB) at Florida International University and M-DCPS I received approval to send my survey to a census of math and social studies teachers at the secondary high school level across all three regions in the district. Moreover, to avoid any potential bias or coercion, teachers who were from my school were excluded from participating

in the study. All secondary high school math and social studies teachers had an opportunity to participate in the study.

The initial population and sample consisted of 967 math and social studies teachers. Of the original population, 444 were social studies teachers and 523 were math teachers. The average age of all participants was 47 years with an average of 15 years teaching. 463 (48%) were Hispanic, 210 (22%) Black Non-Hispanic, 15 Hispanic- White Only, 261(27%) White Non-Hispanic and 18 (2%) Other. 55% of the initial population was male and 45% female. The final participant sample consisted of 150 participants who will be further discussed and compared in the participant section below. It is also important to note that only 130 participants completed the survey in its entirety.

Survey Development

To develop a greater understanding of the impact of resource networks on teacher retention, I developed a quantitative survey study drawing from previous validated instruments used to measure teachers' intent to stay in the profession as well as a school staffing survey used to measure working conditions, school climate and teacher attitudes. I also included a section I developed to measure the frequency of participant interaction with resources with a subsequent section that measured the supportiveness of that interaction. The final part of the survey included general demographic information. Furthermore, because the survey was launched during the COVID-19 pandemic, the survey also contained a section where teachers were asked if the pandemic had impacted their intention to stay in M-DCPS or the professional in general. The survey in its entirety can be found in Appendix B.

Teachers Intent to Stay Scale

I utilized a multi-item ordinal scale (Strongly Agree to Strongly Disagree) to measure a teacher's intention to remain in the profession. For my study, I adapted the four question

Likert Scale from an Intent to Stay Scale from Price and Mueller's (1986) survey so participants could report their intention to remain part of M-DCPS and the teaching profession. Participants responded by selecting one of five points ranging from Strongly Agree to Strongly Disagree. Participants reflected on the following four statements for both M-DCPS and the teaching profession in general: (1) I plan to leave teaching as soon as possible; (2) Under no circumstance will I voluntarily leave teaching before I retire; (3) I would be reluctant to leave teaching; and (4) I plan to stay teaching as long as possible. In researching the validity of this instrument's scale, I was able to find anything relevant. Based on the similarity in responses, I made the decision to only use statements for intention to stay in M-DCPS in the final construction of my scale.

NCES School Staffing Survey

To ascertain teachers' satisfaction, I used survey items from The National Center for Education Statistics (NCES) who administered a Schools and Staffing Survey (SASS) seven times between 1987 and 2011. Surveys disseminated through NCES and SSAS ultimately cover a wide range of topics and aim to provide descriptive data on the context of elementary and secondary education. The 2011-2012 Schools and Staffing Survey was endorsed by the following groups: American Association of School Administrators American Federation of Teachers, National Association of Elementary School Principals, National Association of Secondary School Principals, National Council of Teachers of Mathematics, and the National Middle School Association, augmenting the credibility and validity of the instrument. I replicated Section VI: Working Conditions (Questions 54-57 on the original survey) for my survey. In addition, I used Section VII: School Climate and Teacher Attitudes, (Question 62 (A-F) on the original survey) but modified the Likert Scale from a 4-point to a 5-point scale to

read from a “great deal” to “none at all” when collecting teachers’ responses to how much control they had in their classroom regarding areas of planning and teaching. The final part of the NCES that I utilized in my survey was Question 63 (A-R), which was replicated with the same 4-point Likert Scale Strongly agree to Strongly Disagree. In Table 1 below, I have included the satisfaction survey questions from the Schools and Staffing Survey.

Table 1

Satisfaction Survey Questions

The school administrations behavior toward the staff is supportive and encouraging.
I am satisfied with my teaching salary.
The level of student misbehavior in this school (such as noise, horseplay or fighting in halls, cafeteria or student long) interferes with my teaching.
I receive a great deal of support from the parents for the work I do.
Necessary materials such as textbooks, supplies and copy machines are available as needed by the staff.
Routine duties and paperwork interfere with my job of teaching.
My principal enforces school rules for student conduct and backs me up when I need it.
Rules for student behavior are consistently enforced by teachers in this school, even for students who are not in their classes.
Most of my colleagues share my beliefs and values about the central mission of the school should be.
The principal knows what kind of school he or she wants and has communicated to staff
There is a great deal of cooperative effort among the staff members.
In this school, staff members are recognized for a job well done.
I worry about the security of my job because of the performance of my students on state and/or local tests.
I am given the support I need to teach students with special needs.
The amount of student tardiness and class cutting in this school interferes with my teaching.
I am generally satisfied with being a teacher at this school.
I make a conscious effort to coordinate the content of my courses with that of other teachers.

Measuring Resource Networks: Item Development

To gain an understanding of how teachers engage with varying networks, I spoke with eighteen teachers across the United States and within M-DCPS. I engaged participants in a think-aloud during a telephone conversation. As noted by Ksokey (2016), verbal probing and questioning is part of the think-aloud process and allows participants to verbalize their thoughts around a particular topic. This initial development of the survey was exploratory and was conducted with a convenience sample, as the intention of these questions was not to be representative of a given population. This strategy is recommended by Willis (2016) who explained a process to design surveys in quantitative studies. The eighteen individuals were selected because of my professional relationship with them across varying realms. These were individuals that I knew would provide honest and reflective suggestions based on the questions I was asking. Eight of the teachers were from an AP World History College Board group, three were from a high school were I previously worked as a social studies teacher and seven were from the school where I was employed as an Assistant Principal when I was developing the instrument. Fifteen of the eighteen were excluded from the final survey, the three who provided input from the high school where I taught social studies were invited to complete the final survey, but because the survey was anonymous, I do not know if they any of these teachers completed it. I engaged each of the teachers in an informal think-aloud conversation and asked them to think about who they used for support at the school-site, at the district, and at the national level. I then asked them to think about the teaching profession in general, and with whom they thought teachers, in general, might engage.

After receiving responses from each of the eighteen individuals, I created a list of the most common answers. After making a list of the most common answers, I created a list of resources that were identified by at least five of the original participants. To further validate

my list, I had an additional conversation with the eighteen respondents individually and asked them to review the list and identify anyone with whom they thought teachers would not engage. Each participant, whether they engaged personally with an identified resource or knew another teacher who engaged with that resource, confirmed that the list of resources was reflective of the types of resources that teachers might use in the profession. Table 2, below, identifies the final list of resources used for my survey instrument.

Table 2

School-Site, District and National Resources

School Site	District	National
School-Site Colleagues in your department	Assigned District Mentor Teacher	Colleagues from College Board or AP Reading
School-Site Colleagues outside of your department	M-DCPS Teacher Colleagues	Colleagues from Cambridge or IB
Department Head	MDCPS AICE, AP, DE, or IB Colleagues	FEA/NEA colleagues
Instructional Coach/School-Site Mentor	TFA/Teach Strong Colleagues	Teacher colleagues outside of M-DCPS
Assistant Principal (NCSS)	Dis. Curriculum Support Specialist (CSS)	National Council for Social Studies
Principal	Dis. Instructional Supervisor (IS) National	Council for Teaching Mathematics (NCTM)
	Colleagues from M-DCPS Workplace	Academic Facebook Groups or Schoology
	Colleagues from Microsoft Teams	Colleagues from Instagram or Twitter

The next part of the process in the development of the survey was to think about how teachers interact with the identified resources at each level. The first decision was to think about how many times a teacher may have engaged with an identified resource, which was measured by the frequency of interactions. Previous research has proffered that both the substance and frequency of interactions between teachers and mentors (resources) have vast and important implications that help teachers build their own capacity but also contribute to a reduction in teacher attrition rates (Pogodzinski, 2013). The first block of questions in the

survey therefore measured the frequency of resource usage using an ordinal scale ranging from more than four times in the past week to never. Previous research has indicated that the utilization of ordinal scales is most effective in capturing measurements of frequency (Batt & Nayar, 1998). Pogodzinski (2013) also indicated that it is important to include at least weekly interactions, justifying the first part of the scale that asked respondents whether they had engaged with a particular resource within the past week.

Once respondents indicated they used a particular resource, the subsequent question asked respondents to think about how supportive their engagement with that resource was. Participants were asked to rate the level of supportiveness of each resource network using an ordinal multi- measure scale ranging from "1 Not Very Supportive" to "5 Very Supportive." When teachers feel supported, they are more apt to stay in the profession as discussed in Chapter Two. Therefore, in this study, I accounted for how supportive teachers reported the resources that they engaged were as another means of understanding the resource network.

The block of questions for frequency on engagement as well as level of supportiveness was repeated three times throughout the survey one for each network category - school site, district and national. The first time was to engage frequency and support of school-site resources, then the next site evaluated district resources and the final block evaluated national resources.

Survey Demographics

The final section of the survey asked respondents a series of demographic questions. The requested demographic information helped to provide control variables for the study was also mirror some comparative demographics with M-DCPS as whole. Comparative demographics include gender, teaching assignment and race/ethnicity. I collected other data about teachers including the type of high school in which a respondent worked, highest level of educational attainment, as well as

the level of courses that a respondent was teaching. A complete list of demographic questions can be found in the survey in Appendix B

Advanced and Regular Teachers

Advanced Academic teachers were identified with a multi-item question that ask teachers to identify the current class levels that they were currently teaching or did teach during the previous school year (2019-2020). Choices for class levels included Advanced International Certificate of Education (AICE), Advanced Placement (AP), Dual Enrollment (DE), ESE, Honors, Intensive/Remedial or Regular. The varying choices for class levels were chosen as these are the identified class levels according to M-DCPS that a student can take, or a teacher can teach. Upon downloading the respondent information, I created a category to identify whether a teacher indicated at least one advanced class from the list (AICE, AP, DE) and was coded accordingly. For the purposes of this study, I classified teachers who taught at least one advanced class, who have access to resources that a full -time advanced academic teacher has, as an advanced academic teacher.

Math and Social Studies Teachers

I also asked teachers to identify if they were a math or social studies teacher as a single item. I then asked respondents a multi-item regarding the level of courses that they taught in the previous school year or the current school year. I asked respondents this question to see whether teachers taught advanced or regular classes. As a former, social studies, advanced placement, dual enrollment teacher and, at the time of the survey design, an Assistant Principal who oversaw the math department, I was curious how these areas of certification might differ in their level of engagement with resources and in turn how this engagement impacted their satisfaction and ultimately intention to stay in the profession. In addition, beyond my own curiosities, Boyd, Grossman, Hammerness, Lankford, Loeb, Ronfelt, and Wyckoff (2012), contended that there is

continual shortage of qualified math teachers in the United States. Thacker (2017) argued that informal learning experiences are important to social studies teachers and that for many teachers due to budget restrictions they must find their own ways of soliciting support. With this continued shortage it is important to retain and develop the teachers currently in the profession and provide them with necessary support, further justifying my decision to include these specific subject areas in my study.

Summary of Survey Instrument

My survey consisted of five parts. The first part was a homegrown block of questions, using ordinal scales to measure frequency and supportiveness of engagement with resources, created with localized expertise and constructed with teacher input. The next set of questions asked participants to briefly reflect on the amount of time that they spend at the school-site as well as any positions outside of the classroom that they might hold as well as their professional life and how much control they believed that they had in their own classroom replicated from the 2011-2012 School Staffing Survey from NCES. I replicated the ordinal multi-item scale regarding a teacher's intention to remain in the profession from research conducted by Price and Mueller on Intention to Stay (Price & Mueller, 1986). I also replicated the remaining control variable measures in the next section of the survey from the 2011-2012 School Staffing Survey from NCES. The final section of the survey includes personal demographics, school demographics as well as two questions on teacher's current perception of the impact of COVID-19 on their intent to remain in the profession.

The survey took participants approximately 10 minutes to complete. I pretested my survey with varying educational professionals throughout M-DCPS as well as math and social studies teachers at my former school-site, who were excluded from the invitation to participate in the study. Willis (2016) explained that pretesting is important to remediate problems before

administration of the survey. The pre-testing of the survey questionnaire included cognitive interviewing as well as an evaluation quality assessment within the production of the survey as recommended by Willis (2016). The purpose of the pretest was to gain final feedback regarding question interpretation, flow of questions, grammatical oversights to ensure that I uploaded the most polished and effective version of the survey to Qualtrics. Pretest participants responded positively to the survey and noted that it read well, and it was straightforward and easy to follow. The survey was then uploaded into Qualtrics and prepared for initial an initial launch date of October 1, 2020.

Limitations and Context for Data Collection

On March 13, 2020, the educational landscape in M-DCPS and across the globe was forever changed with the COVID-19 Pandemic. When students and staff left on that Friday afternoon, not many could have fathomed the societal impact and more specifically the impact on teaching and learning that was about to occur. For the remainder of the 2019-2020 academic year teachers and students across the county began to develop new ways to teach and learn and engage students in a new reality as effectively as possible. Over the course of the summer months in 2020, students recovered course credits during summer school and received extra assistance in accountability areas for English and Math. As 2020-2021 approached all eyes were on the district. The M- DCPS school board met with health experts and ultimately established a plan to "Reopen Smart, Reopen Safe." As part of this initiative all schools would open virtually with remote instruction, referred to as My School Online (MSO). M-DCPS was originally scheduled to open on August 19, 2020, however, with a new learning management platform (K-12), the district delayed the opening of schools for one week, so teachers had time to acclimate to the system and plan lessons. The extra week was also a time for students and parents to learn the new system and get ready for remote instruction. On August 31, 2020, M-

DCPS officially opened for the 2020-2021 School year, with remote instruction. From August 31, 2020, to September 9, 2020, M- DCPS was inundated with infrastructure challenges, including a cyber-attack that prevented anyone from having access to the K-12 platform on September 3rd. During the September School Board Meeting held on September 9th, the Board voted to eliminate the use of the K-12 platform. This immediate decision forced teachers and students to begin the scramble to connect on Microsoft Teams or Zoom to continue their MSO experience from September 10th until further notice.

Over the next few weeks, district officials engaged in continued communication with local health experts reevaluated local conditions. During an emergency Board meeting on September 22, 2020, the Board announced that students would have the option to return to traditional brick and mortar schooling beginning on October 14, 2020. After this decision, the Florida Department of Education (FLDOE) sent a letter to M-DCPS stating that students must return by October 5th as part of the state approved reopening plan. The School Board met once again on September 29th and ultimately decided to open schools on the original October 5th date. As schools saw students return physically to school on October 5th, some teachers were teaching students physically, other students remained on-line and, in some cases, teachers were teaching students in what became to be known as dual modality- teaching to some students in a physical classroom and other on-line simultaneously.

Data Collection

I had originally planned to launch my survey at the beginning of September, a few weeks after the 2020-2021 school year started. However, due to the complications with COVID-19 pandemic and the delay of school openings and uncertainty of when schools would open physically, I made the decision to delay the launch. After pre-testing my survey one last

time on September 12th, I decided that I would launch the Survey on October 1st, regardless of what decisions were made regarding the opening of schools physically to students.

On September 30, 2020, I sent a pre-notice to 967 math and social studies teachers at the secondary high school level across the M-DCPS as provided by the Office of Human Resources. A copy of the notification can be found in Appendix A. The pre-notice was sent from my personal dadeschools e-mail address, providing information about the survey and told potential respondents that they would be receiving an email that may be flagged as being "originated outside of dadeschools" and informed them that the sender would read noreply@qemailserver.com , the subject line will read "FIU/MDCPS Study on Connectedness in education" and that it would be a short questionnaire that would take them approximately 10 minutes to complete. In the pre-notice I also stated who I was and what my position was in M-DCPS and why this research is important. I concluded the pre-notice assuring that I would keep their responses confidential and reiterated that their participation was completely voluntary. One day later, on October 1, 2020, I sent the survey invitation that also included access to an on-line consent form to the 967 math and social studies teachers across the district in my sample, see Appendix A for the invitation and pre-notice. 46 E-mails from the original survey were not valid, most likely because of the individual having left the district, therefore, a total of 921 successful e-mails were disseminated. From the initial survey invitation, 77 surveys were completed or partially completed. The first e-mail reminder was sent 13 days after on October 14, 2020, and another 76 surveys were completed or partially completed for a total of 153 surveys. The response rate decreased over the next few days, and I sent a 3rd and final reminder on October 22, 2020, and an additional 31 teachers completed or partially completed the survey for a total of 184 respondents. Over the course of my data collection, I

used my networks as an administrator that oversaw math and social studies at my former high school- site as well as a former social studies and AP teacher to encourage participants to complete the survey

Table 3

Survey Collection Information

Date	Item Distributed	Survey Distributed to
October 1, 2020	Initial Notification Survey	Secondary Math and SS Teachers 921 Potential Respondents
13 Days after Initial Notification October 14, 2020	Reminder	1st Time Non-Respondents 844 Potential Respondents
21 Days after Initial Notification October 22, 2020	Second Reminder	2nd Time Non-Respondents 768 Potential Respondents

I closed the survey on November 1, 2020, and exported my data into SPSS as well as a Microsoft Excel file. My initial response rate was 24% (n=221) for those who started the survey. After reviewing the data, I deleted 71 cases due to essential dependent variables that were not completed by the respondents, which resulted in a final response rate of 16% (n=150). Because I used a census, there is no sampling error in the study (though there is the potential for non-response bias). However, if capturing respondents who completed the survey in its entirety including all relevant demographic data then the response rate was 14% (n= 131).

Missing Data

As previously noted, I deleted 71 cases due to essential dependent variable data not being completed by the participants, which left my study at with a 16% response rate (n=150).

However, it is also important to note that while 15 respondents completed enough of the survey to be included in the construction of the networks by answering at least one series of questions on frequency and supportiveness of resources, only 131 respondents completed the survey in its entirety including all intention to stay and satisfaction and demographic variables. Moreover, including respondents in centrality measures can be done without having a complete date set. It is noted by Dou and Zwolak (2019) that centrality scores are "fairly robust to random missingness" (p. 15). Thus, for this study I used listwise deletion for missing data for each analysis.

Participant Sample

The sample for this study consisted of the following: participants were almost equally women (49%) and (51%) men. The mean age of participants was 46 years old, with the youngest respondent being 24 and the oldest at 74. 58% of the participants had a master's degree and 6% had a PhD. Almost half of the participants were Hispanic (48%), 34% were white/non-Hispanic, 15% were Black, .8% were Asian/pacific Islander and 1.3% identified as another race or ethnicity. Most of the teachers surveyed worked in a traditional high school (44%), while 35% worked in a traditional high school with one or more magnet programs, 18% worked in a whole school magnet, and 3% worked in a Technical or Vocational School. 67% of respondents worked in a Title I school, and respondents had worked an average of 10 years at their current schools (mean = 16 years). During the 2019-2020 school year, at least 34% of respondents taught at least one Advanced Placement (AP) class, 8% taught at least one AICE class and another 8% taught at least one dual enrollment (DE) class. Of the respondents who reported teaching assignments, 54 (42%) were math teachers and 76 (58%) were social studies teachers. Respondents' complete demographics are reported in Table 4.

Table 4

Teacher Characteristics

Gender	***N***	***Percentage***
Man	67	51%
Woman	64	49%
Non-Reported	*19*	
Ethnicity/Race	***N***	***Percentage***
White/Non-Hispanic	45	34%
Black/Non-Hispanic	20	15%
Hispanic	63	48%
Asian/ Pacific Islander	1	.8%
Other	2	1.3%
Non-Reported	*19*	
Teaching Assignments	**N**	**Percentage**
Math	54	42%
Social Studies	76	58%
Non- Reported	*19*	
Teaching Assignment Level	**N**	**Percentage**
Advanced Placement	45	34%
AICE	10	8%
Dual Enrollment	10	8%
Other	65	50%
Title I School Status	**N**	**Percentage**
Title I School	87	67%
Non-Title I School	43	33%
Non-Reported	*20*	
School Type	**N**	**Percentage**
Traditional High School	57	44%
Technical/Vocational	4	3%
Whole School Magnet	24	18%
Trad.H.S. with 1 or more Magnet Programs	45	35%
Educational Attainment	**N**	**Percentage**
Bachelors	47	36%
Masters	75	58%
Ph.D	8	6%

The demographic measures that were used in my study are somewhat disparate from the comparative data that is available from M-DCPS. However, there are certain similarities between demographic measures including: gender, race/ethnicity, and teaching assignment (See Table 5). When comparing the gender of my target population to respondents of my study, the

target population had more men, however, respondents were almost equally represented with only a 4% difference in more men than women who responded. There is a 7% underrepresentation of Black/Non-Hispanic respondents to my survey when compared to the target population of math and social teachers. The largest disparity between demographic information reported by the target population and the respondents is based on teaching assignment. 54% of the target population were math teachers and only 42% of my respondents reported being math teachers. On the other hand, 46% of my target population were social studies teachers and 58% of my respondents were social studies. I would partially attribute the higher number of social studies teachers completing the survey due to my personal connection to several teachers across the district as a former social studies teacher, mentor and lead teacher.

Table 5

Demographics

Gender	**Target Population**	**Respondents**
Man	55%	51%
Woman	45%	49%
Ethnicity/Race		
White/Non-Hispanic	27%	34%
Black/ Non-Hispanic	22%	15%
Hispanic	48%	48%
Other	2%	1.3%
Teaching Assignment		
Math	54%	42%
Social Studies	46%	58%

Data Integrity

To ensure the integrity of this study, I conducted a quantitative study, in which high school math and social studies teachers were given the opportunity to participate in the survey. The independent variables were the constructed centrality measures at the school site, district

and national level and my dependent variable was a teacher's intention to stay in the profession/M- DCPS. To limit errors in the collection of data, I used a Qualtrics account and collected responses accordingly. The survey was constructed with input from educators throughout the United States to capture the types of resources that teachers used or are using. The initial pre-test was a think-aloud asking respondent how they would respond to identified questions and, in the process, I gathered their feedback. The second part of the pre-test had respondents complete the survey and report any problems that may exist with the instrument and what worked. In addition, I formally piloted the survey once constructed with approximately 40 teachers at my former school site (who were excluded from participation once launched) as well as other educators in the district in a myriad of positions. Moreover, because the survey was sent to a census sample of math and social studies teachers there was no sampling error in my study. In addition, because my sampling frame was based on M-DCPS records, it is very unlikely that my study had substantial coverage error. The integrity of the multi-item measures will be discussed later in the dissertation.

To elicit the greatest number of responses, I sent two e-mail reminders to participants who had not started the survey to obtain as much participation as possible. To ensure that any potential ethical issues were at the forefront of decision-making in this quantitative study, the integrity of the data was maintained with password protected files. Finally, confidentiality of individual responses was maintained, and only aggregate results have been reported.

Social Network Analysis and the Educational Domain

Social Network Analysis (SNA) is a toolkit that allows researchers to better understand relationships and interactions. In this study I quantified teacher engagement with resources by examining teachers and their interactions with resources within a network and then SNA is utilized to analyze the network structures and subsequent properties. The social relationships

between teachers and between teachers and leaders at the school-site and district level are integral to the development and well-being of educators. The relationships and larger networks that I created because of these interactions can help educators and other school leaders understand the impact that these networks can have not only on teachers' level of satisfaction but also their intention to remain in the profession. I was able to examine how the influence of ties within the network shaped the outcome of intention to stay by utilizing social network analysis (SNA) to understand the social and material resource networks.

Researchers have been using social network analysis since the 1960s. However, it became more popularized in the educational domain in the 1990s, when education researchers and policy makers became interested in social relationships between educators (Froehlich, Van Waes, & Schafer, 2020). Social network analysis allows researchers to delve deeper into the patterns and qualities of relationships and to what degree interactions are taking place. As noted by (Hogan et al., 2007) SNA also allows for a visualization of the relationships which is not seen in other methods. Moolenaar (2012) explained that no other tool or methodology explores relationships to the depth that SNA does. It is also important to note that most of the SNA publications are focused on quantitative studies, like this one, although in recent years some have begun to examine qualitative aspects of relationships (Froehlich, Van Waes, & Schafer, 2020).

Social network analysis in education has been examined by several researchers in varying capacities. Grunspan, Wiggins and Goodreau (2014) sought to understand classrooms through social network analysis and claimed that "social interactions between students are a major and underexplored part of undergraduate education" (p. 167). Williams, Zwolak, Dou and Brewe (2019) used a social network perspective to link student

engagement and performance. Penuel, Sussex, Korbak and Hoadley (2006) investigated the potential use of SNA to evaluate programs that aimed to foster better teacher collaboration

Major Measures in Social Network Analysis

This next section will lay out some of the foundational measures in SNA and measures used specifically for this study. I provide an overview of social network basics, including key terminology and subsequent measures. I also briefly discuss network types created for this study and why I chose each one. Next, I examine unimodal versus bimodal networks and why a bimodal network was chosen for this study. Finally, I conclude this section with a discussion on centrality measures and the kinds of centralities utilized in my research. It is also important to note, that while I analyzed and explored all the identified centralities, I made the decision to only use degree centrality measures in my final analyses. The reason I made this decision was because the remaining centrality measures (closeness and betweenness) did not result in meaningful findings that impacted the outcomes of my research.

Social Network Basics

At the most fundamental level, "SNA aims to understand the determinants, structure, and consequences of relationships between actors" (Grunspan, Wiggins, & Goodreau, 2014, p. 168). Actors are also known as nodes as there are two schools of thought regarding terminology. Researchers who are more mathematical refer to the individuals and organizations as nodes, whereas researchers who are more sociological refer to them as *actors*. The group of actors or *nodes* is what makes up the network. In this study, I will refer to the teachers and resources that make up the examined networks as nodes. The *nodes* are then examined to see what type of relationship they have with one another, and this is looked at by calculating the number of *edges* or *ties* that the *nodes* have. The use of SNA for my research allowed me to understand how nodes (teachers and resources) were connected. The

connections between teachers and resources were reported as varying measures of centrality-degree, betweenness, and closeness.

Network Types

As explained by Grunspan, Wiggins and Goodreau (2014), the categorization of networks can be understood by the number of actors a network contains. Networks can be unipartite or bi-partite. A network that contains only one set of actors or nodes (teachers) is unipartite (Grunspan, Wiggins & Goodreau, 2014). However, in this study, to understand how teachers (nodes) interacted with varying groups of resources (nodes) I had to construct bi-partite networks. In a bi-partite network the ties between nodes occur between two different nodes, rather than nodes of the same kind. In this bipartite network, I examine the ties occurring between teachers and resources. The ties in a bipartite network ultimately allow researchers to understand the participation by members of one set of nodes with the other. In this study, the bipartite network allowed me to examine how teachers engaged with resources. The first node consists of the teachers, and the second node consists of the resources. For example, teachers (one set of nodes) have a tie with each resource (another set of nodes) with which they engage or belong. A bipartite network is often used when researchers are trying to understand relations when direct interactions do not happen (Grunspan, Wiggins & Goodreau, 2014). This type of analysis allows for an indirect method of inferring ties between teachers and resources.

Each network in this study was constructed independently to better understand how teachers interacted with collegial and administrative resources both at the school-site and district level. In this study four bi-partite networks were constructed. The networks are: (1) school-site collegial resource network; (2) school-site administrative resource network; (3) district collegial resource network; and (4) district administrative network. Though originally. I intended to include a national resource network, my preliminary analyses did not produce

meaningful findings and I made the decision to exclude the national network from this study. Table 6 below identifies the final set of resources that are part of each network.

Table 6

Network Resources

School-site collegial resource network	School-site administrative resource network	District collegial resource network	District administrative network
Colleagues in your Department	Principal	MDCPS Colleagues	Assigned District Mentor
Colleagues outside department	Assistant Principal	AP, DE, AICE Colleagues	Instructional Supervisor
Department Head		MDCPS Workplace Colleagues	Curriculum Support Specialist
Instructional Coach or Mentor		MDCPS Microsoft Teams Colleagues	

Centrality Measures

As I sought to understand how nodes (teachers and resources in my study) interacted with one another, I had to understand the position of the nodes within the network, which revolved around a measure of centrality (Grunspan, Wiggins & Goodreau, 2014). When centrality is measured, I am looking at how engaged teachers are in the school-site or district network based on both direct and indirect connections with the resources, whether social or materialistic. Centrality can be captured with varying levels of measurement. Centrality measurements include degree centrality, closeness centrality and betweenness centrality. Degree centrality is the simplest of measures and it assigns a number based simply on the number of links held by each node. Degree centrality essentially tells someone how many direct connections that each node has to other nodes within the network. When measuring degree centrality, I calculated the number of ties that a node has within the network.

To provide a more nuanced analysis I also calculated the weighted version of each weighted degree centrality measure. In a particular network, not all the ties in the network have the same capacity, therefore, the weighted version of each centrality measure accounts for the

varying capacities of the network ties between nodes. Essentially, in weighted networks, the strength of the node considers the weight of the ties between the nodes. In the survey, participants were asked about their frequency of interaction with varying resources and if they interacted with a resource at least once then they reported the quality of supportiveness from that resource, these items were also calculated in the centrality network measures.

