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ACCEPTANCE

This dissertation, LEADING AN ONLINE PROFESSIONAL LEARNING COMMUNITY OF MATHEMATICS TEACHERS AS AN IMPETUS FOR MY DEVELOPMENT INTO A TEACHER LEADER: AN AUTOETHNOGRAPHIC STUDY, by RABIA SHAHBAZ, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree, Doctor of Philosophy, in the College of Education, Georgia State University.

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

_____

Dr. Christine D. Thomas, Ph.D.

Committee Chair

_____

Dr. Kathryn A. Kozaitis, Ph.D.

Committee Member

_____

Dr. Draga D. Vidakovic, Ph.D.

Committee Member

_____

Dr. Pier A. Junor Clarke, Ph.D.

Committee Member

_____

Dr. Joseph Feinberg, Ph.D.

Committee Member

_____

Date

_____

Dr. Dana L. Fox, Ph.D.

Chairperson, Department of Middle and Secondary Education

_____

Paul A. Alberto, Ph.D.

Dean

College of Education

AUTHOR'S STATEMENT

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Rabia Shahbaz

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Rabia Shahbaz
4015 Longlake Drive
Duluth, GA 30097

The director of this dissertation is:

Dr. Christine D. Thomas
Department of Middle and Secondary Education
College of Education
Georgia State University
Atlanta, GA 30303

CURRICULUM VITAE

Rabia Shahbaz

ADDRESS: 4015 Longlake Drive
Duluth, GA 30097

EDUCATION:

Ph.D.	2014	Georgia State University Middle & Secondary Education
Master Degree	2006	Georgia State University Mathematics Education
Bachelor Degree	2000	University of Punjab Statistics

PROFESSIONAL EXPERIENCE:

2008-present	Mathematics Teacher/Department Chair Meadowcreek High School
2012-present	Part-Time Math Instructor Georgia Gwinnett College
2006-2008	Mathematics Teacher Tucker High School

PRESENTATIONS AND PUBLICATIONS:

Shahbaz, R. (2014, June). Presenter. *Trajectory of a Noyce Scholar in a High-Need School: From Novice Teacher to Exemplar*. 2014 Noyce Conference. Washington, DC.

Shahbaz, R. (2014, June). Facilitator. *Where Standards for Mathematical Practice and Formative Assessments Meet*, Gwinnett County Public Schools, Georgia.

Shahbaz, R. (2013, July). Facilitator. *Teaching Common Core Standards of Analytical Geometry*, Gwinnett County Public Schools, Georgia.

Shahbaz, R. (2012-2013, June/August/ September/March). Facilitator. *Implementing Common Core Standards*, Gwinnett County Public Schools, Georgia.

Shahbaz, R. (2012, September). Panelist. *Successful Mathematics Educator of a High-needs School*. Kennesaw State University, GA.

Shahbaz, R. (2012, May). Co Presenter. *Why I remain committed to teaching in a high need school*, Robert Noyce UMEP annual conference, Washington, DC.

Shahbaz, R. (2012, March). Co-Presenter. *Communities of Practice*, Math Teacher Retention Symposium, Los Angeles, CA.

Shahbaz, R. (2011, October). Presenter: *Ethnomathematics: Islamic Architecture in North Africa*, GCTM Conference, Rock Eagle, GA.

Shahbaz, R. (2010, June). Presenter. *Robert Noyce UMEP Online Professional Learning Community Project*, NSF, Washington, DC.

Shahbaz, R. (2010, March). Presenter. *Robert Noyce UMEP Online Professional Learning Community Project*, NSF regional conference, Clemson, NC.

LEADING AN ONLINE PROFESSIONAL LEARNING COMMUNITY OF MATHEMATICS TEACHERS AS AN IMPETUS FOR MY DEVELOPMENT INTO A TEACHER LEADER: AN AUTOETHNOGRAPHIC STUDY

by

Rabia Shahbaz

Under the Direction of Dr. Christine D. Thomas

ABSTRACT

Recently, the notion of educational leadership has expanded from school administrators to instructional coaches, department chairs, and teacher leaders. This expansion is the result of the 1980s education reform initiatives with which the concept of teacher professional development has evolved into building professional learning communities (PLCs). The PLCs play multiple roles by providing: (a) sources for ongoing instructional support; (b) forums for collaboration and reflection; and (c) platforms for developing leadership skills among teachers. Many studies emphasize the need for teacher leaders (TLs) to lead these communities. However, little is known about the reciprocal role of these communities in the development of TLs.

This study, which is a highly personalized account of my reflections, analyses, and interpretation, chronicles my experience of leading an online PLC of mathematics teachers. The purpose of this study is twofold: developing self-understanding which leads to self-transformation, and constructing a cultural understanding of how a TL develops in her role. Using an insider's vantage point, I provide a retrospective analysis of the factors and processes that influenced my role as the lead teacher of an online PLC and evolved me into a TL outside the online context. The main research question that guides this study is "If and how did my experience of leading an online professional learning community of mathematics teachers contribute to my development into a teacher leader?"

To examine my development, I used Kegan's (1980) framework of adult development based on constructive developmental theory. The study employed autoethnography, a recently emerging research methodology in which the researcher is the main character and the researcher's experiences are the data. The method I used to analyze my autoethnographic data is qualitative content analysis. Using the themes emerged from the literature and Kegan's developmental framework; I examined the factors that contributed in my development into a TL. The results showed that the online PLC played an important role in my development by providing support/mentoring, access to resources, and a positive environment open to experimentation. The study is unique in its approach of using developmental theory and autoethnography to enhance self-understanding and highlight the intricacies and nuances of teacher leadership.

LEADING AN ONLINE PROFESSIONAL LEARNING COMMUNITY OF MATHEMATICS TEACHERS AS AN IMPETUS FOR MY DEVELOPMENT INTO A TEACHER LEADER: AN AUTOETHNOGRAPHIC STUDY

by

Rabia Shahbaz

A Dissertation

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Degree of

Doctor of Philosophy

in

Teaching and Learning of Mathematics Education

in

the Department of Middle and Secondary Education

in

the College of Education

Georgia State University

Atlanta, GA
2014

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Rabia Shahbaz
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DEDICATION

I dedicate this study to my father who has taught me to be a good human being and has always encouraged me to reach my potentials.

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I feel privileged to express my gratitude to the people who were directly involved in my doctoral journey. First and foremost, I want to thank God Almighty for giving me the strength and ability to reach my educational goal. Second, I would like to thank my major adviser, Dr. Christine Thomas, whose belief in me and my potential as the teacher leader has encouraged me to write this autoethnography. In the past five years, Dr. Thomas's role in my life has been more than an advisor of this dissertation; she is my guru, mentor, and coach. Dr. Thomas, I do not have words to express how much I appreciate everything that you do for me. I want to extend my heartiest gratitude to Dr. Kozaitis, whose expertise in ethnographic studies guided me in every step of the way. Other members of my dissertation committee included Dr. Feinberg, Dr. Junor Clarke and Dr. Vidakovic. They have been my professors and mentors from the time I embarked my academic journey in USA, and they all have made a profound impact on my development into an effective mathematics teacher.

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ABBREVIATIONS

ABER	Arts-Based Education Research
CDT	Constructive Developmental Theory
GCTM	Georgia Council of Teachers of Mathematics
GPS	Georgia Performance Standards
GSU	Georgia State University
QCC	Quality Core Curriculum
LP	Lead Professor
MSE	Middle and Secondary Education
NCTM	National Council of Teachers of Mathematics
NSF	National Science Foundation
PD	Professional Development
PI	Principal Investigator
PLC	Professional Learning Community
SL	Second Life
TEEMS	Teacher Education in English, ESOL, Mathematics, Middle Level Education, Social Studies and Science
TL	Teacher Leader
UMEP	Urban Mathematics Educator Program

1 INTRODUCTION

This dissertation is an autoethnography of my journey as a lead teacher of an online professional learning community (PLC) of mathematics teachers and how this experience developed me into a teacher leader. Teacher leaders are defined as teachers who "lead within and beyond the classroom, identify with and contribute to a community of teacher learners and leaders, and influence others toward improved instructional practice" (Katzenmeyer & Moller, 2001, p. 5). By using self-reflection and analyzing/interpreting various forms of data (e.g., videos, chat logs, pre- and post-reflection writings, electronic mail threads, and discussion posts), collected during the planning and implementation of the online PLC, I evaluate the impact of this role on my personal and professional growth as the teacher leader at my school and district level. In this study, I qualitatively measure my growth by using the attributes associated with various stages of Kegan's (1980) developmental model.

This research study offers an insider's perspective of teacher leadership and the culture of online PLCs. Through this dissertation, I seek to contribute to the literature on teacher leadership, specifically on the development of teacher leaders. I seek not to generalize the role of a teacher leader or proclaim my findings as a scientific truth, but to provide self-reflections of my experience to better understand my "self". Merriam Webster (n.d.) defines self as the union of elements (as body, emotions, thoughts, and sensations) that constitute the individuality and identity of a person. I am especially interested in the ways that my identity and individuality is informed by internal and external factors related to teacher leadership. Lastly, through this self-narration, I hope to reinforce the significance of self-reflection in personal and professional development.

Why an Autoethnography?

As unequivocally posited by Moro (2006) in the title of a book review, *It Takes a Darn Good Writer* to write an autoethnography. There have been times when I have questioned my own writing ability, as English is not my first language. Yet, why did I choose to attempt the challenging genre of autoethnography? First, the definition of autoethnography is essential to answering this question and encompasses the essence of my study. Ellis (2004) defines autoethnography as "research, writing, story, and method that connects the autobiographical and personal to the cultural, social, and political (p. xix)." My study connects my lived experience of leading an online PLC with the cultural phenomenon of teacher leadership.

Second, as Chang (2008) contends, "The development of self—reconfiguration, reconstruction, or transformation of self—comes through arduous self-examination. Autoethnographic writings bring this self-development process to light" (p. 141). According to Fassett and Warren (2007), autoethnography provides its authors with an avenue to self-reflect on their past experiences and situate those experiences in relation to larger social (cultural, economic, historical) circumstances. My examination of *self* through an autoethnographic lens may assist in the development of my understanding of the teacher leadership culture. This will, in turn, strengthen my practices as a teacher leader. In addition, this study is designed to give others insight into the role of teacher leaders and highlight the processes and factors that contribute to the development of these leaders.

Finally, my motivation to write an autoethnography comes from the assertion that a qualitative researcher must be adept in writing stories (Wolcott, 1994). According to Wolcott (1994), qualitative researchers have to be storytellers and that storytelling should be one of their distinguishing attributes. Additionally, Richardson (1994) encourages people to write because "writing is a way of 'knowing'—a method of discovery and analysis. By writing in different ways, we discover new aspects of our topics and our relationship to it" (p. 517). It is important to note here that a person does not have to be a great writer to write a story, and the proponents of autoethnography believe that the genre requires more than simply good writing skills. According to Ellis and Bochner (2011), a person can write in aesthetically compelling ways without citing fiction or being educated as a literary or performance scholar. In a doctoral study, Smith-Sullivan (2008) interviewed several autoethnographers and established that the best autoethnography blends the theoretical, analytical, and literary. In alignment with Smith-Sullivan's (2008) criteria, the current study presents a blend of theory, analysis, and storytelling.

Anderson (2006) introduced the term *analytical autoethnography* to distinguish the evocative autoethnography (one that opens up conversations and evoke emotional responses) from more traditional ethnographic practices (one that focuses on exploring a cultural phenomenon). Anderson (2006) describes the role of the researcher in analytical autoethnography, stating that the researcher is (1) a full member in the research group or setting; (2) visible as a member in published texts; and (3) committed to developing theoretical understandings of broader social phenomena. Ellis and Bochner (2006) criticized analytical autoethnography, stating that the goal of autoethnography is not to theorize a phenomenon; rather, the goal is to simply dwell in a lived experience.

Moreover, Ellis and Bochner (2006) consider autoethnography *a story* and analytical autoethnography an *abstract analysis*. The design of the current study reconciles components from both schools of thought. This study, which focuses on analyzing my experience of leading an online PLC, goes beyond a mere narration of my lived experience. Through this study, I intend to deepen my understanding of teacher leadership and possibly theorize the role of PLCs in developing teachers' leadership skills. Instead of labeling the current study as evocative or analytical autoethnography, components from both will be utilized to enhance the benefits of this study.

Despite the contention over what an autoethnography actually is or should be; there is a consensus on the vulnerability of the researcher. For example, Neyman (2011) states that autoethnography differs from other research methods in the dual role of the researcher as both investigator and the one who is being investigated. During this process of self-investigation, the researcher is exposed to the reader. Ellis (1997) considers autoethnography a reflexive writing genre that provides researchers an avenue to learn through exposure and vulnerability. Noting the researcher's vulnerability, Ellis (1999) states that autoethnography uses a wide lens that zooms out to make the social and cultural aspects of personal experience visible, then zooms in to expose a vulnerable self that may refract and resist cultural interpretation. Ellis (2004) further cautions future autoethnographers by stating "not only your work, but your personal life is scrutinized and critiqued" (p. 19).

Many other autoethnographers (Mercardo-Garzo, 2008; Prewitt, 2010; Wall, 2009) have also identified the challenges associated with being exposed and exposing others. To overcome these challenges, Ellis (2004) recommends that the

autoethnographer allows all of the people involved to read the story so that they are comfortable with the information being revealed. However, both revealing and being revealed can be problematic in evocative and therapeutic autoethnographies. Despite these challenges, autoethnography is becoming a widely used research methodology in various disciplines. Autoethnography provides readers with an opportunity to draw on the author's experiences to support their understanding of a particular culture.

Revealing my Identity as the Autoethnographer

As Jackson (1989) states, "understanding of others can only proceed from within our experience and this experience involves our personalities and histories as much as our field of research" (p.17). Therefore, a researcher's history should be known, to some extent, to foster a better understanding of the current study. To serve this purpose, below I provide my brief history before I was selected as the lead teacher of an online PLC of mathematics teachers.

My Background

I am a Pakistani American who moved to the United States (US) in the year 2000. My first visit to the US was in 1996 when my family got the immigrant status. My father worked for an airline, so I had done my share of traveling as a child, visiting several countries in Europe and the Middle East. My husband, who is also from Pakistan, has resided in Georgia since 1989. We got married in Pakistan in 2000 and I moved with him to Georgia.

In Pakistan, I had completed a master degree in statistics. When I moved to the US, I wanted to pursue a PhD degree. But instead, I had to help my husband in managing the two convenient stores that he owned. I spent the first three years of our marriage

helping him with the business. Although I was just 22 years of age, I quickly learned every aspect of the business and eventually managed one of the stores. However, it was not long before the business was sold.

Entering the Teaching Profession as a Substitute

After the business was sold, it became more important for me to secure some type of employment and contribute to the household finances. I chose to become a mathematics teacher, considering my educational background, love for mathematics, and positive experiences with after-school tutoring back in Pakistan. Once I began my job search, I quickly realized that I had to be certified to teach in the state of Georgia. I also realized that I needed to acclimate myself to the culture of schools in the United States, specifically schools in my region. I decided to apply for a substitute teaching position, selecting middle schools due to my tutoring experiences from Pakistan; I was hired shortly thereafter.

I substituted at two different middle schools. Realizing my content knowledge, one of these schools gave me multiple long-term assignments in various mathematics classrooms. I taught in an 8th grade accelerated algebra I class for the entire semester. Serving as a substitute teacher not only exposed me to the mathematics classrooms, but I had the chance to see curriculum across the disciplines, variety in students' behaviors and learning styles, and day-to-day classroom activities. I was also able to see the ways in which the school culture in the US differed from that in Pakistan; substitute teaching helped me adapt to this new culture. Before long, I had begun to enjoy the school environment, as I was presented each day with the opportunity to learn something new.

Molding my Career in Teaching

Being a substitute teacher kindled my desire to have my own classroom, and I decided to take the content examination for middle school mathematics. Once I passed the exam, I was eligible for a provisional teaching certificate, which is a nonrenewable certificate (in the state of Georgia) issued to teachers who (1) are qualified in a specific content area; and (2) have passed the certification exam or have out-of-state certification. In Georgia, the provisional certificate is issued to prospective teachers at the request of the school system wishing to employ, and it allows teachers to work for a maximum of three years. However, to obtain a renewable teaching certificate, I was required to take teacher education courses from an institute accredited by the Georgia Professional Standards Commission.

