Closing the Revolving Door: A Preliminary Investigation of the Efficacy of a Community of Practice Including a Same Subject Mentor Using Social Media in Increasing the Retention Rates of Induction Year Secondary Mathematics Teachers

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Closing the Revolving Door: A Preliminary Investigation of the Efficacy of a Community of Practice Including a Same Subject Mentor Using Social Media in Increasing the Retention Rates of Induction Year Secondary Mathematics Teachers

by

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Dedication

Rex, Wade, and Kate Oliver, my children, provided inspiration for me to complete my goal of receiving the Doctor of Philosophy degree. They constantly cheered me on, were flexible and understanding of my time commitment to this goal, and provided lots of hugs. You can do anything!

Betsy and the late Edgar Rexroad, my parents and first cheerleaders, instilled in me the belief that I could do anything and emphasized the importance of a quality education. In her role as Grandma, my mom provided lots of babysitting, drove many carpools, cooked many meals, cleaned mounds of laundry, and provided many words of encouragement while supporting my work on this manuscript. My dad’s voice saying, “you can do it” was constantly with me even though he no longer was.

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Abstract

Only recently, the well-documented shortage of secondary mathematics teachers is being attributed to retention. Wenger’s Communities of Practice (CoPs) and the provision of same subject mentors have been shown to provide teachers with support, opportunities to collaborate, and a reduction in their feelings of isolation – all factors known to impact retention positively. The rapid advancement and prevalence of online social media provide easily accessible, cost effective means to connect teachers with each other and with same subject mentors.

This study investigated the primary question: What, if any, is the relationship between the retention of first-year secondary school mathematics teachers and their participation in an Online Support Group (OSG) that employs strategies for successful CoPs proposed by Wenger and includes a mentor who is trained in secondary mathematics education? To answer this question the following sub-questions were studied: How do members of a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication? What are the characteristics of this OSG of induction-year secondary mathematics teachers and an online same subject mentor? To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger? To what degree, if any, does participation in the OSG CoP mitigate factors found in the literature known to impact
teacher retention negatively? To what degree, if any, does an off-site, online mentor who is trained in mathematics education impact retention?

This study documents how a same subject mentor and a cohort of teachers negotiated the selection of an online-communications platform and formed an OSG in an effort to impact teacher retention positively. This OSG consisted of ten induction-year secondary mathematics teachers – who were part of the Robert Noyce Teacher Scholarship Program and recently graduated from a large southeastern university – and one same subject mentor – an adjunct faculty member (the researcher) – at the same university – using the educational social media platform, Edmodo.

Using a qualitative, netnographic approach, data sources included four months of participant observation, transcripts and fieldnotes from the Edmodo private group, individual and focus group interviews with community members, and surveys of community members.

Findings suggest that the Edmodo OSG was able to function as a CoP, with the structural characteristics defined by Wenger, to provide support and opportunities for collaboration as well reduce participants’ feelings of isolation – all factors associated with increased teacher retention. The key impact of the same subject mentor was her creation and implementation of a pay-for-participation plan which served as a catalyst for meaningful, frequent, and sustained participation of community members.
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List of Abbreviations

APLU .................................................... Association of Public and Land-grant Universities
BHEF ................................................................. Business-Higher Education Forum
CAEP .............................................................. Council for Accreditation of Educator Preparation
CAQDAS ......................................................... Computer-Assisted Qualitative Data Analysis Software
CMP ................................................................. California Mathematics Project
CoP ................................................................................... Community of Practice
COE .................................................................................. College of Education
DoE .................................................................................. Department of Education
eMSS ........................................................................ electronic Mentoring for Student Success
EPP .................................................................................. Educator Preparation Program
ESEA ................................................................................ Elementary and Secondary Education Act
ETS .................................................................................. Educational Testing Service
MTE-Partnership ......................................................... Mathematics Teacher Education Partnership
NCATE ............................................................... National Council for Accreditation of Teacher Education
NCLB ............................................................................... No Child Left Behind Act
NCTAF .............................................................. National Commission on Teaching and America’s Future
NCTM ........................................................................ National Council of Teachers of Mathematics
NIC .................................................................................. Networked Improvement Communities
NSF .................................................................................. National Science Foundation
NTC .................................................................................. New Teacher Center
NTSP ............................................................................... New Teacher Support Program
OECD....................................................Organisation for Economic Co-operation and Development
OPE................................................................................................................Office of Program Evaluation
OSG.............................................................................................................Online Support Group
PISA..............................................................Program for International Student Assessment
RTTT.............................................................................................................Race to the Top
SMTI.................. Science and Mathematics Teacher Recruitment and Retention Imperative
SASS.................................................................Schools and Staffing Survey
SNS........................................................................................Social Networking Sites
STEM...............................................................Science, Technology, Engineering, and Mathematics
STEM TIPS.....................................STEM Teacher Induction and Professional Support
STIR................................................................................Supporting Teachers to Increase Retention
TAKS...............................................................Texas Assessment of Knowledge and Skills
TEAC..............................................................Teacher Education Accreditation Council
TNTP.............................................................................The New Teacher Project
TPP..............................................................................Teacher Preparation Program
UF.................................................................University of Florida
US......................................................................................United States of America
USC...................................................................................University of South Carolina
UTEP...........................................................................Urban Teacher Education Program
Chapter 1: Introduction to the Problem

Introduction

For decades, educators and politicians have warned that the United States’ (US) position of power and leadership is in danger due to the decline in mathematics proficiency of the US student population. In the influential 1983 report, *A Nation at Risk*, the authors cautioned, “Our nation is at risk. Our once unchallenged preeminence in commerce, industry, science and technological innovation is being overtaken by competitors throughout the world” (National Commission on Excellence in Education, 1983, p.9). Even after sounding this alarm and instituting major reform efforts such as the “No Child Left Behind” (NCLB) Act, the “Race to the Top” (RTTT) program, and the Elementary and Secondary Education Act (ESEA) Blueprint for Reform,” performance of US students in mathematics continues to lag behind many nations. Take, for example, the performance of US students on the 2012 Program for International Student Assessment (PISA) – the latest test for which results are available. The US ranks 27th in mathematics among Organisation for Economic Co-operation and Development (OECD) countries (Organisation for Economic Co-operation and Development, 2014). Furthermore, scores for disadvantaged students in the US are 15% lower than the wealthiest students in the US.

Research consistently indicates that the quality of the teacher has tremendous impact on student achievement. Using value-added models to measure the impact of
teacher effectiveness on student achievement, evidence from Tennessee and Texas indicates “the effect of teaching on student learning is greater than student ethnicity or family income, school attended by student, or class size... is stronger for poor and/or minority students than for their more affluent and/or white peers... and the effects accumulate over the years” (Center for Public Education, 2005). Scholars have noted that teachers may affect learning more in mathematics, which tends to be taught exclusively in school, than in reading (Nye, Spyros, & Hedges, 2004).

But, what factors produce a “high quality” teacher? Research consistently indicates that experience matters. In a review of key studies measuring the impact of experience on student achievement, Rice (2010) found that the impact of early career experience is “stronger than the effect of most other observable teacher-related variables including advanced degrees, teacher licensure tests scores, National Board certification at the elementary level and class size” (p. 1). In their reviews of the literature and research on teacher effectiveness, Goe (2007) and Ingersoll, Merrill, and Stuckey (2014) found that effectiveness improves in the first few years of teaching. Harris and Sass (2007) found that during the first few years of teaching, the impact of experience is stronger in mathematics that in any other subject. Boyd, Lankford, Loeb, Rockoff, and Wyckoff (2007) found that the impact of experience on student gains in mathematics achievement is greatest from year one to year two.

Using data from the Schools and Staffing Survey (SASS), in 1987-88, the modal years of experience for a school teacher was 15. If experience matters, the fact that in 2007-08, the modal experience level of a teacher dropped to one year was cause for great concern. The 2011-12 data (the most recent available) reported an improvement in this
trend with the modal years of teaching experience now at five years. However, Richard Ingersoll (2003) describes a “revolving door” where 50% of new teachers leave within their first five years on the job. And, in urban districts the turnover rate is nearly 16% higher (National Commission on Teaching and America’s Future (NCTAF), 2007). In addition to the negative impact on student achievement, the cost of attrition is great financially. From a purely economic standpoint, teacher turnover has been estimated to cost our public school system over $7 billion annually (NCTAF, 2007).

Teachers who leave the profession often cite isolation (Ferriter & Norton, 2004; Hadar & Brody, 2010; Neason, 2014; Rogers & Babinski, 2002) and a lack of professional and collegial support, such as working collaboratively with colleagues (Johnson, Berg, & Donaldson, 2005; Simon & Johnson, 2013) as reasons for leaving the profession. Because of inflexible schedules and geographical distances, new mathematics teachers are often left to figure things out on their own. Low student motivation (Metz, 1993; Public Agenda, 2004; Steinberg, 1996) and poor student behavior (Allensworth, Ponisciak, & Mazzeo, 2009; Ingersoll, 2004; Ingersoll & May, 2011; Johnson et al., 2005; Kapadia, Coca, & Easton, 2007; Kukla-Acevedo, 2009; Ladd, 2011; Marinell & Coca, 2013) are also attrition factors. Research has shown that the provision of a same subject mentor (Cochran-Smith, McQuillan, Mitchell, Gahlsdorf, Barnatt, D’Souza, …Gleeson, 2012; Fisher, 2009; Ingersoll, 2003; Kapadia et al., 2007; Smith & Ingersoll, 2004), support (Johnson & Birkeland, 2003; Liu, Johnson, & Peske, 2004), and collaborative time with colleagues (Fisher, 2009; Ingersoll & May, 2010; Johnson & Birkeland, 2003; Johnson & Project on the Next Generation of Teachers, 2004; Johnson,
2006; Johnson, Kraft, & Papay, 2012; Kardos, Johnson, Peske, Kauffman, & Liu, 2001; Little, 1982; Marinell & Coca, 2013) have had positive effects on retention.

A Community of Practice (CoP) is a group of people “who share a concern, a set of problems, or passion about a topic, and want to deepen their knowledge and expertise in an area by interacting on an ongoing basis” (Wenger, McDermott, & Snyder, 2002, p. 4). Regarding mathematics teachers in particular, Mellony Graven (California Mathematics Project, 2012) found that a “well-functioning supportive community of practice provides the space for strengthened professional teacher identities, strengthened investment in the profession, and longer term trajectories that support retention” (p. 111). Mathematics teachers explained that through their involvement in the CoP, they “developed confidence in their teaching” and “developed a sense of belonging which reduced their feeling of isolation.”

Through social media, many are only a few key strokes away from “friends” – no matter their geographic location or the time of day. More than half (58%) of Americans have a smart phone, and nearly three quarters (74%) use social networking sites (Pew Research Center, 2015a, 2015b). People use Facebook, Twitter, LinkedIn, and other social media applications in many facets of their personal and professional lives. There are thousands of Online Support Groups (OSGs) ranging from dealing with depression to parenting teens. People turn to social media to get advice on a choice of doctor or contractor, plan family and school reunions, or to follow the critical medical updates of a loved one who is ill. And through these experiences they bond, support, and learn from one another, and also realize they are not alone. Does creating a Community of Practice
(CoP) with a same subject mentor using social media have efficacy in increasing the retention rates of induction year secondary mathematics teachers?

**Problem Statement**

Secondary schools need high quality mathematics teachers to ensure that students entering colleges or careers have the foundation required for success in a 21st century economy.

Richard Ingersoll describes a “revolving door” where new teachers enter the profession and then over 50% leave within the first five years. Numerous studies have shown that experience matters and there is general consensus that the student achievement returns in mathematics linked to teacher experience are strongest in the first year of teaching (Boyd et al., 2007). In the area of secondary school mathematics, the problem of teacher retention is exacerbated by alternatives that offer teachers work options with higher salaries and less stress.

Communities of Practice (CoP) have been shown to increase support, decrease feelings of isolation, and ultimately increase retention of secondary mathematics teachers (Graven, 2005). Social media also provides a means of combating isolation and building community through Online Support Groups (OSGs), and social media also hold promise in the area of mathematics teaching. The provision of a same subject mentor for beginning teachers has also been shown to positively impact retention (Cochran-Smith et al., 2012, Fisher, 2009; Ingersoll, 2003; Kapadia et al, 2007; Smith & Ingersoll, 2004).

Does using social media to create a CoP through an Online Support Group (OSG) with a same subject mentor have efficacy in increasing the retention rates of induction year secondary mathematics teachers? Figure 1.1 provides a graphical depiction of the
key components of this study and how they impact teacher retention. How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication? What are the characteristics of this OSG of induction-year secondary mathematics teachers and an online same subject mentor? To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger? To what degree, if any, does participation in the OSG CoP mitigate factors found in the literature known to negatively impact teacher retention? To what degree, if any, does an off-site, online mentor who is trained in mathematics education impact retention?

*Figure 1.1* Key components of this study.
Conceptual Framework

Concepts that are fundamental to this study and that are grounded in current educational literature include: 1) what constitutes a high quality secondary mathematics teacher, 2) a Community of Practice (CoP) that impacts teacher retention, 3) same subject mentoring and how it impacts teacher retention, 4) Online Support Groups (OSGs) and how they impact retention, and 5) netnographic research. For the purposes of this study and consistent with the Council for Accreditation of Educator Preparation (CAEP), high quality secondary mathematics teachers are those who graduate from nationally accredited teacher preparation programs focusing on grades 6 to 12 mathematics education, participate in a strong induction program, and increase in effectiveness with years of teaching experience. In addition, the researcher will focus on the role that a CoP through the use of an OSG with off-site same subject mentoring can have on teacher retention rates. For this study, the mentor must be trained and experienced in secondary mathematics education. This means that the mentor has at least three years teaching experience, is certified in mathematics education, and has sufficient training to qualify as an intern supervisor at an accredited university.

Accreditation. Eighty-two percent of the public favors that teachers graduate from nationally accredited programs, such as those accredited by the National Council for Accreditation for Teacher Education (NCATE) (NCATE, 2015). A large-scale Educational Testing Services (ETS) study found that graduating from these types of programs increases a teacher’s chance of passing key licensure exams (Gitomer & Latham, 1999). Another study found that “the strongest predictor of the percentage of well qualified teachers… in a state is the percentage of teacher education institutions in a state that meet national accreditation standards through NCATE” (Darling-Hammond,
On July 1, 2013, NCATE merged with another recognized accreditor of teacher education programs – the Teacher Education Accreditation Council (TEAC) – forming the Council for the Accreditation of Educator Preparation (CAEP) – now the only recognized accreditor for educator preparation. Over 900 educator preparation providers – traditional university-based to alternative pathway providers – are served by CAEP (CAEP, 2015).

Induction including mentoring. It has been widely reported that over 50% of new teachers leave the profession within the first three years and attrition drops off after that. One initiative that appears repeatedly in literature is the benefit of a strong teacher induction program for new teachers. Ingersoll and Strong (2011) critically reviewed 15 empirical studies on induction programs and found that “most of the studies reviewed provide empirical support for the claim that support and assistance for beginning teachers have a positive impact on three sets of outcomes: teacher commitment and retention, teacher classroom instructional practices, and student achievement” (p.1). In 2008, the Association of Public and Land-grant Universities (APLU) launched its Science and Mathematics Teacher Recruitment and Retention Imperative (SMTI), to increase the quantity and quality of secondary science and mathematics teachers. In an effort to identify and/or develop effective science and mathematics teacher preparation programs, Jennifer Presley and the Co-Director of SMTI, Charles Coble, created the document, Seeking Consensus on the Essential Attributes of Quality Mathematics and Science Teacher Preparation Programs. Presley and Coble (2012) found that national teacher-preparation experts, practicing teachers, policy leaders, and representatives of disciplinary and professional societies all agree that universities should provide “strong
support for program completers through their critical induction period into teaching” (p. 21). The most effective induction programs include a strong mentor who is in the same field as the new teacher (Cochran-Smith et al., 2012, Fisher, 2009; Ingersoll, 2003; Kapadia et al, 2007; Smith & Ingersoll, 2004). The Business-Higher Education Forum (BHEF, 2007) recommends that stakeholders “develop and implement research-based induction programs for all new mathematics teachers” (p. 5) as implementation of high quality induction programs has reduced turnover from 41% to 18%. The BHEF review of research confirmed the importance of same subject mentors as a key component of any high quality induction program. The National Commission on Teaching and America’s Future (NCTAF, 1996) found that 80% to 90% of new teachers who experienced a comprehensive, long-term induction program stay in the field for at least five years. McBride (2012) found that “new teachers with induction programs incorporating mentors, seminars, and regular communication are 9 times more likely to remain in year 2 and 12 times more likely to remain in year 3 than new teachers without any formal induction” (p. 65).

In his article, The Good Mentor, James B. Rowley (1999) combines his years of experience creating mentor-based entry-year programs for new teachers and the findings of scholarly literature to develop a list of qualities of “good mentors.” In addition, the National Council of Teachers of Mathematics’ (NCTM) publication Empowering the Mentor of the Beginning Mathematics Teacher (Zimmermann, Guinee, Fulmore, & Murray, 2009) provides practical “how to” knowledge for individuals who are specifically involved with mentoring new mathematics teachers. The works of Rowley
and NCTM will be used in this study and will be described in the literature review chapter that follows.

**E-mentoring.** In high needs districts, the supply of quality mentors trained in teaching secondary mathematics is short and when they are present mentors are often overworked (Shields, Esch, Humphrey, & Young, 2000). Electronic mentoring or e-mentoring offers an alternative to face-to-face mentoring. Using electronic methods, such as email or online discussion groups, offers asynchronous communication and allows mentors and mentees to build relationships without the constraints of geography or mutual meeting times (Kasprisin, P. Single, R. Single, & Muller, 2003). One example of a successful e-mentoring program for mathematics, science, and special education teachers is eMSS – the New Teacher Center’s (NTC’s) e-Mentoring for Student Success. Research has found that eMSS has accelerated the effectiveness, increased the satisfaction, and increased the retention of these teachers (New Teacher Center, n.d.).

**Experience.** Research clearly shows that with each year of experience, teachers improve their proficiency and effectiveness during the early years of teaching. Moreover, a study at the University of Virginia found that “teachers constantly improved teaching effectiveness until the 21st year” (Huang & Moon, 2009, p. 227). These veterans also act as mentors to share their knowledge with new teachers who are eager for guidance. The retention problem is clearly acknowledged by influential groups such as CAEP. The new accreditation standards proposed by CAEP highlight the importance of retention by requiring teacher preparation programs to track their graduates and include as a measure of program quality the retention rates of graduates into their first few years of teaching.
Communities of practice (CoP). Induction year teachers are often caught off-guard by the shock of isolation and uncertainty in their abilities as they move from a structured Educator Preparation Program (EPP) that typically contains substantial support to a classroom of their own. During a teacher candidate’s EPP, University Supervisors, site-based Coaching Teachers, numerous professors, advisors, and fellow classmates form a supportive community which offers advice, emotional support, feedback, and a listening ear. Unfortunately, after graduation, this useful, supportive community dissipates. Graven (2012) hypothesized that beginning teachers often lack confidence in their content knowledge and feel overwhelmed with the need to “know it all.” Extending a safe, supportive community established during a teacher’s EPP into a teacher’s induction year shows promise in easing the transition from teacher candidate to professional educator.

Cognitive anthropologists Jean Lave and Etienne Wenger coined the phrase “community of practice” (CoP) in 1991. CoPs are defined as “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (Wenger et al., 2002, p. 4). Wenger defines the structural characteristics of a CoP to be “a domain of knowledge, a notion of community and a practice” (Wenger et al., 2002, pp. 27-29). These ideas will be further explained in the literature review chapter that follows. Supportive CoPs bring teachers together to alleviate isolation and supply a safe place to expose weaknesses and thus advance content knowledge and best practices. Through the process of sharing information and experiences with the group, the members learn from each other, and have an opportunity to develop themselves personally and professionally.
CoPs have been shown to decrease teachers’ feelings of isolation, increase teachers’ feelings of confidence, and increase retention.

Wenger identified seven actions that could be taken in order to cultivate CoPs. Furthermore, Wasko and Faraj (2000) identified three barriers that inhibit individuals in a CoP from engaging in knowledge exchange. An outline of Wenger’s seven actions and Wasko and Faraj’s three barriers is provided in Chapter 2 and details of how the researcher and the group studied followed these seven actions and mitigated the three barriers are provided in Chapter 3. Wenger (1998) also identified stages that a CoP goes through. This researcher used Wenger’s model to monitor the stages of development of the OSG CoP in this study.

**Online support groups (OSG).** Learning is a social process (Vygotsky, 1962; Bandura, 1977) and support groups offer a way for members to learn from one another. A support group is defined as “a group of people who have similar experiences and concerns and who meet in order to provide emotional help, advice, and encouragement for one another” (“Support group”, 2015). In recent decades, there has been a proliferation of support groups that meet exclusively online. Martha Ainsworth (n.d.) notes that the success of OSGs – dating as far back as 1982 – provides evidence that OSGs can serve as effective forums to discuss sensitive personal issues. For a new teacher, admitting a lack of content knowledge or having a question about how to handle a classroom management situation can be very personal and something that he or she only feels comfortable discussing with someone he or she knows and trusts. Although the majority of research on OSGs involves individuals seeking medical support, the benefits of OSGs to educators are transferable. In a variety of contexts, members of
OSGs seek informational support or connect with others to combat isolation. Just like face-to-face groups, OSGs bring together people with common experiences, allow them to share information and provide mutual support, and give them a sense of belonging. According to Maslow (1970), all humans need to feel a sense of belonging and acceptance. An OSG can help fulfill this need and combat isolation and lack of support often cited by teachers as reasons to leave the profession. In addition, studies have shown that OSGs offer additional benefits not found in face-to-face groups – flexibility in meeting time and place, world-wide reach for participants, rapid responses to questions, and disinhibited communication.

Netnographic research. An effective way to study an online community is to become a part of that community and use the standards of “netnographic” research. Netnographic research – or “netnography” – is a type of virtual ethnography with the researcher serving as a participant observer in an online community. In order to more closely model the standards of ethnography and to provide a Geertzian ‘thick’ description (described further in Chapter 2) of the study participants, the researcher fully immersed herself in the online community – and did not just perform an observational study as a specialized lurker. This researcher created an online community of first year secondary mathematics teachers and became an active member of this community as a same subject, offsite, online mentor.

Robert Kozinets (2002) first coined the term “netnography” in an effort to modify accepted ethnographic research procedures in order to establish a consistent, accepted set of procedures for this specific model of research of an online community. Kozinets’ procedures are 1) entrée, 2) data collection and analysis, 3) providing
trustworthy interpretation, 4) research ethics, and 5) member checks. The researcher followed Kozinets’ five procedural steps for netnographic research and will describe the details of Kozinets’ procedures in Chapter 2. Although these procedures were followed, the researcher also capitalized on the “inherent and necessary flexibility” (Kozinets, 2002, p. 60) of netnography and altered the research plan as new information dictated. Consistent with other qualitative research designs, “the researcher [was] the primary instrument for inquiry” and she interacted “directly with study participants, determining from moment to moment how to behave, what to notice and record, and how a particular line of inquiry [did or did not] offer promise for answering the research question at hand” (Locke, Spirduso, & Silverman, 2007, p. 100). In order to leverage the strengths of the qualitative approach to research, this researcher’s plan was carefully thought-out, yet was regarded as tentative – to be improved-upon based on experience in the community and data collection and analysis in situ. “Absolute fidelity in execution of a particular design does not offer the same benefit it yields in quantitative studies. Instead, it is common in qualitative research for plans to be regarded as tentative and contingent on the realities presented by data collection and analysis …in-course adjustments are regarded as part of doing good research rather than fatal breeches of protocol” (Locke et al, 2007, p. 100). According to Kozinets (2002), “it can be useful to start with one set of research questions that evolve during the process of the investigation” (p. 80). The researchers’ dissertation proposal originally had three research objectives and four research questions. As a result of the data collected, two objectives were eliminated and one research question was added. These changes will be described briefly here.
The originally proposed objectives were as follows:

1. Investigate and summarize the strengths and weaknesses of different social media platforms capable of building a CoP with effective mentoring.

2. Conduct a netnography to qualitatively investigate the use of social media to support a Community of Practice (CoP) with effective mentoring among secondary mathematics teachers designed with strategies that are likely to impact retention positively and

3. Conduct a netnography to qualitatively investigate the use of electronic posts, interviews, and surveys of induction year secondary mathematics teachers in order to create individual profiles/dashboards for each teacher so that areas where support is needed are identified and predictions for retention can be made.

As proposed in objective one, the researcher intended to compare social media platforms. However, through discussion with participants and with the consent of advisors, using one preferred and widely used platform, Edmodo, was determined to be the best approach preventing the option of comparisons. As a result, objective one was eliminated. Also, the data collected through four months of participation did not provide sufficient details to create dashboards to summarize the support needs of each teacher.

With the consent of the researcher’s advisor, this objective was eliminated as well.

The research questions, as originally proposed, are listed here along with the rationale for adding an additional research question.

*Primary research question:*

What, if any, is the relationship between the retention of first-year secondary school mathematics teachers and their participation in an Online Support Group (OSG) that employs strategies for successful Communities of Practice (CoP)
proposed by Wenger and includes a mentor who is trained in secondary mathematics education?

*Underlying questions:*

1. How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication?

2. To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger?

3. To what degree, if any, does participation in the OSG mitigate factors found in the literature known to negatively impact teacher retention?

4. To what degree, if any, does an off-site, online mentor who is trained in secondary mathematics education impact teacher retention?

To enhance the fidelity of findings, the researcher chose to use a grounded theory approach to determine what topics the CoP discussed and why, prior to using selective coding to determine if the OSG functioned as a CoP with strategies designed to positively impact retention. As the researcher collected and analyzed the volumes of electronic data collected in this study, a new research question emerged:

*What are the characteristics of this OSG of induction-year secondary mathematics teachers and an online mentor?*

Findings related to this new, fifth, research question add knowledge to the scholarship on mathematics teachers and teaching. In Chapter 3, this researcher will further explain the reasoning for adding this research question and will describe the methodology used to collect and analyze data to answer the question. Then, in Chapters 4 and 5 the researcher will present representations of this data and key findings relevant to the question.
In addition to changes in objectives and research questions, some changes to measurement instruments were necessary as well. Measurement instruments for the study were tested in a pilot study and improvements were made. A tentative schedule was created on when and how to administer each measurement instrument. However, consistent with netnographic methodology, the researcher further refined measurement instruments, developed and administered other instruments, and altered the timing of the administration of instruments in situ in an effort to most fully answer the research questions. Additional details about the creation and administration of the measurement instruments is provided in Chapter 3.

**Logical Structure**

The conceptual framework for this study includes two key factors to secondary mathematics teacher retention: membership in a CoP and effective mentoring. Additional research studies document that more teachers leave the profession after the first year than any other. This information suggests that an OSG with mentoring might serve as a CoP and might mitigate against factors that teachers identify as reasons that they leave after their first year of teaching.

The problem that this researcher studied examined how creating a CoP using social media with effective mentoring has efficacy in increasing the retention rates of induction year secondary mathematics teachers. To examine this problem thoroughly and reach definitive conclusions, a study would need to compare the retention rates of induction year secondary mathematics teachers who are part of a CoP created by social media with effective mentoring and the retention rates of induction year secondary mathematics teachers who are not a part of a CoP with effective mentoring created by
There are many entities with state-wide or national reach that could conduct such a study. For example, a state Department of Education (DoE) could examine this problem by mandating that all districts create CoPs with effective mentoring using social media and require that all induction year secondary mathematics teachers in the district are participants in the CoP. State DoEs could then compare secondary mathematics induction year teacher retention rates from the year that this mandate is enacted to the previous year secondary mathematics induction year teacher retention rates in those same districts. Teach for America, an organization that hires and trains high performing college graduates to teach for two years in high needs districts, has a presence in 35 states and could employ the same study. The New Teacher Project (TNTP) is another organization with a national presence that recruits and trains college graduates to teach in high needs districts. TNTP could employ this study and collect data to address this problem also. Accrediting bodies such as CAEP could adopt standards that require EPPs to create CoPs using social media with effective mentoring for their graduates, assign a faculty member to serve as an online mentor and collect data on the CoP, and maintain retention data as a condition for accreditation.

Each of the above studies would require major infrastructure and support from a national or statewide organization and approximately eighteen months to form the CoP, monitor the use of the CoP and the impact of the online mentoring, and compare retention numbers. As a necessary first step that might inform a more comprehensive study, this researcher conducted research on a local sample and collected data over one semester time period (four months). The data collected and analyzed from this local sample is intended to serve as a springboard for national organizations, states and districts, and
accreditation bodies who are focused on improving the induction year retention rates of secondary mathematics teachers.

The Carnegie Foundation for the Advancement of Teaching (Bryk, Gomez, & Gronow, 2010) recommends a method of research that focuses on improvement across a network of stakeholders using a Networked Improvement Communities (NIC) approach. The NIC model recognizes the slow and expensive nature of traditional research as well as the focus on research outcomes instead of improvement and advocates that local researchers perform research in their own contexts focused on improvement and then share the research with the NIC so that the improvement can be scaled up more quickly. Based on the NIC model, this researcher conducted a local study that can be scaled up to other groups who are networked to the particular group in this study.

CoPs have been shown to positively impact retention. Same subject mentors have been shown to positively impact retention. Therefore, this researcher presents findings on the extent that the OSG in this study functions as a CoP (with the structure specified by Wenger) and the extent that participation in the OSG mitigates factors known to negatively impact retention. The researcher examines and reports the impact of the participation of the same subject mentor on mitigating these factors and the impact of the participation of other members of the OSG on mitigating the factors. The specific retention factors that the strategies in this study aimed to mitigate were lack of professional and collegial support, such as working collaboratively with colleagues (Johnson et al., 2005; Simon & Johnson, 2013), feelings of isolation (Ferriter & Norton, 2004; Hadar & Brody, 2010; Neason, 2014; Rogers & Babinski, 2002), low student motivation (Metz, 1993; Public Agenda, 2004; Steinberg, 1996), and poor student
behavior (Allensworth et al., 2009; Ingersoll, 2004; Ingersoll & May, 2011; Johnson et al., 2005; Kapadia et al., 2007; Kukla-Acevedo, 2009; Ladd, 2011; Marinell & Coca, 2013). Other factors that have been shown to impact retention such as low salaries (Auguste, Kihn, & Miller, 2010; Hanushek, Kain, & Rivkin, 2004; Ingersoll, 2000; Ingersoll, 2001;), poor administrator support (Allensworth, Ponisciak, & Mazzeo, 2009; Boyd, Grossman, Ing, Lankford, Loeb, & Wyckoff, 2011; Curtis, 2012; Neason, 2014; Ingersoll, 2001; Johnson et al., 2012; Ladd, 2011; Marinell & Coca, 2013; McGraner, 2009; Simon & Johnson, 2013), and the school’s student demographics (Boyd, Lankford, Loeb, & Wycoff, 2005; Carroll, Reichardt, Guarino, & Mejia, 2000 Clotfelter, Ladd, & Vigdor, 2011; Hanushek et al., 2004; Ingersoll & May, 2010; Scafidi, Sjooquist, & Stinebrickner, 2007), were beyond the scope of this research and are left for others to investigate in the future.

**Objectives**

This study sought to investigate the efficacy of a Community of Practice (CoP) including a same subject mentor using social media in increasing the retention rates of induction year secondary mathematics teachers, by considering the following objective:

Conduct a netnography to qualitatively investigate the use of social media to support a Community of Practice (CoP) with effective mentoring among secondary mathematics teachers designed with strategies that are likely to impact retention positively.
Research Questions

Questions investigated during the course of this research were:

**Primary research question:**

What, if any, is the relationship between the retention of first-year secondary school mathematics teachers and their participation in an Online Support Group (OSG) that employs strategies for successful Communities of Practice (CoP) proposed by Wenger and includes a mentor who is trained in secondary mathematics education?