Providing a summary of the network measures and their respective definitions as they pertain to this study is also useful in understanding my methodological decisions and results. Three network measures were calculated for each of the four networks, school-site collegial, school-site administrative, district collegial and district administrative. The first centrality measure is *Degree (F.deg)* and this measures the number of resources that teachers are using, every time that a teacher uses a particular resource it counts as an absolute value of 1. The next measure, *weighted degree (F.str)* measures the number of resources teachers are using weighted by frequency with which they use that group of resources. The more that they use the resource the larger this number will be. *Weighted degree (Q. Str)* measures the number of resources teachers are using weighted by the level of supportiveness. The more supportive the resource is to teachers the larger this number will be. The measures identified in this paragraph are the calculations that were used for final analyses and interpretations.

Table 7

Summary of Network Measure Definitions

Network Measures (Term)	***Definition***
Degree (F.deg) # of Resources being used	The number of resources teachers are using. Every time a teacher uses it counts as 1.
Weighted Degree (F.str) Frequency of Engagement	The number of resources teachers are using weighted by the frequency with which they use those resources. The more they use the resource the larger the number.
Weighted Degree (Q.str): Quality of Engagement	The number of resources teachers are using weighted by the level of supportiveness.

A deeper examination of centrality measures can also be understood by the ties and edges in a network. Ties and edges can be assigned a weight by different variables (e.g., number of interactions) and by doing so they can impact the measure of centrality that is being calculated. For each of the four networks, I calculated the network size, using a frequency-based network to calculate the number of nodes in the network, number of edges and the density of the network. In a frequency-based network I am measuring if a teacher ever engaged with a particular resource in the network. In this design, the *node* is the number of teachers in the network. The *edges* are the total number of connections within the network that teachers engaged with. I also include the total possible edges or total possible connections that teachers could have if every teacher used every possible resource in the network. The final piece of descriptive data dealing with the centrality measures that is reported for each of the four networks is density. *Density* is the ratio of edges divided by the total possible number of edges, producing a percentage of engagement by teachers for resources in the identified network.

Exploratory and Confirmatory Factor Analyses

This next section will provide evidence for validity of my multi-item measures of latent constructs through the utilization of factor analysis and will then present the construction of the scales that were used for satisfaction and intention to stay. After discussing both exploratory and confirmatory factor analyses, as well as promoax oblique rotations, I present my factor loadings for satisfaction and intention to stay and present the specific variables used to construct the final instrument.

In this study, I used an exploratory factor analysis (EFA) so I could identify the underlying factor structure for both satisfaction and intention to stay. EFA is an analysis to understand what the factor structure will look like upon participant response and "is essential to determine underlying constructs for a set of measured variables." (Suhr, 2007-2019, p. 1). After an initial exploratory factor analysis, I performed a confirmatory factor analysis (CFA) so I could verify the factor structure of the variables included for satisfaction and intention to stay. Both EFA and CFA are deemed powerful statistical techniques and assist with the development of instruments (Suhr, 2007-2019; Plucker, 2003).

Factor Loadings Intention to Stay

The intention to stay variables that are included in the construction of the instrument can be seen in Table 8. In addition, I made the decision to include only intention to stay questions in M-DCPS and left out the general intention to stay in the profession questions that were included in the survey. This decision was made because respondents answered in similar capacities for M-DCPS and the Profession as a whole, therefore, both scales were not necessary. I used oblique rotation in the exploratory factor analysis. Finch (2006) explained that the "factor rotation involves a transformation of the initial factor loadings so that a greater simple structure is obtained" (p. 41). A promax rotation is an oblique rotation that allows

factors to be correlated. McDonald (1997) argued that oblique rotation is most appropriate because it is rare for factors in underlying tests to be truly uncorrelated. The factor loadings for intention to stay loaded from a range of .622 to .829 as evidenced in Table 8. In this analysis, I tested the hypothesis that 1 factor is sufficient. The chi square statistic is 12.15 on 2 degrees of freedom with a p =.0023. I then ran a CFA (FA1=cfa(FADF1, data=FADF, std.lv = TRUE) and utilized fit measures to ensure that the factor structure and that a latent construct existed. The variables included share similar conceptual meanings regarding intention to stay and all have factor loadings above 0.60.

Table 8

Intention to Stay Variables and Factor Loadings

Item	Intent to Stay Question	Factor Loading
11A	I plan to leave M-DCPS as soon as possible.	0.705
11B	Under no circumstances will I voluntarily leave M-DCPS.	0.622
11C	I would be reluctant to leave M-DCPS.	0.804
11D	I plan to stay at M-DCPS as long as possible.	0.829

After conducting the factor analysis for intention to stay, I then conducted a reliability analysis on the scale. The reliability analysis showed Chronbach's alpha of α=.82, indicating that the scaled has strong reliability.

Factor Loadings Satisfaction

The variables that were included in the construct of the satisfaction scale are included in Table 9 below. Like the intention to stay scale, I also used a promax rotation in the exploratory factor analysis. The factor loadings for satisfaction loaded from a range of .512 to .780 as evidenced in Table 9. In this analysis, I tested the hypothesis that 1 factor is sufficient. The chi

square statistic is 230 on 90 degrees of freedom with a p value of <.001. The CFA completed after the exploratory factor analysis does suggest that the factorial structure is more complex. However, I made the decision that the variance explained with a one factor solution was sufficient for the purposes of this study. I subsequently ran a CFA (FA1=cfa(FADF1, data=FADF, std.lv = TRUE) and utilized fit measures to ensure that the factor structure and that a latent construct existed. Eighteen variables were included in the initial factor loading. I decided to retain the ten satisfaction variables with factor loadings above 0.50.

Table 9

Satisfaction Variables and Factor Loadings

Item	Satisfaction Question	Factor Loadings
10A	The school administrations behavior toward the staff is supportive and encouraging.	.696
10E	Necessary materials such as textbooks, supplies and copy materials are available as needed by staff.	.604
10G	My principal enforces school rules for student conduct and backs me up when I need it.	.780
10H	Rules for student behavior are consistently enforced by teachers in this school, even for students who are not in their classes.	.660
10I	Most of my colleagues share my beliefs and values about the central mission of the school should be.	.512
10J	The principal knows what kind of school he or she wants and has communicated to staff	.646
10K	There is a great deal of cooperative effort among the staff members.	.662
10L	In this school, staff members are recognized for a job well done.	.671
10O	I am given the support I need to teach students with special needs	.581
10Q	I am generally satisfied with being a teacher at this school.	.561

The satisfaction variables that were included in scale were chosen not only for their respective factor loadings, but also because these variables are well researched on how they contribute to job satisfaction. Khaliq (2018) stated that relationships with colleagues influence a teacher's level of satisfaction contributing to a teacher being satisfied at a particular school site or within a district. Toropova, Myrberg and Johansson (2021), examined working conditions and teacher satisfaction and found that there is a strong correlation between the two. After completing the factor analyses, I ran a reliability analysis which showed a Chronbach's alpha of α=.87 for this scale, indicating that the scale had strong reliability.

Scale Construction Summary

In summary, I approached measures of teachers' "intention to stay" and "satisfaction" as latent constructs measured by a set of 4 items and a set of 10 items, respectively. For the sake of simplicity, I assumed a single factor structure which was supported by exploratory factor analysis (EFA), capturing 56% of the variance for "intention to stay" and 30% of the variance for "satisfaction," though confirmatory factor analysis suggests that the factorial structure of the satisfaction items is more complex. I keep this in mind in my interpretation of the models given the limitations that this creates.

Comparison Variables of Interest

I used a few variables of interest to make comparisons across networks. I made comparisons between gender (men (n=67) and women (n=64)), years of experience (mean = 9.8 years), whether a teacher was a math (n=54) or social studies teacher (n=76) and whether a teacher taught advanced (n=65) or regular classes (n=65). These variables were examined in relation to teachers' satisfaction and intention to stay in the profession. I utilized permutated t-tests to compare each of the variables. I will further discuss the details of permutation analyses in the statistical analyses section of this chapter as well as chapter 4.

In further review of potential comparison variables of interest, in my survey, I included several other potential control variables including the Title I status of a school site, type of secondary school (magnet, traditional, vocational, magnet program within a school), and degree attainment level. After conducting my literature review it was evident that several factors influence teacher retention including but not limited to satisfaction, administrative support, engagement with resources, achievement level of students, salary, school site working conditions, district working conditions and teacher efficacy. In the construction of my cumulative satisfaction score, I was able to capture data on salary, provision of necessary resources, influence of state and district standards, support, and overall sense of satisfaction with the profession. The centrality measures that were included in each of the networks captured engagement with resources as well as the frequency of engagement and the level of supportiveness that teachers perceived the support to be. Engagement with resources included engagement with colleagues, engagement with district and school site administration as well as engagement with teachers in the profession across the district and on web-based platforms (Teams and M-DCPS Workplace). I had to make decisions on what to include in my final regressions and some of these variables highlighted in my literature review were not included as separate control or comparison variables as I sought to narrow my focus on subject area, subject level, gender, and years of experience. Therefore, my final model specification included two control variables, network measure, satisfaction, and intention to stay. Gender and subject level (advanced or regular) were used in my permutated t-tests but were not included in final regressions because I did not find any statistically significant associations between gender or subject level and my dependent variable.

Statistical Analyses

Introduction

In this next section, I will describe in detail the statistical analyses that I ran for each network and corresponding research that supports my methodological choices. I begin with a general description of analyses and comparisons made and then delve into a deeper discussion on R studio and subsequent regressions and techniques that account for any Type I errors. After constructing the scale for both satisfaction and intention to stay, I began my analyses for each of the four networks, school site collegial, school site administrative, district collegial and district administrative.

R Studio and Networks

For the statistical analyses, I used language from R statistical programming. I then used the library tidyr package to create network-level measures for each of the four networks: SSRP SSRN, DRP, and DRN. Then I used library igraph to convert network data frames into igraph objects. I then had to confirm the bipartite structures of the network before I could look more closely at each network. Upon confirmation, I added vertex (node) type to the networks and continued with the calculation of network size. When calculating network size, I only used the frequency-based networks to calculate the numbers of nodes, edges, and density. After network size calculations, I calculated the degree, betweenness, and closeness in each network. Originally, I calculated three versions of degree centrality, betweenness centrality, and closeness centrality. Ultimately, I only used three measures of degree centrality: unweighted, weighted by frequency, and weighted by quality. Next, I converted centrality measures into a data frame so they could be visualized. Each of the calculated centralities was then merged into the main data frame for analysis and review.

Permutated T-Tests

Once, I constructed each of the networks and converted the centrality measures in a

frame, I then began the process of running permutated t-tests. To do so, I installed library (MKinfer) in Rstudi which provided me the capability to conduct the permutated t-tests. In each permutated t-test, I was comparing Advanced Academic and Regular secondary teachers, math and social studies teachers and men and women and looking for values less than .05 to denote any statistically significant differences between how each of these identified variables engaged with the resources in each network. I also ran permutated t-tests to see if any of the identified groups had differing levels of satisfaction or intention to stay without any consideration of network engagement.

Regressions and Mediation Analysis

After all permutations were completed, I then moved to regression and mediation analyses. As a reminder, the dependent variable in my study is intention to stay and the independent variable is teacher engagement with resources. To understand the relationship between engagement with resources (measured by centrality measures), satisfaction, course type, gender, years in the profession and level of course taught, I used linear regression modeling. In the initial phase, I wanted to determine which centralities predicted intention to stay in the profession. However, it is also important to note that I have used satisfaction as a mediator between the centrality measures and intention to stay. Further justification for using satisfaction as a mediator is discussed later in this Chapter. I then ran an additional regression to see if any of the centralities predict satisfaction. I ran two additional linear regressions as part of a mediated model to see if satisfaction serves as a mediator between centralities and intention to stay, revealing whether centralities have an indirect effect on intention to stay.

Next, I installed library (psych), library (lmperm) and library (lm.beta) to test each of the mediated models. A sample of the mediated models for one of the centrality measures is

highlighted below in Figure 1. I have included a summary of all statistical analyses run in R studio in Appendix D.

Figure 1

Mediated Model Regression Sample

---

summary(lmp(Int.Stay~Engagement with Resources + Years of Teaching + Subject Area, data = Data Frame: Network Type))

summary(lmp(Int.Stay~Satisfaction + Years of Teaching + Subject Area, data = Data Frame: Network Type))
summary(lmp(Int.Stay~ Engagement with Resources + Satisfaction + Years of Teaching + Subject Area, data = Data Frame: Network Type))

lm.beta(lmp(Int.Stay~ Engagement with Resources + Satisfaction + Years of Teaching + Subject Areadata = Data Frame: Network Type))

summary(lmp(Satisfaction~ Engagement with Resources + Years of Teaching + Subject Area, data = Data Frame: Network Type))

lm.beta(lmp(Satisfaction~ Engagement with Resources + Years of Teaching + Subject Area, data = Data Frame: Network Type))

Permutations and Mediation Analyses

Throughout the analyses, because I tested many models (12), I also ran a permutation test. As explained by Dou and Zwolak (2019), the permutation test randomizes the matching between the independent variable and the dependent variable and compares the "true regression estimated to the distribution of estimates calculated across a certain number of iterations of randomization" (p. 15). The permutation test is beneficial in that it helps with missing data and violations of the assumptions of normality, as previously explained. An additional benefit of mediation analyses that use permutation testing methods, especially in a study with a small sample size, is that the testing methods "permutate residuals under the full model" (Kroehl, Lutz, & Wagner, 2020, p. 1). Another benefit of permutations within regressions in R Studio, as noted by Dou and Zwolak (2019), R studio "randomizes the

matching between the independent and dependent variables and compares the true regression estimated to the distribution of estimates calculated across a certain number if iterations of randomization" (p. 15).

I ran 12 regression models- one with each of three centrality measures for each of the four networks to predict teacher's intention to stay, controlling for years of service and whether someone was a math of social studies teacher. I used a Monte Carlo technique to calculate the permutated mediated models, which was done for two reasons. First, measures of social networks are inherently dependent on one another and therefore violate the assumptions required of typical linear regressions. By running permutation models, I was able to add a layer of rigor that accounts for violations of the assumptions of independence, and I am also accounting for running multiple models and hoping to lessen the possibility of Type 1 error. Additionally, as noted by Dou and Zwolak (2015) the utilization of permutation tests addresses "violation of the assumptions or normality and homescedasticity" (p.15).

While gender, years of experience, subject area and subject level were included in the permutation analyses, in my regression models, I only included subject area (math or social studies) and years of experience. The gender and subject level when included in the regression were not statistically significant predictors; therefore, I made the decision to exclude them from all final regression models.

In summary the collection of data through surveys between secondary math and social studies teachers were compared through a program called R Studio. The statistical procedures that were utilized to analyze the data include permutated t-tests, linear regression techniques permutation correlation tests and factor analyses (EFA and CFA). Finally, mediated models were created to test the relationship between teacher engagement with satisfaction and intention

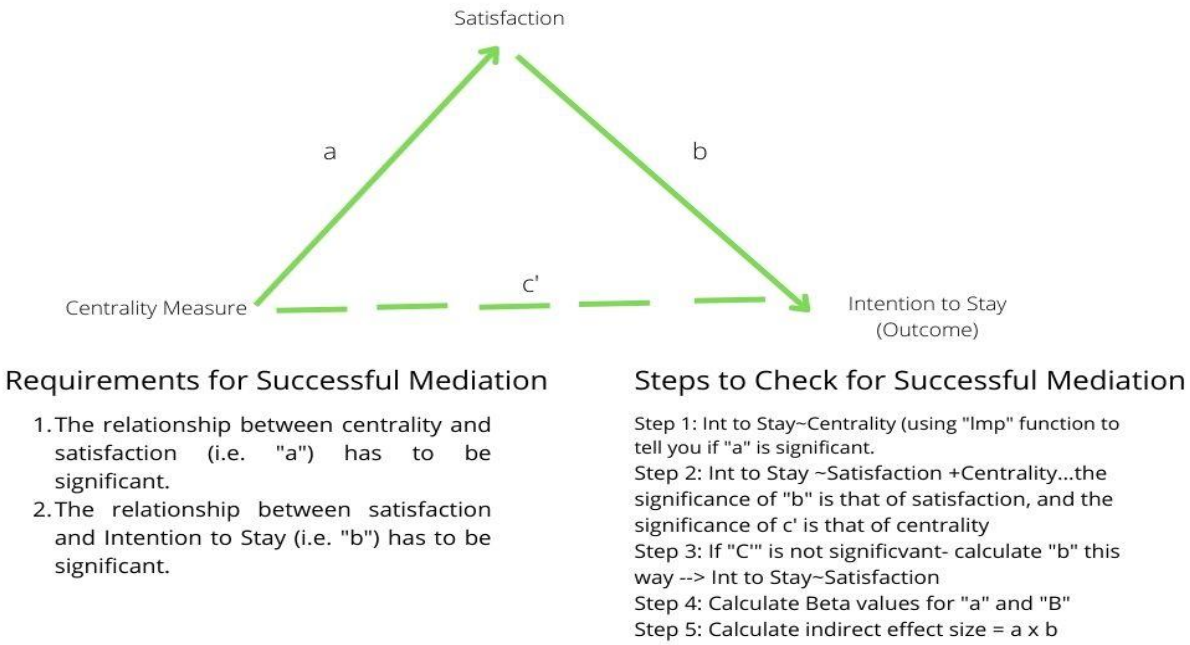
to stay. A more in-depth discussion of the significance of mediated models is discussed below.

Mediated Models (Network Dependent)

The reason I chose to use mediation analysis as a method for understanding the potential association between my independent variable (centrality measures) and my dependent variable (intention to stay) is that it is noted as a common approach for the statistical analysis of relationships between and independent and dependent variable (Hayes, 2009). Another major component of a mediation analysis is to introduce a mediator, that mediates the relationship between the IV and the DV. In my study as previously noted, the mediator is satisfaction. By using a mediation analysis, I was able to determine whether the association between teachers' engagement with resources and intention to stay is due entirely to satisfaction or in part to satisfaction. In my mediation analyses, satisfaction (mediator) transfers the effect of teachers' engagement with resources (independent variable) on the dependent variable (Intention to stay). See figure 2 to see why my constructed mediated model is an appropriate way for understanding the relationships I have included in my study.

Figure *2*

Mediated Model



Once again, a series of mediated models were utilized to test the relationship between satisfaction, engagement with resources and intention to stay. In a mediation analysis, there are three possible results, (1) no direct effect, (2) direct effect, and (3) indirect effect. When the IV does not have a direct effect on the DV, the effect may be indirect when a mediator transmits an effect. A direct effect can occur between the mediator and the DV, the mediator and the IV and the IV on the DV. In my study, the effect of centrality (IV) on intention to stay (DV) was mediated by satisfaction (mediator). In a mediated model, the mediator (satisfaction) helped me to understand how teacher's centrality (engagement with resources) impacted their intention to stay. As noted by Rucker, Preacher, Tormala and Petty (2011), “significant indirect effects can occur in the absence of significant total or direct effects” (p.362). Additionally, it is also

important to think about the strength of relationships. It is possible for the independent variable to have a stronger influence on a mediator than on the dependent measure, creating a stronger indirect effect than total effect. It is further explained Rucker, Preacher, Tormala and Petty (2011), that indirect effect of *a x b* can be statistically significant even when path c is not. In Chapter 4, I will show that satisfaction is predictive of intention to stay for every model. Understanding that satisfaction is always predictive, I sought to further understand whether centrality increased the explanatory power of the model.

Other Considerations

Accounting for Non-Normality

The very essence of networks provides a distribution that often fails tests of normality. In addition, centrality measures, an important component of this research, violate basic requirements of linear regression models due to the tendency for distributions that are not always normal. The skew and kurtosis data results that will be later reported in Chapter 4, will highlight these abnormalities. Therefore, to overcome the non-normality of these regressions, I utilized permutation.

Summary

Throughout this chapter, I explained the methodological decisions I utilized to complete this study. My study was a quantitative study that utilized a home-grown instrument as well as previously utilized constructs as well as social network analysis. The main purpose of the study was to see if a teacher's frequency of use of varying resources within a network and the quality of the interactions with that resource had an impact on a teacher's level of satisfaction and consequently on their intention to stay in the profession/MDCPS.

The survey was administered to a census sample of high school math and social studies teachers in M-DCPS (n=921) across the three regions to examine the potential correlation of

resource utilization and intention to stay. My final response rate was 16% (n=150) who completed the survey in its entirety. I explained how I used SNA to construct my networks. I also explained demographic information for the respondents and a justification of scale and survey development as well as some of my analyses. In the following chapter I will provide the results of my analyses.

Chapter IV: Results

Introduction

Chapter 3 was a detailed overview of the design I utilized to carry out this quantitative study. Throughout the chapter I described each of the methodological choices I made and the logic behind that choice to develop my study and run subsequent analyses. I also carefully present my research questions and explain my data analysis as well as the integrity of data that was collected to complete the study.

In this chapter I will report the findings of my quantitative study which measured teacher engagement with resources using social network analysis. The analysis of the bipartite networks explored throughout this chapter using a mediated model allowed me to explore the relationship between centrality measures, satisfaction, and intention to stay. The centrality measures were created based on engagement with varying resources, and the predictive value of the centrality measures with both teacher satisfaction and intention to stay in the profession are reported.

In this study, I aimed to understand how the characteristics of resource networks are different across school-site and district resource networks. I then sought to understand to what extent are the characteristics of a teacher's centrality within a school site resource network and a district resource network related to their satisfaction and intention to remain in the profession. The use of social network analysis provides a unique and specific idea to think about teacher retention. Social network analysis provides a novel approach to measuring teacher engagement with resources whether at the school-site or district level. The engagements or connections are mapped out and can be analyzed in a variety of quantitative ways which will be evidenced throughout this chapter.

The findings of this study will answer the following five research questions addressing the characteristics of networks as well as the extent of a teacher's centrality within various networks as it relates to their satisfaction and intention to stay in the profession.

1. How are characteristics of resource networks different across school-site and district resources?
2. To what extent are the characteristics of a teacher's centrality within a *school-site collegial resource network* related to their satisfaction and intention to remain in M-DCPS?
3. To what extent are the characteristics of a teacher's centrality within a *school-site administrative resource network* related to their satisfaction and intention to remain in M-DCPS?
4. To what extent are the characteristics of a teacher's centrality within a *district collegial resource network* related to their satisfaction intention to remain in M-DCPS?
5. To what extent are the characteristics of a teacher's centrality within a *district administrative resource network* related to their satisfaction intention to remain in M-DCPS?

The reported findings in this study include twelve models that I tested to investigate if centrality measures (IV) were predictive of satisfaction (M) and/or intention to stay (DV) withing school site and district resource networks. In my study there were four major networks (school site collegial, school site administrative, district collegial, and district administrative). For each of the four networks, I ran three mediated models to assess the indirect or mediated effects and if any direct effects were evidenced. In every model, I examined each centrality measure (the use of resources, the frequency of use and the supportiveness or quality of use) for

a total of three models for each network. As explained in Chapter 3, I ran a series of mediated models, to test whether satisfaction mediated the relationship between centrality measures and intention to stay since there was no evident direct effects between the centrality measures and intention to stay. In the following report of findings, I will only present findings that are statistically significant.

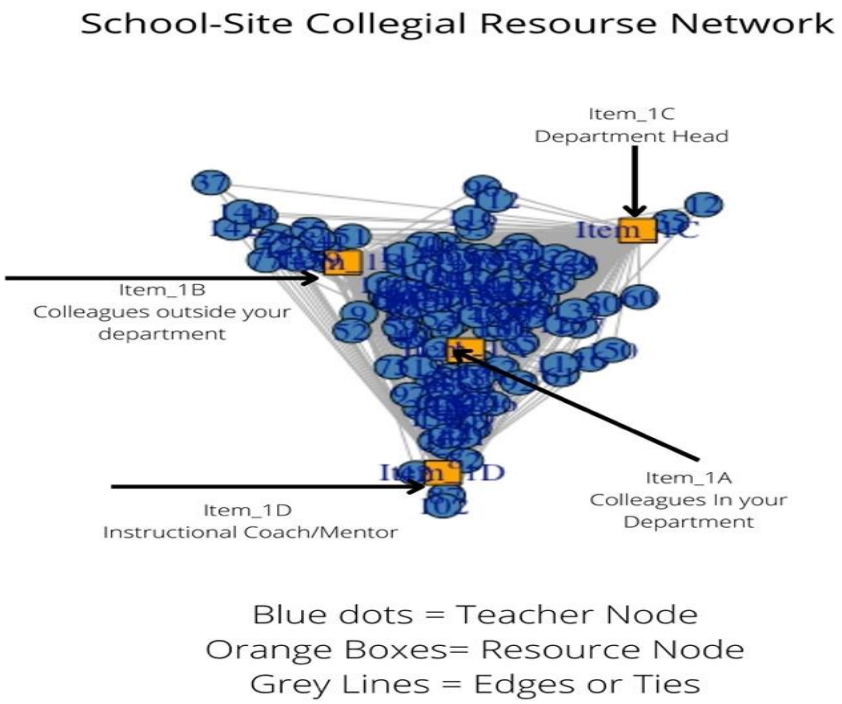
Overview of Network Descriptives

In this next section I will be providing the findings on network descriptives for each of the four networks in my study. The four networks include, school-site collegial resource network, school-site administrative network, district collegial network and district administrative network. For each of the four networks, I calculated the network size, using a frequency-based network to calculate the number of nodes in the network, number of edges and the density of the network. Prior to presenting the descriptive characteristics in writing for each network, I have included an image of the network in Figures 3-6.

Network #1: School-Site Collegial Resources

Figure 3

School Site Collegial Resource Network Visualization



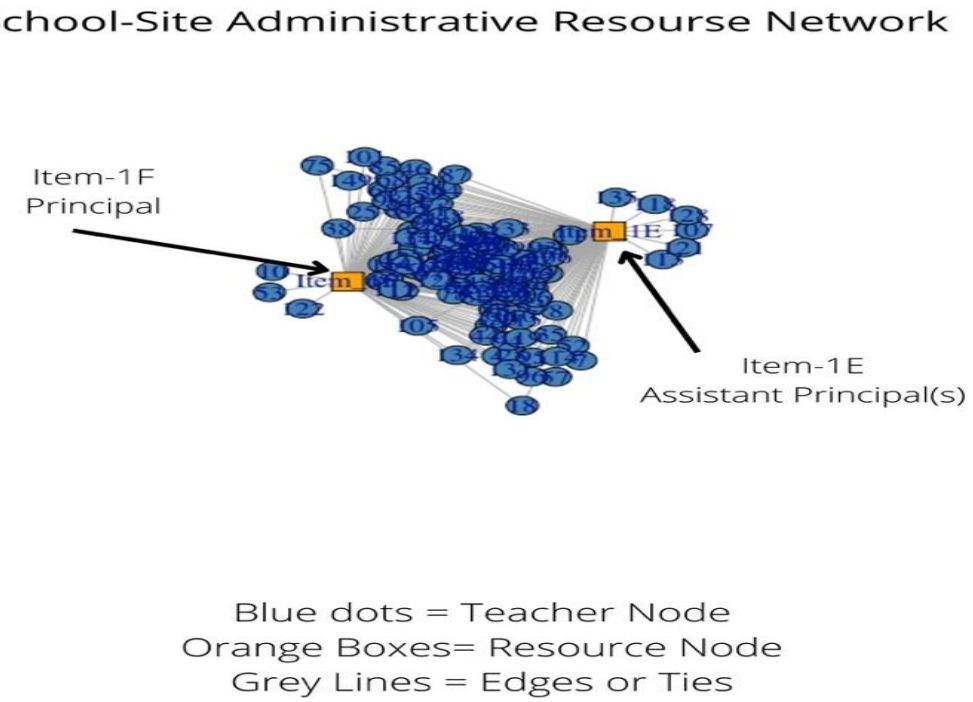
In figure 3, school site collegial resource network visualization, the image depicts the engagement of teachers with resources. The blue dots indicate a teacher node, whereas the orange box represents a resource node. The closer the blue dot is to the orange box, the more frequently a teacher engages with that resource. For example, in the top left of the figure, the orange box labeled (Item_1B) represents school site colleagues outside of your department and the orange box labeled (Item_1A) in the center of the figure represents colleagues inside your department, it is clear from this network that teachers interact with departmental colleagues more than they interact with non-departmental colleagues. The blue dot (37) in the top left-hand corner represents a teacher that does engage with teachers outside of their department, but not very frequently.