While searching for teacher education programs in the year 2005, I discovered TEEMS (Teacher Education in English, ESOL, Mathematics, Middle Level Education, Social Studies and Science), a Master of Arts degree program at Georgia State University. The TEEMS program in mathematics education (with certification for grades 6-12) consisted of 42 hours of coursework (i.e., 15 in graduate-level mathematics, 9 in mathematics education, and 18 divided between instructional technology, educational psychology, research/measurement, social foundations), student teaching, and a certification examination. Upon successful completion of this program, students earned a Master of Arts degree and a renewable teaching certification. Students accepted to the TEEMS program for mathematics education must have completed their undergraduate degrees in mathematics or a related field including at least 24 semester hours of upper division credit in mathematics content. I applied for this program and was accepted. After

being accepted into the program, I had the opportunity to apply for a scholarship program called the Robert Noyce: Urban Mathematics Educator Program (UMEP). With the successful completion of the application and interview process, I was fortunate to be awarded this scholarship. Receiving this scholarship began a new chapter of my career, as the TEEMS program of mathematics education and UMEP scholarship collectively aided my development as an educator and as a teacher leader. The UMEP scholarship program provides the context of the current study; therefore, it is important to describe this program here in detail.

Robert Noyce: Urban Mathematics Educator Program (UMEP)

In 2005, four professors from Georgia State University received funding from the National Science Foundation (Project #0434094) called the Robert Noyce: Urban Mathematics Educator Program (UMEP). The goal of this scholarship program was to increase the number of secondary mathematics teachers in the two partner school districts, which were categorized as high-needs school districts. Fournillier, Thomas, Junor Clarke, and Vidakovic (2011) describe high need schools as having a majority of students whose family incomes are below the poverty level, and having high teacher turnover or teachers who are not certified to teach the assigned subject.

To achieve this goal, the program was divided into two components: The first component dealt with recruiting and training teachers who were committed to teach in one of the two partner urban school districts for at least two years. The second was to retain these teachers in urban school environments by supporting them during their induction years. The program was designed to recruit 40 students (at the rate of 10 students per year over a period of 4 years), who were accepted into the TEEMS program

of secondary mathematics education and demonstrated willingness and commitment to teach mathematics in high-needs urban schools. The training component was embedded in the course work and student teaching requirements of TEEMS program for secondary mathematic education. To provide support and retain UMEP scholars in high-needs schools, an active PLC was maintained which consisted of UMEP scholars, lead professors, mentor teachers and school administrators. The PLC functioned to provide seminars and other forms of professional development to UMEP scholars during their participation in the TEEMS program through their first three years of teaching.

In addition to meeting the TEEMS program requirements, UMEP scholars were required to do the following: (1) maintain full-time student status; (2) attend seminars; (3) make a 2-year commitment at a school from 1 of the 2 partner school districts; and (4) participate in the PLC through their third year of teaching. As a UMEP scholar, I received additional training and support, which improved my effectiveness as a mathematics teacher and later a teacher leader in an urban school setting.

Student Teaching Experience

As a requirement of the TEEMS program, students had to complete a student teaching assignment for a semester. My student teaching assignment was at a high school in one of the partnering school districts. I would consider my student teaching experience as one of the most important aspects of my teacher education program. It was during this time that I was exposed to a different, more dynamic school environment than the one I was familiar with back home in Pakistan. In Pakistan, people are segregated by social class, and my family fit into the upper-middle class, enabling me to attend private schools that used British curriculum. At schools in Pakistan, students are homogenously grouped,

so teachers did not have to differentiate their classroom instruction. The school assigned for my student teaching was a low performing school (in terms of standardized test scores). Students were predominantly African American and belonged to the two extreme social classes.

As a student teacher, I realized the multifaceted role of the classroom teacher as an educator, a facilitator, a mentor, and a role model. As part of the course requirement, during this student teaching experience I conducted an action research to explore students' perspective of effective teachers. The results of this research were later presented at the annual conference of Georgia Council of Teachers of Mathematics (GCTM). In the TEEMS program, I also learned effective teaching and learning strategies, such as differentiated and standard-based instruction, contextual and situated learning, as well as discovery and problem-based teaching. In addition, I learned how to design activities aligned with standards and how to write solid lesson plans. As per other requirements of the program, we had to write a detailed classroom management plan as well as build an e-portfolio; the e-portfolio project made a significant contribution to my digital pedagogy skills. As I neared the end of the teacher education program I took the secondary mathematics teacher certification examination and became certified to teach.

My First Experiences in the Classroom

My student teaching experience, which was my first time in the high school setting, made my decision to teach high school students much easier. My first teaching position after graduate studies was at a high school within a UMEP partner districts. I was hired to teach algebra I and geometry and began work the day after I graduated, which was the first day of teachers' planning week. I had enough experience (i.e., student

teaching, substitute teaching) by this time to be comfortable in the classroom environment, and UMEP training had equipped me with the tools to be effective in the urban school setting. Being a member of a racial minority in the United States, I was delighted to teach a diverse group of students and was able to quickly build rapport with them.

In 2008, I transferred to another school that was closer to my home. The school I transferred to also had a diverse population of students and was a Title I school. According to the Georgia Department of Education (n.d.), Title I schools are least proficient schools in making progress over a 3-year period on statewide assessments. This new school had a separate academy for 9th-grade students. According to a report prepared by the National High School Center (Kennelly & Monrad, 2007), 9th-grade academies strengthen the bridge between middle and high school and beyond, ensuring that students have a smooth, successful transition to high school.

I got this position after being interviewed "on the spot" at a county job fair; the school also gave me a letter of intent at this time. I found out on the day of preplanning that I was scheduled to teach mathematics at the school's 9th-grade academy. It is interesting to note here that this was a transitional year for mathematics curriculum in the state of Georgia, shifting from Quality Core Curriculum (QCC) to Georgia Performance Standards (GPS). In grades 9-12, the state had planned to implement the new curriculum in one grade level each year, and this was the year for 9th grade. The new curriculum was more rigorous than the old, with the focus moving from traditional content-specific curriculum (e.g., algebra I, geometry) to an approach integrating algebra, geometry, and statistics at all four grade levels of high school mathematics. The adoption of new

curriculum in the 9th grade created a need at the local level to re-create content maps, instructional calendars, and common assessments. I collaborated with another 9th-grade mathematics teacher to develop these resources. Although my first year at this new school went well, it required many adjustments, such as teaching time going from 90 to 51 minutes, less planning time, more class sections, mandatory meetings, and nonteaching responsibilities.

My new school was almost three times bigger than my old school in terms of space and student population. The school operated on small professional learning communities (PLCs) of teachers who taught the same course. Subject team leaders were assigned to facilitate these PLCs. Other responsibilities of subject team leaders included: (a) collaborating with other team members to plan and design instructional strategies; (b) analyzing assessment data to plan remediation; and (s) designing student success plans; and (d) intermediating between teachers and administrators. At the beginning of my second year at this school, my department chair offered me a subject team leader position. Due to personal reasons, I could not take over the position right away and informed my department chair that I would like to wait until the beginning of spring semester, and she honored my decision.

The Online PLC for UMEP Scholars

In 2009, to strengthen the PLC component of the UMEP grant, the National Science Foundation provided supplemental funding to the UMEP leadership team. To provide continuous support to the UMEP scholars (most of who were teaching at various high-needs schools) and keep them engaged in a community, the PLC was transformed into a virtual learning environment, and Second Life (SL) was chosen as the Web-based

platform to create this community. SL is a three-dimensional multiuser virtual environment (MUVE) that simulates real-world experiences. The users of SL, called residents, interact with each other through avatars, and these avatars can travel from one place to another by walking, running, and flying. Avatars can also instantly move from one place to another by a feature called "teleporting." For purposes of communication, there are several options: a text-based chat function, instant messaging (IM), and loud voice. In SL, one can also build one's own objects and add hyperlinks to other web-based resources.

GSU owns an island on SL called "Five Points" the image of which is shown in Figure 1. This island consists of five main areas: best practices meeting/seminar rooms, a bookstore, a treehouse, a sandbox, and an amphitheater. The online PLC meetings were scheduled in the best practice meeting room. There is also a password-protected private area on this island, which is reserved for the instructors.

Figure 1. Georgia State University Island on Second Life

To introduce UMEP scholars to the online PLC, the lead professors scheduled a face-to-face meeting for Saturday, October 3, 2009. During this meeting, scholars were introduced to the free and easy-to-download SL platform, One of GSU's IT specialists also participated in the introductory meeting, showing the attendees how to create their avatars and navigate through the Second Life platform. During this meeting, the participants created their avatars and completed a survey about their contact information, teaching assignments, and preferred days and times of the SL meetings. The inaugural SL meeting was scheduled for November 21, 2009.

Getting Started as a Teacher Leader

For the PLC to function effectively, lead teachers were needed to develop and sustain the PLC, conduct PLC meetings, and collect the data required for PLC evaluation. All UMEP scholars were offered a stipend for participating in the UMEP online PLC. There was an additional stipend for scholars in the lead teacher roles. One of my professors encouraged me to apply for this position based on my credentials and my performance as a UMEP scholar. And even though I did not consider myself a leader at the time, I applied and successfully obtained one of the three lead teacher positions. All three of us lead teachers were UMEP scholars, one was in my graduate school cohort and the other was a recent graduate and a first-year teacher. Lead teachers were selected in accord with peer mentoring concepts by Swan and Dixon (2006) and the definition of a "community of practice" by Lave and Wenger (1991).

The first face-to-face meeting of the UMEP PLC leadership team, which included the newly selected lead teachers, the lead professors (LPs), and the graduate research assistant (GRA) involved in the project, took place on November 5, 2009. One

professor participated through the Skype. I also attended the meeting after my doctor's appointment, receiving the recommendation to have an elective induced childbirth on November 10. Because there was a lot of work to do to prepare for the first online meeting with the entire PLC, I was a bit nervous to discuss my upcoming childbirth since that meant I would be unavailable for a while. However, everyone was surprisingly supportive and excited for me once I shared the news.

The surveys that had been collected from all of the PLC teacher participants at the first general meeting were circulated during the first meeting of teacher leaders. I also attempted to familiarize myself with Second Life but quickly discovered that my laptop did not meet the system requirements. This technological setback led me to purchase a new laptop, which I did immediately to avoid any future setbacks. We also learned what was expected from us as teacher leaders at this first meeting. The lead professors assured their support throughout the journey and gave us the freedom to design the PLC. The lead professors understood that no one person holds all of the knowledge, but that knowledge is constructed from interaction and distributed to members of a community, and that teachers often prefer to learn from their colleagues than from other resources (Kemmis & McTaggart, 2005).

The Connection between Autoethnography and Leadership Development

The literature reveals a strong connection between autoethnography and leadership. Autoethnography provides the researcher with an understanding of the culture in which he or she is immersed. This understanding is imperative for a leader to effectively lead. According to Schein (1992), "the bottom line for leaders is that if they do not become conscious of the cultures in which they are embedded, those cultures will

manage them" (p. 15). Shamir and Eilam (2005) identified life stories as a major source of constructing self-knowledge and self-concept, which are basic traits of authentic leaders. Shamir, Dayan-Horesh, and Alder (2005) examined 11 autobiographies of renowned leaders and conducted 16 in-depth interviews with young leaders of various organizations. Shamir et al. (2005) found that: (1) leadership development is a natural process; (2) leadership develops from struggle and hardship; (3) leadership development is finding a cause or sense of direction; and (4) leadership development is a learning process. According to Shamir et al. (2005), a coherent life story is a requirement for authentic leadership because building a life story requires reflection on one's life experiences, which in turn aids the development of new understandings, provokes new emotions, and yields new meanings. This reflection on past experiences also allows an individual to learn about her or his strengths, weaknesses, motives, and values.

Josselson (1993) contends that life stories are not free constructions, but they are constrained by life events. Authentic leaders select elements of a story to confer meaning on prior events—events that may not have had such meaning when they occurred. Shamir and Eilam (1995) affirm, "It is through life experiences and the way they are organized into life-stories that people can develop a self-concept of a leader that supports and justifies their leadership role because the life-story not only recounts but also justifies" (p. 403). Later, Shamir and Eilam (2005) identified writing life stories as an approach to develop authentic leadership, defining authentic leaders as those who possess self-knowledge and personal points of view as a means of clarifying their values and convictions. In this study as I reflect on my journey as a teacher leader, I hope to enhance my self-concept and self-understanding, the traits of authentic leaders.

Background of the Study

According to the literature, there is a strong correlation between K-12 (kindergarten to grade 12) teachers' professional development (PD) and student achievement (Blank & Alas, 2010; Darling-Hammond, 1998; Darling-Hammond & Richardson, 2009; DuFour, 2004; Lock, 2006; Sledge & Morehead, 2006). Sparks and Loucks-Horsley (1989) define PD as "those processes that improve the job-related knowledge, skills, or attitudes of school employees…that is intended to improve student learning through enhanced teacher performance" (p. 1). With the rapid changes in school curriculum, the increased demands of teaching 21st-century problem-solving skills, and the new teacher performance-based accountability measures adopted by Race to the Top states, the need for teacher support and PD is more pronounced than ever before.

In early 1970s and 1980s, stakeholders in education began to question the efficacy of teachers' professional learning opportunities. In the earlier years, Zigarmi, Betz, and Jensen (1977) defined PD as "individually-planned and/or school-planned activities for the improvement of instruction and/or the professional development of staff members" (p. 545). Since the 1980s, education reform has led to an all-new vision for PD, whereby educators are provided the opportunity "to reflect critically on their practice and to fashion new knowledge and beliefs about content, pedagogy, and learners" (Darling-Hammond & McLaughlin, 1995, p. 587). In lieu of providing single-shot, one-size-fits-all teacher-training workshops (Lock, 2006), many schools are adopting the use of PLCs for teachers who teach in the same content areas or at the same grade levels. These learning communities serve multifaceted roles as: (a) sources of ongoing instructional support for teachers; (b) forums for collaboration and reflection; and (c) platforms for the

development of teachers' leadership skills. In recent years, the Internet and advanced virtual environments have encouraged the development of online PLCs, which give teachers more flexibility and greater access to resources than face-to-face PLCs.

Whether a PLC is face-to-face or online, teacher leaders (TLs) are needed to facilitate professional development sessions, foster trust among PLC members, and promote reflective inquiry. Newsom (2010) describes TLs as teachers who step outside their traditional roles as teachers to contribute to the improvement of the school. Albeit the phenomenon of teacher leadership is not new, but the TL roles of the past were limited in scope. In 1983, the National Commission on Excellence in Education published a report *A Nation at Risk: The Imperative of Educational Reform* that initiated education reform at both the state and national level. With these reforms, the traditional *industrial leadership* education model has transformed into the *distributed leadership* model. In the industrial leadership paradigm, one administrator (often the principal) holds the authority to operationalize school policies and procedures (Rost, 1991). In contrast, distributed leadership refers to more than one individual having expertise at any level or in any position and being able to initiate and influence interactions in a professional learning community (Gronn, 2002; Spillane & Diamond, 2007). In the distributed leadership model, TLs are recognized as vital to strengthening the school organization, operation and ultimately the learning process for students.

Many studies have emphasized the need for TLs to develop communities of practice, which would give teachers a forum to improve their practices through reflective dialogue and inquiry. Murphy (2005) reports an increase in teacher leadership research, yet contends that most of this research was focused only on the roles played by TLs

rather than the process of their development. The problem, then, is the dearth of research on the processes and factors that contribute to the development of TLs. More specifically, existing literature on teacher leadership is void of personal testimonials and self-reflections from teacher leaders regarding their own development.