**Underlying questions:**

1. How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication?

2. What are the characteristics of this OSG of induction year secondary mathematics teachers and an online mentor?

3. To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger?

4. To what degree, if any, does participation in the OSG mitigate factors found in the literature known to negatively impact teacher retention?

5. To what degree, if any, does an off-site, online mentor who is trained in secondary mathematics education impact teacher retention?

Definitions

**Community of practice (CoP).** A group of people “who share a concern, a set of problems, or passion about a topic, and want to deepen their knowledge and expertise in an area by interacting on an ongoing basis” (Wenger et al., 2002, p. 4).
**E-mentoring – electronic mentoring.** Mentoring through strictly online communications.

**Induction program.** A structured form of support for beginning teachers.

**Induction year teacher.** First year teacher.

**Intern.** A university student who is seeking a degree in education and is placed at a school site under the apprenticeship of a Coaching Teacher.

**Netnography.** A type of virtual ethnography with the researcher serving as a participant observer in an online community.

**Networked Improvement Communities (NIC).** “A distinct network form that arranges human and technical resources so that the community is capable of getting better at getting better” (Englebart, 2003 as cited in Bryk, Gomez, & Grunow, 2011, p.6).

**Online Support Group (OSG).** “A group of people who have similar experiences and concerns and who meet in order to provide emotional help, advice, and encouragement for one another” (“Support group”, 2015).

**Same subject mentor.** A mentor who is trained and has practiced in the same field of study as the mentee.

**Social media.** “Forms of electronic communication (as Web sites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (as videos)” (“Social media”, 2015).

**Teacher candidate.** A university student who is seeking a degree in education.

**University supervisor.** An individual employed by a university whose job responsibilities include supporting and evaluating interns.
Significance of the Study

This study demonstrates the degree to which a Community of Practice (CoP) of induction year secondary mathematics teachers created through an Online Support Group (OSG) with an offsite mentor trained in secondary mathematics education can mitigate factors known to impact retention. Leaders of businesses, foundations, national and state governments, districts, schools, and Educator Preparation Programs (EPPs) all in pursuit of maximizing the supply and retention of secondary mathematics teachers will be able to use the results of this study to inform initiatives. The benefits to each of these entities are described in this section.

Businesses, foundations, national and state governments spend millions of dollars each year to recruit, train, and hire quality secondary mathematics teachers. If nearly 20% of these induction year teachers leave after the first year and by five years 50% are gone, the impact of these funds is minimal. This study offers evidence that a CoP created by an OSG can provide a viable strategy to retain these teachers and maximize the return on this investment.

Districts and schools are plagued with the financial and time-consuming issue of secondary mathematics teacher turnover. The positive impact of induction programs on teacher retention has been widely reported. However, the range of induction programs offered to new teachers runs the gamut from no formal induction program to multi-year, comprehensive induction programs. Many times the quality of the induction program is dependent on the funds set aside for this effort and the personnel available to lead it. This study offers evidence that an OSG CoP can provide a low cost component to an induction program. Districts or schools without formal induction programs can implement OSG
CoPs to begin an initial induction program for new teachers. Districts or schools with some sort of formal induction program can use OSG CoPs to enhance their current induction program or replace expensive induction components with this low cost alternative in order to siphon funding for other initiatives.

As a result of the newly adopted CAEP standards (August 2013), EPPs are now required to provide evidence of completer impact including retention data. Few EPPs currently track program completers beyond graduation and even less provide any support beyond graduation (Dickey, Oliver, & Fernandez, under review). Collecting this data and creating and implementing programs to impact this data could be very expensive. Leaders of EPPs responsible for assuring that programs comply with the new CAEP standards could use the methods of this study as a blueprint for creating OSGs to serve as CoPs to offer a low cost means for EPPs to track program completers in order to obtain retention data and to positively impact the actual retention.

This researcher created an OSG to serve as a CoP with effective mentoring for the first group of Noyce Scholars that graduated from the University of South Carolina (USC) and received certification in the summer of 2013. The National Science Foundation (NSF) Robert Noyce Teacher Scholarship Program “provides funding to institutions of higher education to provide scholarships, stipends and programmatic support to recruit and prepare STEM majors and professionals to become K-12 teachers” (American Association for the Advancement of Science, 2015, p.1). In an effort to increase the number of highly competent STEM teachers in high-needs districts, students who receive support from the Noyce program – Noyce Scholars – are required to complete two years of teaching in a high-need school district for each year of support. In
efforts to mitigate the high level of attrition after year one of teaching – especially in high needs schools – USC included a New Teacher Support Program (NTSP) in their accepted grant proposal to support Noyce Scholars into their induction year. One component of USC’s NTSP is to connect Scholars through a “web-based community … so that accomplishments and challenges that arise … can be monitored and addressed…” This researcher built this “web-based community” by creating an OSG to serve as a CoP with effective mentoring to support induction year Noyce Scholars. OSGs offer benefits not available with onsite CoPs. Examples include flexibility in “meeting” time, synchronous and asynchronous interaction, no geographical constraints, and greater potential for immediate feedback or action. Furthermore, examining the activity of Noyce Scholars in an OSG provided a method for an off-site mentor who is trained in secondary mathematics education to provide support that is independent of geographical proximity. For the above reasons, this researcher was an active member of this OSG by serving as the same subject, off-site mentor. Leveraging the national reach of the Noyce program, the results of this study can be shared and replicated with Noyce Scholars throughout the country.

USC is a member of another national organization – the Mathematics Teacher Education Partnership (MTE-Partnership) – whose goals include increasing the retention of secondary mathematics teachers. With a presence in 30 states, a strong leadership team, a partnership with the Carnegie Foundation, adoption of the NIC research model, and substantial funding, the MTE-Partnership will be positioned to scale up this research and, in fact, has decided to initiate a fifth Research Action Cluster addressing teacher
retention, mentoring, and induction (personal communication, Ed Dickey, member of MTE-Partnership planning committee).

**Delimitations**

The researcher limited this research to induction year secondary mathematics Noyce Scholars who studied at the University of South Carolina. Thus, this study provides preliminary data on a complex issue – the impact of an Online Support Group (OSG) Community of Practice (CoP) with an offsite mentor trained in secondary mathematics education on retention. But, because of the small, localized sample the results are not generalizable to other induction year secondary mathematics teachers and conclusions are limited to the unique sample and site of the research.

This study is delimited to one semester of implementation and data collection. Thus, this study is not able to report actual retention numbers, but is restricted to finding evidence that participation in an OSG CoP with an offsite mentor trained in secondary mathematics education mitigates factors found in literature that impact retention. A multi-year study could provide actual retention data.

This study is qualitative in nature and provides evidence as to what degree an OSG CoP with an offsite mentor trained in secondary mathematics education positively impacts retention. The study does not compare the retention rates of a sample of induction year secondary mathematics teachers who are part of an OSG CoP with a matched sample of induction year secondary mathematics teachers who are not part of an OSG CoP.
Chapter 2: Literature Review

Introduction

This study sought to investigate the efficacy of a Community of Practice (CoP) including a same subject mentor using social media in increasing the retention rates of induction year secondary mathematics teachers, by considering the following objective:

Conduct a netnography to qualitatively investigate the use of social media to support a Community of Practice (CoP) with effective mentoring among secondary mathematics teachers designed with strategies that are likely to impact retention positively.

Questions investigated during the course of this research were:

**Primary research question:**

What, if any, is the relationship between the retention of first-year secondary school mathematics teachers and their participation in an Online Support Group (OSG) that employs strategies for successful Communities of Practice (CoP) proposed by Wenger and includes a mentor who is trained in secondary mathematics education?

**Underlying questions:**

1. How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication?
2. What are the characteristics of this OSG of induction year secondary mathematics teachers and an online same subject mentor?

3. To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger?

4. To what degree, if any, does participation in the OSG mitigate factors found in the literature known to negatively impact teacher retention?

5. To what degree, if any, does an off-site, online mentor who is trained in secondary mathematics education impact teacher retention?

The review of the research and literature relevant to this study will begin with an overview of teacher retention in the US with an emphasis on secondary mathematics teacher retention. Next, the researcher will present the scholarship on two retention strategies which have shown promise and which will be employed in this study – Communities of Practice (CoPs) and same subject mentoring. Because this study employed an online approach to developing a CoP and to same subject mentoring, summaries of studies of online CoPs and online mentoring will be presented – again highlighting studies related specifically to secondary mathematics teacher retention. To provide background on the social media platform used in this study, an overview of Edmodo and research studies of the use of the Edmodo platform will follow. Next, the netnographic approach to research and investigations using this approach will be presented. This chapter closes with a description of the Carnegie Foundation’s Networked Improvement Communities (NICs) and the use of the Plan Do Study Act (PDSA) approach to improvement science – foundations that ground the approach to using this study as a seed to scale up future research.
Teacher Retention

For decades, many high profile reports have signaled alarms of the impending crisis due to teacher shortages (National Academy of Sciences, 1987; National Commission on Excellence in Education, 1983; NCTAF, 1996, 1997). The reports predicting these shortages cited large approaching increases in student enrollments and teacher retirements as causes. Large-scale recruitment efforts were set in motion. For example, in his 2011 State of the Union address, President Obama called for the recruitment and training of 100,000 new highly qualified science, technology, engineering, and math (STEM) teachers over the coming 10 years launching what became known as a “100K in 10” campaign.

During the period from 1987 to 2012, grades K-12 student enrollments increased by 19.4% (Ingersoll et al., 2014). In addition, high schools across the country increased the number of mathematics courses required for graduation resulting in a 69% increase in the number of students taking mathematics courses. Teacher retirements slowly increased, yet only amounted to 14% of the outflow. The supply of new teachers more than kept up with these developments. Pre-retirement voluntary turnover was the primary – yet under-recognized – cause of the teacher shortage (Ingersoll, 2011; Ingersoll & Perda, 2010). In the twenty-year timespan from 1988 – 2008, annual attrition from the teaching profession overall rose by 41% and the attrition rate for first-year teachers rose by 34% (Ingersoll et al., 2014). “Teaching does have less attrition – those leaving the occupation entirely – than some other occupations, such as child care, secretarial, and paralegal fields; teacher attrition is similar to that of police officers; and, teaching has higher attrition, perhaps surprisingly, than nursing, and far higher turnover than
traditionally highly respected professions, such as law, engineering, architecture and academia (Ingersoll & Perda, forthcoming as cited in Ingersoll et al., 2014, p. 22).

Ingersoll, et al.’s 2014 review of the literature shows that certain groups of teachers are subject to particularly high attrition: minority teachers, teachers who teach in poor schools, and beginning teachers. In addition, Ball (2012) described a particularly high rate of turnover among math teachers – in fact, reporting that the mode of years of teaching mathematics is just one.

The effects of teacher turnover are multi-faceted. The monetary cost of public school turnover has been estimated at over $7 billion per year (Barnes, Crowe, & Schaefer, 2007). Put another way, mid-size to large districts spend between $10,000 to $18,000 per teacher to cover all costs associated with the turnover of a single teacher (Alliance for Excellent Education, 2005; NCTAF, 2007; Shockley, Guglielmio, & Watlington, 2006). In addition to this economic cost, attrition has resulted in a teacher workforce that is “greener” (Ingersoll et al., 2014) or less experienced. With many research studies (Clotfelter, Ladd, & Vigdor, 2007a, 2007b; Goe, 2007; Grissom, 2011; Harris & Sass, 2007, McBride, 2012; Rivkin, Hanushek, & Kain, 2005; Ronfeldt, Loeb, & Wycoff, 2013) documenting the link between a teacher’s experience level and student achievement, the educational costs to students is of even greater concern. A third effect of turnover is the result of a lack of experienced educators to serve as mentors for new teachers (Loeb, Darling-Hammond, & Luczak, 2005). Some researchers – most notably Richard Ingersoll – have sought to shift the national conversation from recruitment of high quality teachers to retention in the profession in order to maximize the impact of money spent on recruitment. At least one major body with national influence – the
Council for the Accreditation of Educator Preparation (CAEP) – has responded by creating policy aimed at addressing retention (CAEP, 2013). Suggesting that it is no longer enough for Educator Preparation Programs (EPPs) to prepare teachers to obtain certification, CAEP has placed a significant weight on EPPs to track program graduates into their teaching careers. In its 2013 standards for accreditation, the “Program Impact” standard requires EPPs to collect data on program completer retention. The Commission recommends that CAEP gather the following data and monitor them annually from all providers: “results of employer surveys, including retention...” (CAEP, 2013, p. 16). Significant changes in areas such as retention numbers could result in revocation of accreditation status – for concerning retention numbers – or the ability to receive a higher level of accreditation – for particularly positive retention numbers.

Many studies (e.g. Boyd et al., 2007; Glazerman, Isenberg, Dolfin, Bleeker, Johnson, Grider, & Jacobus, 2010) have sought to uncover the reasons teachers stay or leave and the impacts of various initiatives directed at positively impacting retention. Large-scale literature reviews and meta-analyses regarding the retention of teachers (e.g., Borman & Dowling, 2008; Guarino, Santibanez, & Daley, 2006; Johnson et al., 2005; Prince, Koppich, Azar, Bhatt, & Witham, n.d.) and specifically the retention of mathematics teachers (e.g., California Mathematics Project, 2012; Math for America, 2009) have summarized the research. The consensus is that large-scale, longitudinal studies that accurately track the movements of teachers and the reasons that teachers stay or leave have yet to be done (Ingersoll, 2012; Math for America, 2009; Simon & Johnson, 2013). Due to the difficulties of tracking teacher mobility, a national working group studying mathematics teacher retention advocates designating local researchers –
leveraging proximity and trust – to track teacher mobility and report local nuances –
discovered especially through interviews – information that national studies fail to
uncover (Faughn, Pence, Canzone, & Tuba, 2012).

Many small-scale studies have sought to identify reasons for attrition and the
impact of various interventions. The list that follows includes factors impacting retention
that have been identified and the literature that identified that factor:

• lack of support (Ingersoll, 2001; Johnson & The Project on the Next Generation
  of Teachers, 2004; Smith & Ingersoll, 2004),
• lack of professional and collegial support, such as working collaboratively with
colleagues (Johnson et al., 2005; Simon & Johnson, 2013),
• isolated working conditions (Ferriter & Norton, 2004; Hadar & Brody, 2010;
  Neason, 2014; Rogers & Babinski, 2002),
• poor student behavior (Allensworth et al., 2009; Ingersoll, 2004; Ingersoll &
  May, 2011; Johnson et al., 2005; Kapadia et al., 2007; Kukla-Acevedo, 2009;
  Ladd, 2011; Marinell & Coca, 2013),
• student apathy (Metz, 1993; Public Agenda, 2004; Steinberg, 1996),
• poor salaries (Auguste et al., 2010; Hanushek et al., 2004; Ingersoll, 2000;
  Ingersoll, 2001),
• lack of support of administrators or school leadership (Allensworth et al., 2009;
  Boyd et al., 2011; Curtis, 2012; Neason, 2014; Ingersoll, 2001; Johnson et al.,
  2012; Ladd, 2011; Marinell & Coca, 2013; McGraner, 2009; Simon & Johnson,
  2013),
the school’s student demographics (Boyd et al., 2005; Carroll et al., 2000
Clotfelter et al., 2011; Hanushek et al., 2004; Ingersoll & May, 2010; Scafidi et al., 2007),
lack of classroom autonomy (Curtis, 2012; Ingersoll & May, 2010),
perception of the “professional status” of teaching (Auguste et al., 2010),
teacher’s “sense of success” with their students (Johnson & Birkeland, 2003;
Ingersoll & The Project on the Next Generation of Teachers, 2004),
teacher input into decision making (Ingersoll, 2001),
working conditions, (Allensworth et al., 2009; Ingersoll, 2001; Johnson et al., 2012; Ladd, 2011; Smith & Ingersoll, 2004),
school culture or environment (Allensworth et al., 2009; Ingersoll, 2001; Johnson & Birkeland, 2003; Johnson & The Project on the Next Generation of Teachers, 2004; Simon & Johnson, 2013),
teacher-parent relationships (Allensworth et al., 2009),
safety of environments for students (Allensworth et al., 2009, Marinell & Coca, 2013, Public Agenda, 2004),
working with colleagues that lack a high expectations for students (Achinstein & Ogawa, 2011; Cochran-Smith et al., 2012; Johnson & Birkeland, 2003; Kardos & Johnson, 2007; Rosenholtz, 1989),

Factors that appear repeatedly in literature as having positive impacts on teacher retention are:

- a professional community of practice (Pence, 2012),
• instructional and emotional support from colleagues and administrators (Johnson & Birkeland, 2003; Liu, Johnson, & Peske, 2004),

• induction programs or novice support including mentoring (Allensworth et al., 2009; Cochran-Smith et al., 2012; Fisher, 2009; Ingersoll, 2003, 2012; Ingersoll & Strong, 2011; Kapadia et al., 2007),

• collegial relationships/peer collaboration (Fisher, 2009; Ingersoll & May, 2010; Johnson, 2006; Johnson & Birkeland, 2003; Johnson & The Project on the Next Generation of Teachers, 2004; Johnson et al., 2012; Kardos et al., 2001; Little, 1982; Marinell & Coca, 2013),

• strong professional development (Polly & Lehew, 2012),

• strong preparation in pedagogy and subject-knowledge including student teaching experience (Johnson & Birkeland, 2003; Liu, Johnson, & Peske, 2004), and

• positive working conditions (Johnson & Birkeland, 2003; Liu et al., 2004).

Researchers (as described above) have identified a multitude of factors associated with teacher-turnover and reported on a variety of strategies aimed to impact retention. Because this researcher’s study uses the strategies of same subject mentoring and a supportive CoP to mitigate the factors of lack of support, lack of opportunities to collaborate with colleagues, isolated working conditions, low student motivation, and poor student behavior – more details of studies involving mentoring and CoPs will be described next.

**Induction with Mentoring**

Over 50 studies and research reports were found that addressed induction of new teachers. Some of the key findings were reported by Ingersoll and his collaborators –
comprehensive induction programs reduced teacher turnover by over 50% (Ingersoll & Smith, 2004). Villar and Strong (2007) attached a monetary savings to this impact – “a return after five years of 1.66 for each dollar invested” (p.14). Many scholars agree that the most important component of an induction program is mentoring (Alliance for Excellent Education, 2014; Fulton, Yoon, & Lee, 2005; Makkonen, 2004).

More than half of states require, and often fund, induction programs, but the composition of these programs varies widely (Alliance for Excellent Education, 2014) and access is inequitable. Only about half of beginning teachers are paired with mentors trained in their subject area (Darling-Hammond, Wei, Andree, Richardson, & Orphanos; 2009; Ingersoll, 2012; Ingersoll & Strong, 2011). Participation in induction and mentoring programs is significantly lower in schools with the highest percentage of poor and minority students (Alliance for Excellent Education, 2014; Goldrick, Osta, Barlin, & Burn, 2012; Wei, Darling-Hammond, & Adamson, 2010). In schools where there is a high percentage of underqualified teachers – teachers who could benefit most from a well-trained mentor – expert educators who would serve mentors are in shortest supply (Shields et al., 2000).

In its report – On the Path to Equity – the New Teacher Center (NTC) (Alliance for Excellent Education, 2014) studied the volume of research on teacher retention and made several recommendations. One recommendation relevant to this study follows:

States and districts should…the New Teacher Center (NTC) (Alliance for Excellent Education, 2014) studied the volume of research on teacher retention and made several recommendations. One recommendation relevant to this study follows:

States and districts should…require comprehensive induction programs for new teachers following entry-level licensure, extending for a minimum of two years.

Successful completion of a high-quality induction program that provides
embedded coaching and feedback by well-trained mentors should be a requirement for professional licensure (p. 12).

**Mentor Quality.** One issue with mentoring referenced above is ensuring the quality of mentors. James B. Rowley’s *The Good Mentor* (1999) and NCTM’s *Empowering the Mentor of the Beginning Mathematics Teacher* (Zimmermann et al., 2009) serve as foundations for quality mentor interaction. In *The Good Mentor* article, Rowley combines his years of experience creating mentor-based entry-year programs for new teachers and the findings of scholarly literature to develop a list of qualities of “good mentors.” According to Rowley, the good mentor:

1. is committed to the role of mentoring,
2. is accepting of the beginning teacher,
3. is skilled at providing instructional support,
4. is effective in different interpersonal contexts,
5. is a model of a continuous learner, and
6. communicates hope and optimism (pp. 20-22).

In addition, NCTM’s publication provides practical “how to” knowledge for individuals who are specifically involved with mentoring new mathematics teachers. Although this guidance is organized in one document, it is actually the compilation of separate manuscripts written by mentors and mentees providing advice for mentors of the beginning mathematics teacher based on their individual experiences. In “Section 3: What a Mentor Does” Nancy O’Rode and Nancy Terman report on research involving thirty mentors over a three-year period. They report that “the mentors played three general roles: resource, relationship builder, and change agent” (Zimmermann et al.,
This researcher used the advice of Rowley and O’Rode and Terman to create guidelines for mentor interaction. These guidelines are described in Chapter 3.

**Online or E-mentoring.** A second issue with mentoring referenced above is ensuring that induction year teachers have access to these quality mentors. The provision of online mentors has been used to ameliorate access issues. The impact of online mentoring on new teachers, advantages of online mentoring compared to face-to-face mentoring, and a description of successful online mentoring programs follows.

Research shows that online mentoring programs have produced similar benefits to teachers as face-to-face mentoring programs. In a study of elementary school pre-service teachers, Tolbert (2008) found that “pre-service teachers who received online mentoring had statistically higher teaching confidence in both mathematics and science than pre-service teachers who did not receive online mentoring” (p. 1). As mentioned previously, confidence in teaching ability has been linked to retention (Johnson et al., 2005). In a study of the Early Support Program (ESP), an online mentoring program for new mathematics and science teachers in Australia, one participant shared how the program reduced his or her feelings of isolation (also associated with attrition).

The ESP… was also a source of support through the process, because all too often there is no one as a sounding board, there is no one to advise you or give you some feedback where relationships are concerned. That’s one of the reasons why there is a high dropout rate of teachers at the younger level, because they do not know who to turn to. If you have someone experienced it is just invaluable (CS mentee 1, 2009) (Ormond, 2011, p. 62).
In addition to sharing the benefits of face-to-face mentoring, online mentoring offers additional advantages over traditional face-to-face mentoring including:

- lack of time constraints (Kasprisin et al., 2003; Martinez, 2004),
- independence of geographical constraints (Kasprisin et al., 2003; Martinez, 2004),
- “mentees take a far more active role in seeking information when they are ready for it” (Martinez, 2004. p. 101), and
- “a more distanced and reflective – perhaps also more relaxed” interaction (Ormond, 2011, p. 68).

New teacher support organizations and universities have begun to implement online mentoring programs in order to assist and retain new teachers. One current example of a successful national e-mentoring program for mathematics, science, and special education teachers is eMSS – the New Teacher Center’s (NTC) e-Mentoring for Student Success. According to its website the NTC has found that eMSS has accelerated the effectiveness, increased the satisfaction, and increased the retention of these teachers (NTC, n.d.). One drawback to eMSS is the cost - $1200 per teacher for one year in the program. The University of Chicago’s Urban Teacher Education Program (UTEP) offers a two-year graduate education program that includes three years of continued support including an online professional support community. According to the program’s website, “ninety percent of UChicago UTEP graduates are still teaching in Chicago Public Schools or urban school districts after five years” (The University of Chicago Urban Teacher Education Program, 2015). In 2012, using a $2 million grant from the Florida Department of Education and Race to the Top, the College of Education at the University of Florida (UF) created STEM-Teacher Induction and Professional Support
(STEM TIPS) to support science and mathematics teachers statewide during their first two years teaching. According to its website, “STEM TIPS is an online instructional coaching platform supporting teacher preparation programs and school districts in developing and retaining new teachers” (Florida STEM TIPS, n.d.). Although UF has not reported the impact on retention, 100% of teachers found STEM TIPS very useful or useful and STEM TIPS’ influence is growing. Recently, Montclair State University, University of Maryland, and The University of Vermont have joined UF as STEM TIPS partners (Florida STEM TIPS, n.d.).

**Communities of Practice (CoP)**

Because CoPs are such an important part of this researcher’s study, this section will include defining key elements of CoPs and presenting findings from research studies and reports. Over 20 studies and research reports concerning CoPs were reviewed for this study.

A CoP is a group of people “who share a concern, a set of problems, or passion about a topic, and want to deepen their knowledge and expertise in an area by interacting on an ongoing basis” (Wenger et al., 2002, p. 4). In CoPs, “learning is viewed as a social activity that occurs primarily in the context of work (as opposed to training)... Informal learning opportunities occur regularly in the context of daily practice, typically in the form of focused episodes dealing with real problems” (Schlager & Fusco, 2003, p. 21). Anthropologist Jean Lave and educational theorist and practitioner Etienne Wenger coined the term, “community of practice” when studying apprenticeship as a learning model – noticing that the community of journeymen and more advanced apprentices served as a “living curriculum” for the apprentice (Wenger, n.d.).
For a community to be a CoP, according to Wenger (n.d.) three characteristics are crucial: “the domain, the community, and the practice.” This researcher’s study sought to create an online CoP with these key characteristics to positively impact retention. Each of these characteristics is described further here and the degree to which the OSG in this study functioned as a CoP with these characteristics will be described in Chapter 4.

The domain. A CoP has a common domain of knowledge and interest. Belonging to the CoP indicates that members have a commitment to and competency in this area of interest that separates them from other people.

The community. Members of a CoP share, discuss, collaborate, and help one another in regards to their domain of interest. Building trusting relationships enables members to learn from one another. They do not need to interact daily, and they can practice in isolation, yet the interactions that they have are essential to influencing their practice.

The practice. Members of a CoP are actively practicing in the shared domain of interest. Sustained interaction in the CoP provides an arena for sharing resources, experiences, and ideas for addressing issues in order to influence practice.

Wenger et al. (2002) identified seven actions that could be taken in order to cultivate communities of practice. These seven recommendations are described below.

Seven Principles for Cultivating Communities of Practice

1. Design for evolution. The interests and goals of members of the CoP are dynamic and the CoP should be open and supportive of shifts in focus.

2. Open a dialogue between inside and outside perspectives. Although members of the CoP are experts in the shared domain of interest and learning from one
another is a significant source of growth, members should also be open to ideas from outside the CoP that could improve their practice.

3. Invite different levels of participation. Wenger and his colleagues identify 3 main levels of participation: a) The core group who participate intensely – often suggesting topics of discussion and soliciting feedback from members – essentially taking leadership roles in advancing the learning of the group in regards to the shared practice, b) The active group who participate regularly, but do not generally lead discussions, and c) The peripheral group who do not generally lead or engage in discussions intensely or even regularly, but occasionally participate in CoP discussions. This peripheral group – although basically passive – still benefits from the interactions of the CoP. Members will shift their levels of participation based on the interest in a particular line of discussion. In addition to these three main levels of participation, there are also individuals outside the group who are interested in the interactions of the group.

4. Develop both public and private community spaces. Most of the interactions of a CoP are in a public forum – public to the members of the CoP, yet closed to people outside the CoP. However, in healthy CoPs, private member to member interactions develop outside the public forum in order to expand or clarify a discussion or enhance member relationships.

5. Focus on value. CoP interactions should focus on the domain of interest so that members experience the value expected in the community. In addition, members should be encouraged to explicitly discuss the value of the community.
6. Combine familiarity and excitement. CoPs should offer the routine learning experiences expected, yet also provide unique discussions and divergent viewpoints in order to provide unexpected learning experiences and keep the group vibrant.

7. Create a rhythm for the community. CoPs should have a somewhat predictable pattern of interaction – not too little or too much – so that members are encouraged to stay involved, yet are not overwhelmed with the commitment.

The researcher created guidelines for the CoP in this study using these seven recommendations as a blueprint. Occasionally, the researcher deviated from Wenger’s tenets. The guidelines and the reasoning for any deviations are described in Chapter 3.

Complementing the work of Wenger, Wasko and Faraj (2000) identified three barriers that inhibit individuals in a CoP from engaging in knowledge exchange. Each of these barriers is described below.

1. *Egos and personal attacks.* Participants in CoPs reported that some CoP members are always searching for a flaw in knowledge or ideas presented by other community members and strive to “one-up” them with superior explanations or ideas. These attacks degrade a person’s self-esteem and lead to a lack of participation.

2. *Large overwhelming CoPs.* When CoPs become too big, the experience level and expertise level of members generally becomes more varied. Sifting through volumes of information to find relevant, valuable content is daunting and frustrating.
3. **Time constraints.** Participants of online communities report that keeping up with the volume of messages in an online community can be extremely time-consuming. Thus, participants of CoPs with full-time jobs find it difficult to find the time to participate fully in professional CoPs.

The researcher referenced these three barriers when creating the guidelines for the creation and facilitation of the CoP in this study in an effort to maximize the success of this CoP. Recognition of these barriers also motivated the researcher to create a responsible use policy. The CoP guidelines and responsible use policy will be described in Chapter 3.

Wenger (1998) identified stages that a CoP goes through as outlined in Figure 2.1.

![Figure 2.1 Wenger’s stages of development of a community of practice. Adapted from “Communities of practice learning as a social system,” by E. Wenger, 1998, Systems Thinker, 9(5). Copyright 2001 by publisher. Adapted with permission.](image-url)
This researcher used Wenger’s model to monitor the stages of development of the OSG CoP in this study.

Many scholars have studied the impact of a CoP on teachers – specifically in regards to retention. In fact, this researcher was a member of a working group through the Mathematics Teacher Education Partnership and was charged to research and co-author a section of a white paper on mathematics teacher retention within the profession. The California Mathematics Project Supporting Teachers to Increase Retention (CMP STIR) Monograph: Mathematics Teacher Retention (2012) – a collection of research studies that document the success of various mathematics teacher retention strategies – was the key resource for the literature review in the white paper. The findings related to the impact of a CoP on mathematics teacher retention were described in the white paper and are repeated here. In a study in South Africa, Mellony Graven (2012) found that a “well-functioning supportive community of practice provides a safe space for strengthened professional mathematical teacher identities, strengthened investment in the profession, and longer term trajectories that support retention.” Janna Canzone (2012) studied the effectiveness of connecting secondary mathematics teachers through a video club in low-performing districts where retention is historically low. When participants were asked if the “video club had helped them feel supported as a teacher and had made them more likely to stay in teaching after participating in the program,” 88 % agreed. The Noyce Urban Mathematics Educator Program (UMEP) at Georgia State University set a goal to “recruit, prepare, induct, and retain 40 students with undergraduate backgrounds in mathematics, or mathematics related fields into teaching” (Thomas, 2012, p. 131). The UMEP emphasizes creating CoPs via an online professional learning community. In
high-needs schools, 90% of UMEP teachers remained beyond three years. The New Teacher Network (NTN) within NebraskaMATH is a three-year mentoring and professional development program for new secondary mathematics teachers in Nebraska. It focuses on three key components: graduate coursework, mentoring, and CoPs. Because many new teachers in Nebraska are isolated due to geography, the researchers attribute the development of a CoP as the key ingredient to the success of the NTN. Results are impressive – only one of the 40 new mathematics teachers who joined NTN left the profession over the three-year period (Smith, Graupner, Hayek, & Welker, 2012). The California Mathematics Project Supporting Teachers to Increase Retention (CMP STIR) was a multi-year study incorporating CoPs in order to positively impact retention. CMP STIR sites saw average yearly retention rates drop from 20% pre-program to 6% after three years of the program (Pence, 2012). A quote from a participant personalizes the importance of the CoP – “The camaraderie, the collaboration helped me and my colleagues. Developing a professional learning community. One of the reasons why I am still here” (p. 40). Supportive CoPs bring teachers together to alleviate isolation and supply a safe place to expose weaknesses and thus advance content knowledge and best practices and increase confidence – all factors which positively impact quality retention.