School-site collegial resources in M-DCPS, for the purpose of my study, included teacher colleagues in the same department, teacher colleagues at the same school, "teacher colleagues outside of your department," assigned department head and instructional coach or school site mentor. It is important to note that the instructional coach position is only assigned to low performing schools, therefore some of the participants by default would not have access to this resource, although they may have other school-site mentors. This network has 145 nodes, 479 edges and a density of 83%. The group of actors or *nodes* is what makes up the network. For this study, the teachers and resources that make up the examined networks are referred to as the nodes. The number of possible edges in this network was calculated by taking the number of nodes (145) and multiplying by the 4 collegial resources that are in this network (4 x 145), equating to 580 possible edges or connections within the network. The edges or ties in a network indicate the relationship between nodes. The 83% density highlights the level of engagement by teachers with these school-site resources (Colleagues in department, colleagues outside of department, department head and instructional coach/school-site mentor). Of all the possible ways that teachers could interact with these resources, there is an 83% utilization rate.

Network # 2: School-Site Administrative Resources

Figure 4

School Site Administrative Resource Network Visualization



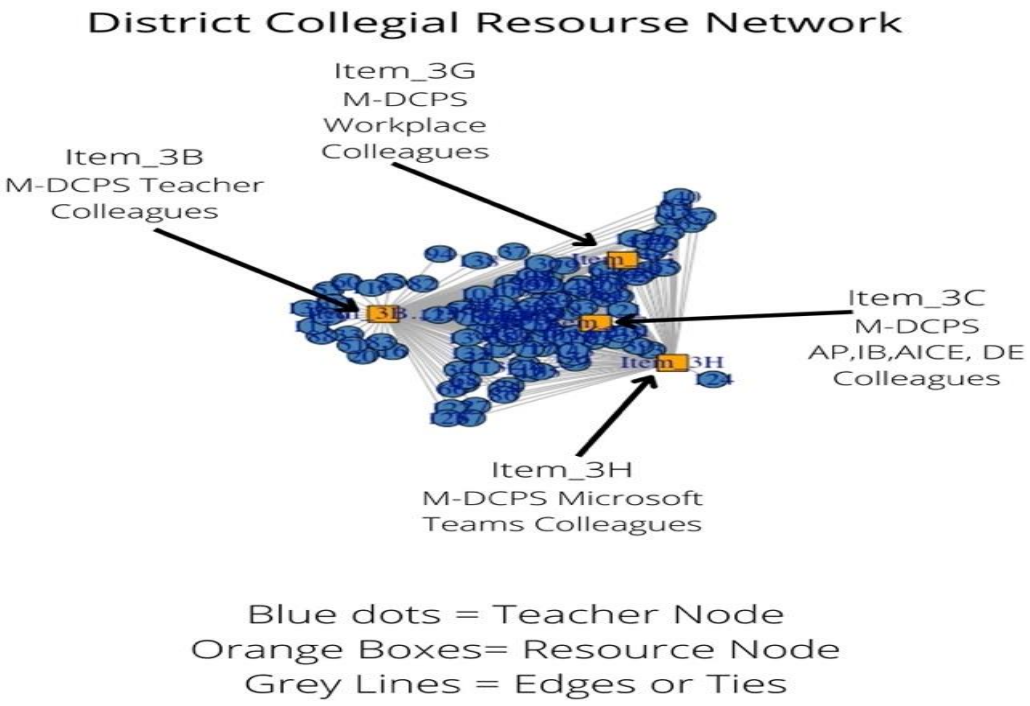
In figure 4, school site administrative resource network visualization, the image depicts the engagement of teachers with resources. Once again, the blue dots indicate a teacher node, whereas the original box represents a resource node. The closer the blue dot is to the orange box, the more frequently a teacher engages with that resource. For example, on the left of the figure, the orange box labeled (Item_1F) represents the school site principal and the orange box labeled (Item_1E) on the right-hand side of the figure represents assistant principals at the school site, it is clear from this network that teachers engage with the assistant principals and principal equally. The blue dots (10,53,122) represent teachers that engage with the principal less than other teachers in the network.

School-Site Administrative Resources included the assistant principal and principal of a particular school. Every school in M-DCPS has at least one principal and one assistant principal that make up the administrative team, although larger schools will have more assistant principals. This network has 141 nodes, 273 edges and a density of 97%. The number of possible edges in this network was calculated by taking the number of nodes (141) and multiplying by 2 school-site administrative resources (141 x 2), equating to 282 possible edges. Of all the possible ways that teachers could interact with the principal and assistant principal at the school-site there is a 97% utilization rate.

Network # 3: District Collegial Resources

Figure 5

District Collegial Resource Network Visualization



In figure 5, district collegial resource network visualization, the image depicts the engagement of teachers with resources. The blue dots indicate a teacher node, whereas the original box represents a resource node. The closer the blue dot is to the orange box, the more frequently a teacher engages with that resource. For example, in the center of the figure the orange dot labeled (Item_3C) represents district AP, IB, DE and AICE colleagues and it is clear that teachers in this network, who engage with these colleagues, do so very frequently. The blue dot (124) on the bottom right side, represents a teacher that engages with teachers on Microsoft Teams, less than other teachers in the network.

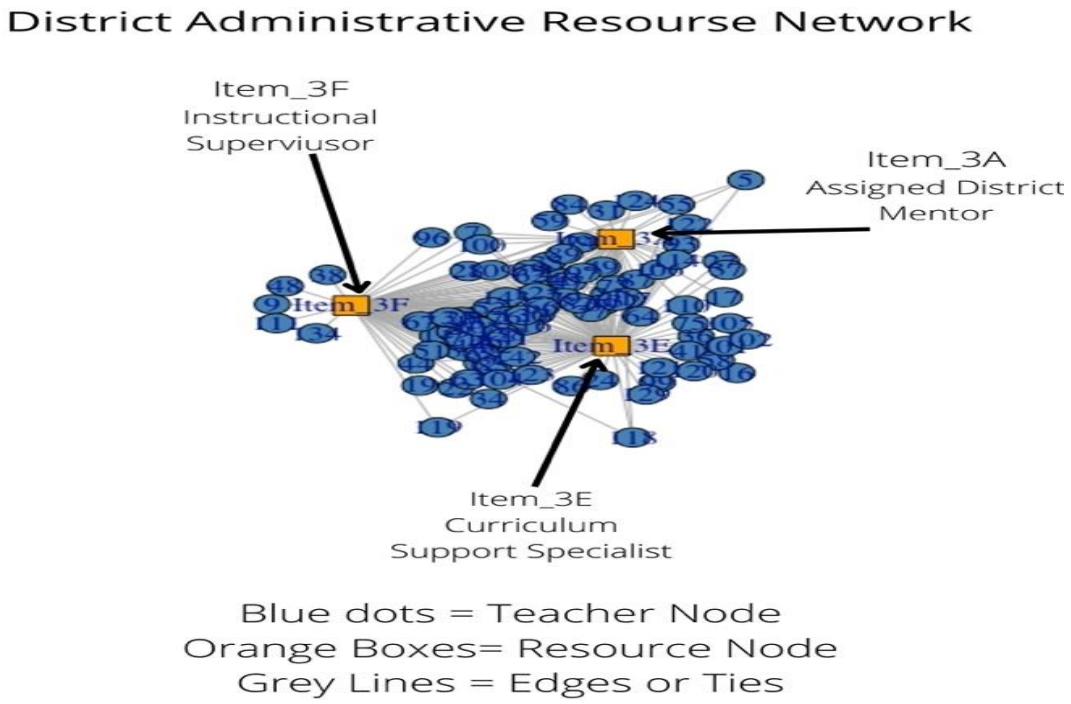
District collegial resources included MDCPS teacher colleagues, M-DCPS Advanced Placement (AP), Dual Enrollment (DE), and Cambridge colleagues (AICE), colleagues from M-DCPS workplace and colleagues from Microsoft teams. The district collegial resource network is different in that it includes both social and material resources Teachers may engage with actual teachers, or they may engage with teachers on a social platform or take materials from the identified social media platforms. This network is also unique in that it includes AP, DE, and AICE colleagues that not all teachers would be connected to and therefore most likely would not engage. However, if teachers teach at least one of these level courses then it is possible they may engage with one of these resources within the network. This network has 136 nodes, 342 edges and a density of 63%. The number of possible edges in this network was calculated by taking the number of nodes (136) and multiplying by the 4 collegial resources that are in this network (4 x 136), equating to 544 possible edges or connections within the network. The 63% density is indicative of a much lower level of engagement than seen in the school-site collegial and administrative resource networks. However, as previously noted, the lower density and lower engagement with district

collegial resources are to be expected. Additionally, it is important to note that teachers traditionally interact with individuals in their school buildings more than those individuals outside.

Network #4: District Administrative Resources

Figure 6

District Administrative Resource Network Visualization



In figure 6, district administrative resource network visualization, the image depicts the engagement of teachers with resources. The blue dots indicate a teacher node, whereas the original box represents a resource node. The closer the blue dot is to the orange box, the more frequently a teacher engages with that resource. For example, on the left-hand side of the figure, the orange box labeled (Item_3F) represents a district instructional supervisor, and it is clear from this network, that teachers do not engage with the instructional supervisor frequently and not as many teachers engage with this resource. The blue dot (119) represents a teacher that

engages with the district curriculum support specialist (Item_3E) and the Instructional Supervisor (Item_3F) but does not engage with an assigned district mentor (Item_3A).

District administrative resources include an assigned district mentor, district curriculum support specialist and a district instructional supervisor. Like district collegial resources, district administrative resources may also have fewer teachers that engage with them due to exposure and accessibility. Lower performing schools will more often receive assistance from Curriculum Support Specialists (CSSs) and Instructional Supervisors (ISs) than higher performing schools. It is also important to note that many teachers who completed this survey, based on years or experience, would not have an assigned district mentor. This network has 96 nodes, 195 edges and a density of 68%. The number of possible edges in this network was calculated by taking the number of nodes (96) and multiplying by the three administrative resources that are in this network (3 x 96), equating to 288 possible edges or connections within the network. In district administrative resource networks 68% of teachers in the network engage with the resources.

Network Descriptives Summary

Table 10

Summary of Network Descriptive Characteristics

	Nodes	Possible Edges	Edges	Density
School-Site Collegial Network	145	580	479	83%
School-Site Administrative Network	141	282	273	97%
District Collegial Network	136	544	342	63%
District Administrative Network	96	288	195	68%

Table 10 provides a summary of all the network descriptives that I calculated for each of the four networks. Density was calculated by the following formula:

Density = [#of edges that exists] / [#edges that are possible]

The densest network is the school-site administrative network, with a 97% density. The second most dense network is the school-site collegial resource network.

The information reported in the summary of all network descriptives answers my first broad research question (RQ1): How are characteristics of resource networks different across school-site and district resources? School-site resource networks, whether collegial or administrative, are much denser than district collegial and administrative networks. By understanding the density of a network, I can see how connected the network is compared to how connected it could be. As expected, school-site networks are much more connected than district resource networks. At the school-site teachers engage with resources daily, whereas engagement with resources at the district level may be more sporadic and spread over weeks or months during an academic calendar year.

Teachers and their Engagement with Resources as Measured by Centrality

After acquiring an understanding of the descriptive characteristics of the constructed networks for this study, I move to examine teacher engagement with resources as measured by centrality. When centrality is measured, I examined how engaged teachers are in the school-site or district network based on both direct and indirect connections with the resources, whether social or material.

Centrality can be measured with varying SNA measures. Centrality measurements I included in my final analyses are degree centrality, weighted frequency, and weighted quality. Degree centrality is the simplest of measures and it assigns a number based simply on the number of links held by each node. Degree centrality indicates how many direct connections that each node has to other nodes within the network.

After I calculated the social network measure of degree centrality for all networks measures, it was evident that degree centrality or the number of resources that teachers are using in the network, resulted in a statistically significant finding. Moreover, because statistical significance was evident in each of the networks and across multiple centralities, I had enough data to make some contributions to the literature. However, to provide a more nuanced analysis I also calculated the weighted version of each centrality measure that was connected to weighted degree (Frequency of Use (F.str)) and (Quality of Support (Q.str)). In the survey participants were asked about their frequency of interaction with varying resources and if they interacted with a resource at least once then they reported the quality of supportiveness from that resource, these items were also calculated in the centrality network measures. Understanding how teachers engage with differing resources at the school site and district level provided greater insight into how relationships impact teachers and subsequently students. Attbery and Byrk (2010) suggested that there is a strong relationship between network characteristics and how these characteristics interact with change efforts aimed at instructional improvement (p. 52). Yonezawa et al. (2011) cited that teachers' engagement with healthy learning communities creates an impactful experience for educators and further noted that these communities are not available in schools and all districts.

Teachers and Measures of Satisfaction

A cumulative satisfaction score was constructed from the survey questions asked to respondents. As explained in the methods chapter, I approached measures of teachers' "satisfaction" as a latent construct measured by a set of 10 items. For the sake of simplicity, I assumed a single factor structure which was supported by exploratory factor analysis (EFA), capturing 33% of the variance for "satisfaction," though confirmatory factor analysis suggests that the factorial structure of the items is more complex. I keep this in mind in my interpretation

of the models given the limitations that this creates. I also tested the reliability of the scale, and for the satisfaction scale (α=.87). Finally, the satisfaction scale was interpreted as 1 being unsatisfied (participants "strongly disagreed" with the statement) and 4 being very satisfied (participants "strongly agreed" with the statement. Table 11 is a summary of the general distribution of satisfaction based on the average score from the questions in Table 1 found in Chapter 3.

Table 11

Satisfaction across Networks

N	Mean	SD	Median	Min	Max	Range	Skew	Kurtosis	SE
126	3.12	.56	3.1	1.8	4	2.2	-.44	-.53	.05

The maximum reported score for satisfaction was 4 with a minimum of 1.8. Teachers overall are more satisfied than dissatisfied evidenced by the reported mean of 3.12. Based on the -.44 Skewness and -.53 Kurtosis, data for satisfaction was normally distributed.

Teachers and Measures of Intention to Stay

Like the intention to stay latent construct, I approached measure of teachers' "intention to stay" as latent constructs measured by a set of 4 items. I once again assumed a single factor structure which was supported by exploratory factor analysis (EFA), capturing 56% of the variance for "satisfaction." I also tested the reliability of the satisfaction scale (α=.82). Finally, the intention to stay scale was interpreted as 1 being unlikely to stay (participants strongly disagreed with the statement) and 5 being very likely to stay (participants strongly agreed with the statement. Table 12 is a summary of the general distribution of intention to stay.

Table 12

Intention to Stay Across the Networks

N	Mean	SD	Median	Min	Max	Range	Skew	Kurtosis	SE
131	3.44	1.09	3.5	1	5	4	-.30	-.75	.09

The distribution of intention to stay resulted in a mean of 3.44, indicating that teachers report that they are more likely to stay on their reported intention to stay than leave (n=131). The maximum reported score is 5 with the minimum score of a 1. Based on the -.30 skew and -.75 kurtosis, data for intention to stay was normally distributed.

Teachers and Measures of Centrality

In Appendix C I report cumulative measures of centrality for each network. I provide descriptive statistics for the cumulative measures of centrality for individuals interested in a more detailed understanding of these measures. It is worth noting that centrality measures are not normally distributed as will be shown in the skew and kurtosis numbers reported in the appendix. The non-normality in distribution, once again justified my rationale for conducting permutated t-tests and permutations rather than simple linear regressions. For the purposes of this study, I did not provide a detailed analysis of the cumulative measures for centrality as they have no bearing on the scope of this study and subsequent findings. However, I include the measures of centrality for each network because they are the necessary measures in which to run my permutated t-tests, regressions, and mediated models. For individuals who may be more experienced in the nuances of SNA, and have an interest in the statistics that are included for the cumulative measures, these statistics can be found Appendix C.

Table 13 below provides the sample size, mean and standard deviation for the variables that were utilized in the permutations and mediated models. In the table, I provide information for advanced/regular, math/social studies, gender, and years of experience**.**

Table 13

Descriptive Variables Used in Permutations and Mediated Models

Variable	N	Mean	s.d.	Coding
Advanced	125	1.54	.500	1=Advanced Teacher 2=Regular Teacher
Math/Soc	125	1.59	.493	1=Math Teacher 2=Social Studies Teacher
Gender	125	1.52	.502	1=Man 2=Woman
Years of Exp.	125	16.948	10.2465	Continuous (range= 1-43)

Permutated T-Tests and Control Variables across Centrality Measures

In the next section of findings, I will report any differences in the way that teachers engage with the identified resources across teacher subject area (math (n=54) or social studies(n=76), across teacher course level (advanced (n=65) or regular (n=65), years of experience (mean 16.948 years), and gender (men, n=67; women n=64). After conducting a series of permutated t-tests for each of the identified centralities across each network, school-site collegial, school-site administrative, district collegial, and district administrative, I will report the findings for each network. To report statistically significant differences and ensure that the model is valid, the p-value must be less than 0.05. The results of these permutated t-tests that include the mentioned comparison variables across centralities are being reported because they provide additional context regarding the characteristics of teachers in this study.

Moreover, by gaining a small understanding of teacher characteristics, I can think about my implications for research and educational policy more precisely in Chapter 5. An additional reason for including these measures is also a personal interest of mine as a former female advanced placement and dual enrollment social studies teacher. Furthermore, attempts to build self-efficacy in social studies appear to be a limited priority for many districts and could contribute to teacher attrition. Thacker (2017) argued that informal learning experiences are important to social studies teachers and that for many teachers due to budget restrictions they must find their own ways of soliciting support. Further justification for including advanced teachers is evidenced from Boyd, Lankford, Wyckoff, Grossman, and Loeb (2009), where they argued that teachers are more apt to stay in schools where the school and students have higher achievement levels. Therefore, understanding how advanced teachers might engage with resources compared to regular teachers may provide some new insight.

Permutated T-Test results for Satisfaction and Intention to Stay

Prior to reporting results from permutated t-tests across each of the networks, I will report results for Satisfaction and Intention to Stay, compared across level taught (advanced or regular), gender (man or woman) and subject area (math or social studies). When I do not consider engagement with resources at the school site or district level, there is no difference in level of satisfaction and intention to stay across levels, gender, and subject areas. In the next sections, I will discuss results of permutated t-tests for each of the four networks while comparing each of the control variables discussed here as well as engagement with resources in the specific network.

I conducted the first series of permutated t-tests for the school site collegial resource network. In the school site collegial resource network there was no statistically significant difference in how advanced academic and teachers and regular teachers engaged with the

network. Also, there was no statistically significant difference in how math and social studies teachers engage with the network. In this network, there also was no statistically significant difference in how frequently advanced and regular teachers engaged with resources and the same was true for math and social studies teachers. When comparing the quality of engagement there also was no statistically significant difference for either group (advanced/regular, math/social studies). In the school site collegial network, men had a higher mean engagement with their school site administrative network than women (M=3.44 vs. 3.14, p.=.02, sd= .73 vs. .72). The effect size as measured by Cohen's d was .41, indicating a small-medium effect. However, there was no statistically significant difference when comparing frequency and quality of engagement between men and women.

School-Site Administrative Resource Network

The next series of permutated t-tests were conducted for the school-site administrative network. In the school site administrative network, advanced academic teachers had a higher mean engagement with their school site administrative network than regular teachers (M=1.98 vs. 1.90, p.=.05, sd= .14 vs. .30). The effect size as measured by Cohen's d was -.34, indicating a small effect. In this network, there also was no statistically significant difference in how frequently advanced and regular teachers engaged with resources. When comparing the quality of engagement there also was no significant difference for advanced/regular teachers. In the school site administrative network when I compared gender (man and woman) and subject area (math or social studies), there was no statistically significant difference between the two groups across any of the centrality measures.

District Collegial Resource Network

The next series of permutated t-tests were conducted for the district collegial resource network. In the district collegial resource network, advanced academic teachers had a higher

reported quality of mean engagement with their district collegial network than regular teachers (M=10.42 vs. 8.7, p.=.02, sd= 4.0 vs. .40). The effect size as measured by Cohen's d was -.43, indicating a small-medium effect. In this network, there was no statistically significant difference in the use of the network or frequency of use between advanced academic and regular teachers. Social studies teachers had a higher mean engagement than math teachers (M=2.70 vs. 2.28, p=.02, sd=.97 vs. .92). The effect size as measured by Cohen's d was .22, indicating a small effect. In further comparison within this network, the frequency of engagement also highlighted that social studies teacher more frequently engage with resources in this type of network than math teachers (M=8.99 vs. 7.2, p=.01, sd=3.77 vs. 3.95). The effect size as measured by Cohen's d was .07, indicating a small effect. In this network there was no statistically significant difference in the frequency of use of the resources between math and social studies teachers. There also was no statistically significant difference in how men and women engaged with the network across any of the centrality measures.

District Administrative Network

The next series of permutated t-tests were conducted for the district administrative network. In the district administrative network there was no statistically significant difference in how advanced academic and teachers and regular teachers engaged with the network for any of the centrality measures. There also was no statistically significant difference in how math and social studies teachers engaged with the network. In the district administrative network, men had a higher mean engagement with their district administrative network than women (M=2.19 vs. 1.84, p.=.03, sd= .77 vs. .77). The effect size as measured by Cohen's d was .46, indicating a small-medium effect. In this network, there also was no statistically significant difference in how frequently men and women engaged with resources. When comparing the quality of engagement tin this network, there also was no statistically significant difference between men

and women. A summary of all the statistically significant permutated t-test measures and comparison groups is found in Table 14.

Table 14

Summary of Permutated T-Test Measures and Comparison Groups

	Mean	p-vlaue	sd	Cohens D
School-Site Collegial Resource Network				
Engagement/Use of Resource				
Men	*3.44*	*.02*	*.73*	*.41*
Women	*3.14*	*.02*	*.72*	*.41*
School-Site Administrative Resource Network				
Engagement/Use of Resource				
Advanced Academic Teachers	*1.98*	*.05*	*.14*	*-.34*
Regular	*1.90*	*.05*	*.30*	*-.34*
District Collegial Resource Network				
Quality of Engagement				
Advanced Academic Teachers	*10.42*	*.02*	*4.0*	*-.43*
Regular Teachers	*8.7*	*.02*	*.40*	*-.43*
Quality of Engagement				
Social Studies Teachers	*2.70*	*.02*	*.97*	*.22*
Math Teachers	*2.28*	*.02*	*.92*	*.22*
Frequency of Engagement				
Social Studies Teachers	*8.99*	*.01*	*3.77*	*.07*
Math Teachers	*7.2*	*.01*	*3.95*	*.07*
District Administrative Resource Network				
Engagement/Use of Resource				
Men	*2.19*	*.03*	*.77*	*.46*
Women	*1.84*	*.03*	*.77*	*.46*

VIF Variables

Next, I will provide the VIF variables amongst centrality measures, satisfaction, subject area, and years of experience. While my permutated regression approach is robust enough to account for multicollinearity, I am also providing the VIF values, so I know the extent of collinearity in my models. The VIF values as indicated in Table 15 are all acceptable values in each of the four networks and across my IV, M, and control variables.

Table 15
VIF Values

	Centrality Measure	Satisfaction	Years of Exp.	Subject Area
School-Site Collegial				
Engagement/Use	1.07	1.09	1.01	1.03
Frequency of Use	1.14	1.12	1.03	1.05
Quality of Engagement	1.20	1.21	1.01	1.04
School Site-Administrative				
Engagement/Use	1.02	1.03	1.01	1.03
Frequency of Use	1.22	1.21	1.01	1.06
Quality of Engagement	1.62	1.62	1.05	1.04
District Collegial				
Engagement/Use	1.09	1.07	1.01	1.06
Frequency of Use	1.19	1.13	1.02	1.09
Quality of Engagement	1.15	1.15	1.01	1.04
District Administrative				
Engagement/Use	1.07	1.07	1.07	1.00
Frequency of Use	1.13	1.13	1.00	1.01
Quality of Engagement	1.18	1.16	1.03	1.02

Mediated Models (Network Dependent)

As discussed in Chapter 3, I utilized a series of mediated models to test the relationship between satisfaction and intention to stay. In this next section, I will report the results from testing a mediated model that was used to see if teachers' engagement with resources predicted satisfaction and intention to stay. In each model, satisfaction is predictive of intention to stay ($p.<.01$). Across

the 12 mediated models spanning the four networks, I included years of experience and whether a teacher was a math or social studies teacher as variables that may be potential statistically significant predictors. Originally, I had included other variables that were involved in the permutated t-tests, but because I did not discover any statistically significant findings, I excluded them from final regressions. As highlighted in Chapter 2, satisfaction is an extremely key factor related to retention (Gersten, Keating, Yovanoff & Harniss, 2001; Singh & Billingsley, 1996, Shreeve, Norby, Griffith, Stueckle, De Michelle, & Midgley, 1986). To understand the impact of a teacher's engagement with resources, their level of satisfaction and intention to stay in the profession, while controlling for years of experience and subject area (math and social studies), I utilized a series of regression analyses to test how centrality measures predicted teachers' intention to stay and how satisfaction predicted teachers' intention to stay, how centrality mediated by satisfaction predicted intention to stay, and how satisfaction and centrality both predicted intention to stay. It is important to note that the way teachers engage with resources provides a direct unique contribution in understanding teachers' satisfaction and consequently their intention to stay. I ran four regressions for each centrality measure across all four networks as indicated in Table 15. I ran the first regression to see if the centrality measure directly predicted intention to stay while controlling for years of experience and whether a teacher was math of social studies. The next two regressions that I ran were to see if the centrality measure directly predicted satisfaction and the next one to see if satisfaction directly predicted intention to stay. It is important to note that these two regressions, when statistically significant, create a valid mediation and model for the included centrality measure. In these two regressions, I also included years of experience and whether a teacher was math or social studies as control variables. The final regression that I conducted was to see if both satisfaction and the centrality measure together predicted intention to

stay. If this final regression is statistically significant, then I have found a valid model, but not one that is mediated. Once again, a summary of each of the regressions is included in Table 15.

Table 15

Regressions and Models

Regression	Type of Model	Centrality predictions	Control Variables
Centrality ----> Intention to Stay (1 regression)	Valid Linear Model	Centrality alone predicts a teacher's intention to stay	Years of Experience Math or Social Studies Teacher
Centrality ----> Satisfaction----> Intention to Stay (2 regressions)	Valid Mediated Model	Centrality predicts satisfaction and satisfaction predicts intention to stay	Years of Experience Math or Social Studies Teacher
Centrality + Satisfaction ---> Intention to Stay (1 regression)	Valid Model but not mediated	Centrality & Satisfaction both predict intention to stay but independently.	Years of Experience Math or Social Studies Teacher

Next, I will briefly explain a mediated model regression summary for one of the centrality measures. In Figure 7, I provide an image of a regression that was run as part of the school site administrative network for degree centrality (Frequency of Resource Use/Engagement). Below the figure, I will explain each line included in the mediated model regression summary. I conducted the series of regressions for each centrality measure (3 per network) across all four networks for a total of twelve models. Also included in each of summaries are a calculation of the standardized beta coefficients that indicate whether the centrality is directly predictive of satisfaction and whether satisfaction is directly predictive of intention to stay. The indirect effect size for the model because of the standardized beta coefficient calculations will also be reported later in Chapter 4.

Figure 7
Mediated Model Regression Summary

```
Line 1: summary(lmp(Int.Stay~SSN.F.str (Frequency of Resource Use) + Years of Teaching  +
Subject Area, data = DF.Done))


Line 2: summary(lmp(Int.Stay~SSN.F.str(Frequency of Resource Use)  + Satisfaction + Years of
Teaching + Subject Area, data = DF.Done))


Line 3:  lm.beta(lmp(Int.Stay~SSN.F.str(Frequency of Resource Use)  + Satisfaction + Years of
Teaching + Subject Area, data = DF.Done))


Line 4: summary(lmp(Satisfaction~SSN.F.str(Frequency of Resource Use)  + Years of Teaching +
Subject Area, data = DF.Done))


Line 5: lm.beta(lmp(Satisfaction~SSN.F.str(Frequency of Resource Use)  + Years of Teaching +
Subject Area, data = DF.Done))
```

In this next paragraph, I will report a line-by-line overview of variables that were included in the regressions and what the regression is attempting to predict. In line 1: summary(lmp(Int.Stay~SSN.F.str (Frequency of Resource Use) + Years of Teaching + Subject Area, data = DF.Done)) I am running this regression to see if there is a direct effect between the centrality measure (Frequency of Resource Use) and intention to stay (Int.Stay). and if a valid linear model is present, while controlling for years of experience (18A) and whether a teacher is math teacher or social studies teacher (31A). In line 2: summary(lmp(Int.Stay~SSN.F.str(Frequency of Resource Use) + Satisfaction + Years of

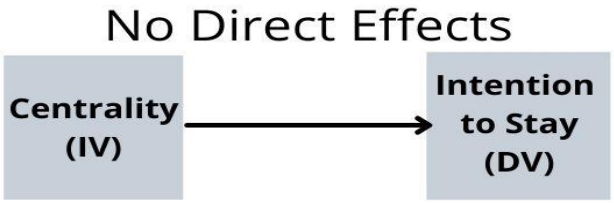
Teaching + Subject Area, data = DF.Done)) I am running this regression to see if I have a valid model, but one that is not mediated, but one that would explain if both satisfaction and frequency of resource use predict intention to stay, while also controlling for years of experience and subject area. In line 3: lm.beta(lmp(Int.Stay~SSN.F.str(Frequency of Resource Use) + Satisfaction + Years of Teaching + Subject Area, data = DF.Done)) I am calculating the standardized beta coefficient for the centrality measure (SSN.F.str) and satisfaction (Satisfaction) in relation to intention to stay (Int.Stay) while controlling for years of experience (18A) and subject area (31A). In line 4: summary(lmp(Satisfaction~SSN.F.str (Frequency of Resource Use) + Years of Teaching + Subject Area, data = DF.Done)) I am running this regression to see if I have the 2nd necessary component for a mediated model to exist by examining the relationship between the centrality measure (Frequency of Resource Use) and Satisfaction, while also controlling for years of experience (18A) and subject area (31A). It is important to note that this step is essential to mediation analysis, since I already know from previous regressions that satisfaction is always directly predictive of intention to stay. In line 5: lm.beta(lmp(Satisfaction~SSN.F.str(Frequency of Resource Use) + Years of Teaching + Subject Area, data = DF.Done). I am calculating another standardized beta coefficient for the centrality measure (SSN.F.str Frequency of Resource Use) and satisfaction (Satisfaction) while controlling for years of experience (18A) and subject area (31A).