Statement of the Problem

The literature on teacher leadership has been limited, traditionally and currently, to the significance of the role of TLs in various school settings. Researchers have overlooked the processes and factors that contribute to the growth and development of TLs. Smylie (1995) and York-Barr and Duke (2004) report that the research in teacher leadership is limited and incomplete. Smylie (1995) recommends more formal, theory-based research on teacher leadership roles such as those associated with professional communities, curriculum, and instructional reform. In an extensive review of the teacher leadership literature, Murphy (2005) identifies two different approaches: the role-based approach and the community-based approach. The role-based approach is focused on positions, whereas the community-based approach highlights the developmental process of teacher leadership. The community-based approach also includes interactions that are influenced by personal development and PLC practices. Murphy (2005) illustrates the need for more community-based research in teacher leadership.

York-Barr and Duke (2004) establish that leading and learning are interrelated and that TLs continue to grow in their understanding of instructional, professional, and organizational practices as they lead. In addition, Frost and Durrant (2002) contend that TLs must be coached and mentored to nurture their leadership skills, increase their confidence and self-esteem, and improve their creative abilities. Yet, the problem is the

lack of literature on the growth process of TLs, a problem that invites several inquiries, for example, “What type of coaching and mentoring do teacher leaders need and by whom?” and “What are the environmental factors that contribute to their development as teacher leaders?”

Purpose of the Study

The purpose of the current study is twofold: (1) Developing a self-understanding, which leads to self-transformation, and (2) Constructing a cultural understanding of a teacher leader’s development and growth in her roles. Through self-reflection, I seek to understand myself better, which will in turn make me a more effective teacher leader. By telling my story I intend to provide others with a cultural understanding of the phenomenon of teacher leadership, unravel the role played by a teacher leader, and present an example (in the form of a lived experience) for the growth and development of future teacher leaders.

Self-Reflection Leading to Self-Transformation

As Chang (2008) stated, “self-reflection can lead to self-transformation through self-understanding” (p. 57). The process of self-reflection allows teachers to contemplate their levels of efficiency within their professional goals. Dewey (1933) contends that teachers must be reflective practitioners who use reflective teaching to examine and improve their practices. According to Schön (1987), “reflective teachers” are those who are concerned with professional artistry and are willing to construct new teaching practices when they see a need to change their practices. In his book, Schön (1983) distinguishes two forms of reflections: reflection-in action and reflection-on-action. Reflection-in-action refers to reflection occurring simultaneously as the action happens

whereas, reflection-on-action refers to the process of reflecting after the action has taken place, in order to improve the future implementation of the action.

My study is mainly a reflection-on-action. In this study, I reflect on my role as the teacher leader of an online PLC of mathematics teachers, the obstacles as well as the opportunities I encountered while performing this role, and how did this experience influence my role as the lead teacher. This study also allows me to reflect-in-action as I evaluate the impact of leading an online PLC on my current practices as the head of the mathematics department at my school and a teacher leader in my school district. Recently, among qualitative researchers, there is a growing trend of using autoethnography to reflect on personal and professional experiences. Furthermore, several researchers have emphasized a strong connection between storytelling and leadership development (Josselson, 1993; Shamir & Eilam, 2005; Shamir et al., 2005; Schein, 1992).

A Model for the Development of Teacher Leaders

Besides accomplishing the personal goal of self-development, this study has a broader goal of providing others with a model of how teacher leaders develop and grow in their roles. It is important to note that model here refers to an example or a paradigm, and not a standardized design. In the limited literature on teacher leaders (Cohen, 1991; Frost & Durrant, 2002; Manno & Firestone, 2008; Newsom, 2010; Smylie & Denny, 1990; Wasley, 1991), the traditional ethnographic approach (in which an outsider explores a cultural phenomenon using observations and filed notes) has been used to reveal the challenges faced by teacher leaders as they maneuver within their roles. The current literature lacks personal reflections and first-person accounts of teacher leaders.

Therefore, through this study I intend to provide an emic view of how I played the role of a lead teacher in an online PLC of mathematics teachers, and which factors influenced my role. I also examine the impact of this experience on my personal and professional development. Merriam Webster (n.d.) defines development as the act or process of growing or causing something to grow or become larger or more advanced. By analyzing various stages of my development, I hope to provide others insight into the role of a teacher leader, the culture of an online PLC, and the processes/factors that contribute to the development of a teacher leader.

The primary question that guides this study is: If and how did my experience of leading an online professional learning community of mathematics teachers contribute to my development as a teacher leader? The following sub questions will guide the analysis and interpretation of the data: (1) What were the benefits and challenges of leading an online PLC, and what were the outcomes of these benefits and challenges on my development? (2) If and how did I transfer my role as a teacher leader from an online context to the face-to-face PLC at my school? (3) What role did mathematics play in my development into a teacher leader?

Rationale and Significance of the Study

The current study is an autoethnography of my evolution as a teacher leader in which I use a storytelling approach to provide cultural analysis and interpretation. As stated by Gardener (1995), “leadership is a process that occurs within the minds of individuals who live in a culture—a process that entails the capacities to create stories, to understand and evaluate these stories, and to appreciate the struggle among stories” (p.2). As mentioned previously, researchers like Shamir and Eilam (2005) encourage the use of

life stories to develop leadership; this life story approach is absent from the teacher leadership literature.

To date, the only personalized narratives we find in literature are told in *third person*. For example, Newsom (2010) wrote about the five urban teacher leaders. Using cross-analysis of the narratives obtained from personal interviews with several teacher leaders, Newsom illuminates critical variables that contribute to leadership-assertion choices to encourage leadership among more teachers in urban school settings. Newsom (2010) is a self-proclaimed "storyteller," retelling the stories of these teacher leaders' development. Other researchers (LeBlanc & Shelton, 1997; Manno & Firestone, 2008; Smylie & Denny, 1990; Wasley, 1991) used the case-study method (i.e., observations and interviews) to identify the challenges faced by teacher leaders in K-12 public education. Although my study shares goals with the aforementioned ethnographic studies, the uniqueness of the current study emerges from my use of personal reflection.

The rationale for this study is the void of first-person life stories and self-reflections in the literature on teacher leadership. As the researcher and the subject of the current study, I provide an insider's perspective to the culture of teacher leadership. Denzin (1997) suggests that we should look inward on the self while maintaining the outward gaze of ethnography. In the current study, I look inward at "self" via self-reflection and self-analysis to develop an outward gaze of the culture of both PLCs and teacher leadership.

This study is significant because of the increased need for teacher leaders to promote education reform within public schools. Barth (1988) strongly encourages school administrators to find ways to overcome impediments and create opportunities for teachers to exercise their leadership power. According to Barth (1988):

> Teachers harbor extraordinary leadership capabilities, and their leadership potential is a major untapped resource for improving our nation‘s schools. The world will come to accept that all teachers can lead, as many as now accept that all children can learn. (p. 131)

This study may benefit administrators, professors, and other researchers by enhancing their understanding of the teacher leadership culture and the development of teacher leaders. In telling my story, I seek to inspire other teachers to take on leadership roles and participate in communities of practice on both small- and large-scales. In addition, I hope to provide a model to aid in the design of supportive school environments and effective PLCs.

Nature of the Study

Consistent with the genre of autoethnography, the current study is limited to my personal experiences and interpretations as the lead teacher of an online PLC. The PLC in reference was funded by a grant, and all members received a stipend for their participation. This particular PLC may not be generalizable to other online PLCs. Also, one of the themes that emerged from Shamir, Dayan-Horesh, and Alder (2005) is that leadership develops from struggles and hardships. Some of these struggles and hardships are work related and others are personal. The struggles in one’s personal life are based on individual circumstances and vary from person to person. Similarly, the incentives that drive individuals to pursue leadership roles cannot be generalized.

Although a study such as this one cannot be generalized, it is relevant to teachers who want to expand their horizons and take on leadership roles. As Barth (1988) states, all teachers can lead, which makes the current study relevant to all teachers. In addition, a basic tenet of constructive developmental theory is that all individuals grow through similar identifiable stages of development, which makes the findings of this study applicable to other individuals and teacher development models.

Organization of the Dissertation

The current study is divided into six chapters (including this one), and each chapter ends with a summary which highlights the chapter's most important points. Chapter 2 presents a review of the literature on teachers' professional development, online professional learning communities, and the role of teacher leaders. In this chapter, I also compare the different writing styles appear in autoethnographic studies. Chapter 3 provides a description of constructive developmental theory and Kegan's framework of adult development, which guides the data analysis for the current study. In Chapter 4, a detailed account of autoethnography as a research method is presented, including the historical development, benefits, and criticisms of the genre. The research design and data analysis method, used in the current study, are also described in this section of the dissertation.

Chapter 5 is a narration of my journey in which I chronologically list the events that happened from the time I was selected to co-lead an online PLC designed for a group of mathematics teachers. This chapter presents the tribulations, challenges, triumphs, and achievements that I faced as I developed into a teacher leader. In Chapter 6, I analyze my story using content analysis and Kegan's (1994) framework of adult development. Study

findings as well as answers to the research questions guiding this inquiry are presented in this chapter. This chapter also includes the implications of the study and my recommendations for future research.

2 REVIEW OF THE RELATED LITERATURE

This chapter provides a detailed review of the literature on (a) the significance of teacher professional development (PD); (b) the purpose and role of developing professional learning communities (PLCs); (c) the recently growing trend of online PLCs including their design and implementation; and (d) the role of teacher leaders (TLs) in facilitating these PLCs. This chapter also presents literature pertaining to autoethnography as a qualitative research methodology and the ways other researchers have incorporated this methodology to study their *selves* in a specific cultural context. The order and relationships among various components of the literature reviewed in the current study is shown in Figure 2.

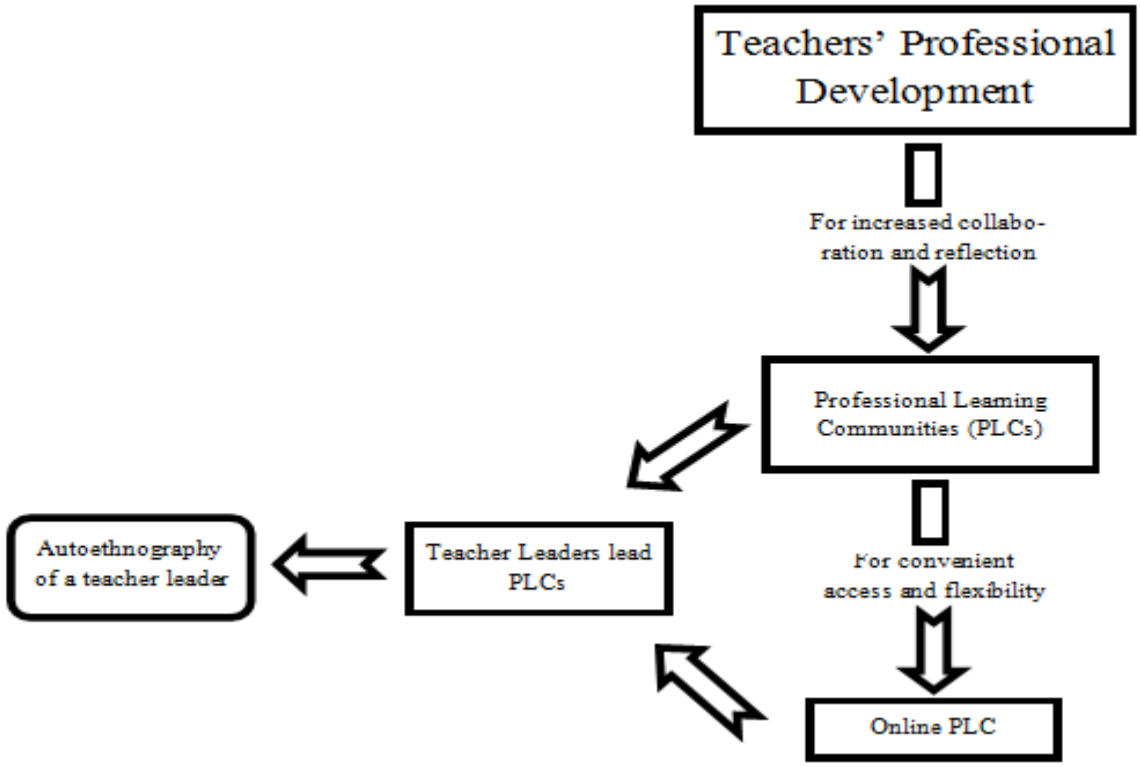

Figure 2. Flow chart model of the literature review.

As seen in Figure 2, TLs lead both face-to-face and online PLCs. In reviewing the literature on the TLs' role in leading PLCs, I will also support the notion that these PLCs reciprocate by providing a platform for developing teachers' leadership skills. This study, an autoethnography of my growth as a TL, is situated within this section of the model presented in Figure 2. This chapter follows the order of the model shown in the figure.

Teachers' Professional Development

Teachers' PD is defined as "formal provisions by organizations of ways of helping teachers and administrators to develop a better workplace and enhance their knowledge and competence in their assigned roles" (Joyce & Calhoun, 2010, p. 10). In a report titled "The workplace matters: Teacher quality, retention, and effectiveness" Johnson (2006) highlights the importance of ongoing teachers' PD in creating collaborative workplaces at schools. Recent studies of K-12 education (Blank & Alas, 2010; Colbert, Brown, Choi, & Thomas, 2008; Darling-Hammond, Wei, Audree, Richardson, & Orphanos, 2009) show an increased emphasis on teachers' PD, as teachers today face many challenges (e.g., a more complex society, changing technology, increased diversity among students, higher academic standards, new accountability measures). Studies have found that PD can improve teacher quality by changing teachers' practices (Wenglinsky, 2002). According to Vrasidas and Glass (2004), PD helps teachers develop the content knowledge and skills they need to be successful in their classrooms. Darling-Hammond and Richardson (2009) suggest that the education system must extend more effective professional learning opportunities so that teachers are better equipped to help their students learn the more complex and analytical skills needed in the 21st century.

Many studies validate the positive effects of PD in improving student achievement (Blank & Alas, 2010; Darling-Hammond, 1998; Darling-Hammond & Richardson, 2009; DuFour 2004; Lock, 2006; Sledge & Morehead, 2006). These studies suggest that ongoing PD not only makes teachers feel confident about their practices, but it also benefits student learning. Blank and Alas (2009) conducted a meta-analysis of studies of teacher PD programs in mathematics and science. They found that 16 studies, 12 out of which were focused on mathematics, showed a significant effect of teacher PD on improving student achievement. The PD programs in these studies included combinations of summer institutes, coursework, study groups, classroom mentoring, and professional networking, whereas, the effects on students' achievement were measured using a pre-post design. In another study, using the statistical technique of multilevel structural equation modeling, Wenglinsky (2000) provided evidence that mathematics teachers who received rich and sustained PD focused on higher order thinking had better student outcomes. Studies such as these indicate that PD that is sustained over time allows teachers to implement the practices they learn, obtain feedback, and reflect on their outcomes in the classroom.

While these studies show the positive effects of PD on student achievement, they also criticize the more "traditional" models. One criticism is that traditional models consist of ad hoc, sporadic, and system-wide trainings that do not address teachers' concerns about their daily challenges. In a conceptual study on the benefits of using online PLCs for providing teachers' PD, Lock (2006) highlights several issues in traditional forms of PD such as: (a) one-shot and one-size-fits-all workshops; (b) use of the transmission model from experts to teachers; (c) failure to address school-specific

differences; (d) just-in-case training; and (e) system-wide presentations that fail to allow sufficient time for teachers to plan or learn new strategies to meet their own realities.

Increased public attention to challenges in education reached its height in the 1980s (A Nation at Risk, 1983), resulting in considerable impetus for more innovative forms of PD. The newer PD models provide regular opportunities for teachers to collaboratively reflect on their practices. Darling-Hammond and McLaughlin (1995) also reference these models, stating that "professional development today means providing occasions for teachers to reflect critically on their practice and to fashion new knowledge and beliefs about content, pedagogy, and learners" (p. 597). Thus, the new paradigm in teachers' PD is community-based, which gives teachers a platform for ongoing collaboration and reflection.