A recent report by the New Teacher Center (NTC) – *On the Path to Equity* (Alliance for Excellent Education, 2014) confirms the findings described in the CMP STIR monograph regarding the success of implementing CoPs to positively impact mathematics teacher retention. After studying the volume of research on teacher retention, the NTC made several recommendations. The following recommendation is relevant to this study:
High-performing districts create the organizational conditions for structured collaborative learning with peers focused on improving student learning and addressing problems of practice (p. 12).

CoPs provide a structure where collaborative learning opportunities flourish.

Effective CoPs can be formed online, yet must have careful design and implementation. Online CoPs have advantages of synchronous and asynchronous communication and are free of geographical and time constraints. CoP members have access to one another twenty-four hours a day, seven days a week as long as they have access to the internet. However, access and convenience alone are not enough to assure that members will use an online CoP. In their research of an online CoP model, Schlager, Fusco, and Schank (2002) report on why online CoPs fail. One factor is that creators and facilitators of online CoPs have little experience with the technology and offer minimal training on the technology to CoP members. In addition, tangible incentives are not offered to participants. Schlager et al. recommend that creators and facilitators of online CoPs invest time upfront to learn the technology and how to effectively use it, train CoP participants, and then provide meaningful incentives for participation. This researcher heeded these recommendations and created an incentive system for participation in the CoP in this study. This incentive system is described in Chapter 3.

Social Media and Edmodo

The explosive growth of Web 2.0 technologies – sites that emphasize dynamic user-generated content as opposed to static websites – particularly social media platforms – expanded the options for creating online CoPs. A background on social media applications, a description of various social media platforms considered for this research
(with a significantly more thorough description of the platform used in this study – Edmodo), and a reporting of results from select research studies on the use of social media to create a CoP follows.

In the past, most e-learning applications (e.g., WebCT and Blackboard) were “designed to support highly structured, university style learning situations and therefore may not be the most appropriate for informal, highly contextualized learning in an educational community of practice” (Schlager & Fusco, 2003, p. 21). The authors further point out that teachers in a CoP needed a different style of platform – one with capabilities for collaboration and informal learning where “any member of the community (has) the technical capabilities and social support required to take on leadership roles” (p. 26). The boom of social media applications in the last decade has created many platforms that are easily accessible and user-friendly and ideal for the informal, collaborative style of communication – with shifting leadership roles – necessary for successful CoPs. *Merriam-Webster’s Online Dictionary* defines social media – a term first used in 2004 – as “forms of electronic communication (as Web sites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (as videos)” (“social media”, 2015). A useful summary diagram was created by Brian Solis and JESS3 and can be reviewed at The Conversation Prism website (The Conversation Prism, 2015). The social media platforms considered for this study were: Basecamp, Blackboard, Edmodo, Facebook, Google, Instagram, LinkedIn, Skype, Twitter, Wiggio, and YouTube. A brief description of the ten platforms not chosen for this study will be followed
by a more detailed description of the platform chosen for this study – Edmodo. Unless indicated otherwise, information was obtained from each platform’s website.

Basecamp is a web-based project management tool with initial roots to 1999, yet officially launched in 2004. It can be used on the Mac, PC, iPhone/iPad, and Android and has apps for the iPhone/iPad and Android. As of 2014, Basecamp is free to teachers to use within their own classrooms, however there is fee ranging from $20-$250 per month for use outside of this constraint. Pricing is based on number of projects and number of gigabytes needed and is independent of the number of users per project.

Blackboard Learn is a learning management system used in K-12, higher education, and professional training and development with tools to engage and collaborate with students and grade and track assignments. Blackboard is not something that an individual teacher can set up – it must be purchased school-wide. It is costly and each price quote is customized to the institution. It also is often described as complicated to use – yet comprehensive.

Facebook is a free, popular social networking service launched in 2004 and now has over 1.39 billion users world-wide. Registered users can create profiles and upload photos and video. They can post text, photos, videos, and web links to their “newsfeed” and can determine who is allowed access to their newsfeed. Users can indicate that they like another user’s post by clicking a “like” button and can comment on another user’s post. Registered users can send messages privately – like email – and can create secret groups to share posts privately within the group.

Google – known primarily for its popular electronic search engine – has a suite of products including a cloud storage service (Google Drive) and a social networking
service (Google +). Google Drive was launched in 2012 and allows users to store and share files publicly or with specified individuals. Users can use collaborative editing tools to work together on files. Google + was launched in 2011 and has over 540 million active users. Google often describes Google + as a “social layer” across all of Google’s services. Users can post photos and status updates to the stream or interest based communities. Users can create groups – called Circles. Users can use Hangouts for multi-person instant messaging, and text and video-chatting. Users can also tag events and locations and edit and upload photos to private cloud-based albums. Users can use the +1 feature to indicate that they “like” another user’s content. Google + is available on the Android, iPad, and iPhone.

Instagram, launched in 2010 and acquired by Facebook in 2013, is a free service available for the iPhone, iPad, iPod Touch, and Android that provides photo-sharing, video-sharing, and social networking. Third-party applications are available for the Blackberry 10 and Nokia-Symbian Devices. Several filters are available to offer photo enhancements. Users can post the location of the photo or video. Users can choose to make their photos public or private for the viewing of only their “followers.” Users can ask other users to “follow” them to be able to view and comment on their private photos. Videos are limited to 15 seconds. Users can create a profile including recently shared photographs, biographical and personal information. Users can use a feature called Direct to send photos to a single specific user or group of users instead of making it viewable to all followers. Users can share uploaded photos and videos on a variety of social networking platforms such as Facebook, Twitter, Tumblr, and Flickr. Currently Instagram has over 300 million users.
LinkedIn is a business-oriented social networking site providing users an opportunity to establish and document “connections” with individuals that they know and trust professionally. Basic membership to LinkedIn is free. Users can attempt to connect to anyone whether a LinkedIn user or not. Once a user has connections, he or she can attempt to make second and third-degree connections though permissions of his or her first connections. This is meant to model the way that professionals network offline. Users can find jobs, people, or business opportunities through connections. Users can view the profile of hiring managers to see if they have any connections in common to provide an introduction. Users can “like” and “congratulate” each other’s updates. Members can list books they are reading, display their latest blogs, and “recommend” products or services. LinkedIn gives users the ability to create private groups. Users can endorse each other’s skills. Users can also pay for premium accounts with additional features such as the ability to solicit connections without introductions from established connections, to see who has viewed their profile page and how they arrived there, and to perform a reference check on someone. LinkedIn was launched in 2003 and currently has over 347 million users world-wide. It is available on the iPhone, iPad, Android, and HTML5.

Skype is a voice communication service – first released in 2003 and currently owned by Microsoft – with over 660 million users worldwide. Skype allows users to make PC to PC calls for free – as long they have an internet connection – worldwide. Users may talk or instant message during the Skype sessions. Users must have a PC with sound, speakers, a microphone, and Skype software – which is free to download. Skype provides a means for video conferencing and public chats. Users can pay monthly
fees to communicate with Skype on mobile devices or landline phones. Skype can be
used on Android, Blackberry, iOS and Windows smartphones and tablets, Nokia,
PlayStation, and Samsung Smart TV.

Twitter is a free social networking service allowing users to send and read 140-
character messages called “tweets.” Registered users choose who to “follow” – in other
words – whose tweets to read, and who can “follow” them – or read their tweets.
Messages are public by default, but users can restrict delivery to just their followers.
Messages from those that a user follows will show up on the user’s timeline. Users can
hashtag (#) key words to group messages about a certain topic. Users can use the @ key
followed by a username to mention or reply to other users. Users can use a “retweet”
button to share messages that they like. Users can include videos or images in their
tweets. Twitter was founded in 2006 and has 284 million monthly active users. Twitter
has mobile apps for iPhone, iPad, Android, Windows Phone, BlackBerry, Firefox OS,
and Nokia S40.

Wiggio is a free Web application, launched in 2008, with a focus on group
collaboration, offered by Desire2Learn. Wiggio allows users to host virtual meetings and
conference calls, manage events with a shared calendar, create to-do lists and assign
tasks, poll your group in real time, send email, text, and voice messages, and upload and
manage files in a shared folder. Wiggio currently has over 1.5 million users and 150,000
groups and is available as an iPhone app or from wiggio.com.

YouTube is a video-sharing website launched in 2005 and purchased by Google
in 2006. Registered users can upload videos – up to 15 minutes in duration. If a
registered user has a good track-record of loading appropriate videos he or she can
receive authorization to upload videos up to 12 hours in length. Unregistered users can watch YouTube videos through the YouTube website. In addition, each YouTube video has an HTML that can be used to embed YouTube videos in websites or blogs – usually so users can share a video with others. YouTube videos can be viewed on devices including Apple TV, iPod Touch, the iPhone. YouTube is available as an app for the iPhone, the Android platform, Xbox Live, the Wii, WiiU, and Nintendo 3DS. Users can comment on videos – but must use a Google + account to do it.

As mentioned previously, Edmodo was the social media platform used in this study and therefore a more detailed description of the Edmodo platform follows. Edmodo is an online social media platform created by Nic Borg and Jeff O’Hara in 2008 – under the Web 2.0 umbrella – designed primarily for teachers to digitally connect and collaborate with students to improve learning outcomes. Over 80 of the 100 largest school districts in the US use Edmodo (Carr, 2013). Edmodo is an interactive Learning Management System (LMS) where teachers can create, manage, and grade assignments and communicate real-time with students through the use of messages and polls. Parents can also view all student information by using their student’s account or teachers can create a separate environment for communication with parents.

Another key use of Edmodo – the use relevant to this study – is for educators to “collaborate with colleagues to share insights and ideas and experience the power of social learning in action” (Edmodo, 2015b). Edmodo is often described and marketed as “the Facebook for schools.” The Edmodo website (Edmodo, 2015a) touts that Edmodo is “the world’s largest K-12 social learning community.” Anyone can create a free Edmodo account – and over 50 million users have done just that. In this free social media
platform – developed by educators for educators – members exchange messages free of the character limits of other social media platforms. Messages can contain videos, web links, and photos. Members can attach useful documents to posts easily. Messages and responses are threaded for ease of following. Edmodo is accessible through a desktop computer with an internet connection or through mobile apps on Android, iPad, iPhone, and Windows devices.

In addition to connecting with educators world-wide, a key feature of Edmodo – central to the design of this study – is the ability of a member to create a private, secure group and invite other members to join. The author of a group creates a group and gives desired members a six-digit code in order to join the group. If an uninvited person obtains the secret code, the group author can deny access to the person and change the group code without affecting those individuals who have already joined the group. The group author can delete the posts of any members at his or her discretion and anonymous postings are not possible within the secure group. Members can communicate with all members of the group and private message the author.

One drawback to Edmodo in regards to teacher-only OSGs is that member-to-member private messaging is not available within a group. However, this feature is actually a necessary, purposeful security measure. As mentioned earlier, Edmodo was primarily designed for teachers to interact with students to improve student learning. The process for teachers to set up this communication with students is to create a private group for each class of students. Once a teacher has a class as a private group – he or she can share information that is pertinent to that class without other classes being bombarded by extraneous information. Students and the teacher can post to the group
and the teacher can private message a student and vice versa, but students cannot private message one another. If students were able to private-message one another, any benefits of teachers and students using Edmodo could be obliterated by a single inappropriate message exchanged between students. The teacher would not have been able to prevent it – and some might even say he or she enabled it – and he or she would also have no idea that it had happened. It is this security feature that prevents teacher-to-teacher private messaging within a private Edmodo group.

Researchers have studied students’ perceptions of the efficacy of Edmodo as a learning tool with university students in Malaysia (Balasubramanian, Jaykumar, & Fukey, 2014), Thailand (Kongchan, 2012; Thongmak, 2013) the Philippines (Enriquez, 2014), and Japan (Hourdequin, 2013). Other researchers have studied the impact of Edmodo on student engagement (Sanders, 2012) and academic achievement (M. Cruz & S. Cruz, 2013; Nee, 2014). Kongchan (2012) also reported on the ease of use of Edmodo for teachers who are not digitally savvy. In her dissertation, Torrey Trust (2014) described how teachers learn in an online CoP – the Math Edmodo Community.

However, a gap in the literature exists. Empirical studies that document the efficacy of Edmodo as a tool to create a CoP structured with characteristics designed to foster collaboration and support in efforts to reduce isolation and positively impact mathematics teacher retention have yet to be done. However, anecdotal evidence foreshadows promise. After implementing Edmodo as a Learning Management System district wide in a school district in Virginia, Adam Selow, director of technology for the district reported that in addition to the benefits to students, “Edmodo has been a great tool for teachers to collaborate with each other and share lesson plans and best practices” (Raths,
In a separate example, the Office of School and Student Success at the Washington State Office of the Superintendent of Public Instruction adopted the use of Edmodo to connect educators throughout the state (Stuart & Hale, 2014). Although the state has not performed an empirical study on the efficacy of using Edmodo for teacher support and collaboration, Stuart and Hale (2014, p. 202) report that the “Office of Student and School Success is continuing to implement its vision for using Edmodo to support CoPs through shared activities” and due to the their success, they plan to expand and formalize the use of Edmodo to foster support and collaboration through targeted initiatives.

Many social media platforms could be used to create an OSG to serve as a CoP of induction-year secondary mathematics teachers. Edmodo was used in this study and the research surrounding the use of Edmodo for this purpose is scant.

**Netnography**

The netnographic method of research – virtual ethnography – was used in this study. Because this study is an investigation of the efficacy of social media to create a CoP in order to positively impact retention – and thus, involved the researcher creating, participating in, and examining the interactions of an online community – the netnographic research method was a natural fit. The scholarly literature on netnography begins with the etymology of the term “netnography” coined by Robert Kozinets in 1997 in an effort to modify accepted ethnographic research procedures in order to establish a consistent, accepted set of procedures for this specific model of research of an online community. Kozinets’ book, *Netnography: Doing ethnographic research online* (2010a), serves as the “how-to” book for researchers who desire to conduct netnographic research.
A brief description of the key tenets of netnographic research and an overview of studies that have used the netnographic research method will be described here.

The term “netnography” combines the familiar terms of “internet” and “ethnography” to describe a new research method. Kozinets’ netnographic method modifies the following well-established practices of ethnography – “identifying a field of study, ensuring ethical research practices, finding a role and managing entry, finding informants, developing and maintaining relations in the field, arranging data collection in situ” (Cohen, Manion, & Morrison, 2011 as cited in Wesely, 2013, p. 308) – in order to provide a Geertzian “thick” description of an online community. This “thick description” explains not just the behavior of a group of people – but the context from an insider’s perspective, so that someone from outside the community can understand its meaning (Geertz, 1973). Netnographies go beyond the counting of words in the texts of an online community, as might be done in a content analysis, and rely heavily on the researcher’s participant observation to examine not only what participants are saying, but why.

Kozinets created a five-step procedure for conducting netnographic research: entrée, data collection and analysis, providing trustworthy interpretation, ensuring research ethics, and member checks (See Figure 2.2). Although the figure suggests a sequential process from entrée to member checks, the steps of the netnographic research process are very much intertwined. A brief description of each of these five steps follows.

**Entrée.** Entrée involves research planning including developing research questions, identifying a sample, identifying a site, and determining the role of the
Figure 2.2 Kozinets’ five step procedure for conducting netnographic research.

Each of these steps of entrée will be described below.

Research questions. Netnographic research questions should be broad and exploratory and follow the same guidelines as other qualitative research methods. Creswell (2009, pp. 129-31) suggests the following guidelines for writing broad research questions to guide qualitative inquiries:

- Ask one or two central questions followed by no more than seven sub-related questions.
- Relate the central question to the specific qualitative strategy of inquiry.
- Begin the research questions with the words ‘what’ or ‘how’ to convey an open-ended and emergent research design.
- Focus on a single phenomenon or concept.
- Use exploratory verbs such as ‘discover,’ ‘understand’, explore’, describe’, or ‘report’.
• Use open-ended questions.
• Specify the participants and the research site for the study.”

Creswell’s last guideline leads us to the next two aspects of netnographic entrée – identifying a sample and a site.

**Identifying a Sample and a Site.** Bulletin boards or forums, chat rooms, playspaces, virtual worlds, lists, rings, blogs, wikis, audio/visual sites, social content aggregators, and social networking sites (SNS) are some of the current places to turn to do a netnography. The most important factor in choosing a sample and a site is that the sample and site match research questions.

**Determining the role of the researcher.** Netnographic research – or “netnography” – is a type of virtual ethnography with the researcher serving as a participant observer in an online community. Netnographers take on participatory roles ranging from no interaction – the “professional lurker” who simply reads electronic posts and analyzes their meaning – to a very visible, active member of the community who not only reads posts but writes posts regularly and comments on the posts of others – perhaps even becoming a valued member of the community (See Figure 2.3). Kozinets (2010a) advocates for the highly participatory researcher so that he or she experiences interaction in the online community in the same way as the study participants.

**Data collection and analysis.** Prior to and during netnographic data collection and analysis, netnographers should keep a binder with key documents detailing decisions that will guide the researcher (Kozinets, 2010a). In netnographic research, data collection and analysis are intertwined as the participant-researcher attempts to uncover the meaning behind the textual-archived data as he or she interacts with the participants.
Netnographies rely on three types of data – archival data, elicited data, and fieldnote data (Kozinets, 2010a). “These categories roughly follow Wolcott’s (1992) categories of watching, asking, and examining or Miles and Huberman’s (1994) categories of documents, interviews, and observations” (as cited in Kozinets, 2010a, p. 98) and will be briefly defined below.

**Archival data.** Archival data are “data that the researcher directly copies from pre-existing computer-mediated communications of online community members, data that she is not directly involved in creating or prompting” (Kozinets, 2010a, p. 97).

**Elicited data.** Elicited data are “data that the researcher co-creates with culture members through personal and communal interaction” (Kozinets, 2010a, p. 98).

**Fieldnote data.** Fieldnote data are “fieldnotes that the researcher inscribes regarding their own observations of the community, its members, interactions and
meanings, and the researcher’s own participation and sense of membership” (Kozinets, 2010a, p. 97). Fieldnotes are especially important in the data analysis phase of a netnography as they help answer “why a particular graphic, photograph, message, or posting was made by a particular person at a particular time” (Kozinets, 2010a, p. 114).

As with any qualitative research study, the researcher must decide whether to code the data manually – with a paper-and-pencil technique, perhaps aided by a basic computer spreadsheet program such as Microsoft Excel – or use a powerful Computer-Assisted Qualitative Data Analysis Software (CAQDAS) such as Nvivo or Atlas.ti. It is generally recommended that netnographers use a qualitative data analysis package to analyze the data collected from online sources unless the data is less than 1,000 pages of double-spaced text (Kozinets, 2010a). Due to the large volumes of data generated in a netnographic study, researchers must decide which data to keep and which to discard. Kozinets (2010a) also warns the researcher to examine non-textual cultural data such as “background colours and font styles as well as more overt graphical representations like drawings, emoticons, and photographs” (pp. 105-106) which aid in interpreting the purposes of the posts.

Netnography is a qualitative research method employing an inductive approach. It generally begins with participant observation and ends with a representation of the researcher’s interpretation of his or her observations. Analysis generally follows one of two methods or most often a combination of both: analytical coding-based methods – coding, noting, abstracting and comparing, checking and refinement, generalizing, and theorizing – or hermeneutic interpretation – a iterative process “in which a ‘part’ of the qualitative data (or text) is interpreted and reinterpreted in relation to the developing
Providing trustworthy interpretation. Addressing validity and reliability is always challenging in qualitative research – and the phrase “trustworthiness of interpretation” encompasses this task for netnographic work. To this end, Kozinets developed a set of 10 criteria with which to evaluate the quality of netnographic work. Table 2.1 provides an overview of these 10 criteria.

Ensuring research ethics. Due to employing the researcher-as-instrument – which involves heavy researcher-participation in every aspect of the study – ensuring ethical research is paramount in each phase of netnographic research. It is not merely enough to document IRB approval – but to document the researcher’s steps to ensure ethical research. Kozinets proposes four guidelines to ensure an ethical and quality netnography:

1) Identify yourself and accurately inform relevant constituents about your research.

2) Ask for the appropriate permissions.

3) Appropriate consent must be gained.

4) Properly cite and credit culture members.

Member checks. Conducting a “member check” (Arnould & Wallendorf, 1994, p. 485; Hirschman, 1986, p. 244; Lincoln & Guba, 1985) is the essential final step in conducting a rich and ethical netnography. A member check involves the researcher sharing all or part of his or her findings with research participants in order for them to verify accuracy and give participants an opportunity to explicitly add their voice to the sense of the ‘whole’” (Thompson, Pollio, & Locander, 1994, p. 433 as cited in Kozinets, 2010a, p. 120).
Table 2.1

Ten Criteria to Evaluate Netnographic Quality (adapted from Kozinets, 2010, p. 163).

<table>
<thead>
<tr>
<th>Criterion Name</th>
<th>Definition (‘the extent to which…’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coherence</td>
<td>Each recognizably different interpretation is free from internal contradictions and presents a unified pattern.</td>
</tr>
<tr>
<td>Rigour</td>
<td>The text recognizes and adheres to the procedural standards of netnographic research.</td>
</tr>
<tr>
<td>Literacy</td>
<td>The text recognizes and is knowledgeable of relevant literature and research approaches.</td>
</tr>
<tr>
<td>Groundedness</td>
<td>The theoretical representation is supported by data, and the links between data and theory are clear and convincing.</td>
</tr>
<tr>
<td>Innovation</td>
<td>The constructs, ideas, frameworks and narrative form provide new and creative ways of understanding systems, structures, experience or actions.</td>
</tr>
<tr>
<td>Resonance</td>
<td>A personalized and sensitizing connection with the cultural phenomenon is gained.</td>
</tr>
<tr>
<td>Verisimilitude</td>
<td>A believable and lifelike sense of cultural and communal contact is achieved.</td>
</tr>
<tr>
<td>Reflexivity</td>
<td>The text acknowledges the role of the researcher and is open to alternative interpretations.</td>
</tr>
<tr>
<td>Praxis</td>
<td>The text inspires and empowers social action.</td>
</tr>
<tr>
<td>Intermix</td>
<td>The representation takes account of the interconnection of the various modes of social interaction – online and off – in the culture member’s daily lived experiences, as well as in its own representation.</td>
</tr>
</tbody>
</table>

final research product. In addition, member checks provide a means for a researcher to stay connected with his or her research participants. Netnographic member checks are generally simple, convenient, essentially no-cost, and time-efficient.
**Flexibility.** In contrast to quantitative research methods, which demand that researchers follow an identified research plan precisely – netnographic research methods demand that researchers’ plans are regarded as tentative and modifications are expected. It is common that research questions change based on whether data do or do not support a particular line of inquiry. “In-course adjustments are regarded as part of doing good research rather than fatal breeches of protocol” (Locke et al., 2007, p. 100).

**Sample netnographic studies.** Netnographic studies have their roots and are still most prevalently used in marketing research. Companies such as American Express, Campbell’s Soup, eBay, and Merck have used the netnographic research approach to study consumer behavior and interaction and relationship to a product (Kozinets, 2010b). However, reports on the use of the netnographic approach to research in education are rare. A few examples are described here. O’Reilly, Rahinel, Foster, and Patterson (2007) used netnography to study the effectiveness of online communication used to supplement “megaclasses” of marketing students. In his dissertation, Kulavuz-Onal (2013) netnographically investigated an online CoP of English language teachers – Webheads in Action – “to understand the broader culture of learning, collaboration, and mentoring” (Kulavuz-Onal, 2013, abstract) in this online community. In a follow-up report, Kulavuz-Onal and his advisor Camilla Vásquez (2013) reported on the differences in their experiences conducting ethnography in person versus online. Lynch (2015) used the netnographic research approach to study the ways that kindergarten teachers familiarize students with foods. Wesley (2013) netnographically investigated a CoP of World Language Educators on Twitter and reported on the characteristics of the CoP and how those characteristics relate to learning. David Scuito (2014), a doctoral student at the
University of Massachusetts Lowell, proposes to conduct a non-participant observer netnography to “explore how issues of new teacher isolation and transition might be resolved” through teachers’ participation in the New Teacher Center’s (NTCs) electronic Mentoring for Student Success (eMSS). Examination of Scuito’s work will provide a nice complement to this researcher’s study.

To date, no netnographic research in the area of beginning mathematics teachers’ use of an online community with a same subject mentor to create a CoP in order to support, increase collaboration, decrease feelings of isolation, improve student motivation and behavior has been done. Robert Kozinets provides the steps to follow the netnographic methodology and other researchers – primarily in marketing – provide examples of executing quality netnographies. A handful of netnographies in the educational arena also provide guidance to researchers employing netnography in the field of education.

**Networked Improvement Communities (NICs)**

One promising strategy currently being used to improve educational research in areas such as mathematics teacher retention is the use of Networked Improvement Communities (NICs). A description of the origin of NICs and their use in educational research follows.

Bryk and Gomez (2008) argue that current widely accepted methods of research fail to address recurring problems in schools such as the retention of secondary mathematics teachers. An increasing number of scholars posit that a very different infrastructure for research is needed (e.g., Burkhardt and Schoenfeld 2003; Coburn and Stein 2010; Committee on a Strategic Education Research Partnership 2003; Hiebert,
Gallimore, and Stigler 2002; Kelly 2006; National Academy of Education Report 1999 as cited in Bryk et al., 2010). In order to implement a more responsive and flexible research strategy, the Carnegie Foundation for the Advancement of Teachers introduced the concept of NICs (Bryk et al., 2010). An NIC is “a distinct network form that arranges human and technical resources so that the community is capable of getting better at getting better” (Englebart, 2003 as cited in Bryk, Gomez, & Grunow, 2011, p.6). NICs are based on Deming’s Plan Do Study Act cycle (PDSA) (See Figure 2.4) commonly used in improvement science across various contexts and used with much success in research and development activities in the business world.

Bryk et al.’s NIC model advocates for an approach where local researchers and practitioners, with a promising idea, start with a set of trials in a small number of places. This is followed by trials in an expanded number of locations where lessons learned from the initial trials provide information to implement improved models – taking into account diversity of site and sample. Finally, examining lessons learned and best practices from all previous trials, additional modifications are made and the research is conducted at an exponential number of sites. The Association of Public and Land-grant Universities’ (APLU’s) Science and Mathematics Teacher Imperative (SMTI) Mathematics Teacher Education Partnership (MTE-Partnership) – a partnership which includes 101 university systems and community colleges and 142 K-12 schools and school districts across 30 states (APLU, n.d.) – has contracted the Carnegie Foundation as a design partner and is using the NIC model in efforts to increase mathematics teacher retention.
Chapter 3: Methodology

Introduction

This study sought to investigate the efficacy of a Community of Practice (CoP) including a same subject mentor using social media in increasing the retention rates of induction year secondary mathematics teachers, by considering the following objective:

Conduct a netnography to qualitatively investigate the use of social media to support a Community of Practice (CoP) with effective mentoring among secondary mathematics teachers designed with strategies that are likely to impact retention positively.

Questions investigated during the course of this research were:

Primary research question:
What, if any, is the relationship between the retention of first-year secondary school mathematics teachers and their participation in an Online Support Group (OSG) that employs strategies for successful Communities of Practice (CoP) proposed by Wenger and includes a mentor who is trained in secondary mathematics education?

Underlying questions:
1. How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication?
2. What are the characteristics of this OSG of induction year secondary mathematics teachers and an online same subject mentor?
3. To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger?

4. To what degree, if any, does participation in the OSG mitigate factors found in the literature known to negatively impact teacher retention?

5. To what degree, if any, does an off-site, online mentor who is trained in secondary mathematics education impact teacher retention?

This chapter outlines the qualitative, primarily netnographic, methods used to study the research questions. The researcher also made use of other qualitative research tools including surveys and individual and focus group interviews. Prior to conducting this study, the researcher performed a pilot study in order to make preliminary judgments on the efficacy of this line of research. Details regarding all methods of data collection and analysis in this study will be described in this chapter. The chapter will begin with a brief description of the pilot study and will be followed by an explanation of how the researcher applied established steps of the netnographic research method in this study. The chapter will conclude with a description of the other more traditional qualitative methods used in this study, including descriptions of each traditional measurement instrument and a timeline the researcher used in the study.

The pilot study. The researcher performed a pilot study with 10 University of South Carolina (USC) teacher candidates involved in part-time mathematics teaching internships in order to refine research questions, improve data collection instruments, and gain experience in netnographic research data collection and analysis. The site used for the pilot study – Facebook – was selected by the participants through a survey process. Results of the pilot study – collected through netnographic and traditional qualitative
research methods including surveys and interviews – indicated that an OSG created through social media could serve as a CoP with a same subject mentor to increase support and collaboration with colleagues and decrease teachers’ feelings of isolation.

**Netnographic research.** Because this study was an investigation of the efficacy of social media to create a CoP in order to positively impact retention – and thus, involved the researcher creating, participating in, and examining the interactions of an online community – the netnographic research method was ideal for this purpose. As was described in greater detail in Chapter 2, the “netnographic” method modifies well-established practices of ethnography in order to provide a Geertzian “thick” description of an online community. The researcher used Kozinets’ five-step procedure for conducting netnographic research: entrée, data collection and analysis, providing trustworthy interpretation, ensuring research ethics, and member checks (Refer back to Figure 2.2). Following is a description of how the researcher applied Kozinets’ five steps in this particular study.

**Entrée**

As explained in Chapter 2, the first step in conducting netnographic research is research planning or entrée – consisting of developing research questions, identifying a sample, identifying a site, and determining the role of the researcher (Kozinets, 2010a). This researcher’s decisions regarding each of these facets of entrée are explained in greater detail below.

**Developing research questions.** Research questions were selected based on the professional work experience of the researcher, a review of the literature on teacher retention, and the influence of a colleague who had successfully implemented an OSG
with business interns, and were improved upon based on experience the researcher gained by performing a pilot study. The researcher served as an adjunct professor at USC. As part of her work responsibilities, the researcher served on a committee of the national Mathematics Teacher Education Partnership (MTE-Partnership) whose responsibility was to investigate the recruitment and retention of secondary mathematics teachers. Through her involvement with the MTE-Partnership, she co-authored a chapter of a white paper (Dickey et al., under review). A review of the literature for the white paper highlighted the significant difficulty of retaining induction year teachers. In addition, many research studies uncovered the positive impact of CoPs and same subject mentors on teacher retention. Concurrently, the researcher interviewed a university colleague who had used social media (Facebook) as part of an internship experience for business interns. The colleague commented that the experience provided a way for the interns to stay connected and support and learn from one another and for her to mentor the business interns. Based on these varied experiences, the researcher hypothesized that social media could provide a means to create a CoP with a same subject mentor (the researcher) to support induction year secondary mathematics teachers in an effort to positively impact retention. The researcher created preliminary research questions and verified that they met Creswell’s (2009) guidelines for writing broad research questions to guide qualitative inquiries, which were described in Chapter 2. As mentioned earlier, in netnographic research, Kozinets (2010a) instructs:

It can be useful to start with one set of research questions that evolve during the process of the investigation. By the time the final research product is complete,
that original set of research questions may have changed quite dramatically, with new ones emerging in the process of investigation and analysis (p. 80).