The process which I describe in the previous paragraph was used for every centrality measure across each of the four networks. I include a summary of each model and subsequent regressions in Appendix D. Note that in the summary of the regressions, the location of each line may be different, however, it does not matter in which order the regressions are run for the final analysis.

To further understand how teachers' engagement with resources impacts their intention to satisfaction and intention to stay, while controlling for years of experience and subject area (Math or Social Studies) as noted above, I utilized a mediation analysis. However, before engaging in the explanation of models that resulted in statistically significant mediations, I initially ran a series of regressions to account for any potential direct associations between centrality measures and intention to stay. After running all the regressions across each centrality measure, no direct effects were evidenced between the centrality measure and intention to stay.

Figure 8

Mediated Model Testing for Direct Effects (Centrality)



Networks and Centrality Measures Tested

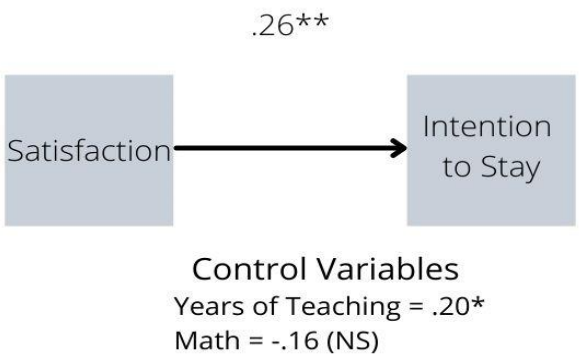
School Site Administrative	*School Site Collegial*	*District Administrative*	*District Collegial*
SSN.F.deg.	SSP.F.deg	DN.F.deg	DP.F.deg
SSN.F.str.	SSP.F.str	DN.F.str	DP.F.str
SSN.Q.str.	SSP.Q.str.	DN.Q.str	DP.Q.str

As noted in the mediated model regression summary, I ran a regression to see if satisfaction was directly predictive of intention to stay, to ensure that satisfaction was a solid

mediator to be used further in my mediation analysis. This regression was only run once since the regression is the same for all models. In this regression satisfaction is always predictive of intention to stay (β=.26, p= .001**). Also, as part of the regression, I wanted to see how years of teaching and subject area (math or social studies) was associated with intention to stay. In this regression, years of experience was significant (β=.20*) while subject area had no statistically significant association. In this regression, years of teaching is positively associated with intention to stay, meaning the more years a participant had in the profession the more likely they are to intend on staying.

Figure 9

Mediate Model Testing for Direct Effects (Satisfaction)

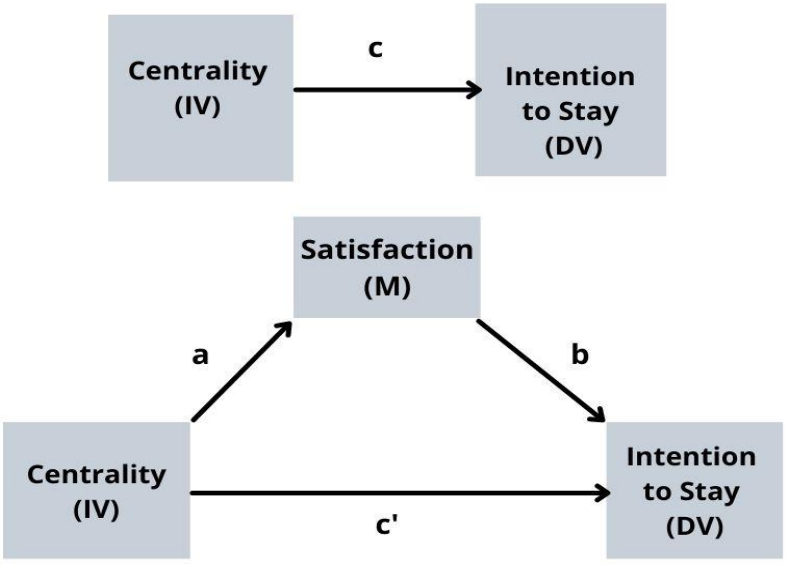


Now, because I was able to determine that there were no direct effects between centrality measures and intention to stay and because satisfaction is always predictive of intention to stay, I can justify my case for mediation analysis and complete remaining

regressions. However, before discussing the statistical support for mediation analysis, I will describe the overall mediation process and necessary steps for mediation to occur in general terms. In each of the models, the centrality measure must be a statistically significant predictor of satisfaction, which makes sense, because for a mediation to take place, centrality, which is the independent variable, must impact satisfaction which is the mediator. Next, I had to confirm that satisfaction (mediator) directly affects intention to stay, the dependent variable, while also considering centrality (independent variable). Furthermore, for an actual mediation to take place, satisfaction must explain more of the variance in intention to stay than each centrality measure used across all models. It is also important to note, that throughout each of the mediations that I will be report below, I consistently controlled for years of experience and subject area (math or social studies) and report how much of the variance is explained by these measures, but only when they are statistically significant. Figure 10 portrays a general form of the model constructed for the mediation analyses that I performed across each of the twelve models.

Figure 10

Mediation Analysis



In Figure 10, **c** represents the total effect of centrality (IV) →intention to stay (DV); **c'** represents the direct effect of centrality (IV) →intention to stay (DV) after controlling for the proposed mediator, **a** represents the effect of centrality (IV) on satisfaction (mediator), **b** represents the relation of satisfaction (mediator) to intention to stay (DV) adjusted for centrality (IV).

Next, I will report results for each of the four networks and subsequent valid mediated models for each centrality measure. I will only report findings for models that were statistically significant at a 0.05 level. For each statistically significant model, I will report the p-value, standardized beta coefficient, and r squared value. As previously noted, in every model satisfaction was always predictive of intention to stay and can be referenced above. I also present

statistically significant findings based on years of experience and whether a teacher is a math or social studies teacher where appropriate.

Finally, before providing results for each of my remaining research questions, I will briefly discuss my r squared values. In any linear regression the r squared value indicates the overall percentage of variance in the dependent variable that the independent variables explain collectively. On a scale ranging from 0 to 1 the r squared values measure the amount of variance explained in the constructed model. Across each of my models, the r squared value ranged from .09 to .11, with most of the regressions falling somewhere in the middle of these values. The reported r squared values are represented from the final regression that examines the centrality measures predictive value on satisfaction which is necessary for a mediation to occur. For my study, it was anticipated that my r squared value was going to be low due to model specification error. With a limited sample size (n=150) and a survey study, to have regressions that explain 11% variance it is evident that some of the models fit the data well. However, even with some of the lower r squared values, because, I only included centrality measures (engagement with resources), satisfaction (based on a cumulative satisfaction score) and made the decisions to only control for subject level and years of experience, explaining 9% to 11% of the variance, I have solid models that helps explain some factors contributing to teacher retention. Moreover, while I address several factors that also contribute to teacher retention in my literature review in Chapter 2: working conditions, stress, school characteristics and student characteristics, I had to narrow areas of focus in my regressions. In addition, after running regressions with other variables, many of the variables did not result in a statistically significant finding, and thus, were excluded from the final regressions.

Research Question 2

To what extent are the characteristics of a teacher's centrality within a school-site collegial resource network related to their satisfaction and intention to remain in the profession?

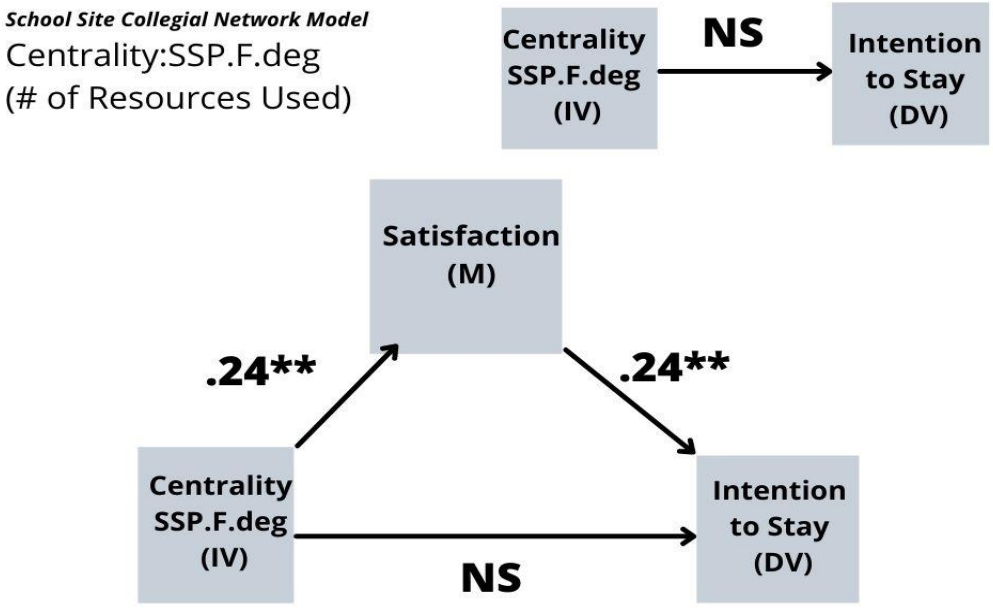
In this next section I will present statistically significant findings from the school-site collegial resource network (colleagues in our department, colleagues outside your department, department head, and instructional coach/mentor). In each of the reported models I controlled for subject area (math vs. social studies) as well as years of experience; however, I will only report information statistically from regressions that result in a statistically significant model. Original regressions also included gender and course level taught (advanced vs. regular) but have been excluded from final regressions because I did not find any statistically significant findings. In each of three school-site collegial resource network models, a valid mediation was evidenced for the identified centrality measure (Engagement, Frequency of Engagement, Quality of Engagement). In this network, the interaction or engagement, the frequency of the interaction and the quality of support from the interaction or engagement impact teachers' satisfaction and thus, teacher intention to stay in M-DCPS.

School-Site Collegial Network (Engagement with Resources)

The findings related to the school-site collegial resource network (Engagement with the Resources) is found in Figure 9. In the model, I examined the direct effect of satisfaction on the centrality measure and intention to stay, the direct effect of the centrality measure on intention stay, as well as the indirect or mediated effect of satisfaction on understanding how the centrality measure effects intention to stay through mediation. In this model, I am analyzing how a teachers' use of colleagues in their department, colleagues outside their department, their department head, and instructional coach/mentor impact their satisfaction and intention to stay in M-DCPS.

Figure 11

School Collegial Network Model Results



As can be seen in figure 11 the direct effect of a teacher's use of school site collegial resources (colleagues in our department, colleagues outside your department, department head, and instructional coach/mentor) on intention to stay was not statistically significant. The direct effect of a teacher's use of school site collegial resources on satisfaction was found to be statistically significant (β=.24**). In addition, the direct effect of satisfaction on intention to stay was also found to be significant (β=.24**). Moreover, because the two indirect effects were found to be statistically significant, the requirements for a mediation model were met with the centrality measure (SSP.F.deg- Engagement/ Resource Use). The direct effect of the centrality measure on intention to stay was not statistically significant in this model. The mediated or indirect effect for this model is (β=.06) and was calculated by (.24*.24). Overall, the mediated model, when accounting for the centrality measure (SSP.F.deg Engagement/ Resource Use),

Satisfaction, Years of Teaching and Subject Area) the model explains 9% of the variance. The previous model where the direct effect of just satisfaction was explored on intention to stay, the model explained 10% of the variance. Thus, when I compare the two regressions the centrality measure (SSP.F.deg Engagement/ Resource Use) does not explain more of the variance, however, it is important to still consider that centrality has shown to explain some of why teachers are satisfied.

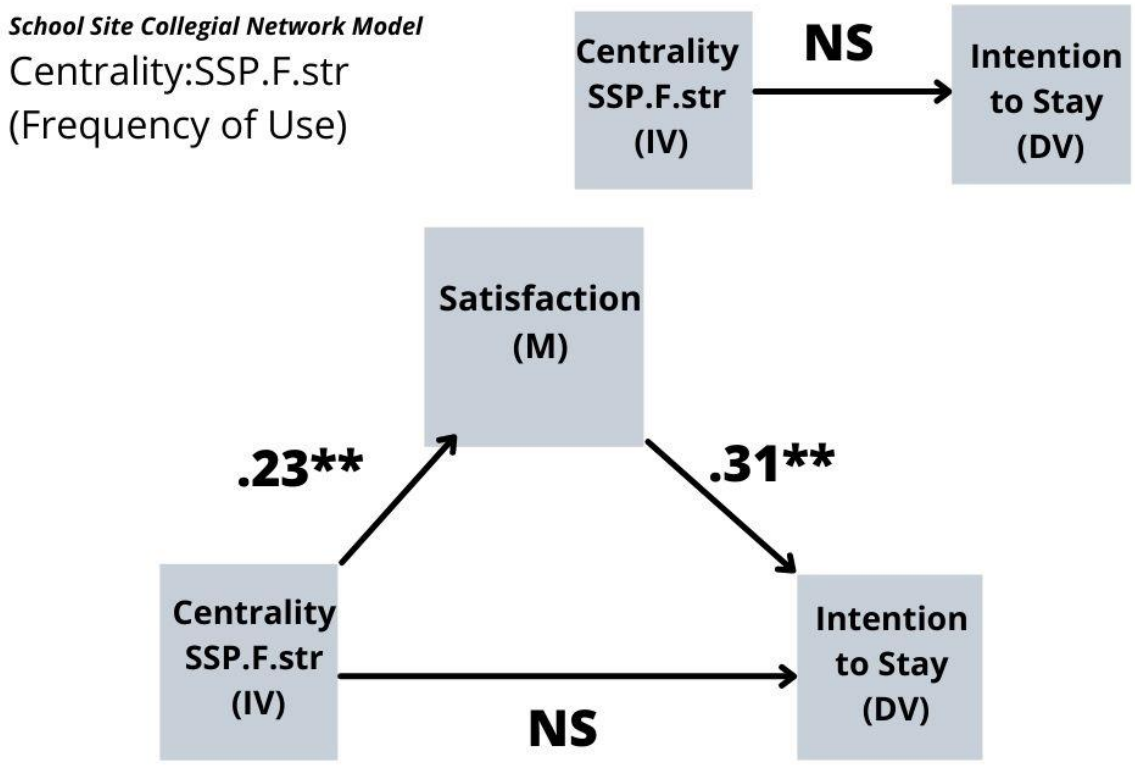
In this next paragraph I will report results as they are related to the control variables, years of teaching and subject area (math or social studies). In the regression where I am considering, the centrality measure, satisfaction as well as the controls, years of experience are positively associated with intention to stay (β=.22**). There is no statistically significant finding regarding subject area (math or social studies) in relation to intention to stay in this regression. In the final regression that is part of this mediation model in the school site collegial network where I am examining the relationship between engagement/resource use and satisfaction, I did not find any statistically significant findings in years of experience or subject area.

School-Site Collegial Network (Frequency of Engagement with Resources)

The findings related to the school-site collegial resource network (SSP.F.str-Frequency of Engagement) is found in Figure 12. In the model, I examined the direct effect of satisfaction on the centrality measure and intention to stay as well as the indirect or mediated effect of satisfaction on understanding how the centrality measure (Frequency of Engagement) predicts intention to stay through mediation.

Figure 12

School Site Collegial Network (Frequency of Engagement with Resources) Results



As can be seen in figure 12, direct the effect of a teacher's frequency of use of school site collegial resources (colleagues in our department, colleagues outside your department, department head, and instructional coach/mentor) on intention to stay was not statistically significant. The direct effect of the centrality measure on satisfaction was found to be statistically

significant (β=.23**). In addition, the direct effect of satisfaction on intention to stay was also found to be significant (β=.31**). Thus, the requirements for a mediation model were met with the centrality measure (SSP.F.str- Frequency of Engagement). The direct effect of the centrality measure on intention to stay was not statistically significant in this model. The indirect or mediated effect for the model was (β=.07**) and was calculated by (.23*.31). Overall, the mediated model with the centrality measure (SSP.F.str- Frequency of Engagement) explains 10% of the variance. However, the previous model where the effect of just satisfaction was explored on intention to stay, the model explained 10% of the variance. Thus, when I compare the two regressions the centrality measure (SSP.F.str- Frequency of Engagement) does not have an impact in explained variance.

In this next paragraph I will report results as they are related to the control variables, years of teaching and subject area (math or social studies). In the regression where I am considering, the centrality measure (SSP.F.str- Frequency of Engagement), satisfaction as well as the controls, years of experience are positively associated with intention to stay (β=.22**). There is no statistically significant finding regarding subject area (math or social studies) in relation to intention to stay in this regression. In the final regression that is part of this mediation model in the school site collegial network where I am examining the relationship between frequency of engagement with the resources and satisfaction, I did not find any statistically significant findings in years of experience however, being a math teacher is positively associated with teacher satisfaction when frequently interacting with school site collegial resources (β=.16*).

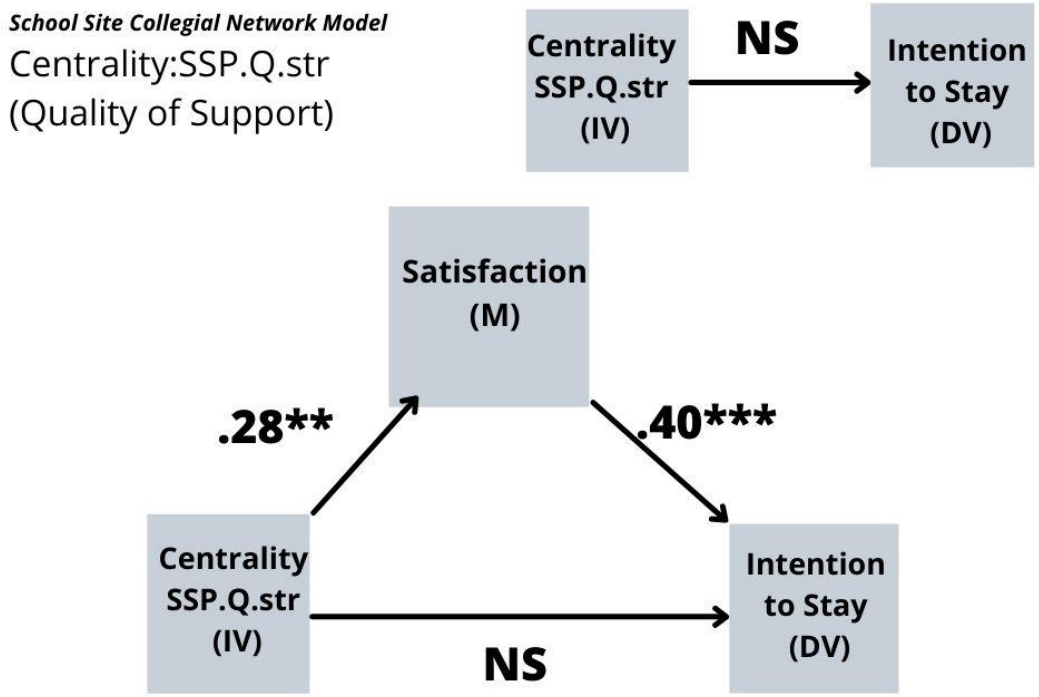
School Site Collegial Network (Quality of Engagement with Resources)

After considering the frequency in which teachers interact with school site collegial resources, I will report how the reported level of supportiveness of those interactions impact

participants intention to stay. The findings related to the mediating roles of satisfaction in the effect of the identified centrality measure (SSP.Q.str- Quality of Engagement with Resources) on intention to stay are presented in Figure 13.

Figure 13

School Site Collegial Network (Quality of Engagement with Resources) Results



As can be seen in figure 11, the direct effect of the quality of engagement with the resources that teachers reported from the school site collegial resources on intention to stay was not statistically significant. I found that the direct effect of the centrality measure on satisfaction was statistically significant (β=.28**). In addition, the direct effect of satisfaction on intention to stay was also

found to be statistically significant (β=.40***). Thus, the requirements for a mediation model were met when considering the quality of engagement with resources. The direct effect of the centrality measure on intention to stay was not statistically significant in this model. The mediated or indirect effect for this model is (β=.11) and was calculated by (.28*.40). Overall, the mediated model with the centrality measure (SSP.Q.str-Quality of Engagement with Resources) explains 15% of the variance. However, the previous model where the direct effect of just satisfaction was explored on intention to stay 10% of the variance was explained according to the model. Thus, the mediated model that included the quality of engagement within the school site collegial network explained about 50 percent more of the variance (a difference in 5 percentage points). In this model, the reported quality of supportiveness that teachers report when interacting with colleagues inside and outside of their department, the department head and/or an instructional coach or is impactful and provides an understanding of teachers reported intention to stay.

Finally, when I examine the control variables, years of teaching and subject area (math or social studies), in the regression where I am considering, the centrality measure, satisfaction as well as the controls, years of experience are positively associated with intention to stay (β=.20*) and math teachers have a negative association (β=-.16*) with intention to stay, when considering the quality of supportiveness from the interactions with colleagues inside and outside of their department, the department head and/or an instructional coach/mentor at the school site as well as how satisfied teachers reported that they are. In final regression that included in this mediation model, when understanding how the quality of interactions with colleagues inside and outside of their department, the department head and/or an instructional coach impact teacher satisfaction, years of teaching and being a math teacher are not statistically significant.

School-Site Collegial Network Summary

In summary of the findings for the school site collegial network, satisfaction mediates a relationship in each of models that used the centrality measures (SSP.F.deg Engagement/Use of the Resource), weighted degree frequency (SSP.F.str-Frequency of Engagement) and weighted degree quality (SSP.Q.str- Quality of Engagement) and intention to stay. Overall, in this network, a teacher's use of the resource and frequency with the collegial resources (colleagues inside and outside of their department, the department head and/or an instructional coach/mentor) at the school-site positively impacts their level of satisfaction and subsequently their reported intention to stay in M-DCPS. Additionally, the quality of the interactions between teachers and school site staff also positively impacts teacher satisfaction and their intention to stay. Furthermore, when I accounted for years of experience, considering that teachers with more years of experience reported being more satisfied (β=.20**), which will be true across all models and networks, when they engage with the colleagues inside and outside of their department, the department head and/or an instructional coach/mentor frequently, they are also more satisfied and more likely to stay in the profession (β=.22*). When controlling whether a teacher is a math or social studies teacher just with satisfaction and intention to stay there were no statistically significant associations. However, when accounting for the frequency of interaction with the colleagues inside and outside of their department, the department head and/or an instructional coach/mentor as well as satisfaction and years of experience math teachers are more satisfied and more likely to stay in M-DCPS than social studies teachers. There was no statistically significant difference when considering the quality of the engagement and years of experience, as well as satisfaction and intention to stay.

Research Question 3

To what extent are the characteristics of a teacher's centrality within a school-site administrative resource network related to their satisfaction and intention to remain in the profession?

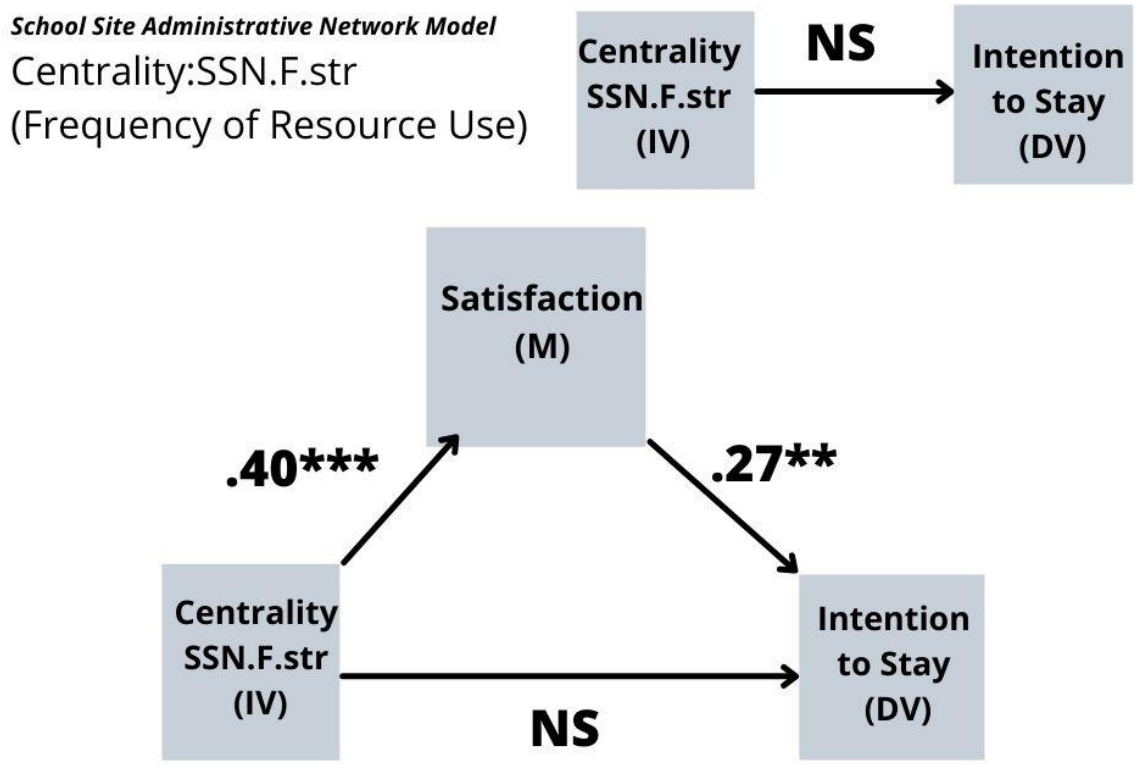
In this next section I will present the significant findings from the school-site administrative resource network. As previously noted, in each of the reported models I controlled for subject area (math vs. social studies) as well as years of experience; however, I will only report statistically significant variables from each of the regressions. Like in previous networks, original regressions in the school site administrative network, also included gender and course level taught (advanced vs. regular) but I made the decision to exclude them from final regressions because there was not a statistically significant significance. In two out of the three models in the school site administrative network a valid mediated model was evidenced and will be reported below.

School-Site Administrative Network (Frequency of Engagement with Resources)

The findings related to the mediating roles of satisfaction on the effect of the identified centrality measure (SSN.F.str- Frequency of Engagement) on intention to stay are presented in Figure 14.

Figure 14

School Site Administrative Network (Frequency of Engagement with Resources) Results



In this model, the effect of a teacher's frequency of use of school site administrative resources (Principal and Assistant Principal) on intention to stay was not statistically significant. The effect of the centrality measure on satisfaction was found to be statistically significant (β=.40***). In addition, the effect of satisfaction on intention to stay was also found to be significant (β=.27**). Thus, the requirements for a mediation model were met with the centrality measure (SSN.F.str- Frequency of Engagement). The effect of the centrality measure on

intention to stay (β=-.07) was not statistically significant in this model. The mediated effect for this model is (β=.11) and was calculated by (.40*.27). Overall, the mediated model with the centrality measure (SSN.F.str- Frequency of Engagement) explains 10% of the variance. However, the previous model where the effect of just satisfaction was explored on intention to stay, the model explained 10% of the variance. Thus, when I compare the two regressions the centrality measure (SSN.F.str- Frequency of Engagement) has limited additional explanatory power.