Professional Learning Communities

Today, many schools are developing PLCs to provide teachers with ongoing PD. According to Reichstetter (2006), a PLC is a team of members who regularly collaborate for continued improvement in meeting learner needs through a shared curricular-focused vision. The mission of a PLC team is to ensure that students learn through teachers' collaborative and interdependent practices, as it allows teachers to meet regularly to analyze and improve their teaching practices, focus on assessment data to guide their instruction, and engage in ongoing discussions that promote team learning and in turn lead to better student performance. Jones, Stall, and Yarborough (2013) reinforce the importance of the PLC in school improvement, associating PLCs with professional development.

Several researchers have focused on the design and use of PLCs, identifying that members of PLCs must have common goals and values (Dufour, 2004; Hord, 1997; Reichstetter, 2006; Sparks, 2005). Additionally, this literature cites mutual trust, reflective dialogue, collective inquiry, and problem solving as traits of a successful PLC. Jonassen, Peck, and Wilson (1998) state that a PLC is unified by a "common cause of mutual support and learning, and by shared values and experiences…learning communities provide a means for learning within an atmosphere of trust, support, common goals, and respect for diversity" (p. 74). Dufour and Eaker (1998) list the following characteristics of the successful PLC: (1) shared mission, vision, values, and goals; (2) collaborative culture; (3) collective inquiry; (4) action/experimentation, (5) commitment to continuous improvement; and (6) results orientation.

In a recent study, Lee and Shaari (2012) explore the synergy between PLCs and communities of practice. According to the authors, a PLC involves teachers who are actively engaged in professional learning with the aim of enhancing their professional identity, whereas, a community of practice is a congregation of practitioners who seek to deepen their knowledge. In other words, in a PLC, professional identity is constructed through reflective and collaborative dialogue with like-minded practitioners, and in communities of practice, individuals gather to obtain professional development in the form of ongoing practice. Lee and Shaari conclude that, the two approaches are conceptually distinct yet, contain complementary values. Lee and Shaari (2012) add that professional community based organizations lacking one form or the other do not optimally achieve their end goals.

Online Professional Learning Communities

Recent literature shows a growing trend in the development of online PLCs for teachers. According to Donavant (2009), this paradigm shift in adult education results from advancing technology. As summarized by Dede, Ketelhut, Whitehouse, Breit, and McCloskey (2006):

> The need for professional development that can fit with teachers' busy schedules, that draws on powerful resources often not available locally, and that can create an evolutionary path towards providing real-time, on-going, work-embedded support has stimulated the creation of online teacher professional development programs. (p.7)

As Preece (2000) suggests, there is no global definition of an online professional learning community; therefore, many researchers (Conrad, 2005; Preece, 2000; Rovai, 2001) have created their own. Preece (2000) states that an "online learning community" consists of (a) people who interact socially to satisfy their own needs or perform special roles; (b) policies to guide people's interaction; (c) a shared purpose that motivates the members; and (d) computer systems to support the interactions and foster a sense of togetherness. Conrad (2005) defines a community as a general sense of connection, belonging, and comfort that develops over time among group members who share purpose or commitment to a common goal.

In addition, Conrad (2005) states:

> The creation of community simulates for online learners the comfort of home, providing a safe climate, an atmosphere of trust and respect, an invitation for intellectual exchange, and a gathering place for like-minded individuals who are sharing a journey that includes similar activities, purposes and goals. (p. 2)

A study on the impact of online PD on teacher quality and student achievement in fifth grade mathematics was conducted by Dash, Kramer, O'Dwyer, Masters and Russell (2012). The results of the study indicated that intensive, sustained, content-focused online

PD in mathematics can effect positive change in teachers' pedagogical content knowledge and pedagogical practices. According to Shulman (1986), pedagogical content knowledge includes an understanding of what makes the learning of specific topics easy or difficult, the conceptions and misconceptions that students might have, and the strategies most likely to be effective in reorganizing the understanding of students. In a conceptual article, "Online communities of practice: A catalyst for faculty development", Sherer, Shea, and Kristensen (2003) consider online communities of practice an effective way to jump-start, facilitate, develop, and sustain faculty involvement.

While there are many benefits of using online forums for providing PD, it also has some disadvantages. Killion (2000) lists the advantages and disadvantages of online staff development (a synonym often used for professional development) for teachers. Advantages include easy access, flexibility, low costs, and increased interaction and collaboration. Disadvantages include hidden costs of web access and course designing, the quality of the online content, and the readiness of the learner. Many recent studies on teachers' professional development have analyzed the design and implementation of online PLCs developed as part of grant funded projects.

Designing and Implementing Online PLCs

The literature reveals many grant-funded projects in which Web-based programs (e.g., TappedIn, WebEd) have been used to enable teachers to participate in communities of practice. For example, Mirny et al. (2010) conducted a collaborative action research involving educators and researchers around the world. The project used an online PD program called WIDE World based at the Harvard University Graduate School of Education. The goal of the project was three-fold: (1) study the process and effects of

online professional development structured by specific research-based educational framework, (2) refine a model of systemic educational improvement that includes online professional development, and (3) devise a new form of collaborative action research to support such work. The study provides an evidence of improved teachers' performance by increasing engagement, flexible understanding, and reflective collaboration. The study also illustrates the power of networked learning to build international communities sustainable across cultural borders.

In another study, Barab, MaKinste, Moore, and Cunningham (2001) describe the sociotechnical structures of Inquiry Learning Forum (ILF), a Web-based PD tool, developed to support a community of pre-service and in-service mathematics and science teachers. This forum was designed around a "visiting-the-classroom" metaphor, the goal of which was to provide teachers with a broad range of experience and expertise to come together in an online environment to observe, discuss, and reflect on pedagogical theory and practice anchored to actual teaching vignettes. The team videotaped several math and science teachers teaching inquiry based lessons in their own classrooms. A debriefing session was recorded at the end of each lesson to capture teachers' reflection and thoughts about the implementation and some of the decision they made during the lesson. The edited videos, reflections, and artifacts such as lesson plans, examples of students' work, and classroom resources were uploaded on the website which also included a discussion forum for visiting teachers. The researchers continuously improved the website based on teachers' feedback. The study shows great implications of the online professional development environment by providing teachers with forums to connect and learn from each other in ways that were not possible before the Internet.

Where researchers have shared their experience of implementing successful online PLCs, they have also highlighted the important elements that must be incorporated while designing such online communities. For example, Hodes, Pritz, Kelley, and Foster (2011) share their experience of designing an online community of 48 in-service technical teachers and administrators on the topic of data-driven instructional improvements. The complete intervention consisted of a one-day workshop followed by several months of mentored work in developing and implementing a data-driven action plan. A website, which they referred to as the sharing center, was developed for participants to post comments, have threaded discussions and upload or download documents. In the sharing center, participants shared resources and strategies and discussed barriers and challenges. Overall, the participants had a positive response to the intervention, but Hodes et al. (2011) report that because only half of the participants shared resources, the challenge became to refine the structure of the online community to encourage more engagement.

Based on this study, Hodes et al. (2011) suggest the following design elements to the potential designers of PLC websites: (a) clarify the goal of the website, (b) ensure member privacy, (c) provide a user orientation, (d) align tasks with course, and (e) build mutual trust among members. Likewise, Lock (2006) calls for three important changes to develop and sustain online learning communities for facilitating teachers' professional development: (1) reforming current perceptions of teachers' professional development; (2) designing ongoing opportunities for professional growth and development based on the needs of teachers; and (3) including individuals from the local school and/or from around the world who share mutual interest and goals.

Critical Analysis of Online PLCs

The literature on online PLCs also includes studies that analyze and measure the success of online PLCs, further making suggestions to guide future development of effective online PLCs. For example, Barnett (2001) reviewed issues and trends in electronic networking for teachers' professional development, making four conclusions: (1) Networking technologies can reduce teacher isolation and support sharing; (2) Networking technologies can foster reflection on practice; (3) Networking technologies influence teaching practice; and (4) Networking technologies support the formation of communities of practice. According to Barnett, most studies that use networking technologies are short term and do not provide enough data to measure their effectiveness. Barnett (2001) recommends on-site study of the ways teachers' practices have changed after collaborating in online PLCs.

Dede et al. (2009) examine online teacher professional development programs and strongly recommend that future research studies include: (1) research questions that address understudied areas and (2) design and methodological strategies for studying these questions. Dede et al. identify in-time assistance, access to experts and archival resources, and more scalability as benefits of online PLCs while still questioning the effectiveness of these programs. In addition, Lock (2006) states that designing an online PLC is not about adding technology, but it is about creating a purposeful, fluid structure that meets teachers' personal ongoing professional development needs. Lock further argues that planning and support is needed to create and sustain an online PLC that facilitates high quality professional development and provides a forum for teachers to be active, long-term members. Lock (2006) provides four guiding principles to

conceptualize an online PLC: (1) Develop living, dynamic images that encourage teachers to be active learners; (2) Create an environment that involves knowledge construction; (3) Provide a safe and trusting space; and (4) Select flexible and reliable technology.

Sociological and Pedagogical Factors of Online PLCs

The sociological and pedagogical underpinnings of effective online PLCs have been highlighted in the literature. The sociological factors promote a sense of community and collaboration among participants, whereas the pedagogical factors promote learning through critical reflection and inquiry. Garber (2004) stressed that social processes are more important than efficient technology in the growth of an online PLC, and that members must be committed to the learning process and be responsive to other members' contributions through trust-based reciprocity. According to Hodes (2011), pedagogical factors should include contextualized authentic learning tasks and critical discourse. Reichstetter (2005) discovered that reflective dialogue and collective inquiry are the major attributes of PLCs. Additionally, Hord (1997) and Sparks (2004) encourage members of PLCs to challenge practices, collectively solve problems, and share ideas that address student needs. The two major themes that emerge from literature on the sociological and pedagogical factors of online PLCs are trust among participants and an effective facilitator who guides reflective dialogue among participants.

Trust. Trust is a strong theme detected in the literature regarding online PLCs, particularly trust-based relationships among participants. To become a true community of learners, members must form solid relationships (Ryman, Hardham, Richardson & Ross, 2009; West, 2010). While some researchers (e.g. Conrad, 2005; Liu, Carr & Strobel,

2009) suggest that face-to-face participant interaction should precede online PLCs, others (such as Hodes et al., 2011; Ryman, 2009) recommend introductory interactions such as user profiles. Liu, Carr, and Strobel (2009) report that professional development with both face-to-face and online components are successful in developing teachers' pedagogical knowledge, content skills, and instructional practices. Conrad's (2005) multiyear study of learners in an online graduate studies reveals similar findings, illustrating face-to-face interactions for more connectedness and satisfaction among cohort members.

Murphy and Laferriére (2005) posit that "for groups to develop to a point where there is interdependence or interinfluence, a conscious, systematic effort must be deployed" (p. 674). Murphy and Laferriére (2005) examined virtual communities of foreign language teachers around the world using the group-development theory TORI (Trust formation, Open communication, Realization of goals, and Interdependence) (as described by Gibb & Gibb, 1967). According to the TORI theory, group participants function well when fears are superseded by trust. Murphy and Laferrière found that collaboration among group members results in progressive trust building and movement toward shared goals.

Effective Facilitator(s). Another theme found in the online PLC literature is the need for effective facilitator(s). Loucks-Horsley, Hewson, Love, and Stiles (1998) acknowledge that whether participating in an electronic network, a pre-service course, or a face-to-face session, the moderator's skill level play a pivotal role in creating the learning experience. According to Barrett (2001), a skilled moderator/facilitator who encourages discussion and provides timely feedback is required for an electronic network

to provide effective professional development opportunities. Effective facilitators of online PLCs are responsible for maintaining both pedagogical and social aspects. Further, Hodes et al. (2011) state that:

> Facilitators play an integral role in promoting and sustaining critical discourse and constructive social dynamics; they manage both learning (e.g., promoting higher level thinking) and the social aspects (e.g., maintaining an appropriate flow of discussion and timely submission of assignments) in an online learning environment. (p. 318)

Collins and Berge (1996) categorize the multifaceted and demanding roles of online instructors into four areas: (1) cognitive, (2) social, (3) technical, and (4) managerial. Rovai (2001) adds that facilitators play various roles in shaping online groups and promoting a sense of community. According to Prestera and Moller (2001), the facilitator's role changes as the community evolves through its various stages. Facilitators also foster active learning by helping community members break away from the stereotypical role of information receiver and become information seekers. Teachers who facilitate these professional learning communities at their local schools are referred as teacher leaders.

The Role of Teacher Leaders

The 21st century view of educational leadership has transformed to focus on a more scientific understanding of teaching and learning, data-driven decision-making, and a broader view of professional development. This new focus has resulted in a shift from industrial to a distributed leadership model. The distributed leadership model utilizes the teacher leaders' expertise to accomplish short- and long-term goals. Many researchers have emphasized the need for TLs to develop communities of practice and provide other teachers with a forum to improve their practices through reflective dialogue and inquiry

(Darling-Hammond, 1998, Darling-Hammond & Nicole, 2009; Dufour, 2004; Hord, 1997; Reichstetter, 2006; Sparks, 2002; York-Barr & Duke, 2004). Sledge and Moorhead (2006) suggest focused professional development and stress the importance of teacher leaders at low-performing schools.

As the role of the TL is being more closely examined in the literature, several themes have emerged: (a) teacher leaders are content experts (Cohen, 1991; Little, 1995; Manno & Firestone, 2008); (b) teacher leaders have positive impact on school effectiveness (Frost & Durrant, 2002); (c) teacher leaders develop positive connections with their peers (Cohen, 1991); and (d) teacher leaders facilitate PLCs (Stronge, 2007; York-Barr & Duke, 2004). Childs-Bowen, Moller, and Scrivner (2000, p. 28) summarize the roles of teacher leaders as, “Teachers are leaders when they function in professional communities to affect student learning; contribute to school improvement; inspire excellence in practice; and empower stakeholders to participate in educational improvement”.

The literature on teacher leadership emphasizes the important role played by teacher leaders as content experts. Odell (1997) states, “one cannot be an effective teacher leader if one is not first an accomplished teacher” (p. 122). In an ethnographic study, Cohen (1991) studied five secondary teachers and found their content knowledge and connections with their peers in their individual school contexts as variables that contributed to their roles as team leaders. Realizing the expertise of TL in their contents, Usdan, McCloud, and Podmostko (2001) stress that school principals should use teachers’ expertise to shape curriculum and design development opportunities.

A direct association between teacher leadership and student achievement has been observed in the literature (Barth, 2001; Futrell, 2011; York-Barr & Duke, 2004). Manno and Firestone (2008) identify the positive effects of a teacher's content knowledge on their leadership role, concluding that TLs with content expertise are able to identify student deficiencies and are seen as curricular resources by their peers. Lambert (2003) defines teacher leaders as "those who have managed to keep their sense of purpose alive and well, are reflective, inquisitive, focused on improving their craft, action oriented; they accept responsibility for student learning and have a strong sense of self" (p. 422). In a case study, Boone, Hartzman, and Mero (2006) found that empowering teachers as instructional leaders result in school improvement in terms of increased graduation rates, student retention, and all-around academic performance.

Another important role played by TLs is that they facilitate PLCs at their schools. In these PLCs, teachers meet regularly, reflect on their practices, review assessment data, and plan new instructional strategies. According to Stronge (2007), teacher leaders share newly gained skills by promoting, participating, and facilitating in a purposeful PLC. Some of activities of TLs in professional learning communities are mentoring new teachers, engaging in peer coaching, leading workshops, and collaborating with and inspiring other teachers. Sledge and Morehead (2006) emphasize that TLs play a pivotal in urban schools by providing professional development to their colleagues within PLCs. A report by National comprehensive center for teacher quality list the following benefits of enhancing teacher leadership: (1) Improve teacher quality; (2) Improves student learning; (3) ensure that education reform efforts work; (4) recruit, retain, motivate and

reward accomplished teachers; (5) provide opportunities for professional growth; (6) extend principal capacity; and (7) create a more democratic school environment.