Following this advice, this researcher added an additional research question to the proposed study:

What are the characteristics of this OSG of induction year secondary mathematics teachers and an online same subject mentor?

This question was added as the researcher made the decision to use a grounded theory approach to determine what topics the CoP discussed and why instead of beginning with selective coding designed to answer whether the CoP had specific pre-selected characteristics mentioned in other research questions. The researcher posits that findings related to this new research question add knowledge to the scholarship on mathematics teachers and teaching.

**Sample.** A homogeneous, convenience sample made up of the first group of Noyce Mathematics Scholars who attended USC and accepted their first teaching position for the 2013-2014 school year served as the subjects for this research. All Scholars completed an academic program which included 41 credits of mathematics at the calculus level or beyond and culminated in a master’s degree. The study took place from January – May 2014. All ten Noyce Mathematics Scholars from USC participated in the study. Nine Scholars began their teaching career in the fall of 2013 and one Scholar began teaching in January of 2014. This small data sample allowed for rich, thick descriptions of interactions. The sample was comprised of eight females and two males. Six Scholars are Caucasian and four are African American. This sample is comparable to USC Secondary Mathematics program completers over the 2009 to 2015
time frame where approximately 70% of completers were female and 25% of completers were African-American. (Ed Dickey, personal communication, March 1, 2015). Noyce Scholars are teaching in districts that range from urban to rural and are primarily in central South Carolina with three on the coast (See Figure 3.1).

Figure 3.1 Distribution of Noyce mathematics Scholars.

One teacher is located at a middle school and the remaining nine teach in high schools. Teachers teach a variety of subjects ranging from Pre-Algebra to Pre-Calculus. Most teachers teach multiple subjects. A breakdown of the number of teachers who teach each subject is provided in Table 3.1.

The researcher chose the Noyce Scholars because, as required by the Noyce Scholarship, they were each teaching in a high needs district where turnover is typically
high and support is usually lacking (NCTAF, 2007). In addition, the Scholars were in their first year of teaching and the turnover rate for beginning teachers is the highest turnover rate for all teachers across all subject areas (Ingersoll et al., 2014). Also, the USC Noyce Project Description includes a New Teacher Support Program (NTSP) for a Scholar’s first two years of teaching. One component of the NTSP is the creation of a “web-based community” for Scholars. As an adjunct faculty member at USC, this researcher was approached to lead the NTSP – including the responsibilities of creating and facilitating the “web-based community” – thus the sample was a natural fit. During their EPP, Noyce Scholars at USC formed a close-knit group – a CoP. They took classes together, attended student teaching seminars together, attended monthly Noyce meetings together, and were connected through a blog authored by the Noyce Project Director. After graduation, this relatively convenient, frequent interaction became much more difficult. Suddenly, Scholars were often unable to meet face-to-face with one another because of full teaching schedules, numerous required administrative duties, and geographical distances. Continuing the established, safe CoP into the induction year

Table 3.1

Distribution of Noyce Mathematics Scholars with Regard to Teaching Assignment

<table>
<thead>
<tr>
<th>Subject Taught</th>
<th>Number of Teachers Who Teach It</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Algebra/Math Strategies/HSAP Preparation</td>
<td>6</td>
</tr>
<tr>
<td>Algebra I</td>
<td>7</td>
</tr>
<tr>
<td>Geometry</td>
<td>4</td>
</tr>
<tr>
<td>Algebra II</td>
<td>3</td>
</tr>
<tr>
<td>PreCalculus/Algebra 3/Trig</td>
<td>2</td>
</tr>
<tr>
<td>Data Analysis/Statistics</td>
<td>1</td>
</tr>
<tr>
<td>Engineering</td>
<td>1</td>
</tr>
</tbody>
</table>

73
through the OSG in this study provided a method for the university to offer valuable continuing support. This study also provided a means to address the new CAEP requirements to track and support program graduates and thus, aided USC in meeting these new accreditation requirements. Finally the researcher chose this sample because there are active Noyce programs located in nearly every state in the country, so scaling up the research could easily be done.

**Site.** The site of this study was a private, secure group – the Noyce Scholars from 2013-14 – within the social networking site Edmodo during a four month timeframe – January – May 2014. The private group consisted of the researcher – as creator of the group and an off-site, online same subject mentor – and the 10 Noyce Scholars described in the sample. The private group was a place where all group members could type and read messages and comment on each other’s messages through a threaded format. Messages could include web links, photos, videos, or electronic polling features and attach most any document. Scholars could private message the researcher and vice versa, but the Scholars could not private message each other within the Edmodo group. Scholars and the researcher could delete their own posts after posting and, in addition, the researcher could delete the post of any group member. The benefits of this feature are that a Scholar could delete a post if he or she had second thoughts about the content shared in a post and the researcher could remove any unprofessional posts. However, none of the Scholars or the researcher made use of this feature and no posts were deleted. In addition to being members of this private group, Edmodo membership provided Scholars an opportunity to join other Edmodo pre-established groups within the
community such as “Math” or “Professional Development” where they could connect to a segment of the over 50 million Edmodo users world-wide.

Based on the success of using Facebook to form an online CoP with interns in the pilot study, the researcher originally planned to use Facebook as the site of this dissertation study as well. However, prior to gaining approval for this dissertation study, the researcher had an opportunity to meet briefly, one-time, face-to-face with several of the research participants. The researcher mentioned that she planned to use Facebook to create a web-based community to connect and support the participants and offer a space for collaboration. She was met with much resistance. Participants were vocal in their desire not to use Facebook for two reasons: 1) school administrators seemed to have a negative impression of Facebook and encouraged Scholars to make sure that if they had a Facebook page – that the page was “nowhere to be found” so that students could not try to “friend” them and 2) some school districts have filtering software which prevents teachers (and students) from accessing Facebook at school. Participants indicated that it would be very important to be able to access the OSG at school while they were working instead of only being able participate in the OSG outside of the work environment. Choosing an OSG platform that ignored these concerns would intrude into participants’ personal lives of time and space and would undermine the potential benefits of the OSG. Some Scholars suggested that Edmodo might be the best platform to use because all Scholars have access to it at school and some districts require teachers to use Edmodo as part of their regular teaching responsibilities.

The researcher strived to select an online platform that would be desirable for all research participants. She abandoned the executive decision to use Facebook as the site
for the online community, even though it had shown to be successful during the pilot, and instead sought input from the research participants. She added research question one, “How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication?” to the scope of this dissertation study. The choice of Edmodo for the OSG was selected through the administration of the Noyce Scholar Social Media Survey (Appendix A). A detailed description of the Edmodo platform was provided in Chapter 2 and a description of the Noyce Scholar Social Media Survey will be provided later in this chapter. The researcher chose to do a survey instead of relying on input from that one, brief discussion with six of the ten Scholars, so that each Scholar had an equal opportunity for input and no Scholar was swayed by any Scholars who were more vocal or opinionated.

**The role of the researcher.** Consistent with the pilot study and the standards for netnographic research, the primary instrument for this study was the “researcher-as-instrument.” For this reason, the following section describes the professional background of the researcher, the participatory level of the researcher with the online community, the researcher’s entrée into the online community, and the researcher’s interaction with the participants outside of the online community – all essential to the understanding of her role in this study.

The researcher is a certified secondary mathematics teacher with experience teaching mathematics at the secondary and post-secondary level. The researcher taught the Mathematics Methods for the Middle Level course and supervised middle and secondary mathematics education teacher candidates at USC for several years. During the time of the study, the researcher served as the University Supervisor, an adjunct
faculty member who supervises a field placement for the university, of six secondary mathematics teacher candidates and served as the first USC Noyce New Teacher Support Program (NTSP) Coordinator.

As described in Chapter 2, netnographers take on participatory roles ranging from the covert, non-participatory observer to the very visible, active participant (See Figure 2.3). Drawing from her experiences as a teacher, methods instructor, and supervisor, this researcher chose to take-on the role of an active, involved, participant-observer in the OSG of secondary mathematics USC Noyce Scholars. Her role was essentially three-fold: 1) the off-site, online, same subject mentor, 2) the individual responsible for tracking and reporting member-usage to Noyce staff, and 3) the researcher. Her status as an online mentor provided a means for ongoing, active, and perhaps even valued membership where she contributed her knowledge and skills to the betterment of the community.

All participants understood the researcher’s three roles, and no attempt was made to disguise the different roles. The researcher was first introduced to the participants as the USC Noyce New Teacher Support Program Coordinator in September of 2013 –four months prior to the start of the investigation – through an email from the Noyce Project Director (See Appendix B). The researcher followed up the Project Director’s email with a more formal email letter of introduction to the Scholars (See Appendix C).

During the fall 2013 semester – the semester leading up to the investigation – the researcher had minimal interaction with participants through infrequent email correspondence and two brief (ten minute) face-to-face discussions with some of the Scholars at the conclusion of two optional Noyce Meetings at the university. However,
during the spring semester of 2014 – the semester of the research – the researcher had substantial interaction with the online community members outside of the online community. She met informally with Scholars at the conclusion of two optional Noyce meetings at the university. She attended one day of a Noyce regional conference with six of the Scholars. She created and coordinated an electronic grant application process in which Scholars applied to receive funds for classroom supplies. She also answered email questions or directed Scholars to others who could answer their email questions regarding other Noyce NTSP components – including Noyce Mentor responsibilities and benefits and the process of submitting videos of their teaching. She periodically, informally visited three Scholars by stopping by their classrooms when she was at their schools to perform supervisor evaluations or have meetings with interns from the university currently placed at the Scholars’ schools. Finally, she conducted individual and focus group interviews and administered two surveys with the participants.

Data Collection and Analysis

This study involved the use of netnographic and traditional data collection and analysis methods. As described in Chapter 2, Kozinets (2010a) recommends that prior to and during data collection and analysis, the judicious researcher keeps “a binder with your guidelines and other relevant documents” in order to organize “research decisions you have made, are making, or will need to make” (p. 91). This researcher created an electronic binder for these purposes and the documents that she included in this binder will be described next.

USC Noyce Scholars New Teacher Support Program Contract (Appendix D). The researcher gained approval from the Noyce Project Director and Primary Investigator
(PI) to develop a Scholars’ contract which included a provision for Scholars to earn $200 for participation in the Edmodo community including responses to surveys and interviews about the community. Although each item in the contract is a support for the Scholar, the financial incentive is provided out of recognition that each support mechanism – attending meetings, submitting videos of teaching, participating in an online network of colleagues – does take time and teachers should be compensated monetarily for their time. Having Scholars sign a contract provides an expectation that although these are supports and are optional – Scholars are expected to take advantage of the supports. All 10 Scholars signed the contract.

**Edmodo Responsible Use Policy (Appendix E).** In Chapter 2, the researcher reported on Wasko & Faraj’s (2000) findings of barriers that inhibit individuals in a CoP from engaging in knowledge exchange. In order to prevent members from exerting egos and personal attacks (one of the barriers), the researcher created the Edmodo Responsible Use Policy. All 10 Scholars signed the responsible use policy.

**Written Guidelines for Researcher Observation and Participation in the Online Support Group (Appendix F).** Also in Chapter 2, the researcher discussed Wenger’s *Seven Actions that Could be Taken in Order to Cultivate Communities of Practice* (Wenger et al., 2002). In addition, the researcher referenced Rowley (1999) and NCTM’s (Zimmermann et al., 2009) suggestions for mentoring. In order to provide guidelines for her interactions with Scholars in the Edmodo group and in effort to establish a CoP with the characteristics of Wenger, the researcher created the Written Guidelines for Researcher Observation and Participation in the Online Support Group.
Edmodo Participation Incentive Plan (Appendix G). Although the researcher created and used the three documents described above, the Edmodo group had a slow start. Heeding the advice of Schlager et al. (2002) detailed in Chapter 2, approximately one month into the study, the researcher sought and gained approval from her dissertation chair to implement a new incentive plan – the Edmodo Participation Incentive Plan – in order to increase participation and in an effort to collect sufficient data for her study. The impact of this plan was significant and will be described in Chapter 4.

With written guidelines in place, the researcher was poised to begin data collection and analysis. The remainder of this section will describe the netnographic as well as the traditional data collection and analysis methods used in this study.

In netnographies, data collection and analysis are essentially intertwined. As described in Chapter 2, netnographies collect three types of data – archival data, elicited data, and fieldnote data (Kozinets, 2010a). In this study, the archival data was data that the researcher directly copied from Edmodo posts of the Scholars that was prompted solely by the Scholars. Elicited data was primarily obtained through simple, brief “netnographic interviews” where the researcher created posts and asked participants to share their experiences or opinions regarding the topic in the post. Fieldnote data consisted of an electronic journal that the researcher added to regularly as she read or posted in the Edmodo community or interacted with the participants through email, occasional meetings, and through survey and interview encounters.

The researcher anticipated that the amount of data that would be collected over the four month timeframe would be sufficiently small enough – less than 1,000 pages of double-spaced text – to use manual coding. In order to remain close to the data and not
lose any subtleties, the researcher coded the data using a paper-and-pencil technique, aided by two basic computer programs – Microsoft Word and Microsoft Excel. To prepare to collect and analyze this electronic post data, the researcher created two documents:

1) A Microsoft Word Document Template where the researcher stored exact transcriptions of Edmodo posts in reverse chronological order through a copy-and-paste method. The researcher also recorded reflective fieldnotes for each post directly in this table. This document was also used as the researcher’s overall fieldnote journal to record additional fieldnotes any time the researcher thought about or interacted with the members of the OSG outside of the Edmodo community. The table had the following four columns: 1) Date of Post, 2) Author of Post, 3) Post Transcript, and 4) Fieldnotes. A sample entry is shown in Appendix H.

2) A Microsoft Excel Template where the researcher transferred exact transcripts of posts from the Word Document through a second copy-and-paste method. Transcripts were again organized in reverse chronological order and identified by date and author. Corresponding fieldnotes were also transferred to Excel along with the transcripts. The researcher used this document for all coding.

The primary data source in this study was this researcher’s participant observation in the daily interactions of Noyce Scholars in the Edmodo community from January – May 2014. This included regularly (multiple times a week) reading and commenting on Scholars’ posts and also regularly (approximately weekly) authoring posts. The researcher then manually copied-and-pasted each electronic post – one-by-one – into the
Microsoft Word Template described above. All posts were logged regardless of their relevance to the research questions so that the author would have a complete picture of the experience of this online community.

As the researcher read and re-read each post, she kept an informal record of her thoughts by jotting reflective fieldnotes into a column in the template alongside each electronic post. Her fieldnotes described the general content of the post and recorded any thoughts and feelings related to the post – especially those related to the research questions. If an author attached photos, web links, or supplementary documents to a post, the researcher made note of this in the fieldnotes column because she was often unable to cleanly cut-and-paste these items into the table in Microsoft Word.

Secondary data sources involved the researcher’s experiences with the Scholars outside of the Edmodo community. As the Noyce NTSP Coordinator, the researcher communicated with the participants through occasional emails, phone conversations, and face-to-face interactions. The researcher logged reflective fieldnotes as chronological entries into the Microsoft Word template described above to informally document and describe her thoughts regarding critical events that took place outside of the Edmodo text-based communication.

**Traditional data sources and measurement instruments.** In addition to collecting data using netnographic strategies, this researcher used several traditional measurement instruments. Three surveys, an individual interview guide, and a focus group interview guide were used to provide a measure of “trustworthiness” by triangulating the participant-observer interpretations of online interactions with the survey and interview response data. The researcher also used the data collected with
these instruments to make improvements to the OSG. A description of each measurement instrument follows.

*The Noyce-Scholar Social Media Survey (Appendix A).* This brief – five-question, researcher-constructed survey was created in SurveyMonkey – an online service which provides options for survey development and gathering response data – and administered online so that Scholars could have input into the decision of which social media platform to use for the OSG in the study and in order to answer the first research question:

How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication?

This survey was modeled after a similar paper-instrument used in the pilot study and improvements were made that ensured validity based on the experience from the pilot and recommendations from the researcher’s dissertation committee. The researcher used the feature of SurveyMonkey to track who had competed the survey and send a reminder email to those who had not completed the survey in order to increase the response rate and be respectful to those who had already responded. These reminders assisted in ensuring reliable responses.

*USC Noyce Scholarship Graduate Survey (Appendix I).* The USC Noyce Scholarship Graduate Survey served two purposes in this researcher’s study and in the independent evaluation required of the Noyce Scholarship grant program. The researcher had planned to administer a researcher-constructed survey instrument midway through the timeframe of the investigation to gather data on the Scholars’ perceptions of their experiences in the online community in order to answer research questions four and five:
4. To what degree, if any does participation in the OSG mitigate factors found in the literature known to negatively impact teacher retention?

5. To what degree, if any, does an off-site, online mentor who is trained in secondary mathematics education impact teacher retention?

About midway through the semester of research, due to her involvement as the USC NTSP Coordinator, the researcher was asked to give input into a survey that USC’s College of Education (COE) Office of Program Evaluation (OPE) was preparing to administer to Noyce Scholars. In order to respect the time of the Scholars, the researcher chose to abandon her own survey of the Scholars and instead leveraged this opportunity to work with OPE staff to have her survey questions incorporated into their survey. Making this change also allowed for an independent entity to survey the Scholars instead of the researcher and thus provided an opportunity for respondents to feel free to answer questions honestly and not attempt to please the researcher.

The OPE is an independent unit of the University of South Carolina’s COE. The OPE was hired by the Principal Investigators of USC’s Noyce grant to provide program evaluation. According to the OPE website, OPE evaluators “are responsible for providing an objective, unbiased view of program implementation, outcomes and impacts” (University of South Carolina, n.d.). As part of OPE’s evaluation of the Noyce Scholarship program, they created the USC Noyce Scholarship Graduate Survey and administered it to all 15 Noyce Scholars. The 15 Noyce Scholars consisted of the 10 mathematics Scholars in this researcher’s study and 5 science Scholars who are not involved in this researcher’s study. This 33-question anonymous online-survey was created in SurveyMonkey and administered to all Scholars in order to “collect feedback
on their first-year teaching experiences and their perceptions of the support they receive from the Noyce program” (D’Amico, Miller, & Zhang, 2014). Scholars were sent this electronic survey through email and two reminder emails were sent to non-respondents.

The words “online community” were used in the survey instead of “Edmodo community” because the Noyce Mathematics Scholars were part of an Edmodo community and the Noyce Science Scholars were a part of a secret Facebook group. This researcher will only report on data collected from the mathematics group – thus, the online community mentioned in the survey is in fact the Edmodo group in this researcher’s dissertation study. The survey gathered data in seven areas: 1) preparation from the Noyce program, 2) financial support, 3) monthly meetings, 4) online community, 5) mentorship from the Noyce program, 6) professional development needs, and 7) career plans. Of particular interest to this study was the section of the survey on the online community – questions 18-23. The researcher also examined the answers to question 28, “Please provide any suggestions to improve the support and resources for Noyce graduates” to discover if any teachers mentioned improvements to the online community. The researcher only examined the responses from the mathematics teachers (not the science). Responses to these questions were used to triangulate the researcher’s interpretation of the electronic posts throughout the four month investigation and to seek out member input on ways to improve the experience.

*USC Noyce Scholar First Year Teacher Survey/Budget Feedback Charts (Appendix J).* The researcher created a three-page paper-feedback document including a 17-question survey and two budget charts in order to collect data to answer research questions four and five. The purpose of the 17-question survey was to measure the
Scholars’ perceptions of support that they received from several sources during their induction year, document the Scholars’ perceived level of participation in the Edmodo community, examine Scholars’ perceptions of the Edmodo community, and determine whether Scholars thought that the Edmodo community should be part of the NTSP for them in their second year of teaching and whether it should be part of the NTSP for induction-year Noyce mathematics Scholars the following year. The purpose of the budget feedback charts was to invite the Noyce Scholars to put themselves in the shoes of the Noyce NTSP Coordinator and plan how the budget available for induction-year and second-year teachers would be spent. The survey and budget charts were emailed to Scholars, posted on Edmodo, and hard-copies were distributed to those in attendance at a Noyce meeting.

*The Noyce Scholar Individual Phone Interview Guide (Appendix K).* This instrument is a 13-question, researcher-constructed guide that was used with six of the ten Noyce Scholars to answer research questions two, three, and four:

2. What are the characteristics of this OSG of induction year secondary mathematics teachers and an online same subject mentor?

3. To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger?

4. To what degree, if any, does participation in the OSG mitigate factors found in the literature known to negatively impact teacher retention?

Phone interviews were used to provide a measure of “trustworthiness” by triangulating the participant-observer interpretations of online interactions with the interview response data. The researcher also used this data to make improvements to the OSG. This guide is
nearly identical to the individual interview guide used in the researcher’s pilot study with
the only minor modifications to address this particular sample. All individual interviews
were conducted over the phone. Based on the length of time that the researcher spent
transcribing the audio from the pilot study – approximately one hour for each 15 minute
interview – the researcher attempted to use speech-recognition software to
contemporaneously translate the oral responses to text as the first interview took place.
The software did not translate voice to text accurately rendering the data from the first
interview as useless. Therefore, as in the pilot, the researcher used Voice Memos – a free
digital voice recorder built into the Apple iPhone – to record the interviews without
taking notes in order give the interviewee undivided attention and to not lose valuable
information. She later contracted an online service (Rev.com) to create transcriptions of
the remaining data set. Interviews took place six weeks after the OSG began in order to
give participants sufficient time in the OSG to have experiences and opinions to share.

The Noyce Scholar Focus Group Interview Guide (Appendix L). This instrument
is a five-question, researcher-constructed guide which the researcher used to answer
research questions two, three, and four (as mentioned previously) to provide a measure of
“trustworthiness” by triangulating the participant-observer interpretations of online
interactions with the interview response data. The researcher also used this data to make
improvements to the OSG.

Many researchers recommend that focus group participants not know or interact
with one another so that opinions that are shared are honest and the discussion is not
effected by previously established roles of the group – particularly leadership roles (Vito,
Kunselman, & Tewksbury, 2008). However, other researchers claim that there are
advantages to using focus groups of participants that know each other. Participants may be less intimidated by the researcher and more comfortable answering questions with a group of peers with whom they have a level of comfort and trust and may lead to data that is richer as participants build off of each other’s ideas and challenge one another (Kitzinger, 1994). The Noyce Scholars formed close bonds as cohorts in the secondary mathematics teacher education program and particularly through their experiences with the Noyce program. Some Scholars socialize outside of the professional education arena. For these reasons, using a focus group interview with this homogenous, familiar sample had the potential to uncover rich data otherwise undiscovered to answer the research questions. The roughly twenty-minute focus group interview session took place at the Southeast Regional Noyce Conference and six Scholars participated. As with the individual interviews, the researcher used Voice Memos to record the focus group interview without taking notes and later transcribed the interview data set using the service Rev.com.

**Flexibility.** Standards of ethnographic and netnographic research require that researchers are flexible in executing research plans. With the researcher serving as both the coordinator of the Noyce NTSP and the sole researcher for this investigation, the researcher was constantly faced with decisions on whether (or for how long) to just experience and observe the online community as it was originally designed in order to “report findings” or whether (or when) to implement changes for the betterment of the community, knowing that this would have an impact on findings. This researcher strived to balance these two roles and will make note of any interventions made and describe any impact that the interventions may have had on the results.
**Data analysis.** The researcher used elements of both hermeneutic interpretation and analytic coding to make sense of the data and address the netnographic expectation that involves “an inductive approach to the analysis of qualitative data” (Kozinets, 2010a, p. 95) and “encompasses the entire process of turning the collected products of netnographic participation and observation… into a finished research representation” (p. 118). The data was analyzed in several phases as described below so that conclusions could be made and recommendations for future research could be suggested in relation to the posed research questions.

The first phase of analysis took place as the researcher recorded fieldnotes as she logged posts from the Edmodo group in the previously described Microsoft Word template. Fieldnotes were recorded contemporaneously (at least weekly) with her participation in the Edmodo community so that they would represent the thoughts and feelings of the researcher regarding the experience of participants in the Edmodo community and not be subject to the memory of the researcher. To combat researcher bias, the researcher read the posts multiple times to gain a sense of meaning from multiple perspectives.

Phase two took place at the conclusion of the semester of interaction in the Edmodo community in this investigation. During this phase, the researcher printed a hard-copy of the electronic posts and fieldnotes. She read the document in its entirety multiple times and made use of the technique of memoing (Glaser, 1998) on the posts and the fieldnotes to gain a full picture of the experience and to begin to develop themes.

Phase three involved the researcher copying all electronic posts and fieldnotes into the Microsoft Excel Template described earlier to prepare for initial coding. In an
effort to prevent researcher bias and to gain a full picture of the Edmodo OSG experience, the researcher used tenets of grounded theory (Glaser & Strauss, 1967) and did not code data according to pre-determined categories, but instead used inductive coding to create categories as they emerged from the data. The researcher re-read the first post along with its corresponding fieldnotes and memos and then created any codes (as Excel column headings) for each distinct characteristic of the post. She placed a “1” in the corresponding cell that indicated that the post was assigned this code. She then repeated this process with the subsequent posts – recording “1s” in cells when posts contained statements or indicated thoughts that matched previously uncovered codes and adding codes as new posts were compared against previous posts and new codes were deemed necessary. As new codes were created, the researcher re-read previously coded posts to determine if old posts also needed to be classified by the newly created codes. If a statement in a post was similar to a statement in another post, yet the previously uncovered codes did not match the statement precisely enough, the researcher occasionally renamed categories to encompass the new statement and previous statements. As codes were renamed, the researcher re-read previously coded posts and re-coded them as necessary. The researcher read the posts multiple times to be sure to identify the posts with as many codes as necessary. Posts varied in length from a single line to several paragraphs; therefore most posts were assigned multiple codes. The researcher created a Microsoft Word document (Appendix M) which listed all 87 codes found through open-coding.

During phase four, the researcher began to collapse the codes into themes and categories. She first examined the list of open-codes and eliminated any that were
essentially duplications and recoded the data associated with those codes. Next, she combined any codes that were closely related and recoded the data associated with those codes. During this phase, the researcher created two questions to organize the coding of posts:

Purpose: Why did the author create the post?

Content: What was the post about?

Using these two primary questions as umbrellas, the researcher was able to create two documents (Appendices N & O) that provided outlines of the collapsed categories under the umbrellas of “purpose” and “content.” Each document contained subcategories that the researcher used in phase five to recode the data.

Phase five involved the researcher using deductive coding to code all posts using the codes specified by the researcher in the above documents created during phase four. The researcher created new headings in columns in the Excel template that represented the collapsed categories and subcategories. The researcher then analyzed the data on two separate occasions – the first, looking solely for the purpose of each post and the second, looking solely for the content of the post. She read (and often reread) each post with its corresponding fieldnotes and memos and recoded the data with the new codes. In Figure 3.2, the researcher provides an example of the manual coding of a single post as described in phases two through five.

Satisfied that all data was represented by the codes established in phase four, phase six involved the researcher quantifying the frequency of posts that were in each category and subcategory. This was accomplished using the SUM and COUNTA features of Excel. Recognizing that frequency of a code does not always reflect the
importance of a theme and does not give a full picture of the qualitative data, phase six also involved the researcher creating a conceptually clustered matrix to better illustrate the purposes of posts in the Edmodo OSG. This matrix will be presented in Chapter 4. Creating this matrix required the researcher to thoroughly comb the posts again looking for posts that best illustrated the reasoning for the categories and subcategories under the purposes of the posts.

Phase seven involved the researcher analyzing all data collected through sources outside the OSG – responses to surveys and interviews – in order to triangulate findings and provide trustworthiness of interpretation. In addition, the researcher used Kozinets’
Ten Criteria to Evaluate Netnographic Quality (See Table 2.1) to further establish internal validity.

Using elements of “collaborative netnography,” the final phase of data analysis involved a member check with Edmodo participants. All ten Scholars were emailed a 56 page document which contained an overview of the study, the methods used in the study, and the results of the study. Pages four through eight contained the key findings of the study. Scholars were asked to comment on the accuracy of the findings and recommend additions, deletions, or edits. This member check provided a way for the researcher to verify the truthfulness of findings and explicitly gave voice to the research participants in the presentation of the final product. The letter that Scholars received detailing the procedures of the member check is provided in Appendix P.

Trustworthy Interpretation

As described above, the researcher used multiple strategies to strive for trustworthy interpretation of netnographic data. She used the results of surveys and interviews to triangulate findings and a member check to validate her interpretations.

Ensuring Research Ethics

The researcher is a doctoral student employed as the USC Noyce NTSP coordinator. The principal investigator (PI) of the USC Noyce grant, Dr. Jan Yow, offered to add the researcher to the approved USC Noyce Institutional Review Board (IRB). The study linked to the approved IRB of interest is entitled: University of South Carolina Science and Mathematics Teachers Initiative (USC – SMTI) – Pro00006849. In order to be added to the approved IRB, the researcher completed a five-to-six hour Collaborative Institutional Training Initiative (CITI) web-based course on protection of
human research subjects and passed all required tests. The research ethics for a netnography also require additional considerations. According to Kozinets (2010a):

Ethics is not a section of your research that can be simply ‘tacked on’ at the end by including a paragraph about IRB approval in a report’s method section. It alters the research questions you choose to pursue, the types of community that you will study, the specific approaches and methods you will use, the type of data you will and will not collect, the way you make your cultural entrée, the kinds of questions you will ask community members, the type of fieldnotes you will keep and the type of analysis you will conduct, as well as markedly transforming the nature of your final report (p. 146).

In addition to seeking IRB approval, the researcher followed Kozinets’ (2010a) four guidelines to ensure an ethical and quality netnography –

1) Identify yourself and accurately inform relevant constituents about your research.

2) Ask for the appropriate permissions.

3) Appropriate consent must be gained.

4) Properly cite and credit culture members (p. 146).

The researcher identified herself as the director of the Noyce NTSP and a PhD student studying the efficacy of an online community providing support for teachers. She told Scholars that she would be an active participant in the online community as a mentor for them. She informed members that they were part of a research study and that their posts would be shared with others for research purposes only using pseudonyms or with their
permission. A paragraph about informed consent was included in the previously mentioned USC Noyce Scholars New Teacher Support Program Contract:

If you do not want your information used please email me to inform me of your choice. Your decision to not include your information in the research will not impact your stipend and you may choose to withdraw your information at any time. If any materials are chosen for the research, they will be anonymous.

All ten Scholars signed the contract.

As part of the member check described earlier, the researcher sought to receive appropriate permissions and to properly cite and credit OSG members. In addition to being emailed a draft report of the findings from the study of the Edmodo OSG and asked to comment on the accuracy of the document and recommend additions, deletions, or edits, all ten scholars were emailed the following two questions:

Q1: Pseudonyms were used to protect the identity of all participants. However, are there any quotes of your electronic posts that you would like removed from this report due to fear of them being linked back to your true identity?

If yes, please let me know the exact quotes that you want me to delete.

Q2: As mentioned above, pseudonyms were used to protect the identity of all participants. Are there any instances where you would like for me to use your REAL NAME to give you credit for your thoughts expressed by direct quotes?

If yes, please let me know the exact quotes that you want me to credit to you through the use of your REAL NAME.

Nine of the ten Scholars participated in the member check and answered the above questions. Scholars’ responses to the member check are presented in Chapter 4.
Member Checks

As described previously, in the final phase of data analysis, the researcher performed a member check. She provided Scholars with a document with the comprehensive findings of the netnography and asked the Scholars to comment on the accuracy of the document and recommend additions, deletions, or edits. As was specified in the Edmodo Participation Incentive Plan (Appendix G), Scholars were provided $50 for completing this member check. Nine out of ten Scholars participated in the member check and a summary of their comments is reported in Chapter 4.