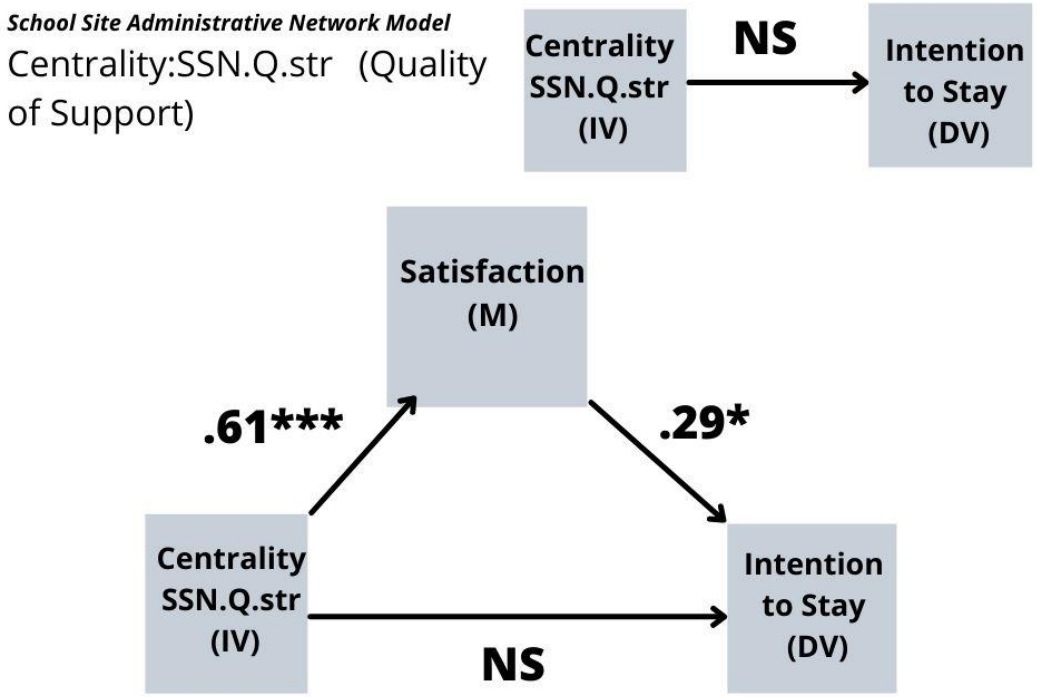
In this paragraph I will report results as they are related to the control variables, years of teaching and subject area (math or social studies). In the regression where I am considering, the centrality measure (SSN.F.str- Frequency of Engagement), satisfaction as well as the controls, years of experience are positively associated with intention to stay (β=.23**). In this regression math teachers have a negative association (β=-.17*) with intention to stay, when considering interactions with the assistant principal and principal at the school site as well as how satisfied teachers reported that they are. In the final regression that is part of this mediation model in the school site administrative network where I am examining the relationship between frequency of engagement with the resources and satisfaction, I did not find any statistically significant findings in years of experience or subject area (math or social studies).

School-Site Administrative Network (Quality of Engagement with Resources)

After considering the frequency in which teachers interact with the assistant principal and principal, I will report how the reported level of supportiveness of those interactions impacts participants intention to stay. The findings related to the mediating roles of satisfaction in the effect of the identified centrality measure (SSN.Q.str-Quality of Engagement) on intention to stay are presented in Figure 15.

Figure 15

School Site Administrative Network (Quality of Engagement with Resources) Results



As can be seen in figure 15, the direct effect of the quality of supportiveness that teachers reported from the use of school site administrative resources (Principal and Assistant Principal) on intention to stay was not statistically significant. The direct effect of the centrality measure on satisfaction was found to be statistically significant (β=.61***). In addition, the direct effect of satisfaction on intention to stay was also found to be significant (β=.29*). Thus, the requirements for a mediation model were met with the centrality measure (SSN.Q.str- Quality of Engagement). The direct effect of the centrality measure on intention to stay (β=-.07) was not statistically significant in this model. The mediated or indirect effect for this model is (β=.18)

and was calculated by (.61*.29). Overall, the mediated model with the centrality measure (SSN.Q.str- Quality of Engagement) explains 10% of the variance. In the model where the direct effect of just satisfaction was explored on intention to stay, the model also explained 10% variance, thus when comparing the effect of these variances, the centrality measure (SSN.Q.str-Quality of Engagement) results in a slight difference in the variance. In this model, the reported quality of supportiveness that teachers report when interacting with the assistant principal and principal provides an understanding of teachers reported intention to stay.

Finally, when I examine the control variables, years of teaching and subject area (math or social studies), in the regression where I am considering, the centrality measure, satisfaction as well as the controls, years of experience are positively associated with intention to stay (β=.23**) and math teachers have a negative association (β=-.18*) with intention to stay, when considering the quality of supportiveness from the assistant principal and principal at the school site. In final regression that is included in this mediation model, when understanding how the quality of interactions with the assistant principal and principal years of teaching are negatively associated (β=-.15*) and being a math teacher is positively associated (β=.13*).

School-Site Administrative Network Summary

In summary of the findings for the school site administrative network, satisfaction mediates a relationship between weighted degree frequency (SSN.F.str-Frequency of Engagement) and weighted degree quality (SSN.Q.str Quality of Engagement) and intention to stay. In this model the frequency in which a teacher engages with the administrative resources (assistant principal and principal) at the school-site positively impacts their level of satisfaction and subsequently their reported intention to stay in M-DCPS. Additionally, the quality of the interactions between teachers and school site administrators also positively impacts teacher

satisfaction and their intention to stay. Furthermore, when I accounted for years of experience, considering that teachers with more years of experience reported being more satisfied (β=.20**), which will be true across all models and networks., when they engage with the assistant principal and principal frequently, they are also more satisfied and more likely to stay in the profession (β=.23**). When I controlled for whether a teacher is a math or social studies teacher just with satisfaction and intention to stay there was no statistical significance, however when accounting for the frequency of interaction with the administration as well as satisfaction and years of experience math teachers are less satisfied and more likely to intend on leaving M-DCPS than social studies teachers. As teachers with more years of experience deem the quality of support from the engagements with assistant principal and principal high, then teachers are more satisfied (β=.23**).

Research Question 4

To what extent are the characteristics of a teacher's centrality within a district collegial resource network related to their satisfaction and intention to remain in the profession?

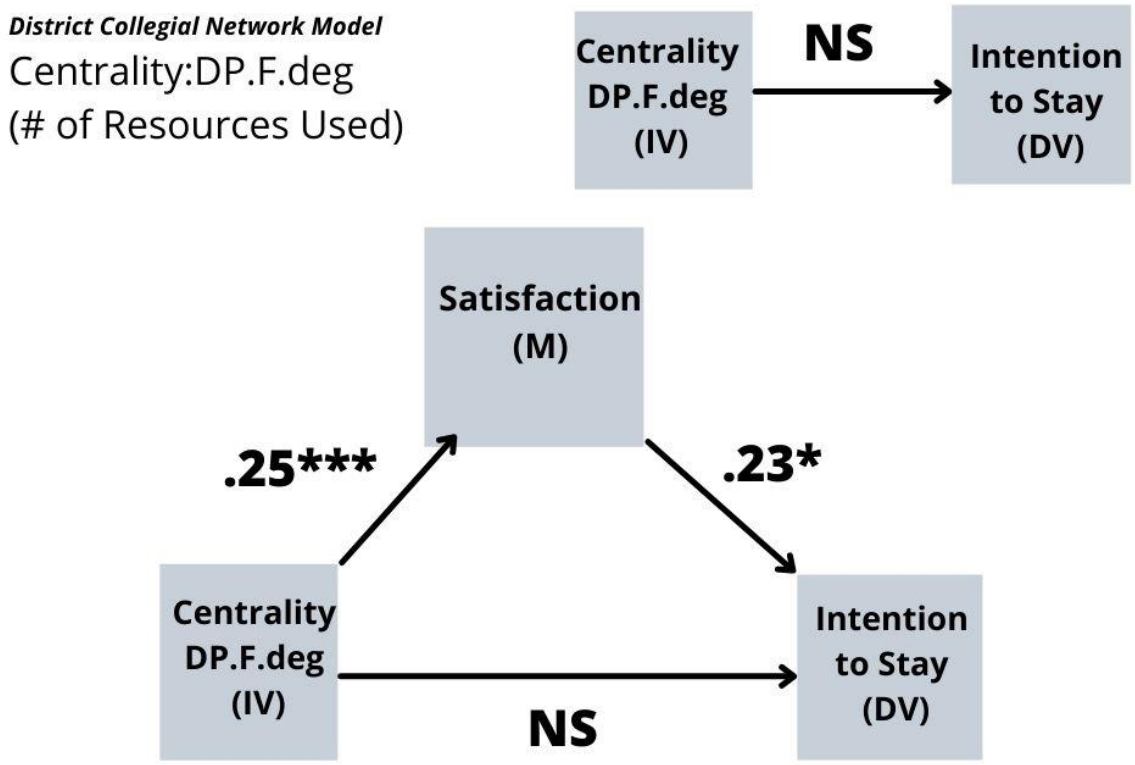
In this next section I will present the significant findings from the district collegial resource network. As previously noted, each of the reported models I controlled for subject area (math vs. social studies) as well as years of experience; however, I will only report statistically significant variables from each of the regressions. Original regressions also included gender and course level taught (advanced vs. regular) but have been excluded from final regressions because no statistical significance was found. All three of the models in this network were valid mediated models for the identified centrality measure.

District Collegial Resource Network (Engagement with Resources)

The findings related to the school-site collegial resource network (DP.F.deg-Engagement/Use of Resource) is found in Figure 16. In the model, I examined the direct effect of satisfaction on the centrality measure and intention to stay as well as the indirect or mediated effect of satisfaction on understanding how the centrality measure affects intention to stay through mediation.

Figure 16

District Collegial Network (Engagement with Resources) Results



As seen in figure 14, the effect of a teacher's use of district collegial resources (M-DCPS colleagues, AP/DE/AICE colleagues, M-DCPS workplace colleagues, M-DCPS Microsoft Teams colleagues) on intention to stay was not statistically significant. The effect of the centrality measure on satisfaction was found to be statistically significant (β=.23*). In addition, the effect of satisfaction on intention to stay was also found to be significant (β=.25***). Thus, the requirements for a mediation model were met with the centrality measure (DP.F.deg Engagement/Use of Resource). The direct effect of the centrality measure on intention to stay was not statistically significant in this model. The mediated or indirect effect for this model is (β=.06) and was calculated by (.23*.25). Overall, the mediated model with the centrality measure (DP.F.deg Engagement/Use of Resource) explains 10% of the variance. However, the previous model where the effect of just satisfaction was explored on intention to stay, the model explained 10% of the variance. Thus, when I compare the two regressions the centrality measure (DP.F.deg Engagement/Use of Resource) does not explain more of the variance.

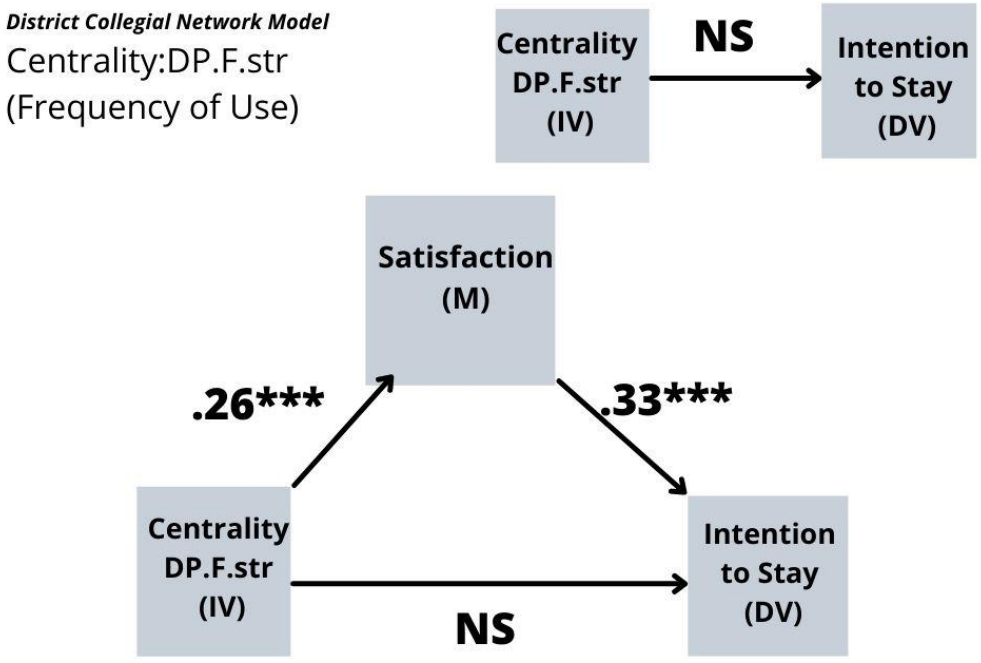
Next, I examined the control variables, years of teaching and subject area (math or social studies) in the regression for district collegial resources. In the regression where I considered, the engagement/use of the resource, satisfaction as well as the controls, years of experience are positively associated with intention to stay (β=.22**) and there was no statistically significant difference of math and social studies teachers' intention to stay, when considering interactions with district collegial resources. In the final regression in the mediation model for district collegial resources, when understanding how interactions with the collegial resources at the district impact teacher satisfaction, there is no statistical difference in years of experience or subject area.

District Collegial Resource Network (Frequency of Engagement with Resources)

The findings related to the district collegial resource network (DP.F.str-Frequency of Engagement) is found in Figure 17. In the model, I examined the direct effect of satisfaction on the centrality measure and intention to stay as well as the indirect or mediated effect of satisfaction on understanding how the centrality measure affects intention to stay through mediation.

Figure 17

District Collegial Network (Frequency of Engagement with Resources) Results



As seen in figure 17, the direct effect of a teacher's frequency of use of district collegial resources (M-DCPS colleagues, AP/DE/AICE colleagues, M-DCPS workplace colleagues, M-DCPS Microsoft Teams colleagues) on intention to stay was not statistically significant. The

effect of the centrality measure on satisfaction was found to be statistically significant (β=.26***). In addition, the direct effect of satisfaction on intention to stay was also found to be significant (β=.33**). Thus, the requirements for a mediation model were met with the centrality measure (DP.F.str- Frequency of Engagement). The direct effect of the centrality measure on intention to stay was not statistically significant in this model. The mediated or indirect effect for this model is (β=.09) and was calculated by (.26*.33). Overall, the mediated model with the centrality measure (DP.F.str Frequency of Engagement) explains 10% of the variance. However, the previous model where the effect of just satisfaction was explored on intention to stay, the model also explained 10% of the variance. Thus, when I compare the two regressions the centrality measure (DP.F.str- Frequency of Engagement) does not have an impact in calculated variance.

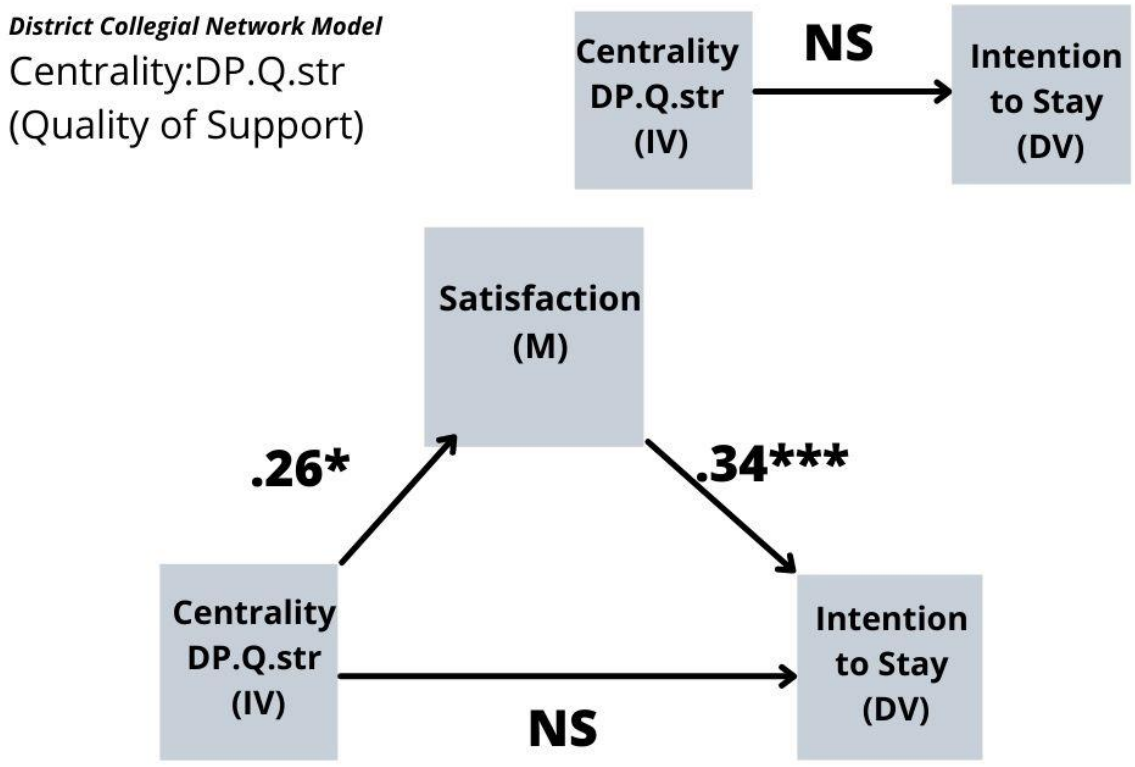
In this next paragraph, I will report results related to the control variables, years of teaching and subject area (math or social studies). In the regression where I am considering, the centrality measure, satisfaction as well as the controls, years of experience are positively associated with intention to stay (β=.22*) and there is no statistically significant difference in math and social studies teachers' intention to stay, when considering interactions with district collegial resources. In the final regression that is part of this mediation model in the district collegial network, when understanding how the frequency of interactions with the collegial resources at the district impact teacher satisfaction, there is no statistically significant difference in years of experience; however, being a math teacher is positively associated with teacher satisfaction when frequently interacting with school site collegial resources (β=.18*).

District Collegial Resource Network (Quality of Engagement with Resources)

After considering the frequency in which teachers interact with district collegial resources, I will report how the reported level of supportiveness of those interactions impacts participants intention to stay. The findings related to the mediating roles of satisfaction in the effect of the identified centrality measure (DP.Q.str-Quality of Engagement) on intention to stay are presented in Figure 18.

Figure 18

District Collegial Network (Frequency of Engagement with Resources) Results



As seen in this figure, the direct effect of the quality of supportiveness that teachers reported from the use of district collegial resources on intention to stay was not statistically

significant. The direct effect of the centrality measure on satisfaction was found to be statistically significant (β=.26*). In addition, the direct effect of satisfaction on intention to stay was also found to be significant (β=.34***). Thus, the requirements for a mediation model were met with the centrality measure (DP.Q.str- Quality of Engagement). The effect of the centrality measure on intention to stay was not statistically significant in this model. The mediated effect for this model is (β=.09) and was calculated by (.26*.34). Overall, the mediated model with the centrality measure (DP.Q.str- Quality of Engagement) explains 10% of the variance. The previous model where the direct effect of just satisfaction was explored on intention to stay, also explains 10% of the variance, thus when comparing the effect of these variances, the centrality measure (DP.Q.str- Quality of Engagement) does not results in a difference in the variance. In this model, the reported quality of supportiveness that teachers report when interacting with colleagues in the district is impactful and provides an understanding of teachers reported intention to stay.

Finally, when I examine the control variables, for this model, years of teaching and subject area (math or social studies), where I am considering, quality of engagement satisfaction as well as the controls, years of experience are positively associated with intention to stay (β=.22*) and math teachers had no statistically significant differences with intention to stay, when considering the quality of supportiveness from the interactions with district colleagues. In the final regression that is part of this mediation model, when understanding how the quality of interactions with M-DCPS colleagues, AP/DE/AICE colleagues, M-DCPS workplace colleagues, M-DCPS Microsoft Teams colleagues impact teacher satisfaction, years of teaching or being a math teacher are not statistically significant.

District Collegial Resource Network Summary

In summary of the findings in the district collegial network, satisfaction mediates a relationship between degree (DP.F.deg-Engagement/Use of Resource), weighted degree frequency (DP.F.str-Frequency of Engagement) and weighted degree quality (DP.Q.str- Quality of Engagement) and intention to stay. The model indicates that how often a teacher engages with the collegial resources (M-DCPS colleagues, AP/DE/AICE colleagues, M-DCPS workplace colleagues, M-DCPS Microsoft Teams colleagues) throughout the district positively impacts their level of satisfaction and subsequently their reported intention to stay in M-DCPS. Additionally, the quality of the interactions between teachers and district colleagues also positively impacts teacher satisfaction and their intention to stay. Furthermore, when I accounted for years of experience, considering that teachers with more years of experience reported being more satisfied (β=.20**), which will be true across all models and networks, when they engage with the colleagues throughout the district frequently, they are also more satisfied and more likely to stay in the profession (β=.22*). When controlling for whether a teacher is a math or social studies teacher just with satisfaction and intention to stay there was no statistically significant difference; however, when accounting for the frequency of interaction with the colleagues throughout the district as well as satisfaction and years of experience math teachers are more satisfied and more likely to stay in M-DCPS than social studies teachers. There was no statistically significant difference when controlling for years of experience and the quality of supportiveness of interactions, satisfaction, and intention to stay from the engagements with colleagues inside and outside of their department, the department head and/or an instructional coach/mentor.

Research Question 5

To what extent are the characteristics of a teacher's centrality within a district administrative resource network related to their satisfaction and intention to remain in the profession?

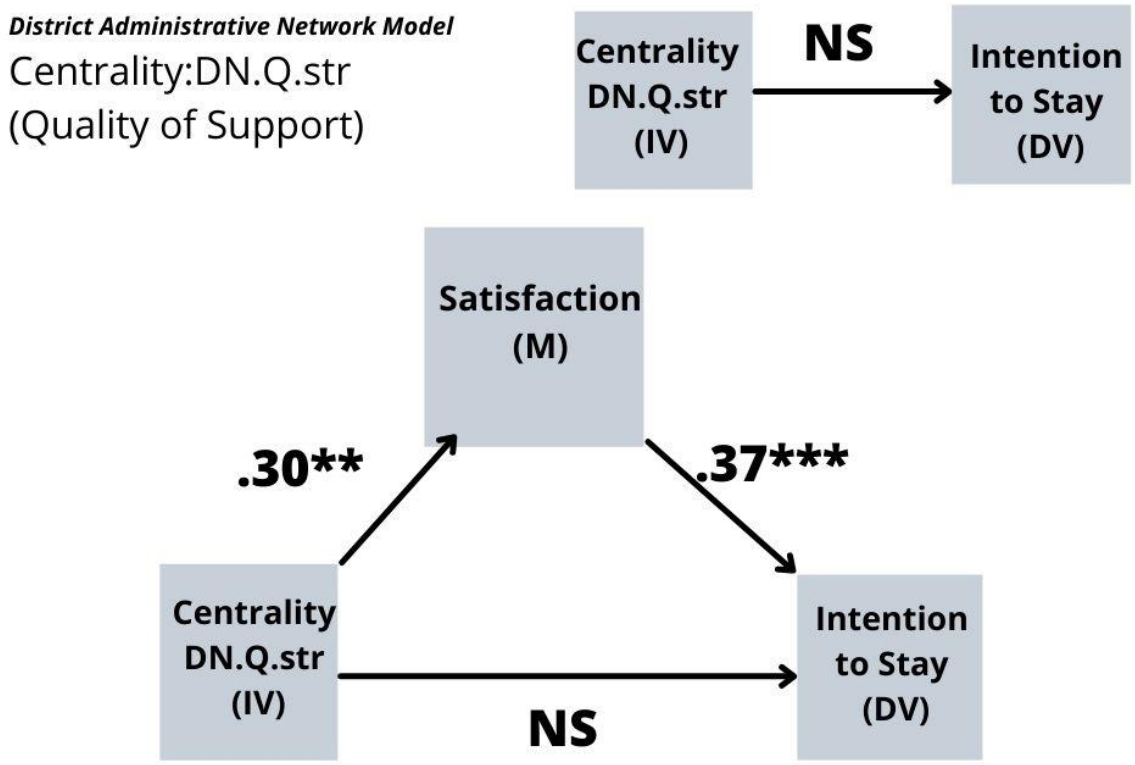
In this next section I will present the significant findings from the district administrative resource network. As previously noted, each of the reported models I controlled for subject area (math vs. social studies) as well as years of experience; however, I will only report statistically significant variables from each of the regressions. Original regressions also included gender and course level taught (advanced vs. regular) but have been excluded from final regressions because no statistical significance was found. In one of the models in the district administrative network a valid mediated model was evidenced.

District Administrative Resource Network (Quality of Engagement with Resources)

The findings related to the mediating roles of satisfaction on the effect of the identified centrality measure (DN.Q.str- Quality of Engagement) on intention to stay are presented in Figure 19.

Figure 19

District Administrative Network (Quality of Engagement with Resources) Results



As seen in figure 19, the direct effect of the quality of supportiveness that teachers reported from the use of district administrative resources (assigned district mentor, Instructional Supervisor, Curriculum Support Specialist) on intention to stay was not statistically significant. The direct effect of the centrality measure on satisfaction was found to be statistically significant (β=.30**). In addition, the direct effect of satisfaction on intention to stay was also found to be significant (β=.37***). Thus, the requirements for a mediation model were met with the centrality measure (DN.Q.str- Quality of Engagement). The direct effect of the centrality

measure on intention to stay was not statistically significant in this model. The mediated or indirect effect for this model is (β=.11) and was calculated by (.30*.37). Overall, the mediated model with the centrality measure (DN.Q.str- Quality of Engagement) explains 11% of the variance. The previous model explained 10% of the variance where the direct effect of just satisfaction was explored on intention to stay, thus when comparing the effect of these variances, the centrality measure (DN.Q.str- Quality of Engagement) results in a 1% percentage point difference in the variance. In this model, the reported quality of supportiveness that teachers report when interacting assigned district mentor, Instructional Supervisor, Curriculum Support Specialist is impactful and provides an understanding of teachers reported intention to stay.

Finally, I will report results related to the control variables for the district administrative network, years of teaching and subject area (math or social studies). In the regression where I am considering, the quality of engagement with the resources, satisfaction, as well as the controls, years of experience are positively associated with intention to stay (β=.22*) and math teachers were not statistically significant with intention to stay, when considering the quality of supportiveness from the interactions with an assigned district mentor, Instructional Supervisor, Curriculum Support Specialist at the district as well as how satisfied teachers reported that they are. In the final regression that is part of this mediation model, when understanding how the quality of interactions with an assigned district mentor, Instructional Supervisor, Curriculum Support Specialist years of experience or subject area, there is once again no statistically significant finding.

District Administrative Resource Network Summary

In summary of the school site administrative network, satisfaction mediates a relationship between weighted degree quality (DN.Q.str Quality of Engagement) and intention to stay. The

quality of the interactions between teachers and district administrators also positively impacts teacher satisfaction and their intention to stay. Furthermore, when I accounted for years of experience, considering that teachers with more years of experience reported being more satisfied (β=.20**), which will be true across all models and networks, when they engage with an assigned district mentor, Instructional Supervisor, Curriculum Support Specialist and find that interaction supportive they are also more satisfied and more likely to stay in the profession (β=.22*).

Summary of Valid Mediated Models

Across each of the four resource networks at the school site and district there were nine valid mediated models. Teachers' engagement with and the frequency of use as well as the quality of the interactions have varying impacts on teachers' satisfaction levels and subsequently their intention to stay. For each network, I summarize the results by reporting the standardized beta coefficient values that represent the two direct effects of satisfaction on intention to stay and then centrality measure on satisfaction. Each of these two direct effects were then multiplied to calculate the effect size of the indirect or mediated effect.

In the school site collegial resource network, when teachers engage with collegial resources they are more satisfied (β=.24*,β=.24**), and the more that teachers use resources in this network, the more satisfied teachers are (β=.23*, β=.31**), and the more supportive these interactions are, the more satisfied teachers are (β=.28*, β=.40 ***), and the more likely they are to stay in the profession. The effect sizes in the school site collegial network range from .06 to .11. In the school site administrative network, the frequency of engagement (β=.27*, β=.40***) as well as the quality or supportiveness of these interactions (β= .29**, β=.61***) teachers are

more satisfied and more likely to stay in the profession. The effect sizes in the school administrative network range from .11 to .18.

In the district collegial resource network when teachers engage with collegial resources they are more satisfied (β=.25***,β=.23*), and the more that teachers use resources in this network, the more satisfied teachers are (β=.26***, β=.33**), and the more supportive these interactions are, the more satisfied teachers are (β=.26*, β=.34***), and the more likely they are to stay in the profession. The effect sizes in the school site collegial network range from .06 to .09. In the district administrative network, the quality or supportiveness of these interactions (β= .30**, β=.37***) teachers are more satisfied and more likely to stay in the profession. The effect size in the district administrative network is .11.