Several studies in the literature on teacher leadership have identified the challenges faced by teacher leaders (Frost & Durrant, 2002; Smylie & Denny, 1990, Wasley, 1991). Some of these challenges include (a) lack of incentives, (b) sporadic and disconnected communication with peers, (c) balancing responsibilities inside and outside their classroom, (d) lack of clear-cut leadership expectations, and (e) no definitive conceptualization of teacher leadership. According to Lieberman, Saxl, and Miles (1988), teacher leaders not only provide learning opportunities for others but, in many ways, they learn and develop in the process. "Stepping out of the confines of the classroom forces these teacher-leaders to forge a new identity in the school, think differently about their colleagues, change their style of work in a school, and find new ways to organize staff participation" (Lieberman, Saxl, & Miles, 1988, p. 164).

In an earlier study, Ovando (1996) observed 132 teachers with leadership duties and found similar challenges. Based on this study, Ovando emphasizes: (1) the need for teacher leaders to overcome these challenges with continuous professional development not only to enhance instructional practices, but to address leadership skills; and (2) the need for mentoring to help with the mental shift from teacher to leader and from leader to teacher. Additionally, Ovando (1996) mentions a supportive environment, a learning culture open to experimentation, and increased professional knowledge through collaboration as useful practices identified by teacher leaders in developing their leadership skills.

A small proportion of the literature on teacher leadership signifies the reciprocal relationship between teacher leadership and PLCs. Caine and Caine (2000) consider learning community as a foundation for developing teacher leaders. York-Barr and Duke (2004) analyzed 41 studies on teacher leadership, noting the recurrent theme of building relationships and collaboration among teachers that requires a structure within local schools. York-Barr and Duke propose a leadership development model organized around four questions: (1) “Who am I?” (Understanding of self); (2) “Where am I?” (Understanding of colleagues and school); (3) “How do I lead?” (Learning ways to lead); and (4) “What can I do?” (Identifying targets and creating plans to apply their knowledge and skills). York Barr and Duke (2004) conclude with the notion that leadership is fostered in PLCs. Childs-Bowen, Moller, and Scrivner (2000) also emphasize the importance of PLCs because they create opportunities for teachers to take on leadership roles and narrow the gap between principals and teachers.

The Role of PLCs in Developing Teacher Leaders

Professional learning communities not only provide a forum for teacher leaders to develop their leadership skills, but they also encourage their participants to adopt leadership roles in various capacities. Ryman et al. (2009) state that by using critical discourse, PLC members can grow professionally, deepen their knowledge and understanding, and ultimately become leaders in their own right. Grossman, Wineburg, and Woolworth (2001) also argue that a community is good for intellectual renewal and provides a venue for new learning and the cultivation of leadership.

Gutierrez and Bryan (2010) support the notion of developing teacher leaders by immersing them in online PLCs. The authors and their research team developed an online professional learning community to develop and improve leadership skills among clinical/mentor teachers of professional development schools. The authors define professional development schools as part of an in-depth school-university partnership in which teacher candidates are mentored by clinical teachers. An online PLC was designed for clinical teachers using the role-based framework of teacher leadership by Killian and Harris (2006). At the beginning of each week, clinical teachers were assigned a role through a weekly task sheet along with a journal article and a link to a video clip. During the week clinical teachers applied this emerging knowledge with the teacher candidates and brainstormed ways to co-teach. The final step in the weekly learning cycle was for clinical teachers to reflect and share (using online discussion boards) their new understandings, ongoing experiences with teacher candidates, and connections of their role to broader aspects of teacher leadership. As a result, Gutierrez and Bryan (2010) found increased collaboration among teacher candidates and clinical teachers, leadership skills among mentor teachers, and student success.

The role of teacher leaders is emphasized in the literature, but little is known about the development of teacher leaders in their roles. To fill this gap in the literature, teacher leaders must share their personal experiences. Stinson (2009) argues that, just as case literature exists in fields such as law and medicine, teachers should develop a similar system inclusive of personal accounts. In this dissertation, I provide a highly personalized account of my experience as the teacher leader of an online professional learning community of pre-service and in-service mathematics teachers. The current study

presents a self-reflection of my personal growth as a teacher leader, which will improve my practices and provide others with a model for leadership development. This study will also promote cultural insight into designing and implementing online PLCs. To achieve this goal of connecting my *self* with the *culture* of online PLC of mathematics teachers, I choose autoethnography as my research methodology. A detailed description of autoethnography is provided in chapter IV of this dissertation. Below, I provide a review of some autoethnographic studies focusing on the writing styles and purposes.

Autoethnography

Autoethnography is a burgeoning qualitative research methodology that provides cultural understanding by describing and systematically analyzing personal experiences. According to Reed-Danahay (1997), autoethnography stands at the intersection of three genres of writing: (1) "native anthropology" produced by people of the same group who were formerly subjects of ethnography; (2) "ethnic autobiography" written by members of ethnic minority groups; and (3) "autobiographical ethnography," in which anthropologists interject their personal experiences into ethnographic writing. Ellis and Bochner (2000) expand the definition of autoethnography and include in it a broader range of similarly situated terms, such as personal narratives, lived experiences, critical autobiography, evocative narratives, reflexive ethnography, ethnographic autobiography, autobiographical ethnography, personal sociology, and autoanthropology. Chang (2008) distinguishes autoethnography from other forms of narrative writing, stating that autoethnography is both ethnographical and autobiographical at the same time. Autoethnography uses ethnographic research methods and connects the culture with the self. As Chang (2008) states, "stemming from the field of anthropology, autoethnography

shares the storytelling feature with other genres of self-narrative but transcends mere narration of self to engage in cultural analysis and interpretation" (p. 43). In this study, I use my experience of leading an online PLC of mathematics teachers to analyze and interpret the culture of online PLCs and their role in developing teacher leaders.

In reviewing autoethnographic studies, it is important to understand four different writing styles (Chang, 2008) that have emerged from ethnographic and autoethnographic literature: (1) descriptive-realistic writing, (2) confessional-emotional writing, (3) analytical-interpretive writing, and (4) imaginative-creative writing. In *descriptive-realistic writing*, the narrator depicts places, people, experiences, and events as accurately as possible without any judgment or evaluation by the author. Yet, the autoethnography is more than just descriptive realistic writing; autoethnographers use this writing style to develop a context for a later cultural interpretation. Most autoethnographies are a combination of descriptive-realistic writing and other writing forms.

In *confessional-emotional writing*, the author exposes his or her emotions related to confusion, problems, and dilemmas in life. Personal agony and experiences that are usually hidden from public view are often subject to this writing style. Confessional and emotive writing has an evocative effect on the reader and a therapeutic effect on the writer. For example, Mercado-Garza (2008) used autoethnography to write about the incestuous abuse and poverty she experienced during her childhood and how she was able to transform herself from being at-risk to resilient. Lewis (2007) wrote about her physical disability and how she successfully embraced a change in her identity from an able-bodied individual to one with a disability. The purpose of these therapeutic writings is to give others insight of the plights of those who are marginalized in society.

Simultaneously, these writings give those in the similar conditions a message of hope. Ellis (1997, 2000) states that reading and writing autoethnography is therapeutic, theoretical, emotional, and cognitive at the same time. Ellis used confessional and emotive writing to express her grief after losing a loved one and about her decision to abort an unborn child. Thus, the confessional and emotive writing processes serve as cathartic practices that encourage both the author and her audience to reflect, understand, and ultimately cope with a traumatic experience.

Analytical-interpretive writing can be divided into analytical writing and interpretive writing. As Wolcott (1994) states, analysis and interpretation are intimately intertwined, but not synonymous in qualitative research. Analytical writing highlights the essential features that transcend from particular details and identifies the relationships among fragmented data. In interpretive writing, the researcher transcends from factual data and makes sense of it by connecting its fragments. Wolcott (1994) recommends keeping a balance among description, analysis, and interpretation in qualitative research and writing, including autoethnographies. An example of this balance is seen in an autoethnography by Lazarre (1996), who writes about her experiences of raising "Black" (biracial) sons as a White mother. Using her biracial family as a spring board, Lazarre analyzes the implications of race in her personal life and interprets racial relations in a broad social context. In another autoethnographic study, Audrey (2003) describes her experiences as a girl turned into a woman and a student turned into a teacher in the context of elementary and middle school. The purpose of her study is to draw attention to the difficulties that girls experience during early adolescence. Adam-Wiggan (2010) explores the pressures and challenges faced by professional Black women in academia,

focusing on the pressure these women feel to alter their physical appearance, as well as the physical, emotional, and professional effects of this adjustment. This writing style allows readers to not only delve into the researcher's lived experiences, but to also use their analysis and interpretation to develop a broader understanding of social phenomena.

As Chang (2008) states, *imaginative-creative writing* is the boldest departure from traditional academic writing. This type of experimental writing opens up creative possibilities for the author and imaginative participation for the readers. This approach has been criticized for blurring genres of fiction and nonfiction and not engaging in enough cultural analysis and interpretation*;* however, many social science scholars have employed it to bring creative energy into a portion or the entirety of their work. Ellis (2004) uses fiction in her methodological novel about autoethnography. In this novel, using both fictitious and real characters and the metaphor of a classroom, Ellis (2004) describes her experience of teaching autoethnography to her doctoral students. Using vignettes she addresses the challenges encountered by students while conducting their autoethnographic researches. Many autoethnographers have experimented with poetry, short stories, vignettes, and other forms of creative writing. Spry (2001) advocates the personal, professional, and political emancipatory potential of performance autoethnography, incorporating poetry and dance to articulate the intersection between people and culture. Spry defines performance autoethnography as the convergence of the autobiographical impulse and the ethnographic moment. According to Chang (2008), imaginative-creative writing is the forte of autoethnography, and an autoethnography without a cultural analysis loses its credibility.

While these writing styles may seem easy to classify and may appear disconnected from each other, autoethnographers commonly mix these styles in one text. With this blend of styles and experiences, autoethnography transcends various disciplines and promotes self-transformation via intensive self-reflection. Unlike traditional ethnography, autoethnography is not merely a narrative solely rooted in the past. Rather, autoethnography aims to encourage and promote transitions of the researcher and the audience through detailed accounts of past experiences embodied with researcher's analysis and interpretation. Such accounts can contribute to improving various tangible situations in multiple environments.

In the current study, I incorporate a combination of descriptive and analytical writing styles with the purpose of improving my practices as a teacher leader by reflecting on my journey as the teacher leader of an online PLC. Through this autoethnography, I intend to improve my practices and provide others a model for designing PLCs to develop teacher leaders within the urban context. Many researchers have incorporated autoethnography as a reflection tool to improve their teaching practices. Stinson (2009) used autoethnography to reflect on his journey of identity construction as a mathematics teacher and how this identity improved his teaching practices. Likewise, Neyman (2011) used autoethnography to self-examine the similarities and differences in her teaching practices in Ukraine and the United States, employing the autoethnographic vignette to reflect on the self-development process as an individual and a teacher.

Other such autoethnographies include a study by Attard and Armour (2005) in which the authors use autoethnography to reveal thoughts, feelings, and learning experiences of a first-year physical education teacher implementing new curriculum. By keeping a reflective diary and sustaining a personal analytical conversation, one of the authors was able to overcome feelings of isolation and improve his practices as a first-year and the only physical education teacher teaching a brand new curriculum at his school. The author uses a reflective teaching model where he continuously reflects on his teaching practices and makes improvements, stating, "This is why I feel that it is important to reflect upon personal experiences so that I try to avoid mistakes, and when this is not possible I will learn from them" (p. 200). The author strongly recommends that other teachers use ongoing reflective teaching practices to reduce the gap between theory and practice. Holt (2003) also claims that autoethnography helped him in examining his teaching practices in a self-reflexive manner. This reflective teaching model is evident in the work of Dewey (1933) who strongly encourages teachers to become reflective practitioners and use reflective teaching to examine and improve their practices.

Whatever the context, autoethnography values human experiences and reflections in drawing understanding of various cultures and subcultures. The mission of autoethnography spans beyond reflection, as reflection merely "suggests a mirroring or accounting of the past" while the reflexivity required of autoethnography "suggests an important motion, back and forth, between one's actions and how those implicate one in social phenomena" (Fassett & Warren, 2007, p. 48). The social phenomenon can be of change and transition, such as change in work place or environment. In recent studies, an autoethnographic approach has been used to study behavior when people are immersed in

new environments. Dethloff (2005) used autoethnography to chronicle his transition as a principal going from one school to another. The introspection and evaluation of this transition not only strengthened his practice as a school administrator, but it gave others an understanding of the transition process and the challenging role of a principal. Similarly, Larson (2011) studied the behaviors, practices, and conditions employed during her transition as a senior healthcare executive. The purpose of the study is to provide others with insight while furthering the knowledge of transition and human development.

Finally, unlike other methodologies, recent progressions in autoethnography have attempted to connect arts-based educational research and autoethnographic studies in order to consider issues ranging from self-perception to social identities. Many arts-based researchers (e.g. Clark/Keefe, 2002; Finley & Mullen, 2003; Saarnivaara, 2000; Saarnivaara & Bochner, 2003) have examined the intersections of art, education, qualitative, and/or autoethnographic research. Commenting about arts-based autoethnography Ellis (2004) states, “Many arts-based researchers combine their art with story. The art part of the project, which creates moods and images, combines with writing, which is better at directing emotion” (p. 215). To understand this intersection, it is important to define arts-based inquiry here. Eisner (1997) defines arts-based inquiry as experiment with alternative ways to transform what is in our consciousness into a public form that others can take in and understand. Barone and Eisner (1997) categorize narrative construction and storytelling as a kind of arts-based educational research.

Arts-based educational research and autoethnography both have goals similar to those of art: they aim to touch the reader/viewer, evoke emotions, and provide alternative perspectives in viewing life (Barone & Eisner, 1997; Bochner & Ellis, 2002; Ellis & Bochner, 2000). Examples of arts-based autoethnographies include a study by Vasconcelos (2011), who used textual snapshots to write an autoethnography of her teacher-student self. Scott-Hoy (2000b) presents another example of arts-based autoethnography that uses evocative stories to intersect with images she paints in her research process. Slattery (2001) considers arts-based autoethnography as using material generated from one's unconscious. In another arts-based autoethnography, Suominen (2003) used photographs and creative writing to gain a deeper and more complex understanding of the changes in her self-perception and social identity as she moved from Finland to United States. By combining a wide tapestry of contexts, individuals, stories, and reflections, autoethnographic studies function as a useful tool for its researcher to gain self-understanding and its reader to gain an understanding of the culture in which the researcher is immersed.

Following this contemporary trend of integrating arts in autoethnography, my autoethnography incorporates images and visuals of various components of the UMEP online PLC. According to Barone and Eisner (1997), "readers of a good story, viewers of a film, audience members of a play may sense that they are moving away from an everyday "real" world and temporarily entering one with which they are less familiar" (p. 98). Besides using them as data, one purpose of including images in this study is to help the reader become familiar with the unknown SL and other aspects of our online PLC. The use of images in autoethnography is becoming more popular in recent years.

According to Cahnmann-Taylor and Siegesmund (2008), “The visual is not just a tool for recording, analyzing or interpreting data; it has become a tool for creating data. The visuals reached a new dimension. It has become generative” (p. 99).

Summary

With the rapidly changing curriculum and increasing demands of teaching 21st-century problem-solving skills, the need for ongoing support and professional learning for teachers is more pronounced than ever. Many schools are now developing PLCs among teachers of the same grade level and/or the same content area. Easily accessible internet and advanced multi-user virtual environments have encouraged the development and implementation of online PLCs. These online PLCs give teachers the flexibility of schedule and a wider access to resources. Recently, the notion of teacher leaders has evolved. Teacher leaders are teachers who lead within and beyond classrooms. They share and collaborate with other teachers; they also facilitate professional learning communities and promote reflective inquiry among teachers. Besides providing a forum for reflection and collaboration, PLCs are also used as a platform for developing leadership skills among teachers. One way to examine online PLCs, and the approach I take in this study, is through autoethnography which combines narration with cultural analysis. Autoethnography allows the researcher to use a variety of writing styles and data. Recently, many researchers have combined arts-based education research methods with autoethnography.