Timeline for Dissertation Study

Below is a timeline outlining the key events of the research study.

Events prior to semester of research

August 2013 – December 2013 Pilot Study with 10 USC A-interns

September 18, 2013 Noyce Project Director introduced researcher to nine members of sample through email (Appendix B).

September 18, 2013 Researcher introduced herself to nine members of sample through email (Appendix C) and asked sample members to complete the USC Noyce Scholars New Teacher Support Program Contract (Appendix D).

September 21, 2013 USC Noyce Meeting – Shodor Conference. Researcher met a portion of Noyce Scholars for the first time.

November 22, 2013 USC Noyce Meeting. Researcher met more Scholars.

Events during semester of research
January 9, 2014 Sent an introduction email and a modified USC Noyce Scholars New Teacher Support Program Contract to the tenth member of the sample who just started teaching this month. Followed up with a phone call of introduction.

January 9, 2014 Sent an email to Noyce Scholars asking them to complete the Noyce Scholar Social Media Survey (Appendix A) in order to select the online platform for the OSG.

January 24, 2014 Created the Edmodo OSG and posted the first Edmodo post to welcome everyone to the group and to remind Scholars to post weekly. Sent an email to the sample to inform them of the platform that was selected as the OSG platform, re-explain the intent of the OSG, identify herself as part of the OSG as a mentor and a researcher, explain how to join the OSG, ask participants to join the OSG, and ask participants to sign a Responsible Use Policy (Appendix E) and write their first posts.

January 24, 2014 – May 29, 2014: Read posts regularly (multiple times a week) and responded to posts as appropriate, wrote fieldnotes, and organized data for coding. Wrote “Tuesday Talks” approximately once per week.

February 3, 2014: First post by a Noyce Scholar.

February 7, 2014: Noyce meeting.

February 20, 2014: Last Noyce Scholar joins group.

March 4, 2014: Implemented new Edmodo Participation Incentive Program (Appendix G).

March 10-12: Conducted Individual Phone Interviews regarding experience in Edmodo group (Appendix K).
**March 21, 2014:** Conducted Focus Group Interview at Noyce Southeast Regional Conference (Appendix L).

**April 8, 2014:** USC’s Office of Program Evaluation conducted an online survey of Noyce Scholars (Appendix I).


**March 15, 2015:** Member Check (See Appendix P).
Chapter 4: Results

Introduction

This study sought to investigate the efficacy of a Community of Practice (CoP) including a same subject mentor using social media in increasing the retention rates of induction year secondary mathematics teachers, by considering the following objective:

Conduct a netnography to qualitatively investigate the use of social media to support a Community of Practice (CoP) with effective mentoring among secondary mathematics teachers designed with strategies that are likely to impact retention positively.

The primary question guiding this investigation was:

What, if any, is the relationship between the retention of first-year secondary school mathematics teachers and their participation in an Online Support Group (OSG) that employs strategies for successful Communities of Practice (CoP) proposed by Wenger and includes a mentor who is trained in secondary mathematics education?

Underlying questions that aided in answering the primary question were:

1. How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication?
2. What are the characteristics of this OSG of induction year secondary mathematics teachers and an online same subject mentor?
3. To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger?

4. To what degree, if any, does participation in the OSG mitigate factors found in the literature known to negatively impact teacher retention?

5. To what degree, if any, does an off-site, online mentor who is trained in secondary mathematics education impact teacher retention?

These research questions provide an outline for the presentation of the results and findings in this chapter.

Choice of Social Media Platform

Because this was a netnographic study, the site of the research – the online community was important. Research question one was created to give Scholars voice into the choice of social media platform. The researcher added this question for two reasons:

1) In a brief face-to-face meeting with Scholars, Scholars expressed concern over the researcher-proposed social media platform – Facebook – due to a lack of access at school and administrator disapproval, and

2) When individuals have input into decisions, they are more likely to engage.

The researcher conducted a Noyce Scholar Social Media Survey (Appendix A) with participants to identify the desired social media platform for this group. Since 8 of the 10 participants returned the survey, the response rate of the survey was 80%. The results of this survey are presented here.

Noyce Scholar Social Media Survey – Results. Question one asked Scholars to indicate their frequency of use of 11 popular social media platforms. In addition to
indicating their frequency of use, the scholars were also asked to choose “yes” or “no” on whether they would recommend each platform for use with our web-based community.

Table 4.1 contains the results from question one.

Table 4.1  
*Frequency of Use and Recommendation of Use of Eleven Social Media Platforms.*

<table>
<thead>
<tr>
<th>Platform</th>
<th>Multiple times a day</th>
<th>Daily</th>
<th>Every Couple Days</th>
<th>Weekly</th>
<th>Less than Weekly</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basecamp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Blackboard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Edmodo</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td></td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Google</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Instagram</td>
<td>2</td>
<td>1</td>
<td></td>
<td>3</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>LinkedIn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Skype</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Twitter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Wiggio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>You-Tube</td>
<td></td>
<td>1</td>
<td></td>
<td>4</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

The results from question one indicate that 75% of respondents use three social media platforms – Edmodo, Facebook, and Google – regularly (at least once a week). In addition, three respondents (37.5%) use Instagram frequently (daily or multiple times a day). One hundred percent of respondents do not use Basecamp, Blackboard, LinkedIn, Skype, or Twitter regularly (less than once a week or not at all). When asked to indicate whether they would recommend each of these 11 platforms for the Noyce web-based
community (and respondents could choose to recommend multiple platforms), the majority of respondents recommended Edmodo (87.5%), Facebook (75%), or Google (75%). One Scholar (12.5%) recommended Twitter.

Questions two and three gave Scholars two opportunities to list additional social media platforms to use for the OSG. All eight respondents (100%) left those items blank, suggesting they had no other platforms to recommend.

Question four asked Scholars to “Please list the platform that you recommend that we use for our Noyce web-based community.” Edmodo and Facebook were the only platforms Scholars listed. The majority of the Scholars (62.5%) selected Edmodo, a quarter of respondents (25%) selected Facebook, and one Scholar (12.5%) specified to use Edmodo or Facebook. Figure 4.1 is a pie chart that summarizes the results of question four.

![Figure 4.1 Social media platforms recommended by Scholars for the web-based community in the study.](image-url)
Question five asked Scholars to explain their reasoning for selecting a particular social media platform. Scholars who selected Facebook mentioned their frequency of use and ease of access.

R1: I visit Facebook every day without fail. It would not only be convenient to have a Noyce platform there, but I would be significantly more likely to participate much more frequently.

R2: Most people use it and it’s easy to access.

Scholars who selected Edmodo stressed the “educational” nature of the platform, its ease of use, and mentioned that they are already using it at their schools. Two Scholars specifically indicated that it was important that they were able to access Edmodo on the school network.

R3: Edmodo provides a great base for professional communication. It’s also made for the educational arena. I also think several Noyce Scholars are already using Edmodo in their school sites.

R4: It’s an educational based website that is easy to use.

R5: I use Edmodo for assignments my school asks that I do. I get access to it on the school network, and I think it is easy to use.

R6: We can access it from school.

R7: Most Edmodo accounts are used for professional reasons. It is very similar to Facebook which most people use, but is probably less personal. We can have discussions there without having to worry about character limit and it is easy to navigate.
The one Scholar who mentioned using either platform touched on the similarities of the platforms.

R8: They are easy to access and create groups in. They are also easy to use. I already check them frequently, and I am already familiar with these platforms. In addition both platforms are easy to upload documents to and to write comments on.

The quantitative results of the survey – the majority of Scholars selecting Edmodo – and the accompanying comments that indicated that Scholars thought of Edmodo as more “professional” or “educational” swayed the researcher towards abandoning the platform familiar to her from the pilot – Facebook – and instead consider Edmodo for this group of Scholars. The comments about being able to access Edmodo at school sealed the decision to use Edmodo with this group of Scholars. The survey results matched the brief initial discussion that took place four months earlier where Scholars expressed concerns about using Facebook for the OSG due to lack of access during the school day and a negative view of Facebook by administrators and thus provided the researcher with additional evidence to support this decision.

Data collected in a focus group interview a few weeks into the semester of the investigation also re-confirmed that Edmodo was a good choice for this group. One Scholar commented:

Megan: It’s definitely easy when it’s something we can access at school, and I don’t feel like, “Oh God, it’s Facebook,” and we, like, put it down or something… At Edmodo, we can have it open for school purposes.
In addition, when Scholars completed the USC Noyce Scholar First Year Teacher Survey/Budget Feedback Charts, all Scholars indicated that they would keep the online community for first and second year teachers with nearly all (88%) indicating to keep it “as-is.” No Scholars suggested alternative platforms for the next year.

During the Focus Group interview, one Scholar suggested an addition to our interaction – an easier place to store and share resources.

Megan: something we could add on to…like…Google Drive… because it’s kind of hard via Edmodo sometimes to post your stuff and when it comes up it doesn’t look like what it’s supposed to look like.

A discussion ensued about the possibility of adding Google Drive or Dropbox into our regular interaction. About three quarters through the semester of research, Elizabeth created a Google Drive for our community, stored a couple lesson plan ideas there, and emailed the community to sign-up to have access to it. However, after the drive was set-up, no other Scholars added any resources to the drive.

**Characteristics of this Edmodo Group**

Describing the overall characteristics of this OSG of induction-year secondary mathematics teachers and a mentor was not an original goal for this researcher. However, through the researcher’s grounded theory approach to gather data to answer proposed research questions, the following question naturally emerged:

What are the characteristics of this OSG of induction-year secondary mathematics teachers and an online same subject mentor?

Using a wide lens, the researcher found evidence to answer the remaining three research questions, but also uncovered additional findings that would have been lost if the
researcher examined the data with a separate microscope for each research question. These additional findings add to the scholarship on mathematics teachers and teaching.

The primary data source used to answer this additional research question was the transcript and accompanying fieldnotes from the semester of interaction in the Edmodo community. When printed without the fieldnotes, the volume of downloaded text amounted to 118 double-spaced, ten-point font pages, representing 193 separate posts. Responses to survey questions and interviews provided additional data to triangulate the findings and provide a sense of trustworthiness of the interpretation of the Edmodo posts. A member check also provided an additional measure of trustworthiness.

As discussed earlier, two questions that are key to understanding the netnographic data emerged:

Purpose: Why did the member create the message?

Content: What was the post about?

Figures 4.2 and 4.3 provide hierarchical diagrams of the categories used to code the data. Figure 4.2 depicts what the researcher interpreted to be the purpose of postings, and Figure 4.3 depicts the interpreted content of the postings.

As shown in Figure 4.2, the researcher determined that authors posted for three primary purposes: 1) to support one another (157 out of 193 posts), 2) to ask for support (26 out of 193 posts) or 3) for administrative purposes (42 out of 193 posts). The total of these three categories exceeds the 193 posts because occasionally a post was written for more than one of the three purposes. Results indicating that posts offering support outnumbered posts asking for support by a factor of six were surprising. Possible explanations for these results will be described in Chapter 5. Figure 4.4 provides a
Figure 4.2 Purposes of posts in the private, Noyce mathematics Scholars’ Edmodo community.

Figure 4.3 Content of posts in the private, Noyce mathematics Scholars’ Edmodo community.
After examining the purposes of each post, the researcher re-coded the data with respect to the content of the post. The researcher discovered that the content of authors’ posts generally fell into eight categories: teacher plans/strategies (n=117), managing students (n = 69), classroom atmosphere (n=62), the teaching profession (n=59), student learning (n=54), Noyce NTSP (n=36), teacher organization (n=18), and general communication (n=6). The total of these eight categories exceeds the 193 posts because often a post dealt with more than one content category. Figure 4.5 provides a histogram of the number of postings by the content of Edmodo posts.
Table 4.2

*purposes of Posts with Illustrative Excerpts from Edmodo Posts*

<table>
<thead>
<tr>
<th>Purpose of Participation</th>
<th>Specific Indicator</th>
<th>Illustrative excerpts from participants’ posts/responses</th>
</tr>
</thead>
</table>
| Supporting               | Sharing – provides a resource/strategy (unprompted), shares student response to an activity/offers reflections on his/her teaching | Elizabeth: *I am attaching a Discovery Activity for Slope. I haven't done it with my students yet so I am not sure if anything needs adjusting but I thought I would share since people are getting close to teaching that in Algebra 1.*  
Jessica: *Here is an activity that I did in my Geometry CP classes to help reinforce creating Conditional, Converse, Inverse, and Contrapositive statements....Attached is the handout my students were given.*  
Michael: [http://www-users.math.umn.edu/~rogness/math1155/soundwaves/](http://www-users.math.umn.edu/~rogness/math1155/soundwaves/) This link is a quick tool I used to get kids interested in trigonometric functions....  
Brittany: So I was looking up a couple of activities for you and here are two that I found that I thought were interesting... |
|                          | Collaborating – Answers another participants’ question, builds off another participants’ post, offers to find answers or share additional resources | Mentor: *I think the 3rd point on the first problem needs to be changed to (1, 4). Also, on the third problem, you may want to say, "What is a (instead of THE) coordinate of a 3rd point on the line - since there is not only one other point. Then, ask what is the coordinate of a 4th point....*  
Brittany: *So I was looking up a couple of activities for you and here are two that I found that I thought were interesting...* |
<table>
<thead>
<tr>
<th>Supporting (continued)</th>
<th>Complimenting</th>
<th>Reducing Isolation – Commiserating/indicates that he/she has had a similar experience/feeling or just connecting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mentor: Thank you for sharing these articles. I think you have done a great job articulating your view and your view is a good one.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ashley: I love the &quot;Nerd of the week&quot; idea! I am going to try to implement this 4th quarter.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emily: Congrats, Michael!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Megan: You are wonderful- don't forget it :)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elizabeth: I have also run into this issue...</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Megan: Samantha - I am having this problem as well.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ashley: I also have this problem.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Michael: Brittany, I have the exact same problem!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Samantha: .... love you guys :-) Have a great spring break!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Megan: While in LA for my spring break I came across this billboard and fell in love. Thought I would spread some good vibes yall's way from Cali. Remember we are all making a difference in our kids’ lives, even if we can't see it right now.</td>
<td></td>
</tr>
</tbody>
</table>

**Image:**

![Billboard](image-url)
<table>
<thead>
<tr>
<th>Asking For Support</th>
<th>Preventively – Asks for resources or strategies for something the teacher wants to do</th>
<th>Reflective – relays an experience and asks for advice/feedback/help on how to handle the situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jessica: Anyone have any good pi day activities? My school has decided to do a faculty/student basketball game in fourth block on Friday, so in order to keep my CP classes together, I'm just going to do a random pi day activity in my first block. I don't really want to give them a free day, but maybe a pi-investigation activity...</td>
<td>Brittany: Does anyone have good ideas for review activities that keep the entire class involved?</td>
<td>Jessica: Does anyone know how to manage parent settings on Edmodo? At our school we have to give the parents the parent code, but I have a parent who complains that she cannot see anything that I post. I did not know if anyone else had used or been successful in using parent codes?</td>
</tr>
<tr>
<td>Megan: So I have this really fun PI day activity- which has to do with throwing hot dogs, so of course the kids love it... but it did not go as smoothly as planned this time around.... I am posing a question to all of yall.... When it comes to reprimanding/punishing your students (in the moment- not afterwards, like calling parents, admins etc.), have you found better results with yelling/ignoring them/having come to Jesus moments with them? Or any other approach that I haven't mentioned?</td>
<td></td>
<td>What I really wish I had done each day after every lesson (although it would have created more work) is to have done some sort of summary. My original idea was a ticket out the door, but I've been thinking about different ways to summarize what we did that day or even asking students to recall what we have done on previous days- homework and</td>
</tr>
<tr>
<td>Asking for Support (continued)</td>
<td>Reflective (continued)</td>
<td>Need Funds/Resources</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Samantha: Hello. I remember hearing that Noyce could provide us with funds for our classroom. Does ink count? I'm out, and we have to provide our own ink, which runs $71 at the district warehouse... can anyone fill me in on how this works?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ashley: I really like the idea of the inbox and outbox as well. I tried to find one of the rolling carts that has about 8 trays on it so that I could be more organized. My desk seems to accumulate ever paper I get. After I spent my money from the district, I found out that they sell them in school catalogs. That will be on my list to purchase for next school year, unless NOYCE buys it. ☺ See y’all later!</td>
</tr>
<tr>
<td>Administrative</td>
<td>Noyce NTSP Components – Mentors, meeting times, grant funds, posting requirements</td>
<td>Michael: My mentor is doing an observation of me this week. Noyce has an official observation form of its own, correct? How do I find that document so she can record, and send it in?</td>
</tr>
<tr>
<td></td>
<td>Marketing Secondary Mathematics Teaching – vacancy postings, info on profession</td>
<td>Samantha: Mentor, is it possible for me to receive the forms to be paid for attending the fall meeting? Thanks!</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mentor: We are seeking an innovative, creative and skilled Math teacher at “XXX School” for the 2013-2014 Academic Year....</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mentor: Samantha let me know that there is a math position open at “YYY School.” Please spread the word if you know anyone who is interested. Please contact the math AP ... or the principal... for more information. Thanks!</td>
</tr>
</tbody>
</table>
| Administrative (continued) | Polling – Seeking Answers to logistical questions | Mentor: What are ya'll doing this summer? Any fun plans? Samantha's post got me thinking. Are any of you doing any math/education related work over the summer? If so - pass on ideas to others who are looking for ways to supplement their income this summer. We can all help each other out! Of course - just relaxing and taking a break are great too! You have worked hard all year and deserve it!

Mentor: One item that we will discuss is how disperse the funds available for classroom supplies. Samantha mentioned ink ($71) What are some of the other needs that each of you have?

Michael: Teaching Pre-calculus at Upward Bound at USC

Brittany: If available I would love AA batteries for my calculators because our students don't have their own calculators and the batteries are all starting to die. |

| Polling – Answering logistical questions |

The online mentor – the researcher – was by far the most active member of the online community – contributing 55 (28%) of the 193 posts. Scholars’ participation in the group was varied with the most active Scholar creating 24 posts and one Scholar creating only one post. Table 4.3 provides a look at the number of posts by participant. Scholars were then classified as either “active” (7 Scholars), “regular” (2 Scholars) or “passive” (1 Scholar) members of the Edmodo community based on their quantity of posts. Figure 4.6 provides a pie chart of the participation levels of the Scholars. A Scholar was considered “active” if he or she exceeded the weekly posting expectations.
Figure 4.5 A breakdown of Edmodo posts by the content of the post.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Number of Posts</th>
<th>Percent of Posts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher</td>
<td>55</td>
<td>28%</td>
</tr>
<tr>
<td>Michael</td>
<td>24</td>
<td>12%</td>
</tr>
<tr>
<td>Jessica</td>
<td>21</td>
<td>11%</td>
</tr>
<tr>
<td>Samantha</td>
<td>18</td>
<td>9%</td>
</tr>
<tr>
<td>Elizabeth</td>
<td>17</td>
<td>9%</td>
</tr>
<tr>
<td>Ashley</td>
<td>16</td>
<td>8%</td>
</tr>
<tr>
<td>Amanda</td>
<td>13</td>
<td>7%</td>
</tr>
<tr>
<td>Brittany</td>
<td>12</td>
<td>6%</td>
</tr>
<tr>
<td>Megan</td>
<td>9</td>
<td>5%</td>
</tr>
<tr>
<td>Emily</td>
<td>7</td>
<td>4%</td>
</tr>
<tr>
<td>Christopher</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>193</td>
<td>100%</td>
</tr>
</tbody>
</table>
(essentially 10 or more posts). A Scholar was considered a “regular” member if he or she met at least 50% of the weekly posting expectations (5-9 posts). A Scholar was considered “passive” if he or she met less than 50% of the weekly posting expectations (less than five posts). Whether the number of posts a Scholar created accurately represented his or her participation in the group is debatable. The researcher did not have the capability to track the number of times Scholars read posts which also would signify a certain level of participation in the group.

![Figure 4.6 Participation levels of Scholars in Edmodo community.](image)

In an effort to determine the level of collaboration present in the community, the researcher recoded the data based on whether the post was an “original” post – where a member asked a question, shared a strategy, expressed opinions – or whether the post was a “response” post – where a member answered another member’s question or built off the
ideas of another member. Forty percent (77 of the 193) of the posts were “original” posts and 58% (112 of the 193) of the posts were “responses” posts with 2% (4 of 193) of posts having a response to a post and concurrently introducing a new topic for discussion. Figure 4.7 provides a pie chart illustrating the level of collaboration present within the community.

One third of posts were related specifically to the teaching of mathematics as opposed to general teacher education or other topics. Geometry was the most frequently discussed subject. Posts discussed mathematics topics including Geometry (42%), Algebra (28%), Probability/Statistics (14%), Pre-Algebra (8%), and PreCalculus/Trigonometry (8%). Figure 4.8 provides a pie chart summarizing the mathematics subjects discussed in this Edmodo community.
In order to describe the other features of Edmodo used by the community, the researcher combed the posts to identify specific features of Edmodo used – beyond the discussion threads and then quantify the use of these features. Scholars embedded web links in their posts (n=24) and attached documents (n=23) and photos (n = 7). The researcher performed one poll with the scholars. Figure 4.9 provides a histogram of the frequency of use of these features.

The documents that participants attached to Edmodo posts were of three major types: lesson plans/activities (n = 17), administrative purposes (n=5), and general educational theory (n=2). The pie chart in Figure 4.10 summarizes the types of documents that Scholars attached to their posts. The web links that participants included
Figure 4.9 Unique features used in posts in the Edmodo community.

Figure 4.10 Types of documents that Scholars attached to Edmodo posts.
in their posts were of three major types: lesson plans/activities (n=13), general education (n=5), and fun (n=2). Four other web links were embedded with other unrelated purposes. Figure 4.11 contains a pie chart that summarizes the characteristics of the web links that scholars attached.

![Pie chart showing types of web links embedded in Edmodo posts.](image)

*Figure 4.11* Types of web links embedded in Edmodo posts.

Photos were attached for a variety of reasons: to show student work, to show teacher-created resources, to inspire, to show an idea for organization, and to post a relevant article from the local newspaper. None of these reasons was dominant.

Reading Edmodo texts provided an opportunity for the researcher to gain an idea of where this group of teachers found resources to use in their teaching. Teachers mentioned the following resources: Google search/online, movies, educational books and journals, other textbooks, ACT/SAT prep books, information learned at conference
sessions, the math coordinator, the local newspaper, Kid President videos, Jimmy Fallon skits, song parodies, clips from Big Bang Theory, and other teachers. Of note is that the most frequent source mentioned for gaining lesson plan ideas was from other teachers. (n=7).

One of the benefits of netnographic research is the automatic transcript of the text in the exact form written by the author. As the researcher combed through the data multiple times, she noticed textual features that indicated that this community was a familiar place where members were comfortable with one another. She recoded the data under this umbrella of familiarity and comfort in the community. She looked at such text-specific factors as “super-punctuation” (!!!, !?!, etc.), all-caps, and emoticons. She then looked for instances where members used opening or closing salutations, addressed an Edmodo member by name, used casual language, used inclusive language such as “us” or “we” (in relation to other community members), shared feelings, or shared personal information. The histogram in Figure 4.12 provides a summary of these findings.

In addition to gaining a picture of the experiences of the group of induction year secondary mathematics teachers in this Edmodo community through the researcher’s participant observation, other data sources helped triangulate these findings and provide trustworthy interpretation along with providing additional insight.

Approximately one week after implementing the new incentive plan, the researcher conducted individual phone interviews with six participants to gain insights regarding Scholars’ experience within the Edmodo community. The key findings are described next.
Figure 4.12 Indicators of familiarity and comfort in the community.

When asked to describe any barriers to their participation in the Edmodo community, the scholars mentioned their “busyness” and the sense that it was an “assignment” or “one more thing to do,” their lack of understanding or indecisiveness on what to post, or their forgetfulness.

Michael: I think the most obvious barrier was probably just busy…treated it at first… or not treated it but thought of it as one more thing that we had to do.

Ashley: The fact of it being another assignment. I don’t think that it has to do with the fact that we chose Edmodo, but it seems like it’s almost like another assignment that we have to do on top of what we already do.

Samantha: Well, actually, when you (the mentor) wrote about Tuesday Talks, I actually wrote to Ashely or Emily and asked them were we supposed to respond to the Tuesday Talk, or were we supposed to write? Now that I know that we’re
just supposed to write… I think it is going to be a little bit harder. Because I
don’t have like a prompt, and there’s really nothing, like on my mind… nothing
that I want to share… But I don’t have anything in depth, so maybe if we had a
prompt or something… But sometimes Tuesday Talks might be conversation
starters.
Ashley: Once someone starts talking I think it is easier to reply to a prompt…
but if you don’t have anything to say it kind of made it feel hard.
Elizabeth: I forget to look at it sometimes, but that’s it… so just my own
forgetfulness.
Michael: It’s so hard to give advice without knowing a specific situation.
When asked opinions about the new incentive plan, Scholars indicated that it
should increase participation, yet it will still take a conscious effort on their part to
“remember” to post. One Scholar did express concerns that Scholars might only post for
the supplemental pay ($10/week for posting at least once that week), but went on to
indicate that he or she did not think this would be the case. However, another Scholar
commented that the financial bonus would aid in assuring that posts were of good quality.
Michael: I think that’s a good idea to get things rolling. I really, that was in my
brain, it was, “Man, if anything was going to get something rolling, this is.” But,
I also I just hope that people aren’t doing it just for that reason, although, I don’t
think they really will. We have things that we’re doing and that we are using and
strategizing and videos that we use in class, so all we have to do is take a few
minutes to put that on Edmodo.
Elizabeth: I think it does help people actually put effort into the post, because of course, we are all friends from grad school and we like sharing things, but sometimes it actually takes a second to sit down and really check out something worth typing, so I think that it helps just to be like, “Okay, well I’ll get $10 for making sure that I sit down and really actually put thought to what I’m saying rather than just be like, “Oh, I love my job,” and then being done with it.”

Samantha: Oh that’s fine. That means I know exactly. I’ve actually worked better that way, because I know that I need to be doing something. Otherwise I probably will not be doing anything. So it works better for me to pace myself.

Michael: I think checking it will have to be something that I do consistently, like, you know, we get in the routine of, but if I check it, and anyone else has posted a comment or an issue or suggestion, I will definitely participate. You know, I love… I love participating in stuff like that. I’ll just have to make it a routine to get on and check, and then I also, I have a note here on my computer, because it says Edmodo on it. I have to remind myself to, if I ever think of a good way to teach something to put that on Edmodo.

Scholars described that the Edmodo community had already been a positive experience for them through other Scholar’s sharing of ideas. One Scholar had already implemented ideas that he gained reading other Scholars’ posts.

Elizabeth: I love it. I was like laughing at things people were saying because it’s so like their personalities, but then also loving how everyone was sharing everything.
Michael: Eventually people got posting some ideas and some issues and some comments and, I mean, we can all talk if we’re in a room, so that’s all Edmodo is, is trying to get us in a room together, and sharing ideas…I love like the closing suggestions. That’s why I tried some of them.

Once the incentive plan had been in place for a couple weeks, the researcher leveraged the unique opportunity of being face-to-face with Scholars at a conference – to conduct a brief focus group interview. The purpose of the focus group interview was to gather data on the Scholars’ experiences in the Edmodo OSG after more sustained interaction. Scholars relayed the following opinions about their experiences in the Edmodo group:

Elizabeth: I love it because it’s just a good way for all of us to keep in touch too. And if it was just like random people I probably wouldn’t like it so much… I care about everyone’s opinions from here because I know they’re all smart people and great teachers, so I really like it. And sharing lessons and things like that, so… I love it.

Samantha: It’s allowed us to connect more, because I know us three have stayed connected, and those two have stayed in connection, but now we all are able to communicate better… It’s good. And we said we would, but we really haven’t. Sharing ideas is a way that you can get ideas and incorporate them into the classrooms.

Michael: Well unique ideas too, I mean I can get on Google and find just about any resource I need, but to check Edmodo every now and then, and get some
random Pi Day activity that I never would have found… that’s where the unique opportunity is for me.

Emily: We can share our same problems and issues, and realize, like, you’re not the only one going through this, because at this school, I know a few of us, we’re the only first year teachers there or maybe another math one, but you never see them, so it’s kind of hard to share your same experiences, and being able to do that with them and make you feel, “Okay, I might be a good teacher one day… It’s just like, “I’m the worst teacher in the world, am I the only one going through this?” so we can share the same experience.

Scholars went on to discuss specific posts that they benefitted from and said the following:

Elizabeth: I did like Amanda’s Pi Day stuff. Like, *The Circle of Life* and letting them look up where their birthdays were in the number Pi, and they would, like, take pictures of it, and they probably put it on Instagram, but whatever they’re Instagramming about math!

Others agreed that they also liked this activity.

Megan: I liked Jessica’s meme project.

Others agreed with this too.

Megan: I know that one of the things that I posted, just like the silly, like, launches that I did, Jessica had texted me and said “Oh, can you send me another one of your launches that you did, the kids really liked it,” so I know she did that. And I really like her project she did.
Near the end of the semester of this study, the Noyce Scholars were invited to be in a “New Teacher Panel” as part of a Noyce meeting for current Noyce Scholars – students who would be first-year secondary mathematics and science teachers the following school year. The researcher was not present during this panel discussion. Noyce Project staff (Jan Yow & Kathy Henson, personal communication, April 25, 2014) reported to the researcher that multiple Scholars mentioned how the Edmodo community was the best thing to keep them connected and that staying connected was important. Scholars mentioned the benefit of sharing and gaining ideas with people they trained with through Edmodo communication and relayed examples of specific ideas that they had already used in their classrooms – particularly Amanda’s Pi day activities and Elizabeth’s Hunger Games Review Game.

**CoP with the Structural Characteristics of Wenger**

The primary data source used to collect evidence as to what degree, if any, the OSG functions as a CoP with the structural characteristics of Wenger was the transcript and accompanying fieldnotes from the semester of interaction in the Edmodo community. Responses to survey questions and interviews provided additional data to triangulate the findings and provide a sense of trustworthiness of the interpretation of the Edmodo posts.

As discussed in Chapter 2, three characteristics are essential to classify a group as a CoP – a common domain of knowledge, a notion of community, and a practice (Wenger et al., 2002). The researcher will describe the degree to which the Edmodo OSG functioned as a CoP with regards to each of these characteristics.

**Domain.** The researcher purposely selected the specific members of the OSG to meet the requirement of a common domain of knowledge. Each member of the CoP was trained in secondary mathematics education at the University of South Carolina and
received certification (except for one Scholar who received provisional certification) to teach mathematics at the secondary level. Thus, members shared two primary domains of knowledge – mathematics and mathematics education.

**Community.** As described earlier in this section – while answering research question two – examples of the Edmodo OSG functioning as a community, as described by Wenger, are numerous. Figures 4.2 and 4.4 illustrate these results. In addition, Table 4.2 provides many examples of posts that document Scholars acting as a community.

Two particularly illustrative posts are repeated here:

Elizabeth: I am attaching a Discovery Activity for Slope. I haven't done it with my students yet so I am not sure if anything needs adjusting but I thought I would share since people are getting close to teaching that in Algebra 1 (Copy of activity was attached as a Microsoft Word document).

Megan: So I have this really fun Pi day activity- which has to do with throwing hot dogs, so of course the kids love it... but it did not go as smoothly as planned this time around…. I am posing a question to all of yall.... When it comes to reprimanding/punishing your students (in the moment- not afterwards, like calling parents, admins etc.), have you found better results with yelling/ignoring them/having come to Jesus moments with them? Or any other approach that I haven't mentioned?