In each of the four networks when calculating the direct effect of satisfaction on centrality while also controlling for the centrality measure and the control variables, years of teaching and subject area, years of teaching are consistently significant across all of the valid mediated models (β= .20* to .23**). In three of the valid mediated models (SSN.F.str-Frequency of Engagement, SSN.Q.str-Quality of Engagement, and SSP.Q.str-Quality of Engagement) math teachers' engagement and frequency of engagement in the school site administrative network, indicates a negative relationship (β=-.18*, β=-.17*), meaning that the more math teachers interact with school site administrative resources the less satisfied they are and may therefore have a lower reported intention to stay. In the school site collegial network, based on the quality of supportiveness of interacting with school site resources, also indicates a negative relationship (β=-.16*) that impacts math teachers' satisfaction and intention to stay in the profession.

When calculating the direct effect of the centrality measure on satisfaction a few additional statistically significant findings were evidenced for the control variables. In the school site administrative network, when teachers with more years of experience, engage with the assistant principal and principal and I consider the quality of that support, years of teaching has a negative relationship (β=.15*), which may contribute to lower levels of satisfaction. Within this direct effect, math teachers when the support is positive (β=.13*), they are more satisfied when they interact with these same resources. Finally, when math teachers frequently engage with resources at the school site collegial level, they are more satisfied (β=.16*).

In each of these models, intention to stay is indirectly predicted by the centrality measure through the mediator of satisfaction. A summary of each of the valid mediated models with the direct and indirect effects can be seen in Table 16.

Table 16

Mediated Models Data Summary

Centrality Measure	R^2	p.	β (Sat~Int2Stay).	YearsExp.β	Subjectβ	β (Cent~Sat)	ES
School Site Collegial Use	.09	.004	.24**	.22**	NS	.24**	.06
School Site Collegial Freq. of Use	.10	.003	.23**	.22*	NS	.31**	.07
School Site Collegial Qual. of Use	.10	.003	.28**	.20*	-.16*	.40***	.11
School Site Admin. Freq. of Use	.10	.004	.27**	.23**	-.17*	.40***	.11
School Site Admin. Qual. of Use	.10	.003	.29**	.23**	-.18*	.61***	.18
District Collegial Use	.10	.002	.25***	.22**	NS	.23*	.06
District Collegial Freq. of Use	.10	.003	.26***	.22*	NS	.33***	.09
District Collegial Qual. of Use	.10	.003	.26*	.22*	NS	.34***	.09
District Admin. Qual. of Use	.11	.009	.30**	.22**	NS	.37***	.11

The effect sizes for each of the valid mediated models ranged from .06 to .18. The mediated effects across each of these models highlight how satisfaction, the mediator impacts centrality measures (IV) and intention to stay (DV). These effect sizes are considered medium effect sizes. The highest effect sizes center around the quality of supportiveness that teachers experience from engagement with resources, and this is true across each network. The frequency in which teachers interact plays a role in teachers' satisfaction and their intention to stay in the profession.

Summary

Throughout this chapter, I have reported the statistically significant findings of the data that I gathered. I began the chapter by providing the network descriptives for each of the four networks, school site collegial, school site administrative, district collegial and district administrative. I reported the number of nodes, edges, and density of each of the networks. I then reported how teachers engaged with resources as measured by centrality. I reported results on how teachers engaged with the resources both socially and materially. I reported both the direct and indirect connections that teachers had with the resources.

I then moved into an examination of the cumulative scores for both satisfaction and intention to stay. I assumed a single factor structure that was supported by exploratory factor analysis (EFA). I then conducted a confirmatory factor analysis, and while the analysis suggests that the factorial structure is more complex than a single structure, for the sake of simplicity, I made the decision to proceed with the single factor structure. I keep this in mind in my interpretation of the models given the limitations that this creates in Chapter 5.

I then reported my results from the permutated t-tests for each network. I reported differences in the way that teachers engage with the identified resources across teacher

subject area, across teacher course level (advanced or regular), and gender. I then used a series of mediated models to test the relationship between satisfaction and intention to stay. I reported the results from testing the mediated models and indicated which models were valid based on whether teachers' engagement with resources was predictive of satisfaction and indirectly of intention to stay. In each of the models, as previously reported, satisfaction is always predictive of intention to stay at two or three stars.

Then, I reported results for each of the four networks and subsequent mediated models for each centrality measure. I only reported findings for models that were significant at a 0.05 level. For each significant model, I reported the p-value, lm beta, R squared and effect sizes. As previously noted, in every model satisfaction was always predictive of intention to stay and thus, will not be reported for each of the individual models. A summary of the centrality measures, predictions, and p-values and R^2 values were also reported for each network. I completed the reporting of my results by providing the effect size of the mediated models.

In Chapter 5 I will interpret the results of the data reported here as well as any implications my data has for research and theory, implications for practice and the limitations of my research.

Chapter 5: Discussion and Implications

Summary of Study

The problem of practice I investigated was teacher engagement with resources at the school-site and district level and how engagement with resources predicted teacher satisfaction and intention to stay in the profession. To understand how teachers engaged with the resources within each network, two measures of interaction were captured, (1) frequency of interaction with the resources within the network; and (2) the quality of supportiveness of resources within the network. This chapter begins by summarizing this study and providing important findings resulting from this quantitative data analysis. The chapter will conclude with implications for research as well as practice and limitations of the study.

Social network theory and social network analysis were used to guide my study. I began my quantitative research by creating a survey which was made up of the Intent to Stay Scale (Price and Mueller, 1986), survey items on satisfaction from the NCES Schools and Staffing Survey, homegrown questions on frequency and supportiveness of resources, questions which addressed teachers' feelings on COVID-19 and how the pandemic affected their intent to stay M-DCPS. The survey concluded with a series of demographic questions that were used as control variables, including current teaching assignment, gender, and years of experience.

I received a database from the Office of Human Resources in M-DCPS and I used the database to send a survey invitation to 967 math and social studies teachers at the secondary level. The 967 teachers represent a census of math and social studies teachers across the district. I conducted my study during a unique time in the field of education and a unique beginning to a new school year within M-DCPS. I launched my survey on October 1, 2020 and closed it on November 1, 2020. After deleting cases with missing information that was vital to survey results, I had a total of 150 cases who completed enough response to be included in the construction of

networks, however, I had 130 cases of individuals that also completed important demographic information used as part of my control variables.

I approached measures of teachers' "intention to stay" and "satisfaction" as latent constructs measured by a set of 4 items and a set of 10 items, respectively. For the sake of simplicity, I assumed a single factor structure which was supported by exploratory factor analysis (EFA), capturing 56% of the variance for "intention to stay" and 30% of the variance for "satisfaction", though confirmatory factor analysis suggests that the factorial structure of the items is more complex. I keep this in mind in my interpretation of the models given the limitations that this creates. The collection of data through surveys between secondary math and social studies teachers was compared through a program called R Studio. The statistical procedures that were utilized to analyze the data included T-tests, linear regression techniques, permutation correlation tests, and factor analyses. Finally, a series of mediated models were created to test the relationship between satisfaction and intention to stay through mediation analysis.

In the next section of this chapter, I will provide a summary of my findings and how teachers' engagement with certain resources at the school-site and district-level predict teacher satisfaction and intention to stay.

Reporting on Findings (COVID-19)

My study was conducted during a global pandemic and to acknowledge potential impacts this may have had, I asked teachers about how they felt about COVID-19 and their intention to leave M-DCPS. When asked if they had considered leaving the teaching profession during the COVID-19 pandemic, the result indicated that 38% of teachers strongly agreed or agreed, 43% strongly disagreed or disagreed and 19% were neutral. Next, when teachers were asked if they

were more likely to leave the teaching in M-DCPS because of their experience during the COVID-19 pandemic, 38% strongly agreed or agreed, 42% strongly disagreed or disagreed and 20% were neutral.

Discussion of Findings

As explained in Chapter 1, researchers have stated that teachers leave the profession for a myriad of reasons. Researchers have identified the following factors as contributing to teacher attrition: job satisfaction (Judge, Thorensen, Bono & Pattonl, 2001; Skaalvik & Skaalvik, 2011); working conditions, school culture, and student characteristics (Boyd et al., 2011; Chiong, Menzies, & Parameshwaran, 2017; Wang, Li, Lou and Zhang, 2020); support (Buchannan, 2010; Lerang, Ertesvag, & Virtanen, 2021; Sparks et al. , 2017); professional development and mentoring (Bressman, Winter & Efron, 2018); and school administration (Boyd, Grossmman, Lankford, Loeb & Wyckoff, 2011). Based on the varying reasons for leaving the profession, I conducted my study to examine how these potential issues impacted math and social studies teachers at the secondary level within M-DCPS as well as years of experience. Table 18 provides a summary of each of the findings that were reported in Chapter 4. The description of the finding highlights the network, control variables and the research question that the finding is affiliated with.

Table 18

Summary of Findings

Network Characteristics	
Finding 1:	School site administrative networks are the densest networks teachers report using (97%). School site networks both collegial and administrative are denser than district resource networks
Satisfaction and Intention to Stay	
Finding 2:	Mean satisfaction for teachers is 3.12, the highest reported satisfaction is 4 and lowest is 1.8. Overall math and social studies teachers in M-DCPS are more satisfied than not.

Finding 3: Mean intention to stay score is 3.44. Teachers are more likely to intend to stay than leave; however, with a max score of 5, it is evident that several math and social studies teachers may want to leave M-DCPS.

Permutated T-Tests Across Networks

Finding 5: In the school site collegial network, men had a higher mean engagement with their school site collegial network than women.

Finding 6: In the school site administrative network, advanced academic teachers had a higher mean engagement with their school site administrative network than regular teachers.

Finding 7: In the district collegial resource network, advanced academic teachers had a higher reported quality of mean engagement with their district collegial network than regular teachers.

Finding 8: In the district collegial resource network, social studies had a higher mean engagement than math teachers.

Finding 9: In the district collegial resource network, the frequency of engagement highlighted that social studies teacher more frequently engage with resources in this type of network than math teachers.

Finding 10: In the district administrative network, men had a higher mean engagement with their district administrative network than women.

Mediation Analyses

Finding 11: There were no direct effects across the twelve models (3 models for each of the four networks) between how math and social studies teachers engaged with resources and intention to stay in M-DCPS.

Finding 12: Satisfaction is always directly predictive of intention to stay in M-DCPS (β=.26, p= .001**).

Finding 13: When analyzing the relationship between satisfaction and intention to stay in M-DCPS, years of teaching is positively associated with satisfaction (β=.20*), meaning the more years a participant had in profession the more satisfied they were and thus likely to intend on staying in M-DCPS.

Finding 14: Teachers' engagement with and the frequency of use as well as the quality of the interactions have varying impacts on teachers' satisfaction levels and subsequently their intention to stay in M-DCPS across all four networks (9 valid mediated models).

Finding 15: In the school site collegial resource network, when teachers engage with collegial resources they are more satisfied (β=.24*,β=.24**), and the more that teachers use resources in this network, the more satisfied teachers are (β=.23*, β=.31**), and the more supportive these interactions are, the more satisfied teachers are (β=.28*, β=.40 ***), and the more likely they are to stay in M-DCPS.

Finding 16: In the school site administrative network, the frequency of engagement (β=.27*, β=.40***) as well as the quality or supportiveness of these interactions (β= .29**, β=.61***) teachers are more satisfied and more likely to stay in M-DCPS.

Finding 17: In the district collegial resource network when teachers engage with collegial resources they are more satisfied (β=.25***,β=.23*), and the more that teachers use resources in this network, the more satisfied teachers are (β=.26***, β=.33**), and the more supportive these interactions are, the more satisfied teachers are (β=.26*, β=.34***), and the more likely they are to stay in M-DCPS.

Finding 18: In the district administrative network, the quality or supportiveness of these interactions (β= .30**, β=.37***) teachers are more satisfied and more likely to stay in M-DCPS.

Finding 19: In three of the valid mediated models (SSN.F.str, SSN.Q.str, and SSP.Q.str) math teachers' engagement and frequency of engagement in the school site administrative network, indicates a negative relationship (β=-.18*, β=-.17*), meaning that the more math teachers interact with school site administrative resources the less satisfied they are and may therefore have a lower reported intention to stay in M-DCPS.

Finding 20: In the school site collegial network, based on the quality of supportiveness of interacting with school site resources, also indicates a negative relationship (β=-.16*) that impacts math teachers' satisfaction and intention to stay in M-DCPS.

Finding 21: In the school site administrative network, when teachers with more years of experience, engage with the assistant principal and principal and I consider the quality of that support, years of teaching has a negative relationship (β= -.15*), which may contribute to lower levels of satisfaction. Within this direct effect, math teachers when the support is positive (β=.13*), they are more satisfied when they interact with these same resources. It was also evidenced that when math teachers frequently engage with resources at the school site collegial level, they are more satisfied (β=.16*).

The first findings in my study addressed network characteristics between school sites and district resources. As expected, the densest networks are at the school site, with 97% and 83% utilization of resources administratively and collegially. Understanding the density of each network, I was able to see how connected the network was compared to how connected it could be. School-sites are much more connected than district networks. Teachers are very connected to the school site administrative network that consists of the Assistant Principal(s) and Principal of the school. This finding is also not surprising as instructional leaders of the building, there is an expectation that they will interact with staff. However, what this finding does not reveal is whether those interactions impact teachers' levels of satisfaction and their intention to stay in the profession.

In further review of each of the networks presented in figures 3-6 in Chapter 4, teachers engage with a myriad of resources at the school site and district level. In the school site collegial resource network teachers most frequently engage with colleagues inside of their department. It has been my experience that at any given school site, teachers tend to communicate with individuals that are part of their departments. Typically, department members share hallways

and often have department meetings that create a space for exchange of information and resources. Also, within this network, teachers do engage with colleagues outside of their department but not as frequently. In the school site collegial network, the department head and instructional coach/mentor are not as frequently used but do have several ties, indicating that they are engaged with. These findings are congruent with my experiences as a teacher and administrator in M-DCPS.

In the school site administrative network, I see a very different network construction. The assistant principal and principal of the school site are engaged with most teachers. This makes sense. As a teacher there are several reasons you might engage with your school site administration. Later I will discuss, in this network, that it is the quality of the engagement in this network that really has an impact on teacher satisfaction and their intention to stay in M-DCPS.

In the district collegial resource network, I want to make note of an interesting but not unexpected finding. In this network, colleagues that are AP, IB, AICE or DE, indicate a frequent engagement by teachers in this network. As a former advanced placement and dual enrollment teacher, I can attest to this frequent use. I often relied on teachers that taught the same subject as me but at a different school site for resources and creative ideas. At the school site, I was the only one that taught the advanced course, so I had to turn to others outside of my building. I can say wholeheartedly that if it were not for teacher colleagues, I would not have become the teacher that I did, they were integral to my satisfaction and desire to continue to grow within M-DCPS. I also found in this network, that some teachers did engage with colleagues outside their school-site in general, but not as frequently as teachers engaged with advanced academic colleagues. In addition, I found that the engagement with Microsoft Teams was not as frequent

as other resources in this network, which does bring forth interesting conversations with the district about on-line platforms designed to allow teachers to interact with one another.

Finally, in the district administrative network, I found the most spread-out network of engagement with these resources. The district administrative network consists of an assigned district mentor, a curriculum support specialist and an instructional supervisor. The reason the density in this network is clearly lower than other networks is because not every school site teacher would have the opportunity to necessarily engage with these resources. Assigned mentors in M-DCPS from the district are typically from advanced academics. Regular teachers would be assigned a mentor at their respective school site and not the district. Also, because a CSS and IS serve multiple lower performing schools as part of the educational transformation office, the frequency of engagement would be a lot less, because they support teachers across the district and not one school site.

The next set of findings are related to teachers' cumulative satisfaction and intention to stay scores. The mean satisfaction score for teachers in my study was 3.12, on a scale of 1 to 4, with a maximum reported score of a 4.0 indicating that at least one teacher (n=130) reported the highest possible level of satisfaction. Examining satisfaction scores overall from the respondents in this study, math and social studies teachers are mostly satisfied. However, the 3.12 overall mean does indicate that teachers are not completely satisfied being a teacher in M-DCPS. It is quite possible that teachers reported satisfaction was lower because I launched the survey during the COVID-19 pandemic. I will discuss the impact of COVID-19 in more detail later in this chapter. The distribution of intention to stay resulted in a mean of 3.44 on a scale of 1 to 5, indicating that teachers are more likely to stay than leave (n=129). While intention to stay is tilted toward wanting to stay, M-DCPS must still be concerned that several teachers who are

currently employed as a math or social studies teacher at the secondary level, are reporting an intent to possibly leave the profession. In a district that is already struggling to retain teachers, M-DCPS must develop a new and creative way to recruit and retain qualified individuals so student achievement can be maintained and enhanced. As reported by Boyd (2005), high rates of teacher turnover have some of the greatest effects on urban and low-achieving schools which directly supports some of the demographics of M-DCPS.

Overall Satisfaction and Intention to Stay

As previously stated, this study reveals that most teachers in M-DCPS are more satisfied than not satisfied in the profession. Most teachers reported being satisfied on the satisfaction scale. However, with an average of 3.12, being closer to 3 than the max score 4, does indicate that some teachers are not satisfied. Thinking about the circumstances contributing to teacher satisfaction, the pandemic is the most obvious. Teachers were forced to pivot from virtual teaching to brick in mortar with limited time to adjust. My decision to launch the survey at this moment of transition may have increased the number of teachers reporting a lower satisfaction rating.

I would be remiss if I did not discuss some of the survey questions that were used to calculate the cumulative satisfaction score. Satisfaction questions asked teachers to think about administration, student behavior, salary, available resources, cooperation, recognition, support, and job security to highlight a few. These measures of satisfaction are consistent with previous research on contributing factors to teacher satisfaction. For example, variables such as administrative support, school discipline, collegial relationships, class size, overall quality of facilities, compensation and assigned roles contribute to teachers reported satisfaction (Horng, 2009; Liu & Ramsey, 2008; Staufer & Mason, 2013) The math and social studies teachers in M-

DCPS that responded to this survey were on the higher end of the satisfaction scale, emphasizing the importance of these factors in contributing to satisfaction and subsequently intention to stay in M-DCPS. Moreover, because I decided on single-factor analysis, for this study, I am not pinpointing which factors specifically contribute to dissatisfaction but look at the factors on a cumulative level. Teachers in M-DCPS need more support and encouragement from school site administration and want to be in schools where colleagues are supportive, and teachers are recognized for a job well done. Teachers want improved policies for student misbehavior and routine duties. Teachers may also feel the pressures of student performance and lack of parental support.

Teachers are faced with a myriad of pressures internally and externally and it is undoubtedly impacting their level of satisfaction. Additionally, while confronting a global crisis on teacher retention, it is important to think about ways to increase teacher satisfaction. As noted by numerous researchers and also confirmed in this study, satisfaction is predictive of intention to stay; therefore, as educators we must find ways to enhance teacher satisfaction (Buchannan, 2010; Judge, Thorensen Bono & Pattonl, 2001; Skaalvik & Skaalvik, 2011). I know based on the results from this research that engagement with resources across the four networks impacts satisfaction and satisfaction predicts intention to stay. Additional ideas will be discussed in the implications section of this chapter regarding what steps might be taken to increase satisfaction and teacher retention rates.

Discussion of Findings: Comparing Control Variables (Satisfaction and Intention to Stay)

The next area of findings highlights the diverse ways that teachers engage with identified resources across teacher subject area, across teacher course level (advanced or regular), and gender. While using a series of permutated t-tests there were no differences between math and

social studies teachers, men or women or advanced or regular teachers on how they engaged with resources, their level of satisfaction or intention to stay in the school site collegial or administrative resource network. Sims (2018) found that gender had no effect on job satisfaction, so this finding is not particularly surprising. Toropova, Myrberg and Johannsson (2021), explained in their study on teacher job satisfaction and teacher characteristics that there is a lot of debate on gender and job satisfaction. However, Poppleton and Riseborough (1990) found that women were more satisfied with teaching then men. In my study, when measuring for intention to stay, there was no statistical significance when comparing female teachers and male teachers; however, I believe with a larger sample size this could be a potential confounding factor to examine around issues of teacher retention. Mills, Martino, Lingard (2004), argued that the status of the teaching profession, in general, contributed to less male teachers in the profession. The career trajectory for men and women can be quite disparate with male teachers riding the proverbial "glass escalator" (Weaver-Hightower, 2011, p. 98). The idea of gender and teacher retention is an opportunity for further study, as the feminization of the profession is commonplace, especially at primary levels, however, this is outside the scope of this study.

It is also explained by Toropova, Myrberg and Johannsson (2021), that teacher subject-matter may influence job satisfaction and explained that math and science teachers are more likely to leave the profession. My findings are inconclusive regarding this concept when considering engagement with resources at the school site and district and satisfaction and intention to stay. I am of the belief that with a larger sample size, it may be more feasible to report significant findings on math teachers and their reported satisfaction and subsequent intent to stay in the M-DCPS. Ingersoll and Perda (2010), stated that one of the main reasons math teachers leave the profession was due to dissatisfaction with aspects of their schools. This is

important to note, since, later in my mediation analyses that I will discuss, when math teachers had a higher engagement with the assistant principal and principal, they were less satisfied and reported a lower intention to stay in M-DCPS. Similarly, when math teachers engage with school site collegial resources, the quality of supportiveness impacts math teachers' satisfaction and intention to stay in M-DCPS. Chen, Frank, Garner, and Horn (2004) noted that the collegial ties that a teacher has supports information sharing and influences the transfer of information augmenting a teacher's learning, and further creating a sense of connectedness.

In further examination of the dissatisfaction of math teachers outside of just engagement with varying resources, one explanation for math teachers being less satisfied than social studies teachers is due to testing accountability pressures in mathematics. While I did not ask respondents specifically what course they taught, math teachers have two areas of accountability in the state of Florida, Algebra and Geometry. Additionally, Algebra in the state of Florida is a graduation requirement for students adding another layer of pressure on math teachers. Social studies teachers who teach US History do have an end-of-course exam, however, the exam is not tied to graduation and accounts for 30% of a student's final grade. Hahs-Vaughn and Scherff (2008), found that professional strains affiliated with high-stake testing may lead to teacher turnover. Valli and Buese (2007), suggested that a teacher's workload has increased because of standard testing. Farber (2010) when schools and districts exceed expectations of accountability, this is often at the expense of a teacher's commitment to the profession. It would seem even from the small sample size of my study, the results that have been found, support previous research and suggest that a math teachers' level of dissatisfaction could potentially be tied to accountability tests associated with the profession.

While there are no statistically significant findings to report regarding advanced academic teachers and regular teachers on their mean satisfaction without considering their engagement with resources, I believe that with a larger sample size differences could be possible. Moreover, I also believe that this is an understudied area of research that may provide different solutions for combatting teacher retention in large urban school districts like M-DCPS. One of the potential explanations for a higher level of satisfaction for advanced teachers is that advanced teachers typically have more well-behaved and higher performing students. As noted by Boyd, Lankford, Wyckoff, Grossman and Loeb (2009), teachers are more apt to stay in schools where the school and students have higher achievement levels. It is further explained that teachers of lower-performing students within the first two years of teaching at a school may decide to leave (Boyd, Lankford, Wyckoff, Grossman, & Loeb, 2009). Advanced academic students have GPA (Grade Point Average) and testing requirements to meet the eligibility criteria for certain courses. Also, advanced academic teachers have additional systems of support through local Universities, Cambridge International and College Board that may impact their satisfaction levels. As a teacher of advanced academics for thirteen years and another five years of experience as an administrator over advanced academics, the systems of support that I acquired at the school-site, district and even national level contributed staunchly to my level of satisfaction and continued to desire to remain in the profession.

Discussion on Permutated T-Test Results

After comparing advanced academic/regular, math/social studies and men/women and their intention to stay in M-DCPS and general satisfaction levels, I then examined how each of these groups engaged with resources at the school site and district level. In the school site collegial network, mean had a higher mean engagement with school site collegial resources than women. Men also had a higher mean engagement with their district administrative resources

than women. Men's engagement with colleagues in and outside of department, as well as department head and instructional coach/mentor and district administrative staff highlights participants engagement with resources that are offered in M-DCPS as well as a sense of collaboration across varying resources. Once again, to engage in discourse centering around gender roles is beyond the scope of this study and therefore, I will not delve deeper into these findings.

In the school site administrative network, advanced academic teachers had a higher mean engagement with their assistant principals and principals than regular teachers. Advanced academic teachers also had a higher reported quality of mean engagement within the district collegial network than regular teachers. This finding is congruent with my experiences as a former advanced placement teacher and administrator that oversaw advanced academics. Advanced academic teacher interaction with assistant principals could be increased due to expectations of teaching an advanced course, ensuring students are properly registered for the course, access to extra resources and materials are required, additional trainings and ordering of AP exams for students, as well setting up opportunities for tutoring at the school site. The college board who published a toolkit for enhancing the school principal and staff relationships, highlighted the importance of effective communication, providing feedback and fostering a shared mission and vision for your respective advanced placement program (2021). These recommendations augment the importance of school site administration and teacher interactions and corroborate why advanced academic teachers may interact with their assistant principal/principal more frequently. Additionally, it is possible that advanced teachers interact with colleagues more outside of their school sites, since in most cases at school site advanced teachers are typically the only teacher of record for that subject area. It is beneficial for advanced

teachers to reach out to other colleagues across the district that teach the same subject area for support and additional resources.

In the district collegial network, social studies teachers had a higher mean engagement than math teachers. In this same network, the frequency of engagement also highlighted that social studies teacher more frequently engaged with resources in this network than math teachers. As a former social studies teacher, I can attest to the district wide collaboration efforts that I engaged in with my peers. Also, using similar logic as advanced teachers, social studies offerings are typically much more varied than math, potentially pushing teachers to look outside of their school building for resources and materials.

Engagement with Resources: Findings and Discussion

I measured teachers' engagement with resources through degree centrality. My study examined how teachers engage with these resources through their interactions that they have with them. The measures of centrality (degree, and weighted degree frequency/quality) are the teacher interactions. I mathematically quantified the many ways that teachers interact with resources at the school site and district. Overall, the ways that teachers interact with resources is not related to a teacher's intention to stay in the profession. However, the ways that teachers interact with resources was consistently related with satisfaction, which in turn is related to their intention to stay in M-DCPS. Teachers' interaction with resources is indirectly related to intention to stay and mediated by satisfaction. These findings support previous research discussed in Chapter 2. Thomas et al. (2019) explained that a greater understanding of the type of networks in the profession can undoubtedly provide a platform in which to understand how to influence teachers to stay (p. 164). Spillane and Louis (2002) argued that teachers that connect

with other individuals, whether at the school-site or outside of it are more likely to be engaged in the profession

To understand teachers' interactions with resources I used social network analysis. SNA is a complex analysis with both resources and teachers. The constructed networks were bipartite networks, because both resources and teachers were included as part of the network. In my networks, I am not examining the relationship of teachers to teachers, but rather, teachers to resources (although certain resources technically are teachers).

Teachers engage with resources at the school site and district level as part of their professional routine whether formally or informally. Teachers engage with resources at the school site more frequently, which is to be expected due to proximity and access. One of the initial findings was that when I accounted for years of experience, teachers with more years of experience, the more they interacted with the school site assistant principal(s) and principal and deemed the quality of those interaction positively, the more satisfied they were and thus more likely to intend on staying in M-DCPS. As I thought more deeply about this, it makes perfect sense. In my study, I did not account for why a teacher was interacting with a given set of resources. I asked respondents how often and then how supportive those interactions were. When examining degree centrality, the more that an experienced teacher interacts with an administrator, it is possible those interactions contribute to a feeling of support by administration toward the experienced teacher. Podolsky, Kini, Bishop and Darling-Hammond (2017) also explained that one of the main factors that teachers identify for leaving the profession is the quality of support that they receive or do not receive from the administration. What matters, based on my findings, is how often teachers interact with the assistant principal and principal and the quality of that support perceived from that interaction.

The remaining discussion of findings is a result of regressions based on mediated models that were utilized to test the relationship between centrality measures, satisfaction, and intention to stay in M-DCPS while controlling for years of experience and subject area. In all models, satisfaction was always predictive of intention to stay in M-DCPS (β=.26**). In the school-site collegial network, the more that teachers engaged with colleagues in and outside of their department, their department head and the instructional coach/school-site mentor, the more satisfied teachers were. The more that teachers use all the resources in this network, the more satisfied they are. This finding is also congruent with previous research. Chen, Frank, Garner, and Horn (2004), who found that when a teacher's social network is strong based on the interpersonal ties of the network, professionalization is supported. Furthermore, as noted by Johnson, Berg and Donaldson (2005), strong collegial relationships support retention. In addition, the more supportive that teachers found the interactions to be with colleagues in the school site the more satisfied they were. Moreover, as satisfaction mediates the relationship between engagement with resources and intention to stay in M-DCPS, teachers in this study, the impact of collegial interactions is important and cannot be underestimated. Collie and Martin (2017) postulate that when teachers have positive and supportive relationships with colleagues at the school then the level of job satisfaction is increased leading to a lower level of burn-out. I can conclude from my findings that in the school site collegial resource network how teachers engage with resources impacts their level of satisfaction and because it is a valid mediate model, it also indirectly impacts their intention to stay in M-DCPS. The more that teachers engage with school site collegial resources the more satisfied they are. In addition, the level of supportiveness of the interactions also contributes to and increases satisfaction. When a teacher interacts with a

colleague in their department or a department head and has a positive experience and feels supported then he/she is more satisfied at that school.