3 THEORETICAL FRAMEWORK

Many recently developed theories on adult learning posit that adults, like children, move through a series of qualitatively distinct levels as a process of interaction with their environment (Graves, 1970; Kegan, 1994; Kohlberg, 1969; Loevinger, 1976; McCauley, Drath, Palus, O'Connor & Baker, 2006; Torbert, 1987). These interactions between individuals and their environment influence many dimensions of an individual's life, including cognitive, affective, interpersonal, and intrapersonal experiences (Kegan, 1982; Popp & Portnow, 2001). Based on the ability of individuals to understand and organize the experiences gained from these interactions, many theorists classify individuals into different stages of development. Helsing, Drago-Severson and Kegan (2004) state that the key distinction between the stages suggested by various theorists is the *type* and *complexity* of the tasks that adults generally undertake at different stages in their lives. Many developmental theorists relate adult development with leadership development and use the stage model of adult development to illustrate various leadership phenomena.

Yulk (2006) defines the effectiveness of a leader as the measure of the extent to which the organization performs its tasks successfully and attains its goals. To reach to this level of effectiveness, a leader has to travel through various cognitive and emotional stages. The developmental theory that aligns with my growth as a teacher leader in the social context of an online professional learning community (PLC) of teachers is constructive developmental theory (CDT). CDT suggests that qualitative differences in the ways individuals make sense of their experiences are not linked to age, life phase, or gender. Instead, the constructive developmental theorists describe developmental

differences in terms of the *complexity* of individuals' meaning making abilities. In this chapter, I present the historical development and philosophical underpinnings of CDT; how it advances the understanding of leadership; and how it helps in framing my study. I also discuss Kegan's leadership development model based on CDT and its relationship to my study.

The Constructive Developmental Theory

The constructive developmental theory is a stage theory of adult development that focuses on the growth and elaboration of a person's way of understanding the self and the world (McCauley et al., 2006). Developmental psychologist Robert Kegan (1980) first introduced the term CDT to explain a body of work on the development of meaning and meaning-making processes across an individual's lifespan. The theory is "constructive" in the sense that it deals with the meanings a person constructs of an experience, and it is developmental in the sense that it deals with how those constructions and interpretations of an experience develop over time. According to Helsing et al., (2004),

> As we interact with our environment, we make sense of our experience, and through this interaction and negotiation — sometimes fitting our experience to mental models, sometimes adjusting our mental models to fit our experience — our meaning systems may gradually evolve and grow more complex. (p. 162)

Thus, the essence of CDT is that humans make meanings as they interact with their environment and that this meaning making process advances and becomes more complex as humans develop and grow. In other words, the development of humans can be analyzed by evaluating the complexity of their meaning making processes. CDT not only focuses on changes within the individual, but also on the context in which the individual is situated.

CDT is built on the seminal work of Piaget (1954) who posited that all children progress through four stages of cognitive development: 1) sensorimotor period (birth to 2 years); 2) preoperational thought (2 to 6/7 years); 3) concrete operational thought (6/7 to 11/12 years); and 4) formal operations (11/12 to adult). Constructive developmental theory extends Piaget's ideas of stage development in several respects as stated by Kegan (1980),

> Indeed, what is "neo" about the constructive-developmental framework is that it moves from Piaget's study of cognition to include the emotions; from his study of children and adolescents to include adulthood; from the study of stages of development to include the processes that bring the stages into being, defend them, and evolve from them; from Piaget's descriptive, outside-the-person approach to include study of the internal experience of developing; and from a solely individual-focused study of development to include study of the social context and role in development. (p. 374)

My study supports constructive developmental theory in extending Piaget's theory of cognitive development. My study is a story of my development as a teacher leader of an online PLC of pre-service and in-service mathematics teachers. This story depicts my emotions as I progressed through various stages of adult development. In this study besides examining my developmental stages, I intend to provide a retrospective analysis of the factors and processes that influenced my role as the lead teacher. My study will provide an internal perspective of my experiences and the role of a social context (in this case the online PLC) in my development as a teacher leader. The goal of my study is to get a deeper understanding of my 'self' and to give others a cultural understanding of the online PLCs of teachers and a model for leadership development.

An underlying assumption of all developmental theories is that each level of development has its own belief system and that growth occurs when individuals experience a challenge which disturbs their current believe system. Constructive-

developmentalists refer to the growth that occurs as a result of these challenges as transformational learning. Partnow, Popp, Broderick, Drago-Severson and Kegan (1998) provide a distinction between informational learning and transformational learning. Informational learning primarily focuses on the acquisition of more skills and an increased fund of knowledge, whereas, transformational learning not only increases knowledge, but changes the person's perspective and understanding of knowledge. According to Kegan (1994), transformational learning is essentially an educational model for personal change. He adds that, while training increases the fund of knowledge, education leads us out or liberates us from a single construction or organization of mind. Similarly, Cook-Greuter (2004) refers informational learning as lateral or horizontal learning and transformational learning as vertical learning.

The epistemology embedded in the CDT is constructivism generally and social constructivism specifically. Constructivism is the philosophical belief that people construct their own understanding of reality (Oxford, 1997). The constructivists believe that we construct meanings based upon our interactions with our surroundings. As put forth by Denzin and Lincoln (2005), "The constructivist paradigm assumes a relativist ontology (there are multiple realities), a subjectivist epistemology (knower and respondent concrete understandings), and a naturalistic (in the natural world) set of methodological procedures" (p. 24). The roots of constructivism exist throughout history. Manus (1996), in her article "Procedural versus constructivist education: A lesson from history" compares Sophists and Socratics. Sophists, the travelling teachers who taught people skills for obtaining positions in society, believed that knowledge could be transmitted via lectures and models. Whereas Socratics, followers of Socrates, believed

that learning was an inner experience and that why we and how we learn was more important than what was learned. Socratic dialectic method of teaching is based on the belief that teachers should pose questions and develop learning experiences for students; and students using dialogue among each other and with teacher should find answers to the questions and construct their own knowledge. Manus (1996) called Sophists' way of teaching as procedural and Socratics' dialectical method as constructivist education. In 1970, Vico reinvented the idea that knowledge is constructed by the knower and was the first to use the term constructivist.

Albeit, Vico's (1710) earlier use of the term constructivism, Piaget (1954) is credited to be the first constructivist who in his theory of knowledge, presented children as little scientists creating their own sense of world (Oxford, 1997). While Piaget (1954) focused only on the individual learner, other philosophers such as Dewey (1859-1952) and Vygotsky (1896-1934) recognized that construction of knowledge occurs as a result of social interaction between individuals and their environment, thus originating the term social constructivism. Social constructivism is a view that individuals interact with social structures but create their own reality independent of others. The constructive developmental theory connects this notion of knowledge construction with various stages of adult development.

Tenets of the Constructive Developmental Theory

To better understand a theory, it is important to learn about its basic tenets. McCauley et al. (2006) provide a list of the basic propositions of the CDT which are adapted from the full range assumptions of Cook-Greuter's (2004) that underlie all developmental theories.

1. People actively construct ways of understanding and making sense of themselves and the world (as opposed to “taking in” an objective world).
2. There are identifiable patterns of meaning making that people share in common with one another; these are variously referred to as stages, orders of consciousness, ways of knowing, levels of development, organizing principles, or orders of development.
3. Orders of development unfold in a specific invariant sequence, with each successive ending and including the previous order.
4. In general, people do not regress; once an order of development has been constructed, the previous order loses its organizing function, but remains as a perspective that can now be reflected upon.
5. Because subsequent orders include all earlier orders as special cases, later orders are more complex (they support more comprehensive understanding) than earlier orders; later orders are not better in any absolute sense.
6. Developmental movement from one order to the next is driven by limitations in the current way of constructing meaning; this can happen when a person faces increased complexity in the environment that requires a more complex way of understanding themselves and the world.
7. People's order of development influences what they notice or can become aware of, and therefore, what they can describe, reflect on, and change. (p.4)

These tenets of CDT support my study. The belief that all humans construct meanings of themselves and the world in a similar fashion makes my study relevant to others. It is also believed that the patterns of meaning making among all humans can be classified into stages or orders of development and that all humans follow these orders in an invariant sequence. Other core principles of CDT are that people always move up to the next stage which is more complex and advance than the previous stage and as one moves to the next stage they can reflect on the previous stages. This movement to the next stage occurs when one’s current stage is challenged. In analyzing my story, I will trace my experiences as I travelled through such developmental stages while leading the online PLC. I will also reflect on the challenges which helped in my progression to the advanced and more complex developmental stages.

Based on the meaning making capabilities of most adults, McCauley et al. (2006) categorize adult development into three broad categories: dependent, independent, and interindependent. According to them, individuals enter into dependent stage during early childhood and adolescence. In this stage individuals depend on others to construct reality. They understand their needs and desires, but depend on other people's approval and confirmation. In the independent stage, individuals rely on their own internally generated values and standards to construct meanings. It is important to note that not every individual transition from dependent to independent stage. Many remain in between the dependent and independent stages. The interindependent stage is associated with self-exploration and on-going development of self and others. Individuals in this rare stage of development can have the capabilities of being dependent and independent as needed. Different constructive developmental theorists use different labels to describe these three stages of development. In my study, I use Kegan's (1982, 1994) framework which classify human development (from birth) into five stages or orders of development. The third, fourth, and fifth stages which he refers as interpersonal, institutional, and interindividual correspond with dependent, independent, and interindependent stages respectively. Later in this paper, I have provided a detailed account of Kegan's developmental stages.

Constructive developmental theory focuses on the understanding of self and how the self evolves through various stages of development and growth. According to McCauley et al. (2006), constructive developmental theory is not the theory of the content of self-concepts, but rather of the deep structures that regulate the meaning of *self* itself. The psychologists define self as one's reflective consciousness or an understanding

of one's own identity. It is due to this emphasis on self that CDT is now widely used as an approach to understand leadership development. Darth and Palus (1994) describe making sense as the process of arranging our understanding of experience so that we can know what has happened and what is happening, and so that we can predict what will happen; it is constructing knowledge of ourselves and the world. Darth and Palus (1994) link this meaning making with the basis of leadership as they state, "The process of making meaning in certain kinds of social settings constitutes leadership. In other words, we can regard leadership as meaning-making in a community of practice" (p. 8).

The Constructive Developmental Theory of Leadership Development

Before I proceed in this section, it is important to understand the difference between leader development and leadership development. The literature on leader development emphasizes on developing individual-based knowledge and skills required to lead organizations. On the other hand, leadership development is defined in the current literature as a social process that engages everyone in the community (Barker, 1997; Drath & Palus, 1994; Day, 2001; Wenger & Snyder, 2000). According to Day (2000), in leader development, the focus is on intrapersonal skills of self-awareness, self-regulation, and self-motivation, whereas in leadership development the focus is on interpersonal skills of social awareness and social skills. The phenomenon of leadership involves building commitments among members of communities of practice (Wenger, 1998). Defining a community of practice, Lave and Wenger (1991) state that, in a community of practice, people are united by more than membership in a group or category; they are involved with one another in action. Day (2000) builds a bridge between leader development and leadership development by stating that leadership development is a more complex endeavor as it combines traditional individualistic approach to leader

development with a more shared and relational approach. In other words, leadership combines leader (self) with the community (culture). It is imperative to develop the intrapersonal capabilities to serve as a foundation for interpersonal competence. Thus, the phenomenon of leader development is embedded in leadership development.

I frame this study using a leadership development model, as with this study I hope to promote a culture of leadership among teachers. The leadership model allows me to examine myself in the role of a teacher leader and study the social factors that played a role in my continuous development. The main focus of my study is not to look at the characteristics required to become an effective leader (or the contents of self-concepts, as stated by McCauley et al., 2006). Rather, I use my "self" to investigate the factors and processes that promote leadership qualities among individuals. It is impossible to separate leader from leadership and even though the purpose of my study is not to accentuate the traits of an effective teacher leader, they will be discussed while analyzing different stages of my development. Constructive developmental theory supports this purpose of my study, as "constructive developmental theory differs from traditional leadership theories in that it focuses on the mindset of an individual and not specific traits or characteristics. The mindset of the individual has an impact on his or her leadership ability" (Hunter, Lewis & Ritter-Gooder, 2011, p. 1804). According to Sirotnik and Kimball (1996), adding the term 'teacher' does not change the fundamental meaning of leadership, which justifies the use of a leadership development model to analyze my development as a teacher leader.

Many developmental psychologists have provided leadership developmental frameworks based on constructive developmental theory. Some of the prominent frameworks are spiral dynamics by Beck and Cowan (1996); subject-object relationship by Kegan (1982); ego development by Lovinger (1976); and action logics by Torbert and Cook-Greuter (2004). Hunter et al. (2011) conducted a study for the leadership institute of American Dietetic Association (ADA) and used the constructive developmental theory to not only identify the stages but the factors that enabled the development of their registered dietitians who were at advanced leadership stages. Hunter et al. used the action logic stage model developed by Torbert and Cook-Greuter (2004) to examine the developmental stages of their leaders. The purpose of the study was to develop among their leaders a self-awareness of their vertical stages of leadership development and an understanding of the factors that contribute to the movement from one stage to the next.

Eigel and Kuhnert (2005) also used constructive developmental theory to measure leadership developmental levels (LDLs) among 21 top executives. Eigel and Kuhnert (2005) developed a framework based on CDT, which included five levels of leadership development called LDLs. Each level measures a leader's maturity, which shapes his or her mental and moral capacities and the understanding of the world. By focusing on the differences among various levels, LDL describes the process by which leaders develop into authentic leaders (Level 5 of LDL framework). Avolio, Gardner, Walumbwa, Luthans and May (2004) define authentic leaders as those who are deeply aware of how they think and behave and are perceived by others as being aware of their own and others' values/morals, perspectives, knowledge and strengths; aware of the context in which they operate and who are confident, hopeful, optimistic, resilient, and of high

moral character. Eigel and Kuhnert (2005) relate authentic leaders to many different characteristics, such as self-awareness, self-esteem, trustworthiness, integrity, respect for others, high emotional intelligence, and transformational leadership. Eigel and Kuhnert consider achieving authentic leadership as the goal of the leadership developmental journey. The underlying goal of all leadership developmental theories is to increase among leaders a self-awareness of who they are, how others see them and how they develop to become authentic leaders. According to Laske (2006), leadership is the natural process of adult development over the lifespan. In this study, I use Kegan's (1980, 1982, 1994) framework of adult development to examine my growth into a teacher leader.

Kegan's Framework of Adult Development

Kegan (1994) suggests that "adulthood itself is not an end state but a vast evolutionary expanse encompassing a variety of capacities of mind" (p.5). He provides a five stage developmental framework based on CDT which is widely used in the leadership literature. He describes the order of development in terms of 'what is subject?' and 'what is object?' at each order of development. Subjects are things that are invisible and nontangible. They are part of the self and cannot be reflected upon. Objects on the other hand are things that we can control, internalize, assimilate, and operate. Explaining subject and object in simple words, Kegan (1994) states, "We have object; we are subject" (p.32). Individuals grow when they are able to reflect and control things to which they were once subject. Each order in Kegan's model is a qualitative upward shift in meaning making and complexity from its previous order.

Kegan (1982) explains the shift between stages in terms of transformation in one's meaning making system. Transformation is different than learning new information or skills; it is a change in the way an individual knows those things. Kegan (1994) states that transformative learning happens when someone changes, "not just the way he behaves, not just the way he feels, but the way he knows—not what he knows but the way he knows" (p. 17). According to Kegan, transformation is about changing the very form of the meaning making system—making it more complex and able to deal with the multiple demands and uncertainties. Transformation occurs when someone is able to step back and reflect on something, or, in other words, be able to move something from a subject to an object category.

The five developmental stages or orders of development as defined by Kegan (1980) are: 1) Impulsive; 2) Imperial; 3) Interpersonal; 4) Institutional; and 5) Interindividual. Kegan also labels these stages in terms of orders of mind as: impulsive mind, instrumental mind, socialized mind, self-authoring mind and self-transforming mind. The first two stages mainly deal with children and adolescents and the last three correspond with dependent, independent and interindependent orders of adult development. In Figure 3 below, Kegan (1994) provides a list of the five developmental stages along with what is subject and object at each stage. The attributes which are subject in one stage are the object in the next higher stage. Below, I provide a brief description of the last three stages of Kegan's developmental model.