Michael’s response to Megan: I usually have a calm, stern, authentic talk with them about respect. This ripples positive effects for a few weeks. But ultimately they're still kids. An argument can also be made that they need to understand that consequences follow misbehavior. But...at the same time negative extrinsic
motivation only works as long as the consequence is present. So in the real world, I think teaching respect is more meaningful.

**Practice.** Finally, the practice aspect of a CoP is met when members “develop a shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems – in short a shared practice” (Wenger, n.d., p. 2). Although Wenger cautions that this type of community “takes time and sustained interaction,” evidence that this CoP met the practice characteristic of the OSG abounds in the posts collected over this semester-long study. Two exchanges where Scholars share resources and other Scholars indicate that they will use these resources in their practice are included here:

Jessica: Towards the end of last semester, I realized that my kids were forgetting all the theorems, definitions, and postulates they need to know in geometry. Since there is a TON of stuff they need, I decided to have them make a portfolio for this semester. This is how I've done it so far:

1) I've created a list of 10-30 items (important definitions, theorems, and postulates as well as specific questions to help summarize big concepts) that they have to complete for each chapter. I give them their portfolio entry at the beginning of the chapter and it's due by the day of the test. A lot of students take this as a way to help study for their test. The entry counts as a quiz grade.

2) On Monday of the last week of school (my week of review) I'm going to give them back all of their portfolio entries and a folder. They're going to create a table of contents (if they want...or maybe I will, I haven't decided yet) and put their entries in order from ch. 1 to ch. 7.

3) They won't be able to use their portfolio on their final, but I do allow them a
"cheat sheet." I'm hoping that the portfolio will help them create their cheat sheet (since it's full of IMPORTANT stuff) as well as help them review for their final.

Comment from Megan to Jessica: I really like that idea Jessica. Was this something that you started at the beginning of the school year or sometime in the middle of a semester? I feel like I always have neat ideas, but it's too late to implement them when I'm months into the curriculum. This would definitely be something that I would like to do next year. Do you have the lists that you could send me?

Comment from Jessica to Megan: I got the idea at the end of last semester, so I didn't have a chance to implement it with those classes. I am lucky in the fact that we have a 4x4 schedule, so I got to start over at the beginning of this semester. So I did get the chance to do it this spring semester. Do you want me to send you like a copy of one of my entries that I give out to them? Or like the rubric? Or I can send everything I have if you'd like. All I really do is go through all the theorems and definitions and decide which ones I've seen since geometry and are important or ones that are important for other concepts. Then I decide which ones they should have an example or picture for, or should just have it written in their own words, etc.

Michael: We studied probability in my Engineering class. This was the quiz I made, pretty simple, but it is relevant! I think the kids will have fun taking it (Copy of quiz was attached as a Microsoft Word Document).

Samantha: I will definitely be using this. I like this activity not only for my stat class, but just as a thinking activity. Thanks Michael.
Data collected from the Focus Group Interview also supported the notion that this OSG was more than a group of people simply connected electronically, but was a CoP with the structural characteristics suggested by Wenger – a domain or knowledge, a community, and a practice. Following are illustrative excerpts from the Focus Group Interview session.

**Domain:**

Samantha: I care about everyone’s opinion in here because I know that they’re all smart people and great teachers.

Elizabeth: I like too… we’re all, like, trained the same way I guess, I would say, so I can, like, easily read other people’s, like, thought process.

Megan: I know their teaching styles… so I trust, you know, going and looking at their stuff and seeing what they’re doing.

**Community:**

Ashley: We all want to hear each other’s experiences… sharing lessons…

Michael: Sharing ideas.

Elizabeth: I have a hard time creating discovery lessons, so when I do create one I like to share it with everyone.

Emily: We can share our same problems and experiences and realize, like, you are not the only one going through this.

**Practice:**

Elizabeth: (The Edmodo group) is a way that you can get ideas and incorporate them into the classroom.
Focus group members mentioned using Amanda’s Pi Day activities and Megan’s launches. Other Scholars mentioned that they really liked Jessica’s meme project.

**Mitigation of Retention Factors**

The primary data source used to collect evidence as to what degree, if any, participation in the OSG mitigates factors found in the literature known to negatively impact teacher retention was the transcript and accompanying fieldnotes from the semester of interaction in the Edmodo community. Responses to survey questions and interviews provided additional data to triangulate the findings and provide a sense of trustworthiness of the interpretation of the Edmodo posts.

The specific retention factors that the strategies in this study aimed to mitigate were lack of professional and collegial support, such as working collaboratively with colleagues, feelings of isolation, poor student motivation, and poor student behavior.

The researcher’s initial grounded theory approach to coding the netnographic data – without respect to the original research questions – uncovered substantial evidence that the OSG functioned as a CoP and provided members with professional and collegial support including collaboration with colleagues and reduced feelings of isolation. Although evidence to support these facets has been previously discussed, the researcher will summarize key findings directly related to this specific research question here.

When examining the posts under the lens of “purpose” of post, the researcher found that nearly all posts were created to either give support (n=157) or ask for support (n=26). When specifically looking for a back-and-forth interaction indicating collaboration – the researcher found that 58% of posts were of this type. Successive phases of coding posts led the researcher to create a category titled “sharing/reducing
feelings of isolation” under the theme of support. Nearly one fifth (17%) of posts involved Scholars either sharing feelings of isolation or reducing others’ feelings of isolation by sharing that “they too” had experienced a similar problem or had similar feelings regarding their students or their competency as a mathematics teacher. Specific examples of direct Edmodo transcripts representing evidence that the OSG provided support, opportunities for collaboration, and a place for Scholars to “not feel alone” in their experiences were included in the conceptually clustered matrix in Table 4.2 earlier in this chapter.

In order to triangulate findings and provide trustworthiness in interpretation, the researcher cross-checked her findings regarding research question four with the findings of surveys and interviews. The researcher will summarize these results as they pertain to research question four.

As described in Chapter 3, the Office of Program Evaluation (OPE) at the University of South Carolina administered a survey of Scholars as part of their independent evaluation of the Noyce grant program and provided the raw data and summary report (D’Amico, et al., 2014) to the researcher. The survey gathered data in seven areas: 1) preparation from the Noyce program, 2) financial support, 3) monthly meetings, 4) online community, 5) mentorship from the Noyce program, 6) professional development needs, and 7) career plans. Of particular interest to this researcher’s study was the section of the survey on the online community – questions 18-23. The researcher also examined the answers to question 28 “Please provide any suggestions to improve the support and resources for Noyce graduates” to discover if any Scholars mentioned improvements to the online community. The researcher only examined the responses
from the mathematics Scholars (not the Noyce science Scholars who also took this same survey). The response rate of the mathematics Scholars was 70%.

Almost all mathematics Scholars (86%) reported that they used the Noyce online community frequently with only one Scholar specifying that he or she used it sometimes. The one Scholar who answered that he or she only used it sometimes cited his or her schedule as a reason he or she does not use it more frequently and he or she was the only respondent to specify that he or she plans to use the online community more frequently in the future. All (100%) of Scholars were satisfied with the level of professional support that they receive through the Noyce online community. Scholars indicated that the Edmodo community provided multiple benefits: provided a means to collaborate with colleagues (100%), provided ideas to improve classroom behavior (100%), provided ideas to improve motivation (100%), provided suggestions on ways to teach topics (100%), reduced their feelings of isolation (86%), and provided support (86%) (See Figure 4.13).

Scholars were asked to provide suggestions to improve the Noyce online community. Only one Scholar responded – and responded with praise:

I think that it is great the way it is. We can participate at our own pace, and I have really enjoyed the others’ feedback and advice. I have used a lot of it!
Figure 4.13 Percentage of Scholars with perceptions of the benefit of the Edmodo community.

When asked to provide any suggestions to improve the support and resources for Noyce graduates, no Scholars mentioned improvements to the online community. Only one respondent answered the question and he or she stated:

The opportunities for us to receive financial support are phenomenal. Please continue to do this; it helps new teachers SO MUCH.

This comment hints that financial incentives do matter.

Results from the “USC Noyce Scholar First Year Survey/Budget Feedback Charts” also triangulate these findings. The response rate for this survey was 80%. Data from questions 8-13 was particularly useful in answering research question three. Almost all Scholars (88%) strongly agreed that they have been active participants in the USC Noyce Edmodo Community with only one Scholar disagreeing. All scholars agreed or strongly agreed that participation in the USC Noyce Edmodo Community:
1) Increased my communication with fellow USC Noyce Graduates,

2) Provided support to me in my teaching career, and

3) Provided opportunities for me to collaborate with fellow Noyce Graduates.

All Scholars disagreed or strongly disagreed that participation in the USC Noyce Edmodo Community “caused me stress.” Nearly all Scholars (88%) agreed or strongly agreed that participation in the USC Noyce Edmodo Community “decreased my feelings of isolation” with one Scholar disagreeing. It is interesting to note that the one Scholar who reported a lack of participation in the Edmodo online community is the same Scholar who reported that the community did not decrease his or her feelings of isolation. This Scholar (along with one other Scholar) also reported the lowest job satisfaction rating.

All Scholars agreed, with nearly all (88%) strongly agreeing, that the USC Noyce Edmodo Community should be a part of the program for USC Noyce graduates in their first and second years of teaching.

In an open-ended question where Scholars were asked to list specific benefits gained from the Noyce Online Community, over half of the Scholars (63%) mentioned gaining ideas or resources or decreasing their feelings of isolation. It is interesting to note that just under half of the Scholars (38%) mentioned their ability to share ideas as a benefit. The researcher did not anticipate sharing to be a benefit. A quarter of Scholars (25%) reported collaboration and a quarter of Scholars (25%) reported support as benefits of the community. One other finding worth mentioning is that a quarter of Scholars (25%) mentioned the make-up of the community – “first-year teachers” or “the people I was trained to be a teacher with” in their responses indicating that these characteristics of the make-up of the group were important.
In an open-ended question where Scholars were asked to list any ways that the
USC Noyce Online Community was detrimental to them, nearly all (88%) indicated no
detriments. Scholars indicated this by either writing “None or NONE!!!” (38%), writing
“N/A” (38%) or leaving the question blank (13%). The only Scholar who wrote a
narrative reported that “at first, I thought of it as an obligation.”

As mentioned earlier, the purpose of the budget feedback charts was to invite the
Noyce Scholars to put themselves in the shoes of the Noyce NTSP Coordinator and plan
how the budget available for induction-year and second-year teachers would be spent.
The charts gave a description of each component of the 2014-15 NTSP – Noyce
meetings, Noyce mentors, videos of them teaching, funding for classroom supplies, and
the Edmodo online community – along with the funding that accompanies each
component. Scholars were asked to indicate whether they would “keep as is,” alter,” or
“discard” each program component. Scholars were asked to list any alterations they
would make if they selected to alter a component and to specify reasons for keeping,
altering, or discarding each component. For the purposes of this dissertation study, the
researcher will only report on the Edmodo online community component. In addition,
the researcher will combine the responses regarding the first and second year programs
because Scholars seemed to either not notice that the two budget forms were different or
answer them as if they were the same charts. The researcher noticed that two Scholars
only completed one of the budget forms when they emailed her their feedback forms.
The researcher contacted the Scholars and asked them to complete the year two budget
feedback form. Both Scholars indicated that they did not realize that there were two
separate forms. The researcher did not notice until well after administering the survey
that two other Scholars did not submit the year two survey. She assumed these two
Scholars also did not notice that there were two separate budget feedback forms – one for
year one and one for year two.

All Scholars indicated that they would keep the Edmodo community for first and
second year teachers with nearly all (88%) indicating to keep it “as-is” and only one
Scholar suggesting an alteration. This Scholar commented that

I liked the $10 per post but sometimes weeks are easier than others. It would be
nice to have two week periods with up to two posts.

It is note-worthy that the researcher also found it difficult to post weekly. The
weekly suggestion was done primarily to collect enough data for the dissertation study.
The researcher is currently involved in four similar OSGs and the incentive offered is $20
per month for posting at least twice a month for these groups.

The data on reasons for keeping, altering, or discarding the Edmodo online
community was sparse. Three Scholars (38%) left that column of the chart blank.
Several comments, such as, “The online community has been amazing!” and “I love the
online community” and “I’m grateful that this was part of Noyce” were too vague to
draw any specific conclusions other than that Scholars were highly satisfied with their
experience in the Edmodo OSG. Two Scholars responded with a little more specificity
that it was “beneficial” and “it has been a really helpful tool to make me a better teacher.”
More specific comments addressed the benefits of keeping in touch with fellow Noyce
Scholars – “I love hearing from my peers” and it is “good for them to keep in touch with
their fellow Noyce members,” sharing resources and experiences – “being able to share
resources,” “sharing successes and even failures,” and providing “a good support network.”

One Scholar added her own footnote to the budget chart. He or she noted that for the next year, USC should “keep Edmodo posts going even from last year (Posts, not $).” This unsolicited comment indicates that this Scholar is likely to use the OSG without any funding.

Previously documented comments from the Focus Group Interview also indicated that the OSG provided opportunities for support, collaboration with colleagues, and helped reduce Scholars’ feelings of isolation. No comments were made in the focus group interview related to student motivation. However, a couple key discussions took place regarding student behavior. When discussing a post that Megan wrote relaying an experience where her students demonstrated poor behavior, she first discussed her dilemma of whether to post the experience or not.

I felt totally comfortable with you know you guys that I said, “Elizabeth, is this appropriate or not?” She’s like, “Yeah, look who it’s going to.” But if it was a stranger… I mean I feel like, I don’t want them thinking I’m a bad teacher because I can’t control my class.

Ashley chimed in,

Yeah, like they’re going to send it to your principal.

These comments provided evidence that the level of trust that Scholars had with each other had an impact on the richness of their interaction.
Same Subject Online Mentor’s Impact on Teacher Retention

The researcher transcribed and selectively coded qualitative data from social media posts and field notes using the constant comparative method looking for evidence of the mentor’s impact on mitigating factors found in literature known to negatively impact teacher retention. The specific retention factors that the strategies in this study aimed to mitigate – lack of support and collaboration with colleagues, feelings of isolation, student apathy, and poor classroom behavior – were explained earlier. Interview transcripts and responses to survey questions were used to triangulate the data and provide evidence of “trustworthy interpretation” of the qualitative data.

The mentor was by far the most active member of the Edmodo community creating 28% (55 out of 193) of the Edmodo posts (See Table 4.3). Although frequency of posting does not indicate the quality of the posts, it does indicate that the mentor “was always there.” As mentioned earlier, posts were often assigned multiple codes because within a post, a participant could post for multiple reasons and could discuss multiple topics. Of the 55 posts that the researcher created, a significant number of posts were classified under categories that were factors shown by literature to have impacts on retention. Twenty-one were classified as “sharing,” 27 were classified as “collaborating,” 11 were classified as “complimenting/thanking,” and 9 were classified as “reducing isolation.” An illustrative example of how the mentor’s role in the OSG mitigates each factor is given below.

a) lack of professional and collegial support

Following is an excerpt of a particularly long post where the mentor offered support in the way of overall teaching strategies (launches) and provided specific mathematics examples for Scholars to use with their students. She was careful to provide
three examples that touched on different subjects because members of the Edmodo group taught a variety of subjects.

Mentor: Tuesday Talk (On Wednesday again!)

Launching a Math Lesson

The purpose of the launch is to gain student interest and provide a memorable experience for students to continue to draw back on as they learn new mathematics content. When you have decided what you will teach – just say to yourself – how can I introduce this in an interesting/memorable way? You can look online for ideas or just come up with a simple launch yourself. The few extra minutes that you will spend creating a good launch will really pay off in students’ comprehension of the new concepts, their interest in learning the new content, and their opinion of you as their teacher. Just as when you listen to a speech – you are more interested in the speaker if he or she draws you into the speech from the start. I love coming up with interesting launches. If you want my ideas on how to launch a specific lesson, send me your requests. Also, if you have some ideas to share with our group – post them here. Below are some ideas to get you started…

1) A Puzzle: A great way to launch a lesson is to give students an interesting problem that you can quickly and secretly solve using algebra leaving your students wondering – how did he or she do it? Below are two examples that would be good to use when introducing a section on translating verbal expressions to algebraic expressions.

Algebra – Fun with calendars http://math.rice.edu/~lanius/Lessons/calen.ht...

Algebra – Guess my birthday http://mathematical-recreation.blogspot.com/2... (I
always used this fun activity on the first day of school to get my students talking, to have fun, and to have them think. At a point later in the year, I offered extra credit points for any student who could explain mathematically how I was able to tell each student his or her birthday when he or she gave me a single number).

2) A current event: As Amanda mentioned - the NCAA basketball tournament provides a great opportunity to talk about probability. Here are some articles about the odds of predicting a perfect bracket in order to win Warren Buffet’s $1Billion prize.

Probability http://www.quickanddirtytips.com/education/ma...
http://ftw.usatoday.com/2014/03/ncaa-tournament...

3) A brief “experiment”: Geometry is a place where it is easy to do a hands-on activity or discovery learning activity. This “experiment” can serve as your launch. The idea is to quickly show the new concept that students need to be able to work problems and then get them to work on the problems.

Triangle Sum Theorem: Have students cut a triangle out of a piece of paper. Have students tear off all 3 corners. Line the corners of paper up to show that the 3 corners form a straight angle which is 180 degrees.

http://www.cutoutfoldup.com/406-illustrate-th... (I used the simpler version found at the bottom of this website page).

Vertical Angles are Congruent: Hold up a pair of scissors. Open them to any position. Ask students what they notice about the vertical angles (You will need to define what vertical angles are). It should be relatively easy for students to see
that vertical angles are congruent. Keep changing the amount the scissors are
open to verify that vertical angles are ALWAYS congruent.

b) collaboration with colleagues

After reading a post from Elizabeth, the mentor looked over Elizabeth’s activity
that she shared. She found a couple improvements that could be made to the activity and
thus recommended these improvements to Elizabeth in a post to the group.

Mentor: Elizabeth, thank you so much for sharing! Great activity. Have you used
it yet? I think the 3rd point on the first problem needs to be changed to (1, 4).

Also, on the third problem, you may want to say, "What is a (instead of THE)
coordinate of a 3rd point on the line?" – since there is not only one other point.

Then, ask “What is the coordinate of a 4th point?” Please share any activities that
you all have. If you want - we can create a little library of activities so that you
can access anything that another Noyce Graduate shares.

c) feelings of isolation

Occasionally the mentor wrote posts to build the Scholars up and let them know
they are important and that someone (the mentor) recognizes the difference that they
make in the lives of students. Here is an example of one of these posts:

Mentor: Tuesday Talk for Noyce Scholars

Each Tuesday, I will do a post - A Tuesday Talk - to Edmodo. My posts will be
there to inform, support, challenge, inspire, or make you laugh. Here is the first -
this one is meant to inspire - each of you inspires so many each day... As Randy
says, “Be a Tigger!” http://www.youtube.com/watch?v=Wn9L4CxAAQY
d) low student motivation

To address low student motivation, the mentor shared the following idea that she had used with her mathematics students on the first day of school to motivate them to do well.

Mentor: For the first day, having students complete a questionnaire to gain information about them is a good first assignment. I always included a question where students had to write down what grade they hoped to achieve in the course.

e) poor student behavior

To make sure that Scholars knew that the mentor understood that student behavior issues are prevalent in schools and that the impact the Scholars make on student behavior is so critical, the researcher brought in outside perspectives from a local newspaper.

Mentor: Here is an interesting article from today's (April 4, 2014) State Newspaper about discipline and trying to end the school-to-prison pipeline. If you have time to read it – let us all know your thoughts. I hope that the file comes through clearly (photo of article was attached).

Analysis of the data from the USC Noyce Scholar First Year Teacher Survey/Budget Feedback Charts was used to triangulate results from the researcher interpretation of the Edmodo posts. Of particular interest to answering research question five was the data from questions 1-7 on the survey. Noyce Scholars were very satisfied with their jobs (satisfaction rating of 8.63 on a 10-point scale) and reported an overall high level of support (8.62). Table 4.4 provides an overview of Scholars’ perceived levels of support with the highest levels of support coming from the Noyce NTSP.
Table 4.4

*Average Perceived Level of Support Assigned by Induction Year
USC Mathematics Noyce Scholars*

<table>
<thead>
<tr>
<th>Support Mechanism</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noyce New Teacher Support Program Director (the researcher)</td>
<td>9.38</td>
</tr>
<tr>
<td>The Edmodo Community</td>
<td>9.00</td>
</tr>
<tr>
<td>Noyce Mentor at School</td>
<td>8.43</td>
</tr>
<tr>
<td>School Administration</td>
<td>8.38</td>
</tr>
<tr>
<td>USC</td>
<td>8.29</td>
</tr>
<tr>
<td>Other Mathematics Teachers at School</td>
<td>8.25</td>
</tr>
</tbody>
</table>

*Note: Rating is on a ten-point scale*

Coordinator (the researcher/online mentor) (9.38) and from the Edmodo Community (9.0).

The Focus Group Interview included data that provides an insight to an important role of the mentor, not directly related to the research questions, yet essential to the success of the OSG. One Scholar commented:

> It’s allowed a lot of us to connect more, because I know us three have stayed connected, and those two have stayed in connection, but now we all are able to communicate better. It’s good. And we said we would, but we really haven’t.

This post indicated that although Scholars desired to keep in touch, they did not do this on their own. Perhaps the mentor’s most critical role was to continuously revise strategies – for example implementing a new incentive plan or changing the nature of a Tuesday Talk from informative to inquisitive to get the Scholars to be interactive in the
Edmodo community “for their own good.” The Longman Dictionary of Contemporary English Online ("For your own good", n.d.) says that to do something “for someone’s own good,” is “to help them even though they might not like it or want it.” Recognizing that some Scholars initially thought of posting to Edmodo as “another assignment” on their long list of things to do, she hypothesized that once Scholars participated, they would appreciate and benefit from the experience. This finding is confirmed by the response of one Scholar to the USC Noyce Scholar First Year Survey/Budget Feedback Charts. The Scholar commented:

At first, I thought of it (participation in the Edmodo OSG) as an obligation. However, the Scholar went on to report that the level of support from the Edmodo community was a 10 (on a scale from 1 to 10, with 10 being the highest) and the level of support of the online mentor was a 10. The Scholar strongly agreed that participation in the Edmodo community increased communication with fellow USC Noyce Graduates, provided support in his/her teaching career, provided opportunities to collaborate with fellow Noyce Graduates, and decreased feelings of isolation. In addition, the Scholar disagreed that participation in the Edmodo community caused him or her stress.

The researcher’s role as a same subject mentor was evident; however, her primary role was to set up a safe space for the CoP to reside and to promote regular and sustained interaction by members of the community. To this end, the mentor created four key documents: the USC Noyce Scholars New Teacher Support Program Contract (Appendix D), the Edmodo Responsible Use Policy (Appendix E), Written Guidelines for Researcher Observation and Participation in the Online Support Group (Appendix F), and
the Edmodo Participation Incentive Plan (Appendix G). The role of each of these
documents is described here.

**USC Noyce Scholars New Teacher Support Program Contract (Appendix D).**

Although all ten Scholars signed the USC Noyce Scholars New Teacher Support Program
Contract which included a provision for up to $200 of funding for active participation in
the Edmodo group, initial participation in the Edmodo group was minimal. Scholars
made a total of only thirteen posts within the first five weeks that the group was up and
running.

**Edmodo Responsible Use Policy (Appendix E).** All ten Scholars signed the
Edmodo Responsible Use Policy and there were no problems with egos or personal
attacks.

**Written Guidelines for Researcher Observation and Participation in the Online
Support Group (Appendix F).** The researcher followed the Written Guidelines for
Researcher Observation and Participation in the Online Support Group as described
earlier in this section.

**Professional Responsibility.** There were no inappropriate or unprofessional
Edmodo posts, posts referring to unethical or illegal practices, or posts indicating that any
Scholar may be experiencing emotional, mental, or physical issues that require
professional attention. Thus, the researcher was not required to remove any posts or
report any posts to any legal or medical authority or professional.

**Operation.** The researcher read posts multiple times per week, but not daily due to
the time constraints of other professional and personal responsibilities. There were no
posts which required immediate attention and thus, the researcher generally gave other
Scholars the opportunity for first response so that their responses would not be influenced by the researcher. Tuesday Talks were initially designed to provide an opportunity for the mentor (the researcher) to provide professional development on a range of topics such as classroom management, motivating students, and instructional strategies to use with secondary mathematics students. However, two comments made by Scholars during individual phone interviews changed the researcher’s approach to Tuesday Talks.

Samantha: I actually wrote to Ashley or Emily and asked them were we supposed to respond to the Tuesday Talk, or were we supposed to write? Now that I know that we’re just supposed to write… I think it is going to be a bit harder. Because I don’t have like a prompt… so maybe if we had a prompt or something… But maybe Tuesday Talks might be conversation starters.

Ashley: Once someone starts talking I think it is easier to reply to a prompt…

The original goal of Tuesday Talks – to deliver professional development – was replaced with the goal of prompting Scholars to share experiences regarding various topics. The following two examples of Tuesday Talks illustrate this shift in purpose.

Post 1 (prior to shift in purpose): Each Tuesday, I will do a post – A Tuesday Talk – to Edmodo. My posts will be there to inform, support, challenge, inspire, or make you laugh. Here is the first – this one is meant to inspire – each of you inspires so many each day… As Randy says, be a Tigger!

http://youtube.com/watch?v=Wn9L4CxAaQY.

Post 2 (after shift in purpose): Do your students know how you graded their tests? This Tuesday Talk – attached – is about the importance of assigning point values on your tests so that students know how much each problem is worth while they
are taking a test and so that two if two independent graders graded one student’s
test – the test results would be consistent.” (Attached to this post was an example
of a possible method used to grade tests).

Post 1 received no responses. Post 2 received responses from five Scholars. Below are
the responses from the five Scholars:

Ashley: I have found success in assigning all questions the same amount of points
and giving students at least 1 point for attempting the problem. It isn’t until I start
grading papers that I actually decide how many points I am going to take off
because I don’t always know what silly mistake they made and I want to give
students as much credit as possible. I know I should write this down beforehand,
but as I take points off I write down how many points and the mistake so that I am
consistent in my grading. This method has seemed to work for me and makes
grading a whole lot easier since I want my students to succeed.

Michael: Honestly, I think we grade exactly the same way, from how you
described. I know my students, and must grade accordingly. Also, we in
Richland District One are not permitted to give our students a 60 or below as a
quarter grade. So what would be the point of grading harshly, only to manually
change the grade later?

Samantha: Regarding the Tuesday Talk that was posted, I ran into that dilemma
earlier this year and I really found myself at a crossroad as to how I should assign
points for the students’ tests. I teach lower level students so I always want to be
able to give them as many points as possible, and I want them to be able to
calculate how they are doing as they work through the assessment. I initially
made problems that required more work count more, but these problems usually were left blank, or their attempt would come up empty. So I eventually began assigning all problems the same amount of points. It makes it easier for me to grade and I feel like I’m awarding the students a little for effort. However, I do feel like word problems and multi-step problems should account for more of the test. I’m interested in seeing what others have done.

Elizabeth: I have also run into this issue since I have an Algebra I Part 2 this semester. In my CP class, we give one point for every step of the problem and just grade the test out of how many points total on the test. Then of course make it out of 100 so all tests count the same amount. When I first started grading Part 2 stuff, I ran after every assessment to see how many points the other teachers were assigning. The always gave each problem the same amount of points and graded out of 100. I had a hard time at first because I would only want to take off 1 point for 1 mistake but when the problem counted for 5 points and it was only a 1 step problem, I hated taking off the full 5 points. Soooo what I finally decided is that if they made no effort, they get full points off, if they tried but got it completely wrong, I will still give them a point or two depending on how much each problem is worth. Hope that helps! I don’t really like the system but with my Part 2 kids, I have to reward them someway for trying.

Brittany: I grade differently in different classes because at my school all of the classes are supposed to give exactly the same test and grade them the same way. There is one teacher that teaches Part 2 and she grades the tests so that every question is worth one point and if they got the question partially right they can get
½ of a point. It seemed really strange to me at first, but it also doesn’t penalize
the students as much for skipping a problem, and the students often like to skip
the harder problems which would be worth more. In my Algebra I class I assign
point values for each problem and I just started adding them to my tests so that
each section has a point value next to it and that works really well.

The researcher initially planned to send reminder emails to Scholars who had not
posted that week reminding them to post once per week. The researcher chose to
abandon weekly reminders due to the Scholars’ responses to the following question posed
during individual interviews:

What have been the barriers to your involvement in the online Edmodo
community?

Michael: I think the most obvious barrier was probably just busy… treated it at
first… or not treated it but thought of it as one more thing we had to do…

Ashley: The fact of it being another assignment…it seems like it’s almost another
assignment that we have to do on top of what we already do.

The Edmodo group was set up to be a support, not an obligation – thus reminder emails
were eliminated. Alternatively, the researcher often added an encouraging suggestion to
write a post at the end of her posts. For example:

Mentor: Don’t forget to post a quality post at least once a week to receive
$10/week allotted for this interaction. A quality response to a colleague’s post
definitely counts!

Tone. The researcher followed the explicit directions in the Written Guidelines for
Researcher Observation and Participation in the Online Support Group regarding using
an accepting, optimistic tone and offering compliments to Noyce Scholars when they offered support or collaborated. Two examples are below:

   Mentor: Thank you so much for sharing. Great activity!
   Mentor: I think you have done a great job articulating your view and your view is a good one.

Organizing Electronic Posts and Researcher Fieldnotes. The researcher used the Microsoft Word Document – the Electronic Post and Fieldnote Journal – described in Chapter 3 to transcribe each participant’s posts and contemporaneously write reflective fieldnotes in order to gain a better understanding of each member’s role in the OSG and to decide in what areas the participants need support. After reading posts where Scholars asked for ideas regarding activities to maintain student interest towards the end of the school year or launches, the researcher chose those as topics for subsequent Tuesday Talks.

Edmodo Participation Incentive Plan (Appendix G). For the first five weeks, communication in the Edmodo community was sparse. To address this concern and to motivate Scholars to participate, on March 4, the researcher informed Scholars of a new Edmodo Participation Incentive Plan and provided examples of quality posts. Within 72 hours of emailing Scholars the new incentive plan, Scholars created 25 posts – nearly double the 13 posts Scholars had made over the five weeks that the community was up and running. Figure 4.14 provides a chart showing the number of Edmodo posts that were authored each day (by the mentor and the Scholars) during the semester of research. The yellow star indicates implementation of the new incentive plan.
Figure 4.14 Number of Edmodo posts per day. (Note: The yellow star indicates the implementation of a new Edmodo Participation Incentive Plan.)

**Member Check**

The researcher performed a member check with participants to validate her interpretations of electronic post data, confirm her interpretation of survey and interview data, and provide participants an opportunity to have their own voices reflected in the final research representation. All ten Noyce research participants were emailed the researcher’s findings (presented in Chapter 5) and asked to comment on whether they agreed with the findings or suggested any changes. Nine out of ten participants responded. All respondents indicated that they agreed with the findings as described by the researcher. The comments of two participants add additional confirmation of the findings:

Jessica: I think that you did a great job picking certain information in order to portray the idea of how helpful and inspiring the Edmodo posts were and how they created this small community that we have all grown through.
Brittany: I am grateful that you started the Edmodo site as a resource for us. It has truly been helpful as a way to remain in contact with other teachers and feel more connected. I agree with your statements that it was very helpful when you gave us ideas of things to post about because many times it is easier to respond to an idea than to come up with a new idea.