Like the school site collegial network, in the district collegial network the more that teachers engaged with colleagues in the district, M-DCPS Workplace and M-DCPS Microsoft Teams, the more satisfied teachers were. The more that teachers use all the resources in this network, the more satisfied they are. In addition, the more supportive that teachers found the interactions to be with colleagues in the school site the more satisfied they were. Moreover, as satisfaction mediates the relationship between engagement with resources and intention to stay in M-DCPS, teachers in this study, the impact of collegial interactions at the district level also cannot be underestimated and should be considered accordingly.

The district administrative network model indicates that the quality of support teachers receives from the resources they engage within the network contributed to teacher's level of satisfaction and indirectly to their intention to stay in M-DCPS. As teachers engage with a set of resources and deem that the quality of supportiveness of those engagements is high, then teachers are more satisfied. This finding appears to be congruent with previous research on the importance of having positive professional relationships with colleagues whether at the school site or in the profession. Fox and Wilson (2015) explained that a crucial influence on teachers' attitudes toward their job and whether they stay, or leave is their professional relationships and support from colleagues. Rippon and Martin (2006) stated that without support teachers, especially beginning teachers, leave the profession. Therefore, whether at the district collegial or administrative level, how teachers are engaging and the level of supportiveness of those engagements are playing a crucial role in teacher satisfaction and their intention to stay in M-DCPS. Gersten, Keating, Yovanoff and Hraniss (2001) explained that support that allows

cooperative work time for planning and classroom management suggestions is integral for teacher success. On the other hand, Smethen (2007) explained that support is evidenced in the mentoring opportunities that help teachers adjust to the school-site as well as the teaching profession. Teachers in M-DCPS may be mentored at the school-site and/or have opportunities for mentorship across the district, each potentially augmenting a teacher's experiences and contributing to increasing satisfaction.

Limitations

In this next section I will present the limitations of my study. There are several limitations that may have had an impact on the findings of this study. Limitations that are potentially evidenced in this study include sample size, availability of previous research, methodological choices, decision making to include certain factors contributing to teacher retention, and the COVID-19 pandemic.

My study was based on a census sample of math and social studies teachers at the secondary level in M-DCPS. The results of this study are not generalized to other districts across the country because it was conducted in this single district. Moreover, because I chose to examine math and social studies teachers, I limited my potential pool of respondents. My initial response rate was 24% (n=221) for those who started the survey. After reviewing the data, I deleted 71 cases due to essential dependent variables that were not completed by the respondents, which left my final response rate as 16% (n=150) who completed with enough response to be included in the construction of networks. However, if capturing respondents who completed the survey in its entirety including all relevant demographic data then the response rate was 14% (n= 131). Another limitation is potential nonresponse bias, as several math and social studies teachers who were invited to take the survey did not reply and may have different

opinions than the ones captured in this study. Also, because this survey was launched during COVID-19, many teachers may have been less apt to participate in an online survey as they were transitioning back to a brick-and-mortar setting. COVID-19 may have also had an impact on teachers reporting of satisfaction and intention to stay in M-DCPS.

While constructing the various networks, I had to make decisions early on regarding who would be included in each of the four networks. Moreover, while I engaged in preliminary testing and asked for correspondence from teachers in the field, it is possible that a different group of teachers would have highlighted other systems of support that they engaged with because of being in the education profession. With a more expansive option for selecting resources that teachers used, I may have been able to report disparate findings.

In Chapter 4, I previously discussed the potential limitations of my sample size on some of my findings that were not statistically significant. I believe my small sample size contributed to non-statistically significant findings between advanced academic and regular teachers, math, and social studies teachers, as well as men and women, and think that these could be potential significant factors in a study with a larger sample size.

Another limitation of this study is the lack of previous research studies on the topic of teacher engagement with resources and the impact on their satisfaction and intention to stay. While there is plethora of research on teacher retention and teacher satisfaction, there is less information available on the impact of teacher engagement with resources at the school site and district level. There is even less research on the impact of course level on teacher satisfaction and subsequently teacher intention to stay. In addition, while the field of social network analysis is growing across the educational research landscape, it is a relatively new area of research, and even newer when placed in the context of teacher retention.

A major unforeseen limitation of my study emerged because of the COVID-19 pandemic. COVID-19 undoubtedly had impacts far beyond what we can truly comprehend at this moment in time. Future researchers will be studying and writing about the impacts of COVID-19 in the educational setting for years to come. Teachers across the nation and in M-DCPS were forced to transition to online learning causing stressors never experienced before. Both the physical and emotional toll of the pandemic impacted teachers' willingness to complete the survey and, in some cases, caused them to consider leaving the profession earlier than intended.

Additional limitations emerge from some of the methodological choices I made for my study. In the creation of my scale construct. I chose to assume a single factor structure, and while this was supported by exploratory factor analysis, the confirmatory factor analysis did show that the factorial structure is more complex. While 30% variance is captured for satisfaction, and 56% for intention to stay, I could have used a multi-factor structure to indicate how differing measures of satisfaction may have impacted / mediated intention to stay.

Finally, because I chose to carry out a quantitative study, I limited responses to survey questions on a variety of scales. I limit my ability to engage respondents in deeper conversations that could be captured in a qualitative study. However, a qualitative study on how teachers engage with resources and the impact on their satisfaction and intention to stay in M-DCPS or the profession in general is a potential future study.

Implications

Implications for Research and Theory

After conducting my study on teacher engagement with resources and the subsequent impact on teacher satisfaction and intention to stay in M-DCPS lead to many implications for future research. My results undoubtedly confirm that engagement with resources, both

collegially and administratively, is directly related to satisfaction and indirectly predictive of intention to stay. Like a myriad of research studies on teacher satisfaction, teacher satisfaction is integral to the stabilization of the profession. In each of four networks and across all models, satisfaction was always predictive of intention to stay. My literature review in Chapter 2 also reinforces the importance of satisfaction when thinking about teacher retention. Yet, what is quite disparate is how teachers' engagement with resources, investigated through varying centrality measures, contributed a more nuanced understanding. In my study, it was found that teacher's engagement with resources indirectly predicts intention to stay when mediated through satisfaction. Differing ideas are proffered on what leads to teacher satisfaction; however, I have found that that my results align with many of the concepts that have been previously discussed. In contrast, few studies examine teachers' engagement with resources and intention to stay using a robust analytic technique that is conducted using social network analysis. There is a clear need to further examine how teachers are using resources, both in the social networks they engage (people) and/or physical networks (material items).

As noted in my literature review. engagement with resource networks is a significant medium that can impact a teacher's experience. Attbery and Byrk (2010) argued that "social networks play a key role in understanding the degree of success schools experience in terms of improvements for teachers and students" (p. 73). Coburn et al. (2015) explained that while researchers have studied the impact of social networks via a value-added model, more research is necessary to understand the impact of social networks on teachers' experiences. I would wholeheartedly agree with the sentiments presented by Coburn. Researchers have an opportunity to delve into an area that is not that well researched and one that can have major ramifications on teachers' satisfaction and intention to stay. Polizzi et al. (2019) explained that a greater

examination of the "range of teacher networks" at varying levels may contribute to a larger understanding of "spheres of influence and teacher leadership capacity" (p.51). Like my previous agreement with Coburn, Polizzi also presents an interesting notion, that with a greater examination of teacher networks, researchers can begin to understand the varying influences within in teacher network as well as the impact of teacher leadership and the subsequent impact that it might have within a school or district.

Another technique I used to understand teacher engagement with resources and intention to stay, is the idea of a mediated model. In my study a mediated model was used to understand how satisfaction mediated the centrality measure and intention to stay. My study as constructed did not find any direct relationships between engagement with resources and intention to stay. Prior studies have focused on direct influences on teacher retention. Very few studies and none that I was able to review have focused on and evidenced the mediating role of factors on teacher retention. So, while my research fills in the gap on this area of research by trying to understand how satisfaction mediates the relationship between engagement with resources and intention to stay, more research with greater generalizability would be beneficial to educational researchers.

My research also fits into the growing interest of social network analysis in the field of education. This study could be replicated using different resources to measure engagement to see how it may change the relationships with satisfaction and intention to stay. Additionally, varying measures of satisfaction could also be utilized to see what other influences exist and their subsequent impact on intention to stay. As an experienced classroom teacher and administrator, there are a multitude of social resources and material resources at the school-site and district level with which teachers engage. The informal and formal connections clearly have an impact on teacher satisfaction. Additional research on these direct effects could also be explored to

ascertain more specifically, who and what is contributing to teachers' being satisfied. Now, what I undoubtedly know is that satisfaction is crucial to retaining teachers in this profession.

In further examination of implications for research there is still potential for understanding satisfaction levels of advanced academic and regular teachers and contributing factors to any disparities. Moreover, while some research as outlined in Chapter 2 discussed teachers' satisfaction and high-achieving students, this is an area that is not well researched, but could potentially provide new insights. I also believe based on my results, further exploration is needed on math teachers and intention to stay, where I have discussed, and other literature has discussed that math and science teachers leave the profession in much higher rates than other content areas.

Finally, because my results indicated that teacher engagement with resources and satisfaction are predictive of intention to stay, it would be worthwhile for my study to be replicated. I would recommend that other researchers expand the sample size across school levels to elementary, middle, and K-8 to see if engagement with resources at that level has any influence on satisfaction and intention to stay. The study could be replicated by engaging other subgroups of teachers, beyond social studies and math. The study could also be replicated to other districts across the state of Florida and across the country.

The findings of my study undoubtedly have implications for future research. My results confirm that teacher satisfaction is a major predictor of intention to stay and is a worthwhile area of research. As previously mentioned, researchers could conduct a qualitative study to understand how engagement with resources influences a teacher's intention to stay. Researchers could also triangulate this quantitative research with a focus group of teachers to gain a better

understanding of factors leading to satisfaction and types of resource that impact satisfaction and consequently create an improved rate of teacher retention.

Implications for Practice

My study, like many others, found that teacher attrition is problematic for schools, districts, and educational leaders. (Ingersoll, 2011; Marker, Mitchall, & Lassiter, 2013; Petty, Fitchett, O'Connor, 2012; Torres, 2019; Wronkowski, 2018). Job dissatisfaction has been identified by researchers as one of the major contributors to teacher attrition. Skaalvik and Skaalvik (2011) highlighted that teachers' motivation for leaving the profession is related to overall job satisfaction and levels of emotional exhaustion. In my study, I found that satisfaction was always predictive of intention to stay. Administrative practices are extremely important to teacher satisfaction and subsequently to teacher retention. Administrative behavior should be supportive and encouraging and recognize teachers when they are doing a good job. Educational leaders must find new and creative ways to demand support from the parents and at the same time support teachers by backing them up when a situation calls for it. Watson, Harper, Ratliff and Singleton (2010) discussed the impact of stress on teachers and how higher levels of stress contribute to a decrease in job satisfaction. Educational leaders must also find ways to create a collegial atmosphere and provide opportunities for teachers to engage with one another. The frequency and supportiveness of teacher engagement indirectly predicts teacher intention to stay, so how teachers are interacting matters. Educational leaders need to engage in dialogue with teachers to understand how levels of satisfaction can be addressed. Educational leaders must become more aware of the needs of teachers. Administrators must lookout for teacher burnout and ask the questions, so teachers feel supported and more satisfied. Urick (2015) noted that the perception that a teacher has of the school leadership team is a "well-established predictor of attitudes" (p. 435) and contributed to a teacher's intention to stay or leave.

One of the other findings of my study highlights the impact of teacher engagement with resources is on their level of satisfaction and indirectly to their intention to stay in the profession. Teachers benefit from the social aspects of the profession, whether these interactions take place informally or in formal organization meetings relevant at the school site, district, or the profession. Thomas et al. (2019) further explained that a greater understanding of the type of networks in the profession can undoubtedly provide a platform in which to understand how to influence teachers to stay (p. 164). How teachers engage with one another matters and may indicate if a teacher's intention to stay not only in the profession but at the respective school site they work. It is important for school sites to develop opportunities for teacher engagement through varying modalities. Spillane and Louis (2002) argued that teachers that connect with other individuals, whether at the school-site or outside of it are more likely to be engaged in the profession. The more positive interactions that a teacher has, the more satisfied a teacher is, and the more satisfied a teacher is, the more likely they are to stay in the profession. Creating an understanding of how teachers engage with resources, whether formal or informal, allots educators and policymakers in Miami-Dade County and the State of Florida a way in which to address attrition rates.

Educational professionals need to be cognizant of approaches to induction, mentoring, and professional growth opportunities. As evidenced from this study, engagement with resources by teachers at the school site or district level are important to mitigating attrition rates. In the quest to keep teachers in the profession, it is important to understand how to better utilize school sites and district resources. As teachers' interactions are improved with varying resources their satisfaction levels may be increased. Buchannan (2010) delved into the issues of teacher attrition and uncovered that "lack of support emerged as the single strongest predictor of a

decision to leave the profession" (p. 205). Educators need to feel like they are supported. Lerang, Ertesvag, and Virtanen (2021) emphasized the significance of the disparity in the types and quality of support. Support strengthens their job satisfaction and collegial collaboration. Based on the cumulative satisfaction scores, school sites and districts have an opportunity to increase teacher satisfaction by ensuring that school sites and community practices are reviewed. Teachers with less experience often need additional support, but educational leaders must be cognizant how often they are interacting with newer teachers and what impact that interaction may be having.

A closer examination of M-DCPS and some of its current operations and programs highlight some positive practices that can contribute to previously discussed suggestions. It is clear from the research and this study that administration plays a crucial role in teacher satisfaction and intention to stay. The way that an administrator interacts, to the opportunities that an administrator provides at the school site or in conjunction with the district, relates to satisfaction and in some cases indirectly to intention to stay. Currently, aspiring administrators apply and are selected into a BENCH (Building Excellence in Novice leaders through Challenges and High) program after an application review and interview process. The principal BENCH is a two-year program that is designed to enhance and intensify the professional growth of administrators. This program is an ideal setting to provide principals training and insight on how important teachers' satisfaction is to intention to stay as well as develop systems and routines for opportunities for teachers to engage with resources at the school site and district. In the educational profession it is easy to get caught up in your educational ecosystem and work in silos, but now more than ever we need to come together as professionals to save our profession and our #1 most important goal, the education and safety of children.

M-DCPS can extend training and insight for current administrators through professional development courses offered on my learning plan and through the Leader-2-Leader program. Providing current administrators with research-based practices that will enhance teacher satisfaction and provide opportunities for teachers to engage with other colleagues will be essential moving forward.

Conclusion

In general, people are undoubtedly social entities and build complex relationships with those around them. Every connection that an individual makes in some way has an impact on them. These social dynamics are at the forefront of social network analysis and of my study. SNA allowed me to answer questions and acquire insight regarding teacher satisfaction and intention to stay that are not necessarily available with other approaches. This nuanced approach to understanding teacher engagement with resources and the impact on teacher satisfaction and intention to stay offers a unique and robust understanding not previously provided in SNA and educational research. Moreover, while some of my initial thoughts on teacher retention and resource usage were not proven statistically significant, with a larger sample size it is possible that future research can discover additional nuances and create additional contributions as recommended throughout Chapter 5.

As I conclude this study, there are a few takeaways I would like briefly to mention as they confirmed some larger concepts regarding teacher satisfaction and intention to stay. My research confirmed the significance of satisfaction to intention to stay for math and social studies teachers in M-DCPS. In addition, I was able to confirm that the role of school site administration is critical to teacher satisfaction and intention to stay, specifically when accounting for the quality of support that teachers perceive their engagement to be with the assistant principal and

principal. Across all networks, school site collegial and administrative as well as district collegial and administrative the frequency and quality of interactions matter for satisfaction and subsequently a teacher's reported intention to stay. One final takeaway that I think should be examined more closely is related to math teachers and their reported satisfaction and intention to stay. When math teachers engage with their assistant principal and principal at the school site frequently, they are less satisfied and more likely to report an intention to leave. As a district and a profession, we can ill afford an additional exodus of math teachers. Administrators must be cognizant of their relationships with all teachers, but even more so with math teachers.

Today, there is frequent discourse amongst educators regarding the Great Resignation within the teaching profession. This research has shown that teacher retention is undoubtedly a problem. It is up to educational leaders and policy makers to re-define the educational landscape by providing quality support to teachers to enhance satisfaction levels so more teachers want to stay in the profession. How teachers interact with individuals at varying level within the profession matters, we cannot take these interactions and engagements for granted. We must be deliberate in our approach for the sake of our students and advancement of society!

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APPENDIX

Appendix A: Survey Invitation

Connectedness in Education

Survey on the Impact of Resources

Dear Jennifer,

Teacher Retention is a global problem that also affects Miami Dade County Public Schools. As a fellow educator, I would appreciate your assistance in understanding how we might be able to stabilize our profession by completing this survey on connectedness in education. As a doctoral candidate in Educational Leadership and Policy at Florida International University and current Assistant Principal in the North Region, I am conducting this research in hopes of making a contribution towards alleviating this crisis. You, too, can be a part of this journey. I am asking all current secondary math and social studies teachers in M-DCPS to participate in this survey. A goal of this survey is to understand how formal and informal resource networks influence a teacher's decision to stay in the profession.

This survey should take approximately 10 minutes to complete. This survey will work best on a desktop, laptop or tablet. To begin the survey, simply click on this link:

Link:_____

The results of this survey will be kept completely confidential. Your participation is voluntary, and if you come to any questions that you prefer not to answer, please skip it and go onto the next. Should you have any questions or comments please contact me at jmurr001@fiu.edu or my dissertation chair, Dr. Ethan Kolek: ekolek@fiu.edu.

I look forward to sharing the results with you. They will be available by clicking the following link in October of 2020.

Link:_____

Many Thanks.

Jennifer Murray

Educational Leadership

Doctoral Candidate

Jmurr001@fiu.edu

Dr. Ethan Kolek

FIU Professor

Doctoral Chair

Appendix B: Instrument

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Default Question Block

Thank you for your interest in this survey- I value your time and responses. This survey should take approximately 10 minutes to complete. This survey will work best on a desktop, laptop or tablet. The results of this survey will be kept completely confidential. Your participation is voluntary, and if you come to any question that you prefer not to answer, please skip it and go onto the next. Should you have any questions or comments please contact me at jmurr001@fiu.edu or my dissertation chair, Dr. Ethan Kolek: ekolek@fiu.edu.

Please indicate whether or not you consent to participate in this study, then click the arrow below.

- ○ I consent to participate in this study.
- ○ I do NOT consent to participate in this study.

The first set of questions asks about how often you receive support from a variety of people- individuals at your school-site, from the district, and from national entities- then asks you how supportive those sources have been to you. The interaction or relationship can be something as informal as an in-person conversation, a clarifying text message, an off-campus meeting, a phone call, e-mail or shared drive of resources. The interaction or relationship can also be more formal-for example, a scheduled meeting, PLC, PD session, mentoring session, conference, workshop or reading. Please consider any interaction of relationships that has had professional value to you as an educator.

How often do you receive support from each of the following school-site personnel?

	More than four times in the past week	One to three times in the past week	About once in the past month	At least once in the past year	Have received support but not in the past year	Never

	More than four times in the past week	One to three times in the past week	About once in the past month	At least once in the past year	Have received support but not in the past year	Never
School-site colleagues inside your department	○	○	○	○	○	○
School-site colleagues outside your department	○	○	○	○	○	○
Department Head	○	○	○	○	○	○
Instructional Coach /School-site Mentor	○	○	○	○	○	○
Assistant Principal	○	○	○	○	○	○
Principal	○	○	○	○	○	○

Next, please indicate how supportive each of the following has been to you, where 1 is Not very supportive and 5 is Very Supportive.

	1 Not Supportive	2	3	4	5 Very Supportive
School-site colleagues inside your department	○	○	○	○	○
School-site colleagues outside your department	○	○	○	○	○
Department Head	○	○	○	○	○
Instructional Coach /School-site Mentor	○	○	○	○	○
Assistant Principal	○	○	○	○	○
Principal	○	○	○	○	○

How often do you receive support from each of the following fellow M-DCPS colleagues, district personnel or on-line networks?

	More than four times in the past week	One to three times in the past week	About once in the past month	At least once in the past year	Have received support but not in the past year	Never
Assigned District Mentor Teacher	○	○	○	○	○	○

	More than four times in the past week	One to three times in the past week	About once in the past month	At least once in the past year	Have received support but not in the past year	Never
M-DCPS Teacher colleagues	○	○	○	○	○	○
M-DCPS AICE, AP, DE or IB colleagues	○	○	○	○	○	○
TFA/Teach Strong colleagues	○	○	○	○	○	○
District Curriculum Support Specialist (CSS)	○	○	○	○	○	○
District Instructional Supervisor (IS)	○	○	○	○	○	○
Colleagues from M-DCPS Workplace	○	○	○	○	○	○
Colleagues from Microsoft Teams	○	○	○	○	○	○

Next, please indicate how supportive each of the following has been to you, where 1 is Not very supportive and 5 is Very Supportive.

	1 Not supportive	2	3	4	5 Very supportive
Assigned District Mentor Teacher	○	○	○	○	○
M-DCPS Teacher Colleagues	○	○	○	○	○
M-DCPS AICE, AP, DE or IB Colleagues	○	○	○	○	○
TFA/Teach Strong Colleagues	○	○	○	○	○
District Curriculum Support Specialist (CSS)	○	○	○	○	○
District Instructional Supervisor (IS)	○	○	○	○	○
Colleagues from M-DCPS Workplace	○	○	○	○	○
Colleagues from Microsoft Teams	○	○	○	○	○

How often do you receive support from colleagues outside of M-DCPS? As a reminder, this may include personal interactions with individuals, on-line correspondence and/or participation in conferences or trainings.

	More than four times in the past week	One to three times in the past week	About once in the past month	At least once in the past year	Have received support but not in the past year	Never
Colleagues from College Board or AP Reading	○	○	○	○	○	○
Colleagues from Cambridge or IB	○	○	○	○	○	○
FEA/NEA colleagues	○	○	○	○	○	○
Teacher colleagues outside of M-DCPS	○	○	○	○	○	○
National Council for Social Studies (NCSS)	○	○	○	○	○	○
National Council for Teaching Mathematics (NCTM)	○	○	○	○	○	○
Academic Facebook Groups or Schoology	○	○	○	○	○	○
Colleagues from Instagram or Twitter	○	○	○	○	○	○

Next, please indicate how supportive each of the following has been to you, where 1 is Not very supportive and 5 is Very Supportive.

	1 Not Supportive	2	3	4	5 Very supportive
Colleagues from College Board or AP Reading	○	○	○	○	○
Colleagues from Cambridge or IB	○	○	○	○	○
FEA/NEA Colleagues	○	○	○	○	○
Teacher colleagues outside of M-DCPS	○	○	○	○	○
National Council for Social Studies (NCSS)	○	○	○	○	○

	1 Not Supportive	2	3	4	5 Very supportive
National Council for Teaching Mathematics (NCTM)	○	○	○	○	○
Academic Facebook Groups or Schoology	○	○	○	○	○
Colleagues from Instagram or Twitter	○	○	○	○	○

The next set of questions is asking you to think about your time at the school-site and positions that you might hold.

Including hours spent during the school day, before and after school, and on the weekends, how many hours do you spend on ALL teaching and other school-related activities during a typical FULL WEEK at THIS school?

During this school year, do you or will you-

	YES	NO
Coach a sport?	○	○
Sponsor any student groups, clubs, or organizations?	○	○
Serve as a formal mentor in your school or district?	○	○
Serve on a school-wide or district-wide committee or task force?	○	○
Serve as a department lead or chair?	○	○

When answering the next set of questions, think about your professional life and indicate how much control you have in your classroom.

How much actual control do you have IN YOUR CLASSROOM at this school over the following areas of your planning and teaching?

	A great deal	A lot	A moderate amount	A limited amount	None at all
Selecting textbooks and other instructional materials.	○	○	○	○	○
Selecting content, topics, and skills to be taught.	○	○	○	○	○
Selecting teaching techniques.	○	○	○	○	○
Evaluating and grading students.	○	○	○	○	○
Disciplining Students.	○	○	○	○	○
Determining the amount of homework to be assigned.	○	○	○	○	○

This next section will measure *to what extent do you agree or disagree with each of the following statements.*

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
The school administration's behavior toward the staff is supportive and encouraging.	○	○	○	○
I am satisfied with my teaching salary.	○	○	○	○
The level of student misbehavior in this school (such as noise, horseplay or fighting in the halls, cafeteria or student lounge) interferes with my teaching.	○	○	○	○
I receive a great deal of support from parents for the work I do.	○	○	○	○
Necessary materials such as textbooks, supplies, and copy machines are available as needed by the staff.	○	○	○	○

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Routine duties and paperwork interfere with my job of teaching.	○	○	○	○
My principal enforces school rules for student conduct and backs me up when I need it.	○	○	○	○
Rules for student behavior are consistently enforced by teachers in this school, even for students who are not in their classes.	○	○	○	○
Most of my colleagues share my beliefs and values about what the central mission of the school should be.	○	○	○	○

This next section will measure *to what extent do you agree or disagree with each of the following statements.*

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
The principal knows what kind of school he or she wants and has communicated it to the staff.	○	○	○	○
There is a great deal of cooperative effort among the staff members.	○	○	○	○
In this school, staff members are recognized for a job well done.	○	○	○	○
I worry about the security of my job because of the performance of my students on state and/or local tests.	○	○	○	○

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
State or district content standards have had a positive influence on my satisfaction with teaching.	○	○	○	○
I am given the support I need to teach students with special needs.	○	○	○	○
The amount of student tardiness and class cutting in this school interferes with my teaching.	○	○	○	○
I am generally satisfied with being a teacher at this school.	○	○	○	○
I make a conscious effort to coordinate the content of my courses with that of other teachers.	○	○	○	○

The next questions will be inquiring about your intent to remain as part of Miami-Dade County Public Schools (MDCPS) and your intent to remain in the teaching profession. As a reminder, all of your answers to questions in the survey will be kept confidential only aggregate results will be reported.

The next set ask is asking about your intentions regarding Miami-Dade County Public Schools (MDCPS) as an organization. Select the option that best reflects your feelings about MDCPS.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I plan to leave MDCPS as soon as possible.	○	○	○	○	○
Under no circumstance will I voluntarily leave MDCPS before I retire.	○	○	○	○	○
I would be reluctant to leave MDCPS.	○	○	○	○	○
I plan to stay at MDCPS as long as possible.	○	○	○	○	○

The next set ask is asking about your intentions regarding the teaching profession in general. Select the option that best reflects your feelings about the teaching profession.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I plan to leave teaching as soon as possible.	○	○	○	○	○
Under no circumstance will I voluntarily leave teaching before I retire.	○	○	○	○	○
I would be reluctant to leave teaching.	○	○	○	○	○
I plan to stay teaching as long as possible.	○	○	○	○	○

Please indicate the extent to which you agree or disagree with each of the following statements about the COVID-19 pandemic and your thoughts about remaining in the teaching profession.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Often, I have considered leaving the teaching profession during the COVID-19 pandemic.	○	○	○	○	○
I am more likely to leave the teaching profession because of my experiences during the COVID-19 pandemic.	○	○	○	○	○

Click to To put your answers into context, we would like to gather some further information from you. Your answers will be held in the strictest confidence. Please select one answer per question.

What is your gender?

What is your current age?

Which of the following best describes your race/ethnicity?

- White
- Black
- Hispanic
- Asian or Pacific Islander
- American Indian or Alaskan Native
- Other

How many years have you been at your current school?

How many years have you been teaching?

What is your highest level of educational attainment?

- Bachelors (AB/BA/BS)
- Masters (MA/MS/Med)
- PhD or EdD

Do you currently teach at a Title I School?

- Yes
- No

What type of high school do you currently work in?

- Traditional 9-12
- Technical / Vocational 9-12
- Whole School Magnet
- Traditional High School with 1 or more magnet programs

Which of the following best describes your current teaching assignment?

- ○ Math Secondary Teacher
- ○ Social Science Secondary Teacher

What is the current level of classes that you are teaching? (Check all that apply)

- ☐ AICE
- ☐ AP
- ☐ Dual Enrollment
- ☐ ESE
- ☐ Honors
- ☐ Intensive/Remedial
- ☐ Regular

What class levels did you teach during the 2019-2020 School Year? (Check all that apply)

- ☐ AICE
- ☐ AP
- ☐ Dual Enrollment
- ☐ ESE
- ☐ Honors
- ☐ Intensive/Remedial
- ☐ Regular

Prior to the 2019-2020 school year did you teach any of the following? (Check all that apply)

- ☐ AICE
- ☐ AP
- ☐ Dual Enrollment
- ☐ ESE
- ☐ Honors
- ☐ Intensive/Remedial
- ☐ Regular

What grade levels are you currently teaching? (Check all that apply)

- [ ] 9th
- [ ] 10th
- [ ] 11th
- [ ] 12th

What grade levels did you teach during the 2019-2020 school year? (Check all that apply)

- [ ] 9th
- [ ] 10th
- [ ] 11th
- [ ] 12th

Did you complete a teacher preparation program as part of your BS/BA degree?