Developmental Stage/ Order of Mind (typical ages)	What can be seen as *object* (the content of one's knowing)	What one is *subject* to (the structure of one's knowing)	Underlying Structure of Meaning-Making
1st Order: Impulsive Mind (~2-6 years-old)	one's reflexes	one's impulses, perceptions	Single Point
2nd Order: Instrumental Mind (~6 years-old through adolescence)	one's impulses, perceptions	one's needs, interests, desires	Categories
3rd Order: Socialized Mind (post-adolescence)	one's needs, interests, desires	interpersonal relationships, mutuality	Across Categories
4th Order: Self-Authoring Mind (variable, if achieved)	interpersonal relationships, mutuality	self-authorship, identity, ideology	Systemic
5th Order: Self-Transforming Mind (typically > ~40, if achieved)	self-authorship, identity, ideology	the dialectic between ideologies	System of Systems

Figure 3. Kegan's Five Stages of Development. Adapted from Robert Kegan, *In Over Our Heads: The Mental Demands of Modern Life* (Cambridge: Harvard University Press, 1994), pp. 314-315 by Peter W. Pruyn, http://developmentalobserver.blog.com/

Third Order-Interpersonal (Socialized Mind): This stage is embedded in mutuality and interpersonal concordance. Adults in this stage of development have a socialized mind. They internalize the ideas or emotions of others who represent their meaning systems and are guided by the ideologies, institutions, or people that are most important to them. Adults in this stage are unable to handle conflicts between ideologies, institutions or people who they associate with. They depend on others for the resolution of these conflicts. They are excellent followers of strong cultures because they internalize the ideas and philosophies of others and stay loyal to the larger group. They do not have independently-constructed self and their esteem is entirely reliant on others. Kegan (1994) reports that between 43% and 46% of adults aged 19-55 make meaning at the Third order or in the Third-Fourth transition.

Fourth Order-Institutional (Self-Authoring Mind): This stage of adult development is embedded in personal autonomy and self-system identity. Adults in this stage have a self-authoring mind and a self-constructed identity. The perspectives, opinions, and ideologies that they were subject to when they were making meaning at the third order are now object to them. In other words, they still internalize ideas and opinions of important others, but instead of blindly following them, adults in this order question and reflect upon them. The adults in this stage are able to handle conflicts and finding balance. Kegan (1994) reports that between 18% and 34% of adults between ages 19 and 55 make meaning at this order.

Fifth Order-Interindividual (Self-Transforming Mind): This stage is embedded in interpenetration of systems. It is the most advance stage of adult/leader development. Adults at this stage have a self-transforming mind. They understand the limits of their own inner system and limits of full identification with one inner system in general. Adults at this stage look across inner systems and find similarities, understand/handle conflicts very well, and adapt easily to the changing circumstances. Kegan (1994) reports that between 3% and 6% of adults aged 19-55 make meaning in transition between the fourth and fifth orders; no adults in the studies reported by Kegan made meaning fully at the fifth order. It is important to note that these stages or order of development provide a continuum of growth; many adults spend their lives in spaces in-between orders. Kegan's theory has been criticized for not including the issues of intelligence, morality, psychological wellness, class or culture in identifying one's stage of development.

Kegan's framework also provides an approach to examine why some leaders exhibit more transactional behavior and others more transformational behavior (Burns, 1978). Transactional leadership occurs when one person takes the initiative in making contact with others for the purpose of an exchange of something valued. Transformational leadership is based on more than the compliance of followers; it involves shifts in the beliefs, needs, and values of followers (Kuhnert & Lewis, 1987). Kegan suggests that the difference between two types of leaders is due to their different orders of development. The two types of leaders are qualitatively different in the way they view the world and construct meaning from it. Kegan associates transactional leaders with the dependent stage and transformational leaders with the independent stage of developmental order.

Implications of Kegan's Framework

The major implication of Kegan's developmental framework is that it gives adults a self-awareness of where they stand in the continuum of development (which influence their relationships with others) and what attributes are required in order to move to the advanced stages. These advanced stages lead to career advancement, compensation, personal learning, and career satisfaction (Chandler & Kram, 2005). Knowing adults' stages of development makes it easier for the organizations to plan professional development and foster both formal and informal mentoring for their members. Many theorists suggest a healthy holding environment to support the growth of leaders and encourage transformational learning. A holding environment refers to the mentoring network. According to Kegan (1982, 1994), a good holding environment serves three functions: (1) It holds well, (2) It lets learners move on when they are ready and challenges them to grow beyond their existing perceptions to new and more complex ways of knowing, and (3) It remains in place to recognize and sustain individuals' growth and change.

Kegan's framework is based on constructive developmental theory, which emphasizes the factors that cause developmental movement rather than the orders of development themselves. The three propositions that underlie Kegan's framework are: 1) An individual's order of development is related to his or her effectiveness as a leader; 2) Followers' order of development impacts their evaluation of leaders; and 3) Formal leader development interventions should create holding environments conducive to developmental movement. My study focuses on the first and third propositions of the Kegan's framework. I analyze my developmental stages in relation to my effectiveness as

a teacher leader of the online PLC of mathematics teacher. I also examine the role of online PLC and other social factors that contributed in my development as a teacher leader. Using the attributes defined for each stage of adult/leadership development, I evaluate my growth during different phases of the planning and implementation of online PLC as well as my role outside the online context as I evolved into a teacher leader at my school and district.

Summary

Constructive developmental theory is used to identify stages of adult development. The phenomenon of leadership development is based on the same propositions as adult development, which is why the constructive developmental theory is now widely used in leadership literature. I use Kegan's framework to examine my development as a teacher leader. Kegan (1980, 1994) explains developmental stages in terms of what is subject and what is object at each stage. Many theorists claim that the majority of adults stay in the 3rd order (dependent stage); only a small fraction advance to 4th order (independent stage) and rarely anyone reaches the 5th order (interindependent stage). The stages of development provide a continuum of growth and many adults spend their lives in between two stages.

Adults in the higher stages of development perform leadership roles. The highest stage of development is referred to authentic leadership by many developmental psychologists. The authentic leaders exhibit characteristics such as self-awareness, self-esteem, trustworthiness, respect for others, and high emotional intelligence. These developmental psychologists consider authentic leadership as the goal and the stages of development as the journey to achieve this goal. A major implication of constructive

developmental theory is that organizations can assign various roles to their leaders based on their current developmental stages. This also helps organizations in designing supportive environments, planning professional development and creating opportunities for future growth of their leaders. As adults transition to higher orders, they reflect on their self and life experiences, or, in other words, what was subject becomes object. This self-reflection helps leaders identify their own stage of development and seek opportunities for their advancement to later stages. A common assumption of all developmental theories is that development occurs through the interplay between person and environment, not just by one or the other. It is a potential that can be encouraged and facilitated by appropriate support and challenge.

4 METHODOLOGY

The current study is an introspection of my role as the lead teacher of an online professional learning community (PLC) and the impact of this role on my growth from a novice mathematics teacher into a teacher leader. As I reflected on my journey in the current study, I also analyzed the factors contributing to my growth through various stages of leadership development. The purpose of this study was to gain self-understanding, which brings self-transformation, and also to aid a cultural understanding of online PLCs and the roles of teacher leaders in urban high-needs schools. I begin this chapter by describing autoethnography, discussing its historical development, and highlighting some of its benefits and limitations. Next, I describe the research design chosen for the current study.

Autoethnography as a Research Methodology

Autoethnography is categorized as a qualitative research methodology. Qualitative research, as described by Denzin and Lincoln (2000), is a type of research that involves an interpretive and naturalistic approach, which means that researchers study things in their natural settings and attempt to make sense of or interpret phenomena in terms of the meanings people attach to them. According to Bogdan and Biklen (1998), the goal of qualitative research is to help us “better understand human behavior and experience...grasp the processes by which people construct meaning and to describe what those meanings are” (p. 38). Autoethnography shares this purpose of aiding our understanding of human behavior and experience (in this case the researcher’s self) in a natural setting (which we describe as “culture”).

The three major components of autoethnography are auto (self), ethno (culture) and graphy (writing). Ellis (2004), Jones (2005), and Reed-Danahay (1997) define autoethnography as an approach to research and writing in which one seeks to describe and systematically analyze (*graphy*) personal experience (*auto*) in order to understand cultural experience (*ethno*). Autoethnography gives writers the freedom to vary their emphasis on these three main axes (i.e., auto, ethno, graphy), which results in the production of manuscripts that differ significantly in tone, structure, and intent (Wall, 2006).

From a positivist perspective, a researcher's voice is viewed as a contaminant that brings bias to the research. These traditional scientific approaches require researchers to minimize their "selves" in the research by denying their identity. According to Ellis (1991), autoethnography challenges this silent authorship and makes self-introspection or self-ethnography a legitimate focus of study in and of itself. Likewise, Spry (2001) posits that the autoethnographic approach challenges canonical ways of conducting research and representing others. It provides an opportunity to educate, empower, and emancipate those who reflexively engage with the self-examination process. Bochner (2005) describes autoethnography as a research inquiry developed by the oppressed who insisted that their research projects should make sense in the context of their lived experiences. The four goals of writing autoethnography, as synthesized by Ellis (2004), are to (1) evoke emotions, (2) give voice to the marginalized, (3) acknowledge the value of researcher's story, and (4) improve the reader's life.

The inherent purpose of autoethnography is to provide an opportunity for the reader and the author to become co-participants in the recorded experience and broaden their understanding of the culture. Ellis and Bochner (2000) state, “The story we write puts us into conversation with ourselves as well as with our readers. In conversation with ourselves, we expose our vulnerabilities, conflicts, choices, and values” (p.748). Autoethnographic studies also inspire readers to reflect on their own experiences. As Sparkes (1996) states in his autoethnography, “I attempt to take you as the reader into the intimacies of my world. I hope to do this in such a way that you are stimulated to reflect upon your own life in relation to mine” (p. 467).

Autoethnographical accounts are typically written in first person and contain contextual details, dialogue, emotion, and self-consciousness as well as stories affected by history, social structure, and culture (Ellis & Bochner, 2000). Sparkes (2001) refers autoethnographies as “highly personalized accounts that draw upon the experiences of the author/researcher for the purpose of extending sociological understanding” (p. 21). In an autoethnography, the researcher plays a dual role: the investigator and the subject being investigated. Culture, composed of the self and others, is an important component of autoethnography. Reed-Danahay (1997) defines autoethnography as a form of self-narrative that places the self within a social context. Therefore, autoethnography is not a study of self alone; rather, it is a study of self as the main character with others as supporting actors in the lived experience. Autoethnography expands the notion of meaningful and useful research, and autoethnographers believe that research—besides being rigorous, theoretical, and analytical—is also emotional, therapeutic, and inclusive of personal and social phenomena. Autoethnographers also value the need to write and

represent research in aesthetic ways (Ellis, 1991, 2004; Ellis & Bochner, 2011; Pelias, 2003). To better understand autoethnography as a methodology, it is important to learn about its historical antecedents, to which I now turn.

Historical Development of Autoethnography

During the fourth moment in the history of qualitative research, which was marked by crises of representation and legitimization, questions emerged concerning the traditional criteria for evaluating and interpreting qualitative research (Denzin & Lincoln, 1994). In this period, reviewers criticized ethnographic research for its hegemonic attitude in which a researcher enters a culture, exploits the members of the culture, and then leaves and writes about the culture for monetary or professional gains, disregarding any emotional ties with the members of that group. The traditional ethnography was also criticized for the lack of reflexivity and voice of the researcher. According to Clandinin and Connelly (1994), if a researcher's voice is omitted from a text, the writing is reduced to a mere summary and others' interpretation of the work.

These crises contributed to the birth of postmodernism, which marks the era of experimental and new ethnographies (1990−1995) in the history of qualitative research. The goal of postmodernism was not to completely reject the traditional scientific method, but only to challenge its position as the only way to do research and to legitimize other ways of knowing and inquiring. Many critical and emancipatory theories emerged and gained acceptance during this period. According to Wall (2006), this questioning of the dominant scientific paradigm made room for the sharing of unique, subjective, and evocative stories of personal experiences that contribute to our understanding of the social world and allow us to reflect on what could be different because of what we have

learned. It is during this phase of cultural shifts in history that autoethnography started to gain acceptance as a legitimate qualitative research approach.

Autoethnography has close ties with phenomenology and hermeneutics. Phenomenology is the study of a phenomenon or a lived experience. Additionally, phenomenology is nonscientific inquiry used to construct interpretations of a certain human experiences (Manen, 1990). Using phenomenological research methods, data are analyzed without prejudicing subject's character. In most cases, the researcher's own knowledge and presuppositions are "bracketed" so that the data are not tainted (Crotty, 1998). Hermeneutics is the study of the nature and meanings of such interpretations. The difference between phenomenology and hermeneutics is similar to that of epistemology and ontology. It is believed that one can understand the natural world simply by understanding the parts that make the whole (phenomenology), but in the case of human sciences, one must move dialectically between part and whole (hermeneutics). A hermeneutic approach helps us connect our thinking with our real-life experiences (Raudenbush 1994). Autoethnography is situated in the vein of hermeneutics.

In terms of terminological origin, the distinction of "autoethnography" was first introduced by anthropologist Karl Heider in 1975 in an article "What do people do? Dani auto-ethnography," published in the *Journal of Anthropological Research*. In this article, using the data obtained by questioning 60 school-aged children, Heider reports the simple routine of the people of Dani. The "self" in this study did not mean the researcher's self, but rather self of the people who were studied. Heider (1975) explained his use of term "auto" for autochthonous and automatic, since it was Dani's own account of their simple routines. Later in 1979, Hyano used the term autoethnography to define studies by

anthropologists of their “own people.” In Hyano’s (1979) broad definition of autoethnography, the researcher does not have to be the native and may just acquire the perspective of the “insider” through socialization or acquiring other intimate familiarities with a group.

In a more recent review, Denzin (1989) characterizes autoethnography as a text that blends ethnography and autobiography. For Denzin (1989), an autoethnographer incorporates his or her own life experiences when writing about others through biography or ethnography. The term was further promoted, influenced, and developed by Ellis and Bochner (1999, 2000). Autoethnography shares a purpose with heuristic inquiry, which emerged in the late 1960s. According to Moustakas (1990), the basic design of a heuristic research project involves six steps: initial engagement, immersion, incubation, illumination, explication, and culmination in a creative synthesis. Wall (2006) considers autoethnography an advanced form of heuristic inquiry that infuses social science with the emotions and personal self of the researcher.

Benefits of Autoethnography

Chang (2008) discusses three primary benefits of autoethnography: (1) It offers a friendly research method, (2) It enhances cultural understanding to self and others, and (3) It has a potential to transform the self and others. Autoethnography has challenged accepted normative views about silent authorship and author-evaluated texts (Sparkes, 2000). According to Dethloff (2005), a study that discounts the researcher’s role in the process does not provide a holistic view of a subculture. To obtain a richer understanding of the context, one must embrace the biases of the researcher. Ellis and Bochner (2011) identify autoethnography as an approach that acknowledges and accommodates

subjectivity, emotionality, and the researcher's influence on research, rather than assuming these matters are nonexistent.

Additionally, autoethnography gives readers the opportunity to draw on the author's experiences to support his or her own understanding of a particular culture. It also allows readers to become co-participants in the story by engaging morally, aesthetically, and intellectually (Ellis & Bochner, 2000). The sharing of one's experiences may lead others to recognize similarities in their own lives, which may lead to a reader's own self-reflection and transformative learning (Cranton, 2006). As Chang (2008) states, "at the end of a thorough self-examination in its cultural context, autoethnographers hope to gain a cultural understanding of self and others directly and indirectly connected to self" (p. 49). Through self-reflection, Hughes (2012) recognized a mental disorder he had, and his autoethnographic study transformed him from a person in denial of his disease to a spokesperson for others suffering from the disease.

Thus, the autoethnographer not only tries to make personal experience meaningful and cultural experience engaging, but additionally, by producing accessible texts, he or she may be able to reach a wider and more diverse audience that is usually disregarded by traditional research (Bochner, 1997; Ellis, 1995; Ellis & Bochner, 2011). Another attractive feature of autoethnography is the versatility seen in the writing. Ellis (2004) states that an autoethnography may be composed of short stories, poetry, fiction, novels, photographic essays, scripts, co-constructed narratives, personal essays, journals, fragmented and layered writing, multi-voiced accounts, twice-told tales, and social science prose.