In addition to validating the researcher’s findings, the researcher sought out to make sure that participants did not want her to remove any quotes (although pseudonyms were used) out of concern that a particular quote would be tied back to the participant and to offer to replace a pseudonym with a participant’s real name if a participant wanted to be given credit for his or her thoughts. All nine participants who responded to the member check indicated that all quotes were acceptable as written.

**Netnographic Quality Check**

The researcher evaluated her netnographic results using Kozinets’ *Ten Criteria to Evaluate Netnographic Quality* (See Table 2.1) described in Chapter 2. Using grounded theory and the constant comparative method to arrive at themes and categories of data satisfied the criterion of coherence. Rigour was established by strictly adhering to Kozinets’ five steps for netnographic research. In Chapter 2, the researcher reviewed important literature related to the study, satisfying the criterion of literacy. The researcher provided many direct quotes of participants in order to provide evidence of groundedness, to elicit resonance, and to provide verisimilitude. It has been widely reported that induction year teachers need a lot of support. The netnographic approach to this study satisfied the criterion of innovation by revealing a finding which has not been widely reported – the significant amount of valuable support that induction year teachers...
freely give to other induction year teachers when provided with the opportunity – as opposed to only reporting the amount of support that induction year teachers receive. To satisfy the standard of reflexivity, the researcher acknowledged her struggle between her roles as the researcher and the mentor. She reported on being constantly faced with decisions on whether to adhere strictly to the originally established research protocol in order to present findings or to make improvements to the CoP in order to benefit the Scholars. In this study, the researcher primarily interacted with the participants through the online Edmodo group. However, the researcher also interacted with participants in face-to-face meetings and over the phone – satisfying the criterion of intermix.

**Summary**

Using the research questions as a framework, data has been presented that allow conclusions to be drawn and discussed in the chapter that follows. Only the reader can truly evaluate whether this netnography meets Kozinets’ final criterion of evaluating the quality of this netnography – praxis – inspiring and empowering social action. This is a goal of Chapter 5.
Chapter 5: Conclusions

Introduction

This chapter begins with a summary of the study followed by conclusions and discussions regarding the findings. Recommendations for individuals implementing online Communities of Practice (CoPs) of educators are provided. This chapter concludes with suggestions for future research.

Summary

The shortage of secondary mathematics teachers is a well-documented, perennial issue facing our nation. Contrary to customary belief, we are producing enough mathematics teachers to cover the increase in student enrollments and mathematics teacher retirements. Enlightened by the findings of Ingersoll, we are beginning to understand that pre-retirement attrition is the underlying problem to the shortage of qualified mathematics teachers. Further analysis of teacher turnover patterns provides evidence that teacher turnover is especially high in the first few years of teaching. One study found that the modal years of teaching math is just one. It is this issue in education – early years’ mathematics teacher turnover – that this study aimed to address.

Numerous studies have documented that the provisions of a same subject mentor and a CoP of educators have positive impacts on early years’ mathematics teacher retention. Unfortunately access to quality same subject mentoring and a CoP of educators is limited, particularly in the urban and rural high-needs districts where it is
needed most. Social media – with its widespread use among adults – could be the extra tool necessary to ensure access to high quality, same subject mentors and a CoP of mathematics educators.

The problem addressed in this investigation was captured in these questions: Does using social media to create a CoP through an Online Support Group (OSG) with a same subject mentor have efficacy in increasing the retention rates of induction year secondary mathematics teachers? How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication? What are the characteristics of this OSG of induction year secondary mathematics teachers and an online same subject mentor? To what degree, if any, does the OSG function as a Community of Practice with the structural characteristics defined by Wenger? To what degree, if any, does participation in the OSG CoP mitigate factors found in the literature known to negatively impact teacher retention? To what degree, if any, does an off-site, online mentor who is trained in mathematics education impact retention?

The works of Richard Ingersoll and his collaborators provided the most comprehensive look at the magnitude of the teacher supply and retention problem, the trends surrounding it, and the positive influence of induction and mentoring on retention (e.g. Ingersoll & Strong, 2011; Ingersoll et al., 2014). Key reports highlighted the expense of retention financially (Alliance for Excellent Education, 2005; Barnes et al., 2007; NCTAF, 2007; Shockley, et al., 2006), in terms of academic achievement (Clotfelter et al., 2007a, 2007b; Goe, 2007; Grissom, 2011; Harris & Sass, 2007, McBride, 2012; Rivkin et al., 2005; Ronfeldt et al., 2013), and in loss of experienced
teachers available to serve as valuable mentors (Loeb, 2005). Large scale literature reviews summarized promising strategies to combat attrition (Borman & Dowling, 2008; California Mathematics Project, 2012; Guarino et al., 2006). In addition to same subject mentoring, Wenger’s model of a Community of Practice (Wenger et al., 2002) served as the primary tool used in this study to impact retention positively. Wasko and Faraj’s (2000) recommendations to create quality CoPs and Rowley (1999) and NCTM’s (Zimmermann et al., 2009) advice for successful mentoring assisted the researcher in creating research guidelines for this study. Because the CoP in this study was online, the researcher reviewed and reported on her comprehensive overview of the websites of eleven social media platforms with a special emphasis on the platform chosen by participants in this study – Edmodo. An essential resource for the methodology of this study – netnography – was Robert Kozinets’ (2010a) book, *Netnography. Doing Ethnographic Research Online*. Finally, the researcher found that the Carnegie Foundation’s Networked Improvement Communities (NICs) utilizing Deming’s Plan-Do-Study-Act (PDSA) Cycle (Bryk et al., 2010) – provided avenues to scale up the research conducted on this small, localized sample.

The researcher incorporated netnographic and other qualitative methods to gather data to answer the research questions. The sample for the study consisted of 10 induction year secondary mathematics teachers – all of whom graduated from the University of South Carolina and were Robert Noyce Scholarship Program recipients – Noyce Scholars. The site of the research was a private Edmodo group comprised of the Noyce Scholars and the researcher. Scholars selected Edmodo as the platform through a survey process. The researcher served as a participant-observer in the group as a same subject
mentor. In an effort to promote regular and quality interaction in the Edmodo group, the researcher created two documents that she required all Scholars to sign: the Edmodo Responsible Use Policy (Appendix E) and the USC Noyce Scholars New Teacher Support Program Contract (Appendix D). The Scholar Contract included $200 in incentives for “weekly” online participation in the OSG. However, initially, there was little interaction in the Edmodo group. Five weeks into the study, the researcher gained approval from her dissertation chair to implement a new incentive plan – the Edmodo Participation Incentive Plan – (Appendix G) to address this concern and promote participation in the Edmodo group. As an active participant observer performing a netnographic study, the researcher collected data through four months of online interaction – including reading or authoring 193 posts and creating researcher fieldnotes. The researcher administered individual interviews, a focus group interview, and two surveys to triangulate findings and provide trustworthiness in interpretation of the data.

Analysis of the Edmodo post data included direct transcription of all 193 posts in order to prepare for coding. The researcher used analytic coding and hermeneutic methods to make sense of the transcript data. Data were initially coded inductively to capture the full picture of the responses and were subsequently coded deductively in order to answer the research questions. In order to bolster “trustworthiness” of the researcher’s interpretation of electronic posts, she analyzed the responses of surveys and interviews using standard quantitative and qualitative methods, in order to triangulate findings. She also performed a member check with participants to validate her findings and adhere to the tenets of collective netnography – providing participants an opportunity to have their own voices reflected in the final research representation.
The researcher represented the data with a variety of data figures and tables. She created two hierarchical diagrams that summarized the purposes (Figure 4.2) and content (Figure 4.3) of the Edmodo posts. She developed a conceptually clustered matrix (Table 4.2) to provide examples of posts and how the posts were coded. She created a table (Table 4.3) to illustrate the quantity of posts by participant and a scatterplot (Figure 4.14) to illustrate the overall participation of the Scholars and the mentor over the 4-month study. The scatterplot also revealed the impact of the Edmodo Participation Incentive Plan. The researcher created a pie chart (Figure 4.7) to illustrate the percent of posts that indicate collaboration is present. She created a bar graph (Figure 4.9) that illustrates textual factors that indicate a community is present. In order to provide further information on the characteristics of this Edmodo group of secondary mathematics teachers, the researcher created bar charts or pie graphs to illustrate the following: the mathematics topics discussed, the features of Edmodo used, the types of attachments used, the types of web links used, and where Scholars indicate that they find resources.

**Conclusions and Discussion**

The primary question guiding this investigation was:

What, if any, is the relationship between the retention of first-year secondary school mathematics teachers and their participation in an Online Support Group (OSG) that employs strategies for successful Communities of Practice (CoP) proposed by Wenger and includes a mentor who is trained in secondary mathematics education?

Underlying questions that aided in answering the primary question were:
1. How does a CoP negotiate and finalize the selection of a social media platform to serve as the means of providing online support and communication?

2. What are the characteristics of this OSG of induction year secondary mathematics teachers and an online same subject mentor?

3. To what degree, if any, does the OSG function as a CoP with the structural characteristics defined by Wenger?

4. To what degree, if any, does participation in the OSG mitigate factors found in the literature known to negatively impact teacher retention?

5. To what degree, if any, does an off-site, online mentor who is trained in secondary mathematics education impact teacher retention?

The findings relevant to these questions based on the results presented in Chapter 4 and the scholarship and literature presented in Chapter 2 will be discussed here.

**Choice of social media platform.** From the results presented in Chapter 4, a key finding is that participants desire to have input into the selection of the social media platform used for their Online Support Group (OSG). Factors that were important to this particular group of participants were 1) the ability to access the social media platform during the school day through the school’s server, 2) the belief that the platform is “professional” and would also be viewed by their administrators as professional, and 3) ease of use. The results of a battery of surveys indicated that this sample was satisfied with their choice of Edmodo as the social media platform for the site for their OSG. In addition, all participants indicated their desire for the Edmodo online community to continue to be a part of the support for Noyce Scholars who would be first year teachers for the following year and for these Scholars’ second year of teaching. Results from
surveys, interviews, and transcripts of electronic posts indicated that in addition to using Edmodo for support and collaboration, participants also desired an easier place to store shared resources – such as a Google Drive or Dropbox account.

**Characteristics of this Edmodo group.** The grounded theory approach to analyzing electronic posts, coupled with analyzing the results of surveys and interviews, allowed the researcher to identify and then describe key characteristics of this particular OSG. Findings relevant to research question 2 are presented here.

**Purposes of posts.** Findings indicated that the primary purpose of Edmodo posts was to support one another. Support consisted of Scholars sharing, collaborating, complimenting, and commiserating with/reducing the isolation of others. Secondary uses of Edmodo were administrative purposes – primarily regarding components of the Noyce New Teacher Support Program such as Noyce Mentors, meetings, grants, or teaching videos submissions or to ask for support. As described in Chapter 4 and shown in Figure 4.2, surprisingly, results indicated that posts offering support outnumbered posts asking for support by a factor of six. Possible explanations for these results are:

1) One person would ask for support on a topic and multiple Scholars would respond.

2) The researcher would create a prompt that would result in participants sharing resources and ideas.

3) Pay it forward. Helping each other is contagious. Once a Scholar benefited from the idea of another Scholar, he or she was inspired to provide an idea to help others.
4) Perhaps a little pride. Scholars might want to showcase what they are doing with their students.

5) This sample of teachers had a good support network at their schools (as shown in Table 4.4).

Content of posts. The primary topic of discussion in Edmodo posts was lesson plans/teaching strategies. Secondary topics of discussion were managing students, classroom atmosphere, the teaching profession, and student learning. Looking deeper into the data, one third of posts were related specifically to the teaching of mathematics as opposed to general teacher education or other topics. Geometry was the most frequently discussed subject.

Participation levels. The online mentor – the researcher – was by far the most active member of the online community – contributing 55 (28%) of the 193 posts. Scholars’ participation in the group was varied with the most active Scholar creating 24 posts and one Scholar creating only one post. Whether the number of posts a group member created accurately represented his or her participation in the group is debatable. The researcher did not have the capability to track the number of times group members read posts which also would signify a certain level of participation in the group.

Features of Edmodo. The ability to embed web links and attach documents and photos was important to this group. The polling feature and library feature of Edmodo were not important to this group. The documents that participants attached to Edmodo posts were of three major types: lesson plans/activities, administrative purposes, and general educational theory. The web links that participants included in their posts were of three major types: lesson plans/activities, general education, and fun. Photos were
attached for a variety of reasons: to show student work, to show teacher-created resources, to inspire, to show an idea for organization, and to post a relevant article from the local newspaper.

*Sources of support for this group.* The most frequently mentioned source of lesson plan ideas was other teachers. Teachers also mentioned the following resources: Google search/online, movies, educational books and journals, other textbooks, ACT/SAT prep books, information learned at conference sessions, the math coordinator, the local newspaper, Kid President videos, Jimmy Fallon skits, song parodies, and clips from Big Bang Theory.

*Barriers to participation in Edmodo group.* Scholars indicated the following barriers to participation in the Edmodo group:

1) “Busyness,”

2) The sense that it was an “assignment” or “one more thing to do,”

3) Lack of understanding or indecisiveness on what to post, and

4) Forgetfulness.

Some Scholars mentioned that when the mentor provided a prompt, it was easier to begin meaningful online discussions.

*Incentives.* Clear incentives for participation made a difference to this group. Five weeks into the study, participation was sparse. The researcher implemented a new incentive plan and within 72 hours, Scholars made 25 posts – nearly double the 13 posts they had made in the five weeks prior to implementation of the plan. In Wenger’s model CoP, an incentive plan would not be necessary because the community would be grass-roots and members would participate because they sought out membership into this group.
on their own. However, the CoP in this study was researcher-created and thus, an incentive plan served as a crucial catalyst to encourage Scholar participation. Over time, the incentives could be reduced and even eliminated as members begin to recognize the benefits of the OSG and want to participate in order to receive these benefits regardless of receiving compensation for the time it takes to participate.

*Composition of Edmodo private group.* This group desired to have members with the following characteristics:

1) People they had a trusting relationship with,
2) People who were trained the same way they were trained, and
3) People who they felt were smart and strong teachers.

*CoP with the structural characteristics of Wenger.* Results were presented in Chapter 4 that indicate that this Edmodo group of induction year secondary mathematics teachers and an online same subject mentor was able to function as a CoP with the structural characteristics of Wenger – a common domain, a community, and a practice. The purposeful design of the group – first year secondary mathematics teachers – assured a common domain of knowledge. Transcripts from Edmodo posts provided numerous examples of participants acting as a community – sharing, collaborating, complimenting, commiserating, and reducing others’ feelings of isolation. Participants applied the learning from the Edmodo group directly to their practice of teaching secondary mathematics. Responses from surveys and interviews confirmed the researcher’s interpretation of Edmodo texts.

*Mitigation of retention factors.* Results presented in Chapter 4 indicate that participation in the Edmodo CoP:
1) Provided support,
2) Provided opportunities for collaboration,
3) Reduced feelings of isolation,
4) Provided strategies for classroom management,
5) Provided strategies to address student apathy, and
6) Provided a place for participants to share their ideas.

At the time of this writing all ten Scholars have completed their second year of teaching secondary mathematics and all but one plan to begin their third year of teaching again this fall.

**Same subject online mentor’s impact on teacher retention.** The impact of the online same subject mentor (the researcher) included the same first five benefits described above as well as:

6) Continuously revised strategies in order to maximize quality participant interaction, and
7) Created a well-received incentive plan.

In Wenger’s model CoP, a leader in the form of a mentor/facilitator would not be necessary because the community would be grass-roots and members would take leadership roles naturally. However, the CoP in this study was researcher-created and thus, facilitation by the researcher was initially essential in order to build the community. Over time, the facilitator/mentor could greatly reduce and even eliminate involvement if the group is self-sustaining.

**Components of a successful beginning teacher induction program.** Based on this researcher’s experiences as part of this study and supported by literature, the
following components are essential to a successful induction and support program for new secondary mathematics teachers.

A peer-network. This network could be face-to-face or online and provides a space for new teachers to share experiences, lesson plans, or other teaching related ideas and receive feedback from peers. Using an online platform for this interaction has the advantage of delivering job-embedded, “just-in-time” professional development.

A peer-network facilitator/cheerleader. This facilitator/cheerleader is responsible for encouraging peer-network interaction and fostering valuable discussions. An individual trained in the same subject as the induction year teachers is preferable, yet not necessary for this role.

A same subject mentor. The same subject mentor could be an individual at the induction teacher’s school or could be online. Key roles of the mentor include providing feedback on lesson plan ideas and answering content-related questions. The mentor should watch the mentee teach (in person or through videos) and offer non-evaluative feedback. It is critical that the mentor be trained in the content area of the new teacher because without knowledge of and expertise in the subject area, particularly for middle and high school mathematics, the mentor cannot adequately guide the new teacher’s development in teaching content.

An organized electronic repository (such as a Google Drive) to store documents and resources. Many beneficial ideas will be shared in the peer-network and it is important to organize the documents containing these ideas in a way that members of the peer-network can quickly locate the resources and ideas as needed. The peer-network facilitator/cheerleader should manage the repository.
Incentives. Participation in an induction program takes time and teachers should be compensated for their time. Examples of compensation include recertification credits, release from other professional development responsibilities, and financial incentives such as cash or gift cards.

A supportive administrator. Based on experience of this researcher outside of this study, yet grounded in literature related to this study, another essential component of a successful induction program is a supportive school administrator. For example, on this researcher’s first day as the Professional Development School liaison to a local high school, she asked the principal how she could best help the high school. The principal asked the researcher if she could work with the new teachers; the principal said that some of the new teachers were really struggling. In order to identify areas of struggle, the researcher conducted a feedback session with new teachers at the high school and, not surprisingly, found that classroom management was the biggest problem. New teachers struggled with how to handle student discipline and were frustrated with the length of time that it took to process discipline referrals so that misbehaving students had immediate consequences. To address this area of concern, the researcher worked with an assistant principal at the school to set up a structure where all new teachers reported classroom management issues directly to this assistant principal. This assistant principal’s job responsibilities normally did not include handling student discipline issues. However, recognizing a need, he took on this additional responsibility in order to provide dedicated support to new teachers. When a new teacher had a classroom management issue, the assistant principal met individually with new teacher to conduct a
brainstorming session on how to handle the specific classroom management issue and also assigned immediate consequences to the offending student.

**Optional induction program components.** The Noyce Scholars in this study also received additional induction year support. Each of the support programs or activities contributed to the success of the induction experience and is summarized below.

**Grant program.** Each Scholar received the opportunity to apply for $250 in classroom supplies. Although the researcher would not consider a teacher supply grant program an essential component of a successful induction program, creators of induction programs should highly consider it if funding is available. Many districts require teachers to pay out-of-pocket for supplies necessary for the teacher’s job – ink cartridges for printers and batteries for classroom sets of calculators. A small amount of funding for classroom supplies gives more respect to the profession; it mimics an expense report that a person in a business-related career might use to be reimbursed for job-related expenses.

**Videos of teaching.** Requiring induction teachers to video record their teaching of lessons provides benefits to the new teachers’ growth. Noyce Scholars received funding for submitting videos of their teaching. However, they were not required to watch the video or write a reflection on it and did not receive feedback on their teaching from peers or a mentor. Using videos for lesson studies with other teachers or the mentor/facilitator could serve as a valuable support. However, if an induction teacher has a quality onsite mentor who observes him or her teaching lessons and provides non-evaluative feedback, submitting videos of teaching to others is unnecessary.

**Face-to-face meetings with programming.** Five optional meetings to provide professional development and informal sharing of experiences were planned for Noyce
Scholars. These meetings provided a good support mechanism for local teachers, but were not convenient for teachers who lived farther away. Although electronic attendance (e.g., Skype) was encouraged for out-of-town induction teachers, it was left up to the responsibility of the Scholars to coordinate this effort and no Scholars took advantage of the electronic attendance option. The induction program coordinator should take on the task of facilitating alternative or electronic attendance or consider alternating the location of the meeting so that this barrier might be eliminated.

Conference attendance. Six of the ten Scholars participated in the Southeast Regional Noyce Conference. All participating Scholars appreciated this opportunity and felt that they benefited from this opportunity. Attending a conference allows for peer support from a broader community, provides access to new ideas, and builds a sense of professionalism in teaching.

Flexibility. Teacher induction program facilitators should reserve time and resources to allow for flexibility and responsiveness. An important role of the facilitator is to perform frequent needs assessments in order to react to the specific needs of the induction teachers.

Recommendations

Just as the Dutch boy in Mary Mapes Dodge’s novel, *Hans Brinker or The Silver Skates* (1896), saves his country by putting his finger in a leaking dike, social media has the potential to serve as the small tool to stop the revolving door of secondary mathematics teachers leaving the profession. The research presented in this study has implications for Education Preparation Program (EPP) coordinators, district or school level induction program coordinators, and teachers of any subject or grade level.
Education Preparation Program (EPP) coordinators. All EPPs should designate a subject level mentor to create and facilitate an OSG with new program graduates. Ideally this person should be a person who already has a good relationship with the new teachers such as a methods instructor. However, a person unknown to all or some of the group could serve as the mentor – a university supervisor, graduate student, coaching teacher, retired teacher – really any person who has the following qualities:

1) Experience teaching secondary mathematics,
2) A desire to be a mentor,
3) A commitment of time, and
4) A commitment to follow the roles of The Good Mentor (Rowley, 1999) and NCTM’s (Zimmermann, 2009) recommendations for mentoring the beginning mathematics teacher.

If the mentor does not have a relationship with some or all of the members of the OSG, he/she should work very hard on the front end to build a relationship with the members of the online community. Whether or not the mentor has a relationship with the members of the community – he or she should work hard on the front end to re-establish the community that was present during the time the teachers were together in their EPP.

Many factors contributed to the success of this OSG of induction year secondary mathematics teachers. Edmodo was a successful platform for this sample. However, this does not preclude the use of other social media as successful platforms. The key aspect of selecting a platform for an OSG is to have the buy-in of the participants. A second important aspect of a successful OSG is privacy – the platform should offer a private group option. Another key aspect of the program was the incentive system. Posting once
a week proved to be somewhat burdensome for both the induction year teachers and the mentor. This researcher recommends that participants post twice a month and receive $20 per month or some comparable monetary rewards for this participation. The facilitator/mentor also should be compensated. Based on her experience as the creator of the CoP, mentor of the induction year teachers, and individual responsible to report participation so that incentive pay could be distributed, this researcher estimates that it would require 110 hours of time to start-up, mentor, and track participation for a group of 10 mentees over one year. Another factor important to the success of the group is for the facilitator/mentor to post regularly – approximately twice a month – to provide prompts that encourage a healthy group dialogue related to the practice of teaching secondary mathematics. Furthermore, in one of the facilitator/mentor’s first posts, he or she should provide examples of quality posts so that the participants have an idea of the expectations and benefits of participation in the OSG. To kick-off group participation, the facilitator/mentor should ask each participant to create an introductory post which includes identifying where he or she is teaching, what he or she is teaching, and what (if any) extracurricular activities he or she is involved with. This provides an opportunity for participants to become familiar with the platform and begin the habit of posting and reading the responses of other CoP members. Finally, the facilitator/mentor of the OSG should gain the input of members of the CoP to select a means of storing shared lesson plans or activities electronically. The facilitator/mentor of the OSG should maintain organization of this shared site.

Looking beyond the first year, during successive years, the leadership/facilitation of the CoP could be transitioned to one or more of the participants so that the mentor
could begin another CoP with the next cohort of first-year teachers. Second year teachers who experienced benefits from the CoP might voluntarily continue participating in the CoP during year two and beyond. Funding might continue or be trimmed or eliminated.

EPPs that create CoPs involving social media will benefit from this experience. First, this CoP experience gives EPPs the ability to track and support program graduates into their early years of teaching as required by the new CAEP standards. Second, EPP coordinators will gain valuable feedback from program graduates regarding how well they were prepared for various aspects of their career and be able to quickly adjust topics covered in methods courses or requirements for internship experiences to improve the preparation of all teaching candidates.

*District or school level induction program coordinators.* Districts and schools are plagued with the financial and time-consuming issue of secondary mathematics teacher turnover. The positive impact of induction programs on teacher retention has been widely reported. However, the range of induction programs offered to new teachers runs the gamut from no formal induction program to multi-year, comprehensive induction programs. Many times the quality of the induction program is dependent on the funds set aside for this effort and the personnel available to lead it. This study offers evidence that an OSG CoP can provide a low-cost component to an induction program. Districts or schools without formal induction programs can implement online CoPs to begin an initial induction program for new teachers. Districts or schools with some sort of formal induction program can use online CoPs to enhance their current induction program or replace expensive induction components with this low-cost alternative in order to siphon funding for other initiatives. Based on this study, an incentive system for participation
should be in place. Incentives might be monetary or come in the form of continuing education or professional development credits required by most districts.

**Teachers of any subject or grade level.** Although this research involved a local sample of induction year secondary mathematics teachers, many other teachers could benefit from involvement in an online CoP involving social media. Teachers of other subjects, other grade levels, other experience levels, and from a variety of geographical locations could create CoPs to increase support, collaboration, and reduce isolation.

**Suggestions for Future Research**

The researcher limited this study to a small, convenience sample of induction year secondary mathematics Noyce Scholars who studied at the University of South Carolina, thus the results are not generalizable to other induction year secondary mathematics teachers and conclusions are limited to the unique sample and site of the research. Future researchers might identify and examine the online transcripts of multiple samples of induction year secondary mathematics teacher OSGs to compare findings.

This study was delimited to one semester of implementation and data collection. Thus, this study was not able to report actual retention numbers (although all 10 Scholars in this study were retained for the second year of teaching), but was restricted to finding evidence that participation in an online CoP with an offsite mentor trained in secondary mathematics education mitigates factors found in literature that impact retention. A multi-year study could provide actual retention data.

The incentive plan for participation in the OSG seemed to play a significant role as a catalyst for members’ active, sustained interaction in the OSG. A researcher might create multiple online CoPs of induction-year secondary mathematics teachers and create
different incentive plans for each OSG. Then, the researcher might compare the participation levels of each CoP in order to discover the most efficient incentive program that positively impacted participation.

The role of the mentor in this study was primarily to implement strategies continuously that promoted the active involvement of all members. The mentor was seldom solicited for advice regarding mathematics content. This finding is most likely due to two factors influencing this particular sample:

1) All Scholars completed an academic program which included 41 credits of mathematics at the calculus level or beyond and culminated in a master’s degree, and

2) Scholars reported high levels of support from their onsite Noyce same subject mentors and other mathematics teachers at the school (See Table 4.4).

Thus for this particular sample – the facilitator did not necessarily need to be an experienced same subject mentor. An induction year teacher who is a member of an online CoP may also serve in the role of “leader” or “facilitator” of the group.

Researchers might compare participation levels and characteristics of OSGs that have experienced same subject mentors as “facilitators” of the group with OSGs that have one of the induction year teachers as the “facilitator” of the group.

Low student motivation and poor student behavior are two factors associated with teacher attrition. This study was able to report that induction year teachers often discussed strategies to improve student motivation and behavior, but fell short of documenting whether the motivation or behavior of students actually improved as a result of the teacher’s experience in the CoP. Future researchers might directly examine
whether the behavior and/or the motivation of students improved as a result of a teacher’s involvement in an Edmodo OSG similar to the one in this study.
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Appendix A: Noyce Scholar Social Media Survey
Noyce Scholar Social Media Survey - Math

Web Platform Selection

Dr. Yow and Kathy Henson asked me to set up a web-based community for the Noyce Scholars to use to keep in touch, share strategies, share successes and challenges, ask for advice, and/or collaborate. I will also be an active part of this community as an additional mentor for you. Please complete this short 5-question survey by Monday, January 13 to help us uncover the best platform to use. Thank you!

1. Please indicate your frequency of use of each platform and your opinion on whether or not you think the platform would be a good one for us to use for our Noyce Scholar web-based community.

<table>
<thead>
<tr>
<th>Platform</th>
<th>Frequency</th>
<th>Recommend use for our Noyce Scholar web-based community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basecamp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blackboard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edmodo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Google</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instagram</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LinkedIn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skype</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twitter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiggio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You-Tube</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Please list another platform that you use and your frequency of use and whether or not you think it would be a good platform to use for our Noyce Scholar web-based community.

If you do not use any other social media platforms, please go on to question 4.

<table>
<thead>
<tr>
<th>Social Media Platform</th>
<th>Frequency of Use</th>
<th>Yes or No to recommend for Noyce web-based community</th>
</tr>
</thead>
</table>

Page 1
3. Please list another platform that you use and your frequency of use and whether or not you think it would be a good platform to use for our Noyce Scholar web-based community. If you do not use any other social media platforms, please go on to question 4.

<table>
<thead>
<tr>
<th>Social Media Platform</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Use</td>
<td></td>
</tr>
<tr>
<td>Yes of No to recommend for our Noyce web-based community</td>
<td></td>
</tr>
</tbody>
</table>

*4. Please list the platform that you recommend that we use for our Noyce Scholar web-based community.

*5. Please explain why you think that the platform that you chose in question 4 is the best one for us to use for our Noyce Scholar web-based community.
Appendix B: Email Introduction of Researcher to the Sample

Hi all! I hope your first few weeks in school have gone well. I'd love to hear about it. I'm writing to remind you that as a Noyce Scholar we have some ways to support you as a first year teacher. You may remember we told you about money for needed classroom supplies and the opportunity to attend professional development meetings. Well...we are hosting a Shodor conference at USC Saturday, September 21 from 9am-noon. You can read more about the conference on the Noyce blog: http://gamecocknoyce.wordpress.com/

IF you are interested let me know. PLUS, we can PAY you to attend. We can pay mileage plus $150!

Also, can you please reply to this email regardless of attendance to let me know you got the email? This will be my primary form of communication with you.

Lastly, Mrs. Beth Oliver is working with us to develop our Noyce Graduate support...organizing mentors, notifying you of available meetings, possibly observing you (for research purpose only), online support through social media, and more! If you come to the meeting you can meet her. Also, she will be in touch soon through email with more details.

Look forward to hearing from you!

Noyce Project Director
Appendix C: Email to Noyce Scholars Introducing Researcher and Giving Them a Contract to Sign

Sent: Wednesday, September 18, 2013 6:37 AM  
Subject: Welcome to The ROCK - The USC Noyce New Teacher Support Program

Hello Noyce Scholars,

I hope that you are enjoying your new role as a classroom teacher! I am writing you to introduce myself and to assure you that USC is here to continue to support you into your first years of teaching. My name is Beth Oliver and I am the USC Noyce New Teacher Support Program Coordinator. We are calling this support program The ROCK - Reaching Out - Caring and Keeping. I am a graduate of the USC MAT program, taught mathematics at Dreher High School, taught the Mathematics Methods for the Middle Level course at USC for several years, and currently supervise USC secondary mathematics student teachers. I even supervised two of you for your A internships last year! I only tell you this information so that you know that I have been in your shoes and am here to support you in any way that I can.

As a Noyce Scholar, here is what USC will provide for you:

1) Professional Development
2) An Online Support Group
3) An Onsite, same-field mentor (Please see note below about this.)
4) Classroom Observations
5) Opportunities to apply for funds for classroom supplies
6) Up to $1300 in stipends

In order for us to best support you and to assess the Noyce Program so that improvements can be made, there are a couple ways that we need your help. Being the first group of USC Noyce Scholar graduates allows you the opportunity to make this program your own and receive financial stipends for your efforts. A contract is attached that outlines the benefits to you and the ways that we need your input. Please print the contract, sign it, take a picture of it, and email it to me at wyz@xyz by Friday, September 20. Once I receive all of the contracts, I will work to confirm your mentors, set-up the Online Support Group, and start taking requests for supplies. To get started, please contact me at xyz@xyz to let me know if your school has already assigned you a mentor. If so, please email me your current mentor's name, email address, and phone number. I will contact your mentor to see if he/she would like to also serve as your Noyce Mentor (He/she will receive a stipend for doing this.). If you do not have a mentor, please suggest an individual at the school (who is also a mathematics teacher if you teach mathematics or a
science teacher if you teach science) that you would like for me to ask to be your mentor and send me his/her email address and phone number.