- ○ Yes
- ○ No

Thank you for completing the survey. Please find a few links to educational web-sites you may find useful. Best of luck with your 2020-2021 school year and all future endeavors.

https://www.educatorstechnology.com/2020/07/10-great-edtech-websites-for-teachers.html
https://blog.education.nationalgeographic.org/2018/01/26/10-free-tech-tools-websites-every-teacher-should-know-about/

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Appendix C

Measures of Centrality

Centrality Measure	n	mean	sd	median	trimmed	mad	min	max	range	skew	kurtosis	se
School Site Collegial Resource Network												
SSP.F.deg	145	3.3	.73	3	3.38	1.48	2	4	2	-.53	-.99	.06
SSP.F.str	145	12.2	3.81	12	12.31	4.45	3	20	17	-.25	-.61	.32
SSP.Q.str	146	13.79	3.92	14	13.95	4.45	4	20	16	-.3	-.59	.33
School Site Administrative Resource Network												
SSN.F.deg	141	1.94	.25	2	2	0	1	2	1	-3.53	10.54	.02
SSN.F.str	141	6.28	2.14	6	6.42	2.97	1	10	9	-.57	-.12	.18
SSN.Q.str	142	7.66	2.29	8	7.92	2.97	2	10	8	-.69	-.57	.19
District Collegial Resource Network												
DP.F.deg	136	2.51	.95	2.5	2.52	.74	1	4	3	.01	-.94	.08
DP.F.str	136	8.12	3.84	8	7.96	4.45	1	18	17	.33	-.42	.33
DP.Q.str	132	9.33	4.11	9	9.18	4.45	1	20	19	.35	-.07	.36
Administrative Resource Network												
DN.F.deg	96	2.03	.77	2	2.04	1.48	1	3	2	-.05	-1.35	.08
DN.F.str	96	5.49	3.06	5	5.23	2.97	1	14	13	.71	-.08	.31
DN.Q.str	96	5.48	3.27	5	5.14	2.97	1	15	14	1.04	.65	.33

Appendix D

R Studio Network Scripts

```
# Creating the Networks
#Administrative School Site Resource Network
names(DF)
SSN=DF[,c(1,6:7)]
names(DF.Done)
CM=DF.Done[,c(2:13,102,144,146:147)]
names(CM)
names(SSN)
SSN$Item_1E[SSN$Item_1E=="6"] = NA
SSN$Item_1F[SSN$Item_1F=="6"] = NA
SSN$Item_1E=6-SSN$Item_1E
SSN$Item_1F=6-SSN$Item_1F

SSN.F=gather(SSN,person,weight,Item_1E:Item_1F,factor_key = TRUE)
SSN.F=na.omit(SSN.F)
library(igraph)
gSSN.F = graph_from_data_frame(SSN.F, directed = FALSE)
SSN.F.deg=degree(gSSN.F,mode="all",loops=FALSE)
SSN.F.str=strength(gSSN.F,mode="all",loops=FALSE,weights = E(gSSN.F)$weight)

#Quality
SSN.Q=DF[,c(1,12:13)]
colnames(SSN.Q)[2]="Item_5B"
colnames(SSN.Q)[3]="Item_6B"
names(SSN.Q)
SSN.Q$Item_5B[SSN.Q$Item_5B=="6"] = NA
SSN.Q$Item_6B[SSN.Q$Item_6B=="6"] = NA
```

```
SSN.Q=gather(SSN.Q,person,weight,Item_5B:Item_6B,factor_key = TRUE)
SSN.Q=na.omit(SSN.Q)
gSSN.Q = graph_from_data_frame(SSN.Q, directed = FALSE)
SSN.Q.str=strength(gSSN.Q,mode="all",loops=FALSE,weights = E(gSSN.Q)$weight)


SSN.F.deg=as.data.frame(SSN.F.deg)
SSN.F.str=as.data.frame(SSN.F.str)
SSN.Q.str=as.data.frame(SSN.Q.str)


library(data.table)
rownames(SSN.F.deg)
SSN.F.deg=setDT(SSN.F.deg,keep.rownames=TRUE)
SSN.F.deg=SSN.F.deg[c(-142:-143),]
colnames(SSN.F.deg)[1]="ID"

rownames(SSN.F.str)
SSN.F.str=setDT(SSN.F.str,keep.rownames=TRUE)
SSN.F.str=SSN.F.str[c(-142:-143),]
colnames(SSN.F.str)[1]="ID"

rownames(SSN.Q.str)
SSN.Q.str=setDT(SSN.Q.str,keep.rownames=TRUE)
SSN.Q.str=SSN.Q.str[c(-143:-144),]
colnames(SSN.Q.str)[1]="ID"

rownames(SSN.F.deg)
```

```
##############################################################################################
#School Site Positive Resource Networks
names(DF)
SSP=DF[,c(1,2:5)]
names(SSP)
SSP$Item_1A[SSP$Item_1A=="6"] = NA
SSP$Item_1B[SSP$Item_1B=="6"] = NA
SSP$Item_1C[SSP$Item_1C=="6"] = NA
SSP$Item_1D[SSP$Item_1D=="6"] = NA
#This needs to be run everytime (inversing numbers so 5 becomes 1, etc)
SSP$Item_1A=6-SSP$Item_1A
SSP$Item_1B=6-SSP$Item_1B
SSP$Item_1C=6-SSP$Item_1C
SSP$Item_1D=6-SSP$Item_1D

SSP.F=gather(SSP,person,weight,Item_1A:Item_1D,factor_key = TRUE)
SSP.F=na.omit(SSP.F)
library(igraph)
gSSP.F = graph_from_data_frame(SSP.F, directed = FALSE)
SSP.F.deg=degree(gSSP.F,mode="all",loops=FALSE)
SSP.F.str=strength(gSSP.F,mode="all",loops=FALSE,weights = E(gSSP.F)$weight)

#Quality (SSP)
names(DF)
SSP.Q=DF[,c(1,8:11)]
colnames(SSP.Q)[4]="Item_2C"
colnames(SSP.Q)[5]="Item_2D"
names(SSP.Q)
SSP.Q$Item_2A[SSP.Q$Item_2A=="6"] = NA
```

```
SSP.Q$Item_2B[SSP.Q$Item_2B=="6"] = NA
SSP.Q$Item_2C[SSP.Q$Item_2C=="6"] = NA
SSP.Q$Item_2D[SSP.Q$Item_2D=="6"] = NA

SSP.Q=gather(SSP.Q,person,weight,Item_2A:Item_2D,factor_key = TRUE)
SSP.Q=na.omit(SSP.Q)
gSSP.Q = graph_from_data_frame(SSP.Q, directed = FALSE)
SSP.Q.str=strength(gSSP.Q,mode="all",loops=FALSE,weights = E(gSSP.Q)$weight)

SSP.F.deg=as.data.frame(SSP.F.deg)
SSP.F.str=as.data.frame(SSP.F.str)
SSP.Q.str=as.data.frame(SSP.Q.str)

library(data.table)
rownames(SSP.F.deg)
SSP.F.deg=setDT(SSP.F.deg,keep.rownames=TRUE)
SSP.F.deg=SSP.F.deg[c(-146:-149),]
colnames(SSP.F.deg)[1]="ID"

rownames(SSP.F.str)
SSP.F.str=setDT(SSP.F.str,keep.rownames=TRUE)
SSP.F.str=SSP.F.str[c(-146:-149),]
colnames(SSP.F.str)[1]="ID"

rownames(SSP.Q.str)
SSP.Q.str=setDT(SSP.Q.str,keep.rownames=TRUE)
SSP.Q.str=SSP.Q.str[c(-147:-150),]
colnames(SSP.Q.str)[1]="ID"
```

```
#################################################################################################
#########
#Negative District Resource Network
names(DF)
DN=DF[,c(1,14,18:19)]
names(DN)
DN$Item_3A[DN$Item_3A=="6"] = NA
DN$Item_3E[DN$Item_3E=="6"] = NA
DN$Item_3F[DN$Item_3F=="6"] = NA
DN$Item_3A=6-DN$Item_3A
DN$Item_3E=6-DN$Item_3E
DN$Item_3F=6-DN$Item_3F

DN.F=gather(DN,person,weight,Item_3A, Item_3E:Item_3F,factor_key = TRUE)
DN.F=na.omit(DN.F)
library(igraph)
gDN.F = graph_from_data_frame(DN.F, directed = FALSE)
DN.F.deg=degree(gDN.F,mode="all",loops=FALSE)
DN.F.str=strength(gDN.F,mode="all",loops=FALSE,weights = E(gDN.F)$weight)



names(DF)
#Quality
DN.Q=DF[,c(1,22,28:29)]
names(DN.Q)
DN.Q$Item_4A[DN.Q$Item_4A=="6"] = NA
DN.Q$Item_4G[DN.Q$Item_4G=="6"] = NA
DN.Q$Item_4H[DN.Q$Item_4H=="6"] = NA

DN.Q=gather(DN.Q,person,weight,Item_4A, Item_4G:Item_4H,factor_key = TRUE)
```

```
DN.Q=na.omit(DN.Q)
gDN.Q = graph_from_data_frame(DN.Q, directed = FALSE)
DN.Q.str=strength(gDN.Q,mode="all",loops=FALSE,weights = E(gDN.Q)$weight)



DN.F.deg=as.data.frame(DN.F.deg)
DN.F.str=as.data.frame(DN.F.str)
DN.Q.str=as.data.frame(DN.Q.str)

library(data.table)
rownames(DN.F.deg)
DN.F.deg=setDT(DN.F.deg,keep.rownames=TRUE)
DN.F.deg=DN.F.deg[c(-97:-99),]
colnames(DN.F.deg)[1]="ID"

rownames(DN.F.str)
DN.F.str=setDT(DN.F.str,keep.rownames=TRUE)
DN.F.str=DN.F.str[c(-97:-99),]
colnames(DN.F.str)[1]="ID"

rownames(DN.Q.str)
DN.Q.str=setDT(DN.Q.str,keep.rownames=TRUE)
DN.Q.str=DN.Q.str[c(-97:-99),]
colnames(DN.Q.str)[1]="ID"

################################################################################################
########
#Collegial District Resource Network
names(DF)
DP=DF[,c(1,15:16,20:21)]
```

```
names(DP)
DP$Item_3B...15[DP$Item_3B...15=="6"] = NA
DP$Item_3C[DP$Item_3C=="6"] = NA
DP$Item_3G[DP$Item_3G=="6"] = NA
DP$Item_3H[DP$Item_3H=="6"] = NA

DP$Item_3B...15=6-DP$Item_3B...15
DP$Item_3C=6-DP$Item_3C
DP$Item_3G=6-DP$Item_3G
DP$Item_3H=6-DP$Item_3H

DP.F=gather(DP,person,weight,Item_3B...15:Item_3C,Item_3G:Item_3H,factor_key = TRUE)
DP.F=na.omit(DP.F)
library(igraph)
gDP.F = graph_from_data_frame(DP.F, directed = FALSE)
DP.F.deg=degree(gDP.F,mode="all",loops=FALSE)
DP.F.str=strength(gDP.F,mode="all",loops=FALSE,weights = E(gDP.F)$weight)

#Quality
names(DF)
DP.Q=DF[,c(1,23:24, 28:29)]
colnames(DP.Q)[2]="Item_4B"

names(DP.Q)
DP.Q$Item_4B[DP.Q$Item_4B=="6"] = NA
DP.Q$Item_4C[DP.Q$Item_4C=="6"] = NA
DP.Q$Item_4G[DP.Q$Item_4G=="6"] = NA
DP.Q$Item_4H[DP.Q$Item_4H=="6"] = NA

DP.Q=gather(DP.Q,person,weight,Item_4B:Item_4C,Item_4G:Item_4H,factor_key = TRUE)
```

```
DP.Q=na.omit(DP.Q)
gDP.Q = graph_from_data_frame(DP.Q, directed = FALSE)
DP.Q.str=strength(gDP.Q,mode="all",loops=FALSE,weights = E(gDP.Q)$weight)


DP.F.deg=as.data.frame(DP.F.deg)
DP.F.str=as.data.frame(DP.F.str)
DP.Q.str=as.data.frame(DP.Q.str)


library(data.table)
rownames(DP.F.deg)
DP.F.deg=setDT(DP.F.deg,keep.rownames=TRUE)
DP.F.deg=DP.F.deg[c(-137:-140),]
colnames(DP.F.deg)[1]="ID"

rownames(DP.F.str)
DP.F.str=setDT(DP.F.str,keep.rownames=TRUE)
DP.F.str=DP.F.str[c(-137:-140),]
colnames(DP.F.str)[1]="ID"


rownames(DP.Q.str)
DP.Q.str=setDT(DP.Q.str,keep.rownames=TRUE)
DP.Q.str=DP.Q.str[c(-133:-136),]
colnames(DP.Q.str)[1]="ID"

#SSP.F.deg, SSP.F.str, SSP.Q.str (145) SSP Q (146)
#SSN.F.deg, SSN.F.str, SSN.Q.str (141) SSN Q (142)
#DN.F.deg, DN.F.str, DN.Q.str (96)
```

```
#DP.F.deg, DP.F.str, DP.Q.str (136)

DF.HalfDone=merge(merge(merge(merge(merge(SSP.F.deg,SSP.F.str,all=TRUE,by="ID"),SSP.Q.str,all=TRUE,by="ID"),SSN.F.deg,all=TRUE,by="ID"),SSN.F.str, all=TRUE,by="ID"),SSN.Q.str,all=TRUE,by="ID")

DF.twothirdDone=merge(merge(merge(merge(merge(DP.F.deg,DP.F.str,all=TRUE,by="ID"),DP.Q.str,all=TRUE,by="ID"),DN.F.deg,all=TRUE,by="ID"),DN.F.str, all=TRUE,by="ID"),DN.Q.str,all=TRUE,by="ID")

DF.Done=merge(merge(DF.HalfDone, DF.twothirdDone,all=TRUE,by="ID"),DF,all=TRUE,by="ID")

write.csv(DF.Done,file="DF.Done.csv")

######################Building the Networks#######################

library(igraph)

# Checking to see the bipartite structure

bipartite.mapping(gSSN.F) # School site negative

bipartite.mapping(gSSP.F) # School site positive

bipartite.mapping(gDN.F) # District negative

bipartite.mapping(gDP.F) # District positive

# Adding vertex (node) type to the networks

V(gSSN.F)$type <- bipartite_mapping(gSSN.F)$type

V(gSSP.F)$type <- bipartite_mapping(gSSP.F)$type

V(gDN.F)$type <- bipartite_mapping(gDN.F)$type

V(gDP.F)$type <- bipartite_mapping(gDP.F)$type

# Calculating number of nodes for each network

SSN.F.Nodes = length(which(V(gSSN.F)$type == "FALSE"))

SSP.FNodes = length(which(V(gSSP.F)$type == "FALSE"))

DN.FNodes = length(which(V(gDN.F)$type == "FALSE"))

DP.FNodes = length(which(V(gDP.F)$type == "FALSE"))

print(SSN.F.Nodes)
```

```
print(SSP.FNodes)

print(DN.FNodes)

print(DP.FNodes)


# Calculating number of edges


SSN.F.Edges = ecount(gSSN.F)

SSP.F.Edges = ecount(gSSP.F)

DN.F.Edges = ecount(gDN.F)

DP.F.Edges = ecount(gDP.F)


print(SSN.F.Edges)

print(SSP.F.Edges)

print(DN.F.Edges)

print(DP.F.Edges)


SSN.F.Edges/(SSN.F.Nodes*2)

SSP.F.Edges/(SSP.FNodes*4)

DN.F.Edges/(DN.FNodes*3)

DP.F.Edges/(DP.FNodes*4)


# Plotting

col <- c("steelblue", "orange")

shape <- c("circle", "square")

plot(gSSN.F, layout = layout_with_dh, vertex.color = col[as.numeric(V(gSSN.F)$type)+1], vertex.shape =
shape[as.numeric(V(gSSN.F)$type)+1]) # School site negative

plot(gSSP.F, layout = layout_with_dh, vertex.color = col[as.numeric(V(gSSP.F)$type)+1], vertex.shape =
shape[as.numeric(V(gSSP.F)$type)+1]) # School site positive

plot(gDN.F, layout = layout_with_dh, vertex.color = col[as.numeric(V(gDN.F)$type)+1], vertex.shape =
shape[as.numeric(V(gDN.F)$type)+1]) # District negative

plot(gDP.F, layout = layout_with_dh, vertex.color = col[as.numeric(V(gDP.F)$type)+1], vertex.shape =
shape[as.numeric(V(gDP.F)$type)+1]) # District positive
```

```
#Correlation Test
CM=DF.Done[,c(2:13,102,146:147)]
names(DF.Done)
names(CM)
CM=na.omit(CM)
CM=as.data.frame(CM)
cor(CM,use = "complete.obs")
str(CM)

##############################Factor Analyses#############################
names(DF.Done)
FA2DF=DF.Done[,c(70:87)]
FA2DF=na.omit(FA2DF)
FA1=factanal(FA2DF,factor=1,rotation="promax")
FA1
FA2=factanal(FA2DF,factor=2,rotation="promax")
FA2
FA3=factanal(FA2DF,factor=3,rotation="promax")
FA3
FA4=factanal(FA2DF,factor=4,rotation="promax")
FA4
FA5=factanal(FA2DF,factor=5,rotation="promax")
FA5
FA6=factanal(FA2DF,factor=6,rotation="promax")
FA6

names(DF.Done)
FA3DF=DF.Done[,c(70:81,84:86)]
FA3DF=na.omit(FA3DF)
```

```
FA1=factanal(FA3DF,factor=1,rotation="promax")

FA1

FA2=factanal(FA3DF,factor=2,rotation="promax")

FA2

FA3=factanal(FA3DF,factor=3,rotation="promax")

FA3

FA4=factanal(FA3DF,factor=4,rotation="promax")

FA4

FA5=factanal(FA3DF,factor=5,rotation="promax")

FA5

FA6=factanal(FA3DF,factor=6,rotation="promax")

FA6

DF.Done$Item_10A=5-DF.Done$Item_10A

DF.Done$Item_10E=5-DF.Done$Item_10E

DF.Done$Item_10G=5-DF.Done$Item_10G

DF.Done$Item_10H=5-DF.Done$Item_10H

DF.Done$Item_10I=5-DF.Done$Item_10I

DF.Done$Item_10J=5-DF.Done$Item_10J

DF.Done$Item_10K=5-DF.Done$Item_10K

DF.Done$Item_10L=5-DF.Done$Item_10L

DF.Done$Item_10O=5-DF.Done$Item_10O

DF.Done$Item_10Q=5-DF.Done$Item_10Q


DF.Done$Satisfaction=(DF.Done$Item_10A+DF.Done$Item_10E+DF.Done$Item_10G+DF.Done$Item_10
H+DF.Done$Item_10I+DF.Done$Item_10J+DF.Done$Item_10K+DF.Done$Item_10L+DF.Done$Item_10O
+DF.Done$Item_10Q)/10

describe(DF.Done$Satisfaction)

#### Reliability Analysis

names(DF.Done)

FA4DF=DF.Done[,c(70,74,76:81,84,86)]

alpha(FA4DF)
```

```
write.csv(FA4DF,file="FA4DF.csv")


rownames(FA4DF)

colnames(FA4DF)

FA4DF

FA4

##Intent to Stay (reverse order)

DF.Done$Item_11B=6-DF.Done$Item_11B

DF.Done$Item_11C=6-DF.Done$Item_11C

DF.Done$Item_11D=6-DF.Done$Item_11D


names(DF.Done)

FA5DF=DF.Done[,c(88:91)]

FA5DF=na.omit(FA5DF)

FA1=factanal(FA5DF,factor=1,rotation="promax")

FA1

alpha(FA5DF)

write.csv(FA5DF,file="FA5DF.csv")

DF.Done$Int.Stay = (DF.Done$Item_11A + DF.Done$Item_11B + DF.Done$Item_11C +
DF.Done$Item_11D)/4

describe(DF.Done$Int.Stay)

##############################################################################################
######

library(MKinfer)

###### School Site Administrative


colnames(DF.Done)[142]="Item_29A"


DF.Done$Item_29A=as.factor(DF.Done$Item_29A)

DF.Done$Item_14A=as.factor(DF.Done$Item_14A)

DF.Done$Item_31A=as.factor(DF.Done$Item_31A)
```

```
perm.t.test(SSN.F.deg~Item_29A,data=DF.Done)
with(DF.Done, aggregate(SSN.F.deg~Item_29A, FUN = sd))
cohen.d(DF.Done$SSN.F.deg,DF.Done$Item_29A)
perm.t.test(SSN.F.str~Item_29A,data=DF.Done)
perm.t.test(SSN.Q.str~Item_29A,data=DF.Done)

perm.t.test(SSN.F.deg~Item_31A,data=DF.Done)
perm.t.test(SSN.F.str~Item_31A,data=DF.Done)
perm.t.test(SSN.Q.str~Item_31A,data=DF.Done)

perm.t.test(SSN.F.deg~Item_14A,data=DF.Done)
perm.t.test(SSN.F.str~Item_14A,data=DF.Done)
perm.t.test(SSN.Q.str~Item_14A,data=DF.Done)

perm.t.test(Satisfaction~Item_31A, data=DF.Done)
perm.t.test(Satisfaction~Item_29A, data=DF.Done)
perm.t.test(Satisfaction~Item_14A, data=DF.Done)
perm.t.test(Int.Stay~Item_31A, data=DF.Done)
perm.t.test(Int.Stay~Item_29A, data=DF.Done)
perm.t.test(Int.Stay~Item_14A, data=DF.Done)

##############School Site Collegial
perm.t.test(SSP.F.deg~Item_29A,data=DF.Done)
perm.t.test(SSP.F.str~Item_29A,data=DF.Done)
perm.t.test(SSP.Q.str~Item_29A,data=DF.Done)

perm.t.test(SSP.F.deg~Item_31A,data=DF.Done)
perm.t.test(SSP.F.str~Item_31A,data=DF.Done)
perm.t.test(SSP.Q.str~Item_31A,data=DF.Done)
```

```
perm.t.test(SSP.F.deg~Item_14A,data=DF.Done)
with(DF.Done, aggregate(SSP.F.deg~Item_14A, FUN = sd))
cohen.d(DF.Done$SSP.F.deg,DF.Done$Item_14A)
perm.t.test(SSP.F.str~Item_14A,data=DF.Done)
perm.t.test(SSP.Q.str~Item_14A,data=DF.Done)

#######District Administrative
perm.t.test(DN.F.deg~Item_29A,data=DF.Done)
perm.t.test(DN.F.str~Item_29A,data=DF.Done)
perm.t.test(DN.Q.str~Item_29A,data=DF.Done)

perm.t.test(DN.F.deg~Item_31A,data=DF.Done)
perm.t.test(DN.F.str~Item_31A,data=DF.Done)
perm.t.test(DN.Q.str~Item_31A,data=DF.Done)

perm.t.test(DN.F.deg~Item_14A,data=DF.Done)
with(DF.Done, aggregate(DN.F.deg~Item_14A, FUN = sd))
cohen.d(DF.Done$DN.F.deg,DF.Done$Item_14A)
perm.t.test(DN.F.str~Item_14A,data=DF.Done)
with(DF.Done, aggregate(DN.Q.str~Item_14A, FUN = sd))
cohen.d(DF.Done$DN.Q.str,DF.Done$Item_14A)
perm.t.test(DN.Q.str~Item_14A,data=DF.Done)

########District Collegial
perm.t.test(DP.F.deg~Item_29A,data=DF.Done)
perm.t.test(DP.F.str~Item_29A,data=DF.Done)
perm.t.test(DP.Q.str~Item_29A,data=DF.Done) #Advanced (10.42)- Regular (8.69) p value .01
with(DF.Done, aggregate(DP.Q.str~Item_29A, FUN = sd))
cohen.d(DF.Done$DP.Q.str,DF.Done$Item_29A)
```

```
perm.t.test(DP.F.deg~Item_31A,data=DF.Done) #(math 2.29) SS (2.70) p value .02
with(DF.Done, aggregate(DP.F.deg~Item_14A, FUN = sd))
cohen.d(DF.Done$DP.F.deg,DF.Done$Item_14A)
perm.t.test(DP.F.str~Item_31A,data=DF.Done) # Math (7.21) SS (8.99) p value .01
with(DF.Done, aggregate(DP.F.str~Item_14A, FUN = sd))
cohen.d(DF.Done$DP.F.str,DF.Done$Item_14A)
perm.t.test(DP.Q.str~Item_31A,data=DF.Done)

perm.t.test(DP.F.deg~Item_14A,data=DF.Done)
perm.t.test(DP.F.str~Item_14A,data=DF.Done)
perm.t.test(DP.Q.str~Item_14A,data=DF.Done)

##############################################################################################
# Mediated Models
library(lmPerm)
library(lm.beta)

summary(lmp(Int.Stay~Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~Satisfaction + Item_18A + Item_31A, data = DF.Done))

summary(lmp(Int.Stay~SSN.F.deg + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~SSN.F.deg + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~SSN.F.deg + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~SSN.F.deg + Item_18A + Item_31A, data = DF.Done))
describe(SSN.F.deg)

#Mediated Model (SSN.F.str)
summary(lmp(Int.Stay~SSN.F.str + Item_18A + Item_31A, data = DF.Done))
```

```
lm.beta(lmp(Int.Stay~SSN.F.str + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~SSN.F.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~SSN.F.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~SSN.F.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~SSN.F.str + Item_18A + Item_31A, data = DF.Done))
describe(SSN.F.str)

#Mediated Model (SSN.Q.str)
summary(lmp(Int.Stay~SSN.Q.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~SSN.Q.str + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~SSN.Q.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~SSN.Q.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~SSN.Q.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~SSN.Q.str + Item_18A + Item_31A, data = DF.Done))
describe(SSN.Q.str)

#########Collegial School Site Network

#Mediated Model (SSP.F.deg)
summary(lmp(Int.Stay~SSP.F.deg + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~SSP.F.deg + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~SSP.F.deg + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~SSP.F.deg + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~SSP.F.deg + Item_18A + Item_31A, data = DF.Done))
describe(SSP.F.deg)

#Mediated Model (SSP.F.str)
summary(lmp(Int.Stay~SSP.F.str + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~SSP.F.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~SSP.F.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
```

```
summary(lmp(Satisfaction~SSP.F.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~SSP.F.str + Item_18A + Item_31A, data = DF.Done))
describe(SSP.F.str)

#Mediated Model (SSP.Q.str)
summary(lmp(Int.Stay~SSP.Q.str + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~SSP.Q.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~SSP.Q.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~SSP.Q.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~SSP.Q.str + Item_18A + Item_31A, data = DF.Done))
describe(SSP.Q.str)

#########Administrative District Network
summary(lmp(Int.Stay~DN.F.deg + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~DN.F.deg + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~DN.F.deg + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~DN.F.deg + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~DN.F.deg + Item_18A + Item_31A, data = DF.Done))
describe(DN.F.deg)

summary(lmp(Int.Stay~DN.F.str + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~DN.F.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~DN.F.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~DN.F.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~DN.F.str + Item_18A + Item_31A, data = DF.Done))
describe(DN.F.str)

#Mediated Model (DN.Q.str)
summary(lmp(Int.Stay~DN.Q.str + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~DN.Q.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
```

```
lm.beta(lmp(Int.Stay~DN.Q.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~DN.Q.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~DN.Q.str + Item_18A + Item_31A, data = DF.Done))
describe(DN.Q.str)

########Collegial District

#Mediated Model (DP.F.deg)
summary(lmp(Int.Stay~DP.F.deg + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~DP.F.deg + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~DP.F.deg + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~DP.F.deg + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~DP.F.deg + Item_18A + Item_31A, data = DF.Done))
describe(DP.F.deg)

#Mediated Model (DP.F.str)
summary(lmp(Int.Stay~DP.F.str + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~DP.F.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~DP.F.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~DP.F.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~DP.F.str + Item_18A + Item_31A, data = DF.Done))
describe(DP.F.str)

#Mediated Model (DP.Q.str)
summary(lmp(Int.Stay~DP.Q.str + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Int.Stay~DP.Q.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Int.Stay~DP.Q.str + Satisfaction + Item_18A + Item_31A, data = DF.Done))
summary(lmp(Satisfaction~DP.Q.str + Item_18A + Item_31A, data = DF.Done))
lm.beta(lmp(Satisfaction~DP.Q.str + Item_18A + Item_31A, data = DF.Done))
describe(DP.Q.str)
```

VITA

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