I can't wait to meet all of you! For those of you that are coming to the Shodor Conference this Saturday - I look forward to seeing you there! I am here for you. If you have any questions or suggestions on ways we can support you, please feel free to call or email me. Thank you!

Every day is a gift.
Beth R. Oliver
USC Noyce New Teacher Support Program (The ROCK) Coordinator
Researcher’s Phone Number
Appendix D: USC Noyce Scholars New Teacher Support Program Contract

ROCK – Reaching Out – Caring and Keeping
2013-2014 Contract

Expectations:

1) Attend at least one Noyce meeting per semester. You will receive $100 for each Regular Noyce meeting that you attend and $200 for each Enhanced Noyce meeting that you attend. The dates for the fall semester are:
   Enhanced Noyce Meeting – Shodor – Saturday, September 21 from 9-12
   Regular Noyce Meeting – Friday, November 22 from 4:30 – 6
   Dates for the Spring Semester are TBD.
   (Note: If you live beyond 10 miles from USC, your mileage will be reimbursed pending funding. If you live more than 30 miles from USC, you can arrange virtual attendance.)

2) Participate regularly (at least once per week) in the Noyce Online Community in order to share successes and challenges and return surveys, participate in interviews, and respond to requests in a timely manner. You will receive $200 for your active participation.

3) Submit 4 videos of your inquiry teaching lessons along with a reflection of your teaching based on a guided observation rubric. You will receive $100 for each of the four videos with reflection that you submit.

Benefits:

1) The above mentioned stipends.
2) Opportunities to attend additional Noyce Meetings beyond the expected 2.
3) Access to an Online Community to stay connected to fellow Noyce Scholars.
4) An on-site mentor.
5) Classroom observations by your mentor and Noyce project faculty.
6) The opportunity to apply for funds to pay for classroom supplies.

I agree to the terms of the Noyce Scholar New Teacher Support Contract.

Research/Evaluation: Information gathered from mentors may be used for research purposes to better understand how teachers develop as teacher leaders in an effort to improve teacher profession satisfaction and retention. If you do not want your information used please email me to inform me of your choice. Your decision to not include your information in the research will not impact your stipend and you may
choose to withdraw your information at any time. If any materials are chosen for the research, they will be anonymous.

Name _______________________________________
Signature ____________________________________
Email _______________________________________
Phone _______________________________________
School ______________________________________
Mentor ______________________________________
Courses that you teach ____________________________________________________

Please read and sign this contract and either scan or take a photo of it and email it to Beth Oliver at xyz@xyz.com by Friday, September 20. If you have any questions or suggestions, please let me know. I look forward to working with you. Thank you!

Beth Oliver
USC Noyce New Teacher Support Coordinator
xyz@xyz.com
XXX-XXX-XXXX
Appendix E: Edmodo Responsible Use Policy

Members of the community should:

- Use the Edmodo community to directly benefit the instruction and learning of students.
- Keep passwords private.
- Keep personal information from being transmitted, uploaded, or downloaded unless it directly serves the instruction and learning of students.
- Use polite, professional language that supports positive relationships.
- Report inappropriate or illegal use of the web-based community to the New Teacher Support Program Coordinator (Beth Oliver) as soon as possible.

Members of the community should not post messages that:

- Exhibit or promote academic dishonesty.
- Bully or intimidate another individual.
- Personally attack another individual.
- Use elitist language.
- Contain inappropriate or illegal content.
- Disrupt a classroom or teaching.

Members must sign an agreement acknowledgement yearly. Please sign this agreement acknowledgement, take a photo of it, and email the signed agreement back to me at xyz@xyz.com by Wednesday, January 29. Thank you.

__________________________________________________________________________
Noyce Scholar – Print Name   Noyce Scholar – Sign name

Date __________________________

Adapted from: http://www.judgememorial.com/handbook/responsible-use-policy
Appendix F: Written Guidelines for Researcher Observation and Participation in the Online Support Group

The written guidelines in this section represent research decisions the researcher has made, is making, or will need to make to facilitate answering the research questions of the proposed study.

Professional Responsibility

1. The researcher will immediately remove any inappropriate or unprofessional posts.

2. If the researcher reads a post that refers to unethical or illegal practices, the researcher will report the post to the appropriate authority for the given situation.

3. If the researcher reads a post that indicates that the Scholar may be experiencing emotional, mental, or physical issues that require professional attention, the researcher will report this post to the appropriate professional for the given situation.

Operation

4. The researcher will read all electronic posts daily.

5. If a post asks the researcher directly for advice, the researcher will respond with an electronic post with a proposed intervention on the same day that she reads the post.
6. If a post expresses an area of concern or poses a question to the community at large, and the researcher feels that an immediate response is necessary, the researcher will respond immediately. If the researcher feels that the area of concern or the question does not require an immediate response, the researcher will wait three days to respond to give other participants the opportunity to respond without having their response be influenced by the researcher.

7. Each Tuesday the researcher will write an unsolicited post that could be beneficial for any new teacher of secondary mathematics, but particularly the needs of the group. This post will have the title: “Tuesday Talk.” Sample Tuesday Talk topics may include classroom management, motivating students, and instructional strategies to use with secondary mathematics students.

8. Each Thursday the researcher will write reminder emails to Scholars who have not posted that week reminding them to post once per week.

**Tone**

9. The researcher will never criticize a Noyce Scholar, but will always offer comments that are ‘accepting’ of the Noyce Scholar and ‘communicate hope and optimism.’ (Rowley – The Good Mentor).

10. The researcher will write posts that compliment Noyce Scholars when they offer support or collaborate.
Organizing Electronic Posts and Researcher Field Notes

11. *Electronic Post and Fieldnote Journal*: In order to organize data from electronic posts and document the researcher’s “own observations of the community, its members, interactions and meanings, and the researcher’s own participation and sense of membership,” (Kozinets, 2010, p. 98) the researcher will keep an electronic journal (a Microsoft Word document). In this journal the researcher will transcribe each participant’s posts and contemporaneously write reflective field notes in order to gain a better understanding of each member’s role in the OSG. In addition, the researcher will also refer to this journal to decide in what areas the participants need support. The researcher will choose topics to address in the weekly “Tuesday Talk” that offer this support in an area of identified need. The researcher will update this journal at least 3 times per week. A sample entry from this electronic journal is in Appendix H.
Appendix G: Edmodo Participation Incentive Plan

To: Noyce Mathematics Graduates
Re: Pay for Online Support Community Participation

From: Beth Oliver
Date: March 4, 2014

The University of South Carolina wants to keep in touch with you and support you in your beginning teaching career through a web-based communication platform. Your group chose Edmodo as your platform and the group is up and running. Although, we hope that you will participate in the group because you find value in the experience, we have budgeted some money to help fund this support. Below you will find an outline of the pay that you will receive for your participation. Descriptions of each category follow the chart.

**Participation Pay Plan**

<table>
<thead>
<tr>
<th>Edmodo Post Deadlines ($10 each)</th>
<th>Interview Deadlines ($10 each)</th>
<th>Survey Deadlines ($10 each)</th>
<th>Member Check ($50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 3 – Mar 9</td>
<td>Mar 6 – Mar 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar 10 – Mar 16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar 17 – Mar 23</td>
<td>Mar 20 – Mar 22</td>
<td>Mar 18 – Mar 23</td>
<td></td>
</tr>
<tr>
<td>Mar 24 – Mar 30</td>
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<tr>
<td>Mar 31 – Apr 6</td>
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<tr>
<td>Apr 7 – Apr 13</td>
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<td>Apr 15 – Apr 22</td>
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<tr>
<td>Apr 14 – Apr 20</td>
<td>Apr 25 – Apr 29</td>
<td>Apr 21 – Apr 27</td>
<td></td>
</tr>
<tr>
<td>Apr 28 – May 4</td>
<td></td>
<td>Apr 25 – Apr 29</td>
<td></td>
</tr>
<tr>
<td>May 5 – May 11</td>
<td>May 6 – May 11</td>
<td>May 16 – May 23</td>
<td></td>
</tr>
</tbody>
</table>

**Total available: $200/graduate**
**Descriptions**

**Edmodo Posts:** Quality posts are to be made weekly. These posts are to seek support, offer support, collaborate, share successes, share challenges, provide lesson plan ideas or teaching strategies, etc. These posts do not have to be a certain length – they just need to be quality. You can start a post, or answer another Scholar’s post. The point is that we are acting as a community and supporting and learning from one another. The discussion between Brittany and Elizabeth about parent use of Edmodo was a great example. Jessica’s post from 2/17 was excellent – nice job Jessica. And, this was a good idea to post something that you were already required to do at your school any way so that we could each know a strategy that your school was using and so that we could learn from your experience. However, I do not want any of you to feel that your post has to be that comprehensive. Elizabeth’s post where she shared an activity that she was planning to use was also a great post. In case you are thinking, “I don’t know what to post.” Here are two other examples of posts that teachers in a similar group have posted:

“Today for review I did a game called mathketball. I know some of you have seen this before. Basically there are three types of questions: 1 point, 2 point, and 3 point questions. You give the kids 1 minute to make a ball for themselves out of paper. They are in groups and have one white board per group. They take turns writing on the white board and choosing questions. If they get the answer right first they get one point. If they get the answer right in general they can take a shot for the amount of points it is worth. It went really well. It gets a little rowdy, but the kids love it.”

Another quality post:

“I have this dilemma. My students talk while I’m teaching sometimes, but they are almost always talking about math. I’m impressed with how they ask me questions and help each other understand and of course I love the fact that they are engaged enough to discuss what we are doing in class. However, it gets a little loud occasionally and I have to ask them to be quiet so I can teach. Should I stop and give them time to discuss? I’m afraid if I did that it might get out of control. I don’t want to discourage them from discussing math.”

Other teachers then posted their ideas to help this teacher.

In addition, I will create a post each week for you to offer your feedback on in case you are having trouble selecting something quality to post about that week.
**Interviews:** Each interview will take no more than 15 minutes. The March 6-7 interview is an individual phone interview. The March 20-22 interview is a group interview at the SE Regional Noyce Conference for those in attendance or an individual phone interview for those who do not attend. The April 25-29 interview is a group interview at the last regular Noyce Meeting of the year for those in attendance or an individual phone interview for those who cannot be there.

**Surveys:** Each survey should take you no more than 10 minutes to complete. An electronic link to a SurveyMonkey survey will be sent to you on the first date listed. The deadline to complete the survey is the second date listed.

**Member Check:** This should take no more than 30 minutes. At the end of this semester, I will create a research report which describes the group’s experience with the web-based communication platform. I will email the report to the group for feedback. Scholars are asked to read the report and offer feedback on its validity.
## Appendix H: Sample Post and Fieldnotes Stored in a Word Template

<table>
<thead>
<tr>
<th>Date</th>
<th>Participant</th>
<th>Post</th>
<th>Fieldnotes</th>
</tr>
</thead>
</table>
| May 27 | Ashley      | As the year comes to a close and I reflect, I realize that my biggest challenge is classroom management. I am too nice and give students too many chances. I want them to remain in class, so I rarely send them out or give them a referral because it would result in them losing class instruction. Some students just cannot perform around others and cannot be quiet, so I have found that letting those students work in the halls or listen to music helps them to get their work done. That will be one of my major focuses next year. After doing the surveys many of my students had positive comments about me and I am grateful that my year turned out the way it did. Overall, it was a great year. Of course I had my days when I didn't want to be at school or wanted to just throw in the towel, but my passion for my students and their education kept me going. These last days have been bittersweet, but I am glad that my students are going to the next level and some I am just glad they will be out of my hair. LOL I hope you all enjoy your last few days! | Reflecting
|        |             |                                                                                                                                       | Classroom Management                                                                                                           |
|        |             |                                                                                                                                                                                                  | Too nice                                                                                                                   |
|        |             |                                                                                                                                                                                                  | Want students to stay in class                                                                                             |
|        |             |                                                                                                                                                                                                  | Music                                                                                                                      |
|        |             |                                                                                                                                                                                                  | Work in halls                                                                                                              |
|        |             |                                                                                                                                                                                                  | Did the Survey                                                                                                             |
|        |             |                                                                                                                                                                                                  | Many positive comments from students                                                                                      |
|        |             |                                                                                                                                                                                                  | Shares some days wanting to quit                                                                                           |
|        |             |                                                                                                                                                                                                  | Happy for students                                                                                                       |
|        |             |                                                                                                                                                                                                  | Glad to be done with some                                                                                                 |
|        |             |                                                                                                                                                                                                  | Very honest                                                                                                                |
|        |             |                                                                                                                                                                                                  | Sharing                                                                                                                    |
Appendix I: USC Noyce Scholarship Graduate Survey
## USC Noyce Scholarship Graduate Survey

### Introduction

The Office of Program Evaluation (OPE) at the University of South Carolina is collaborating with the USC Science and Mathematics Teachers Initiative (Noyce Program) on an evaluation of the program.

This survey is part of the evaluation and seeks information from teachers about their preparation and experiences with the Noyce program. The survey should take approximately 10 to 15 minutes to complete. Your completion of the survey is voluntary and your responses are anonymous.

### Demographics

1. **What is your gender?**
   - [ ] Female
   - [ ] Male

2. **What is your ethnicity?**
   - [ ] African American
   - [ ] Asian-Pacific Islander
   - [ ] Caucasian
   - [ ] Hispanic
   - [ ] Native American
   - [ ] Other (please specify): 

3. **What is your age?**
   - [ ] 20-25 years old
   - [ ] 26-30 years old
   - [ ] 31-35 years old
   - [ ] 36-40 years old
   - [ ] 41-45 years old
   - [ ] 46-50 years old
   - [ ] 51 years or more

### Current Teaching Experience
USC Noyce Scholarship Graduate Survey

4. Which degree did you attain?
   - MAT
   - MT
   - Other (please specify)

5. Which grade level do you teach?
   - Middle (6-8th grade)
   - High (9-12th grade)
   - Other (please specify)

6. Which content area do you teach? (check all that apply)
   - Science
   - Mathematics
   - Other (please specify)

7. Which of the following best represents your year in the teaching profession?
   - First year
   - Second year
   - Third year
   - Fourth year
   - Other (please specify)

8. Where are you currently teaching?
   - CA
   - NC
   - Other (please specify)
**USC Noyce Scholarship Graduate Survey**

### 9. My degree program prepared me to...

<table>
<thead>
<tr>
<th>Activity</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>write effective lesson plans.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>effectively manage student behavior.</td>
<td></td>
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<tr>
<td>incorporate technology into my teaching.</td>
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<tr>
<td>teach students at varying achievement levels.</td>
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<tr>
<td>meet the needs of students living in poverty.</td>
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<tr>
<td>meet the needs of culturally diverse students.</td>
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<tr>
<td>meet the needs of students with special needs.</td>
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<tr>
<td>respond professionally if my students approach me inappropriately.</td>
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<tr>
<td>use various teaching strategies.</td>
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</tbody>
</table>

### 10. My experiences in the Noyce program improved my...

<table>
<thead>
<tr>
<th>Skill</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>leadership skills.</td>
<td></td>
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<tr>
<td>content knowledge.</td>
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<tr>
<td>classroom management skills.</td>
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<tr>
<td>ability to work with diverse students.</td>
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</tbody>
</table>

### 11. I would have pursued my teaching certificate without the Noyce program.

- [ ] Strongly Disagree
- [ ] Disagree
- [ ] Agree
- [ ] Strongly Agree

### 12. Do you plan to apply for any of the available $250 financial support for your classroom from the Noyce program?

- [ ] Yes
- [ ] No

**Financial Support**

**Financial Support**
USC Noyce Scholarship Graduate Survey

13. How do you plan to use the financial support for your classroom from the Noyce program (up to $250)?

Monthly Meetings

14. How many monthly meetings have you attended since you graduated?
   - 0
   - 1-2
   - 3-4
   - 5 or more

15. What prevents you from attending more monthly meetings?

16. I plan to attend monthly meetings in the future.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree

17. The monthly meetings enhance my teaching skills.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree

Online Community
USC Noyce Scholarship Graduate Survey

18. How often do you participate in the Noyce online community?
   - Frequently
   - Sometimes
   - Rarely
   - Never

19. What prevents you from using the Noyce online community more frequently?

20. I plan to use the online community more frequently in the future.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree

21. I am satisfied with the level of professional support I receive through the Noyce online community.
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree

22. The Noyce online community...
   - Reduces my feelings of isolation.
   - Provides support.
   - Provides a means to collaborate with colleagues.
   - Provides ideas to improve classroom behavior.
   - Provides ideas to improve student motivation.
   - Provides suggestions on ways to teach topics.
   - Other (please specify)
**USC Noyce Scholarship Graduate Survey**

23. Please provide any suggestions to improve the Noyce online community.


**Professional Support from the Noyce Program**

24. I am satisfied with the level of professional support that I received from my school.
   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Agree
   - [ ] Strongly Agree

25. I am satisfied with the level of professional support I received from my Noyce mentor since graduation.
   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Agree
   - [ ] Strongly Agree

26. Please explain how your Noyce mentor has enhanced your preparation as a teacher.


27. Overall, I am satisfied with the level of professional support I received from the Noyce program since graduation.
   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Agree
   - [ ] Strongly Agree

28. Please provide any suggestions to improve the support and resources for Noyce graduates.


Page 6
**USC Noyce Scholarship Graduate Survey**

### Professional Development

29. What challenges have you encountered as a teacher?

30. I need professional support in order to better:

- [ ] manage my classroom.
- [ ] teach in a high-needs district.
- [ ] teach students of varying levels.
- [ ] engage my students in the content area and classroom activities.
- [ ] incorporate research-based content knowledge into my classroom plans.
- [ ] I do not need additional professional development.
- [ ] Other (please specify):

### Career Plans

31. How long do you plan to teach?

- [ ] Beyond the Noyce program requirement
- [ ] Until I fulfill the Noyce program scholarship requirement
- [ ] I plan to leave teaching prior to fulfilling my requirement related to Noyce program.

32. Have you changed your career plans since you started teaching?

- [ ] Yes
- [ ] No

33. Why have you changed your career plans since you started teaching?
Thank you

Thank you for your feedback!
Appendix J: USC Noyce Scholar First Year Teacher Survey/Budget Feedback Charts

USC Noyce Scholar First Year Teacher Survey/Budget Feedback Charts

Please complete the following brief survey and budget feedback charts. Your responses are for research and programming purposes only. You will receive $10 for your completion of this survey/budget feedback charts. Also, I will hold a brief (15-20 minute) focus group interview with you at around 5:45pm today at the Noyce Meeting. You will receive $10 for this interview as well. I will be travelling in from an out of town commitment and will not arrive until very close to the interview time. Please don’t leave - I will be there. ☺

For the following statements, please circle the number (On a scale of 1-10 with 10 being the highest), that best describes your opinion.

1) Your job satisfaction
2) The level of support from your school administration
3) The level of support from your Noyce mentor at your school
4) The level of support from other mathematics teachers at your school
5) The level of support from USC
6) The level of support from the Edmodo community
7) The level of support from me (Beth Oliver)

For the following statements, please circle the letters (SA = Strongly Agree, A=Agree, D = Disagree, SD = Strongly Disagree) that best describe your experience in the Noyce Online Edmodo Community.

8) I have been an active participant in the USC Noyce Edmodo Community
9) increased my communication with fellow USC Noyce Graduates
10) provided support to me in my teaching career
11) provided opportunities for me to collaborate with fellow Noyce Graduates
12) decreased my feelings of isolation
13) caused me stress

The USC Noyce Edmodo Community should be part of the program for USC Noyce graduates who are
14) first year teachers for the 2014-2015 school year (this year’s graduates)
15) second year teachers for the 2014-2015 school year (this is YOU!)
For the following statements, please describe your thoughts.

16) Please list any specific benefits that you gained from the USC Noyce Online Community.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

17) Please list any ways that the USC Noyce Online Community was detrimental to you.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Please also complete the 2 Budget Feedback Charts - attached. Thank you!
<table>
<thead>
<tr>
<th>Funding</th>
<th>Component Description</th>
<th>Keep as is (K) Alter (A) or Discard (D)</th>
<th>If you would alter (A) this component, please list the alterations that you would make</th>
<th>Reasons for Keeping (K), Altering (A) or Discarding (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$800</td>
<td>Meeting Attendance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- $100 for regular 1.5 hour meetings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- $200 for enhanced meetings (Shodor and SE Regional Conference)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>$500</td>
<td>Mentor Payment</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- $250 per semester for active mentoring and documentation of one observation per semester</td>
<td></td>
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<td></td>
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<tr>
<td>$400</td>
<td>Videos</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Submission of up to 4 with reflections for each</td>
<td></td>
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<tr>
<td>$250</td>
<td>Classroom Supplies</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Apply through mini-grant process, funds that are not requested opened up for 2nd round</td>
<td></td>
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<tr>
<td>$200</td>
<td>Online Community</td>
<td></td>
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<tr>
<td></td>
<td>- Originally $200 for weekly participation and responses to surveys and interviews</td>
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<tr>
<td></td>
<td>- Altered to $10 per week for at least one quality post per week and $10 per survey or interview and $50 for reading report on experience and offering feedback</td>
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<tr>
<td></td>
<td>New Component – List here and complete all columns</td>
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</table>
### Second Year Teacher Budget Survey

<table>
<thead>
<tr>
<th>Funding</th>
<th>Component Description</th>
<th>Keep as is (K) Alter (A) or Discard (D)</th>
<th>If you would alter (A) this component, please list the alterations that you would make</th>
<th>Reasons for Keeping (K), Altering (A) or Discarding (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$800</td>
<td>Meeting Attendance</td>
<td>- $100 for regular 1.5 hour meetings</td>
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<tr>
<td></td>
<td></td>
<td>- $200 for enhanced meetings (Shodor</td>
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<td></td>
<td></td>
<td>and SE Regional Conference)</td>
<td></td>
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<tr>
<td>$500</td>
<td>Mentor Payment</td>
<td>- $250 per semester for active</td>
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<tr>
<td></td>
<td></td>
<td>mentoring and documentation of one</td>
<td></td>
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<td></td>
<td></td>
<td>observation per semester</td>
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<tr>
<td>$400</td>
<td>Videos</td>
<td>- Submission of up to 4 with reflections</td>
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<td></td>
<td></td>
<td>for each</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$250</td>
<td>Classroom Supplies</td>
<td>- Apply through mini-grant process,</td>
<td></td>
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<td></td>
<td></td>
<td>funds that are not requested opened</td>
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<td></td>
<td>up for 2nd round</td>
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<tr>
<td>$200</td>
<td>Online Community</td>
<td>- Originally $200 for weekly participation and responses to surveys and interviews</td>
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<td></td>
<td>- Altered to $10 per week for at least one quality post per week and $10 per survey or interview and $50 for reading report on experience and offering feedback</td>
<td></td>
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<tr>
<td></td>
<td>New Component – List here and complete all columns</td>
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</table>
Appendix K: Noyce Scholar Individual Phone Interview Guide

Community Building Questions:

1) a) How is your semester going?
   b) On a scale of 1-10 (10 being highest) how do you rate your job satisfaction?

2) Which classes are you teaching?

3) Tell me about any clubs you are involved with or any coaching that you do.

4) What is your biggest challenge?

5) What is the biggest obstacle that you have overcome?

6) How is it going with your mentor?

7) What advice do you have for new teachers?

8) What are your interests outside of the classroom?

Online Community Questions

9) On a scale of 1-10 (10 being highest), how do feel about the level of support that you have from
   a) your administration
   b) your mentor
   c) other mathematics teachers at your school
   d) USC

10) What have been the barriers to your involvement in the online Edmodo community?

11) What do you think would make it easier for you to participate in the Edmodo community?

12) Does the new pay-plan seem reasonable?

13) Do you plan to participate in the community?

14) What ideas do you have for ways that USC can support graduates, like you, who are first year secondary mathematics teachers?
Wrap-Up

15) Please verify that I have your preferred contact data and the preferred contact data of your mentor. (I will go over the contact data that I have collected from the graduate and his/her mentor to verify that this is the preferred contact data.)

16) Will I see you at the SE Noyce Conference in Greenville in a couple weeks? (If yes, let the graduate know that I will post to Edmodo a time to meet for a 15-minute focus group interview.)
Appendix L: Noyce Scholar Focus Group Interview Guide

Introduction: Thank you very much for taking part in this focus group interview in order to describe your experience in the OSG so far and to suggest ways to improve the OSG. This group interview should take 30 minutes or less. You can interrupt me at any time. Answers are for research purposes only and your identity will be protected. I will audio-record this group interview using Voice Memos so that I can later transcribe it in order to not lose important information that you tell me. Are you ready to begin?

1) What are your thoughts about the OSG?

2) Please describe your experience in the OSG.

3) How do you select what you write in your posts?

4) Please describe any specific experiences that you have had in the OSG that have affected your teaching.

5) Please tell me about any improvements that you think can be made to this OSG experience.
Appendix M: 87 Codes After First Pass of the Data

Sharing a strategy
Collaborating or volunteering to collaborate
Supporting
Administrative
Complimenting
Encouraging Sharing/Asking a question to the group
Implementing or planning to implement a shared idea
Evidence of community
Sharing a resource
Expressing Isolation/Reducing Isolation
Sharing students' responses to an activity/strategy
Marketing of Math Vacancies
Bringing in Outside Resources
Request from someone from USC to post something
Shared something mentioned on Edmodo with someone outside of the group
Sharing Summer Work Opportunities
Commiserating
Reflecting
Sharing feelings about teaching or students
Collecting Data/Polling
Admitting where growth is needed/or something poster needs to do better
Funding Needs – Supplies, PD
Reviewing with Students
Literal Equations
NCTM/SCCTM Membership
Statistics/Probability
Launching Lessons
Thinking
Assessment/Testng/SAT/ACT/HSAP/FINALS/EOC
First Day of School
Edmodo
Closure/Ready to be Assessed
Graphs, equations of lines, slopes
Classroom Management
Motivating/Engaging Students/Apathy/Incentives
Building Relationships with students
Birthdays
Conferences/Meetings
Connecting with one another
Foldables
Administration
Feedback from students
Fun/Classroom Atmosphere
Student Differences/needs
Music
Pre-Algebra
Twitter
Being a Teacher/Motivating/Inspiring
PreCal/Trig
Mentors/Mentor Evaluations
Algebra

Discovery
Create a Library to Share Resources
Attitudes toward PD
Coaching
Creative Solutions
Calculators
Geometry
Related math to real life
Sharing Student Work
Posting a Photo
Support from Administration/Colleagues/School
Colleagues/Policy
Post a Website
Students’ feelings about math
Use of food/candy/rewards/incentives
Parent involvement
Learning Disabilities
Class size
Videos/Movies
Notetaking/organization of teachers and students
Geogebra
You-tube
Pi-generator
SMART-exchange
Homework
Substitute Teachers
Looking for a website
Functions/Domain/Range
Technology
Timing
Games
Students showing work
Planning
Personal Mastery
End of School Year
Scheduling Differences 4X4
Student work on skills in the summer
Appendix N: Themes Relating to Purpose of Post
Created After Collapsing Categories During Phase 4 of Data Analysis

1 Supporting
   A Sharing
       Initiates sharing resources/strategies/student responses to activities/reflections on teaching/students
   B Collaborating
       Answers another Scholar or the researcher’s questions, builds off of another Scholar or the researcher’s posts, offers to get answers for someone, offers to share additional resources with someone
   C Complimenting
   D Reducing Isolation/Commiserating
       I have had the same feelings or experience or I understand what you mean or I hear you

2 Asking for Support
   A Preventive
       Asking for resources/strategies for something the teacher wants to do
   B Reflective
       Relays an experience that has already occurred and wants advice/feedback/help
   C Regarding Resources/Funds

3 Administrative
   A Noyce NTSP Components
       Mentors, meeting times, grant funds, posting requirements
   B Marketing the secondary math teaching profession
       news articles, vacancy postings
   C Polling – seeking answers
   D Polling – receiving answers
Appendix O: Themes Relating to Content of Post
Created After Collapsing Categories During Phase 4 of Data Analysis

1 Managing Students
   A Disruptive behavior (parent communication, teacher-assigned groups)
   B Apathy/motivation (use of incentives and rewards, evaluation of group efforts)
   C Variety of ability levels (IEPS, teacher-assigned groups)
   D Poverty levels (need batteries for calculators, no pies for pi-day)
   E Readiness to learn based on school factors (day before spring break, days after HSAP testing)
   F Other differences

2 Creating a Positive Classroom Atmosphere
   A Fun
   B Caring
   C Décor
   D Engaging
   E Love of math

3 Organization of Teacher
   A Parent communication
   B Student papers
   C Keeping up with different preps
   D Lesson plans

4 Student Learning
   A Organization
   B Obtaining algorithmic skills (worksheets, computer-aided)
   C Obtaining conceptual understanding (investigations, discovery)
   D Connections for real world

5 Teacher plans and strategies
   A Lesson plans/learning activities (investigations/discovery, skills practice, computer-aided)
   B Review/summary/closure/test-prep strategies (games, worksheets, computer-aided)
   C Resources suggested/needed (document camera, ink for printers)
   D Reflections
   E Assessments/grading
6 Noyce NTSP components
   A Edmodo requirements
   B Mentor requirements
   C Grant questions
   D Meeting reminders/paperwork

7 The teaching profession
   A Motivational
   B Need for resources/funding
   C Teacher’s role outside the classroom
   D Role of administration (“school administrators,” guidance counselors, district personnel)
   E Outside influences (HSAP testing)
   F Openings
   G Summer work

8 General communication
Appendix P: Letter Requesting a Member Check

Dear Noyce Mathematics Scholar,

Thank you so much for your participation in the research for my dissertation through your involvement with our Edmodo Online Community. Although our Edmodo group is still actively open, my dissertation study involved our four months of Edmodo interaction from January – May 2014 only.

It has taken me a while to analyze the volumes of data from our posts, interviews, and surveys and write the final report. Prior to submitting my dissertation to my committee for final acceptance, it is essential that I receive your feedback on whether this report accurately reflects your experience in this Online Support Group.

As second year teachers – I know you are very busy. I need your help. And, as promised in the March 2014 Edmodo Participation Plan, you will receive $50 for your timely review and comments on this report. Could you please do the following by March 19?

1. Please read this research report. Pages 4-8 are necessary. The remaining pages provide data FYI.

2. Please answer the following questions:

   A. Does this report accurately reflect your experience in the Edmodo group?
      No. (Please suggest any changes, deletions, additions that I should make.)
      Yes.

   B. Pseudonyms were used to protect the identity of all participants. However, are there any quotes of your electronic posts that you would like removed from this report due to fear of them being linked back to your true identity?
      If yes, please let me know the exact quotes that you want me to delete.

   C. As mentioned above, pseudonyms were used to protect the identity of all participants. Are there any instances where you would like for me to use your REAL NAME to give you credit for your thoughts expressed by direct quotes?
      If yes, please let me know the exact quotes that you want me to credit to you through the use of your REAL NAME.
3. Please write any additional comments here. Also, please feel free to call or email with any comments, questions, suggestions, or concerns. I have enjoyed and continue to enjoy working with you. THANK YOU SO MUCH!!!!

Every day is a gift.
Beth Oliver
XXX-XXX-XXXX