Challenges and Criticisms of Autoethnography

Wall (2008) considers writing an autoethnography one of the most challenging ways to approach qualitative study. Issues of representation, objectivity, data quality, legitimacy, and ethics are some of the challenges reported by autoethnographers (Holt, 2003; Sparkes, 2000; Wall, 2008). Despite the long history of documenting personal experience through narrative, autoethnography has only recently been accepted by the academy as a legitimate form of qualitative research. The fact that there are no established guidelines and that personal experiences constitute primary content make each autoethnography unique and non-replicable, which is a challenge for autoethnographers who want their work to be accepted and deemed credible by varying audiences.

Not surprisingly, many autoethnographers have discussed these academic and ethical challenges. For example, in her article "Easier said, than done: Writing an autoethnography" Wall (2008) discusses the ethical issues she encountered while writing an autoethnography about the international adoption of her son. She describes her issues with acceptance, representation, and balance and identifies her major dilemma as the intricate connection between the personal and social. This connection made it impossible for her to write about herself without writing about her son and his biological mother. Wall was also concerned about peoples' reactions to her story and could not decide whether the contribution of the story would outweigh the ethical dilemmas and pain that would be experienced by the characters and readers (as proposed by Ellis, 2000). Wall (2008) also mentions the criticism she received from formal and informal reviewers about the lack of a theoretical basis and the value of her study. Similarly, Holt (2003) discusses

the critique he received via peer review on the representation and legitimation of his autoethnographic manuscript and calls for development of appropriate evaluative criteria for such work. Being called narcissistic is another major criticism faced by autoethnographers, as autoethnographies are considered too self-indulgent, introspective, and individualized (Atkinson, 1997; Sparkes, 2000).

Addressing some of the critique lobbed at autoethnography, Ellis and Bochner (2011) posit that autoethnography is part ethnography and part autobiography, but is often criticized as if one is seeking to achieve the same goals as more canonical work in traditional ethnography or in the performance arts. Thus, autoethnography is criticized for either being “too artful and not scientific” or “too scientific and not sufficiently artful.” Also, the use of self as the primary data source can be a restrictive yet a powerful aspect of exposing the many layers involved in the study of a particular cultural or social context. Ellis and Bochner (2000) caution potential autoethnographers that these criticisms function to preserve the very types of dominant viewpoints that autoethnographers wish to question.

Other proponents of autoethnography suggest ways to combat these challenges and criticisms. For example, Duncan (2004) cautions potential autoethnographers against emotional writing, lack of honesty with oneself, and failing to connect personal experience with theory. Chang (2008) illustrates five pitfalls that autoethnographers should preclude: (1) excessive focus on self in isolation of others, (2) overemphasis on narration rather than analysis and cultural interpretation, (3) exclusive reliance on personal memory and recalling as a data source, (4) negligence of ethical standards regarding others in self-narratives, and (5) inappropriate application of the label

autoethnography. Further, Chang provides three-fold criteria for autoethnography, stating that "Keeping in mind the triadic balance, I argue that autoethnography should be ethnographic in its methodological orientation, cultural in its interpretive orientation, and autobiographical in its content orientation" (p. 48). Ultimately, Ellis and Bochner (2000) suggest that researchers should be adept at identifying pertinent details; at introspection, descriptive, and compelling writing; at confronting issues about themselves that may be less than flattering; and at handling the vulnerability of revealing oneself to a greater audience.

Issues of Reliability, Validity, and Generalizability

According to Ellis and Bochner (2011), when reliability, validity, and generalizability are applied to autoethnography, the context, meaning, and utility of these terms are altered. For an autoethnographer, questions of *reliability* refer to the narrator's credibility, which means if the evidence exists proving that the narrator actually underwent the experience described. Closely related to reliability are issues of *validity*, which refers to the experiences, described being life-like and believable. Addressing her students on the issue of validity , Ellis (2004) states, "You also can judge validity by whether it helps readers communicate with others different from themselves or offers a way to improve the lives of participants and readers- or even your own" (p. 124). In terms of *generalizability*, Ellis (2004) argues that the generalizability of an autoethnography is tested by readers as they determine if the story speaks to them about their own experiences or about the experiences of people they know.

Many scholars have proposed techniques to increase the credibility, validity, and generalizability of self-studies. According to Bullough and Pinnegar (2001), a self-study that engages the reader's imagination, transcends the purely personal, has compelling research questions, and provides compelling answers to these questions makes a significant piece of research. Muncey (2005) suggests using various data sources to add to the richness of autoethnography. Additionally, Patton (1990) encourages qualitative researchers to triangulate their data to guard against the accusation that a study's findings are simply an artifact of a single method, a single source, or a single investigator's bias. Others have also suggested using techniques such as member checks and inter-rater reliability to validate findings. Ellis (2000) posed the following questions to measure a study's validity: "Can the author legitimately make these claims for his story? Did the author learn anything new about himself? . . . Will this story help others cope with or better understand their worlds?" (p. 275). Ellis (2000) also suggests that autoethnographers ask these questions of themselves not only to reflect on the veracity and value of their own stories, but also to reflect how these stories can inform others' ways of comprehending the world around them while contributing to the growing body of literature in a field.

The current doctoral study has a personal goal and a universal goal: The personal goal is to gain a deeper self-understanding, and the universal goal is to contribute to the literature on teacher leadership, online PLCs, and the role of PLCs in developing teacher leadership. I also seek to fill the void of personal reflections in the literature on teacher leaders and create a model for the development of teacher leaders. The reliability and credibility of the current study comes from the use of multiple data sources (i.e., memory,

chat logs, post-meeting reflections, e-mail threads, surveys). This study may not be generalizable to all teachers, but it will provide them with an insightful narration of the journey of a teacher leader.

Research Design and Method

Research design sets forth the guidelines for connecting theoretical perspectives to inquiry strategies and gives methods to collect the empirical material (Denzin & Lincoln, 2000). The research design of a qualitative inquiry is fluid in nature due to the continuously evolving themes and interpretations of data. Denzin and Lincoln (1994) articulate this challenge as "The process of analysis, evaluation, and interpretation are neither terminal nor mechanical. They are always emergent, unpredictable, and unfinished" (p. 479). This process becomes cumbersome in an autoethnography where the researcher is analyzing culture, behavior, and human interaction as both an informed insider and an analytical outsider (Cunningham & Jones, 2003). Where this dual role of the researcher makes autoethnography a unique form of research, it also elicits questions about its legitimacy and credibility as scholarly work.

To strengthen the rigor and validity of an autoethnographic study, Feldman (2003) suggests four criteria: (1) provide clear and detailed descriptions of how data are collected and what counts as data, (2) provide clear and precise descriptions of how the representation of the data is constructed, (3) provide multiple sources of data, and (4) provide evidence that the research produced change and added value to the body of knowledge for the profession. The research design used in this study is underpinned by Feldman's (2003) suggested criteria: I use the current literature on teacher leadership to establish the significance of this study, my study relies on multiple data sources to

provide a “confluence of evidence which breeds credibility” (Eisner, 1991, p. 110), I also include in this section a description of how and when the data were collected and what meanings and representations it constructed in answering my research questions.

The Context of the Study

To understand teacher leadership, one must also understand the contexts in which teacher leaders operate (Darling-Hammond, Bullmaster, & Cobb, 1995; Heller & Firestone, 1995). The current study is embedded in an online PLC designed for the participants of the Robert Noyce Urban Mathematics Education Program (UMEP) at Georgia State University (GSU). The web-based platform Second Life (SL) was used for synchronous meetings. As described in Chapter 1, SL is a three-dimensional multiuser virtual environment (MUVE) that simulates real-world experiences. Google groups, a service provided by Google, Inc., were also used for asynchronous discussion. Two Google groups were created, one for planning and collaboration among the members of the leadership team and the other for communication and sharing between the leadership team and the participants (as well as among the participants themselves).

My role in this online PLC was that of a scholar and a lead teacher with the responsibility of planning and facilitating online meetings. In addition, I collected and analyzed data for the continuous improvement of the project. A second context of the study is the high school where I am currently employed as a mathematics teacher and the head of the mathematics department. This study is focused on my evolution as a teacher leader both inside and outside the online context. Additionally, I analyzed the factors that influenced my role and examined their effects on my personal and professional growth.

Data Collection

An attractive feature of autoethnography is the versatility in the type of data used. Ellis (2004) states that autoethnographic data may come in a variety of forms. The data used in this autoethnographic study is the narrative of my personal experiences as I developed from a novice mathematics teacher into a teacher leader. To create this narrative, I relied on two sources: (1) data from the online PLC, including email threads chat logs of SL meetings, reflections, email threads, and survey results; (2) personal memory.

The data from the online PLC were collected from September 2009 to May 2011 on a continuous basis to evaluate the progress and needs of the PLC participants, to plan and make changes as needed. These data were also used by the evaluator of the grant to monitor and evaluate the effectiveness of the online PLC in improving participants' teaching and learning practices. Since this study is focused on my role and development as a teacher leader, I purposefully selected data that encompassed my role as one of the lead scholars. In selecting the data, I attempted to remain fair and honest while showing both my successes and failures as a lead teacher. The major advisor of this study, who was also the Principal Investigator (PI) of the UMEP online PLC project, has served as the inter-rater for this research.

Where the online PLC data are tangible and objective in nature, the data generated via personal memory were nontangible and subjective. Chang (2008) considers personal memory as a building block of autoethnography "because the past gives a context to the present self and memory opens a door to the richness of the past" (p. 71). In this study related to my development as a teacher leader, I recalled the major events (epiphanies) in

my life mainly starting at the time I moved to the United States. Ellis and Bochner (2000) assert that the analysis of data in a personal narrative involves a process where the researcher emotionally recalls past events. The researcher looks back on specific, memorable episodes and experiences paying particular attention to the emotions and physical surroundings during the recollection.

Research Questions

In the current study, I seek to answer the following question: If and how did my experience of leading an online professional learning community of mathematics teachers contribute to my development into a teacher leader? The following sub questions also guide the data analysis and interpretation: (1) What were the benefits and challenges of leading an online PLC, and what were the outcomes of these benefits and challenges on my development?; (2) If and how did I transfer my role as a teacher leader from an online context to the face-to-face PLC at my school?; and (3) What role did mathematics play in my development into a teacher leader?

Data Analysis and Interpretation

Within the realm of research, data analysis and interpretation are considered two separate but interdependent activities. Wolcott (1994) describes data analysis as identifying essential features and interrelationships among various components of data and data interpretation as making sense of the data. In other words, data analysis refers to dissecting data to discover *how things work* and data interpretation is connecting the fractured data to discover *what it means*. In qualitative research, data analysis and data interpretation are conducted concurrently. Thorne (2000) states that data analysis processes in qualitative research are not entirely distinguishable from the actual data.

Thorne (2000) further adds that oftentimes, qualitative data analysis occurs as an explicit step to conceptually interpret data by transforming it into a new, coherent depiction. Thus, part of my data analysis in this study was chronologically arranging my experiences in the form of a coherent story to aid in the processes of interpretation and answering the research questions.

The method I incorporated to interpret my autoethnographic data is qualitative content analysis. Hsieh and Shannon (2005) define qualitative content analysis as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (p. 1278). Zhang and Wildemuth (2009) consider content analysis as one of the most extensively employed analytical tools in information and library science. Content analysis has primarily been a quantitative research method until recent decades. Many researchers are now using qualitative content analysis, which goes beyond word counting and allows a researcher to understand social reality in a subjective but scientific manner (Zhang & Wildemuth, 2009). Distinguishing between qualitative and quantitative content analysis, Smith (1975) posits, "qualitative analysis deals with the forms and antecedents-consequent patterns of form, while quantitative analysis deals with duration and frequency of form" (p. 218).

Another difference between quantitative and qualitative content analysis is that the former incorporates *deductive* reasoning and the latter uses *inductive* reasoning. Based on the degree of involvement of inductive reasoning, Hsieh and Shannon (2005) provide three approaches to qualitative content analysis: (1) *Conventional content analysis*, in which coding categories are derived directly and inductively from the raw

data; (2) *Directed content analysis*, in which initial coding starts with a theory or relevant research findings and then the researchers immerse themselves in the data and allow themes to emerge; and (3) *Summative content analysis*, which manifests content (e.g., word count) and then extends the analysis to include latent meanings and themes. My use of content analysis falls in the category of *directed content analysis*. Initial codes in my study were derived from the characteristics described in the three later stages of Kegan's leadership development model and the literature on the development of teacher leaders. I also identified other themes as they emerged from the data.

My step-by-step plan consisted of first compiling the online PLC data and dissecting this data by semesters. After dissecting the data by semesters, I re-examined it to get an overall sense of the data (Creswell, 2007). While sifting through the data, I used open coding to record key ideas and concepts that required further exploration. Agar recommends preliminary coding, sorting, and sifting to find pieces that are worthy of more intensive analysis. Dissecting the data by semesters allowed me to adjust my focus as I zoomed in and out of the data. As I "zoomed in" to the fractured data, I focused on my growth through various stages of Kegan's (1980) developmental model. As I "zoomed out" of the data, I looked for overarching themes about the culture of online PLCs and the development of teacher leaders. My use of content analysis in this study is inspired by Tejedor's (2011) qualitative study on a potential model for K-12 professional development using virtual learning environment, Tejedor (2011) used content analysis to examine the organizational structures and processes in three different virtual learning environments (VLE). The data in this study included documents such as transcripts and participants' evaluations, digital artifacts such as software specifications and screen

shots; and direct observations. The researcher first read all collected information to get a sense of overall data, used open coding to find key concepts and ideas, and lastly used content analysis to examine documents and artifacts from each VLE and chartered - against eight guiding questions of the pedagogical framework.

In my study, however, the data alone do not tell the story of my development in the role of a teacher leader as there was more to be told that included my professional and personal life outside the realm of online PLC. During the preliminary analysis of the online PLC data, I recorded my thoughts, emotions and the changes in my meaning making processes as I continued to evolve as a teacher leader. My next step was to then narrate my story (presented in chapter 5) using the online PLC data and my personal memory. As Hodder (2003) states "…meaning does not reside in a text but in the writing and reading of it. As the text is reread in different contexts, it is given new meanings, often contradictory to each other and always embedded" (p. 156). I used the themes emerged in the literature on teacher leadership and the attributes described by Kegan's (1980) developmental framework to then examine the role of the online PLC in my development as a teacher leader.

Summary

The current doctoral study is an autoethnography describing my evolution as a teacher leader. The primary research questions that guided this study addressed if and how my experience leading an online PLC of mathematics teachers aided my experience of leading an online PLC of mathematics teachers contribute to my development as a teacher leader, and the sub questions the opportunities and challenges I encountered throughout this process and the leadership attributes that I transferred from the online

context to my job as teacher leader at my school. The research questions were developed to foster a better understanding of my personal growth and a cultural understanding to provide others with a model of growth. I chose autoethnography as a research method to meet the dual purpose of this study.

This chapter identifies some of the challenges and criticisms of autoethnography as a research method although it has become more widely used recent qualitative research. As many experts in the field have recommended using multiple data sources to increase the reliability and validity of the research findings, this chapter describe the sources from which I collected data, including memory-based reflections, observations, and also concrete data collected from the online PLC that was studied. Finally, this chapter presents a discussion of directed content analysis. In the current study, I employed themes identified in leadership development framework (Kegan, 1980) as well as the literature on teacher leadership.

5 MY JOURNEY

How, When and Where?

My journey as a teacher leader began in 2009 when I was selected to lead the online professional learning community (PLC) of mathematics teachers. As I mentioned in chapter 1, this online PLC was part of a project funded by a National Science Foundation (NSF) grant, which was designed to support its scholars through their induction years of teaching mathematics in high-needs urban schools. I was a member of the first cohort who received this scholarship and was in my fourth year of teaching mathematics when the face-to-face PLC component of this project transformed into an online PLC. At the time, the lead professors (LPs) of this project were looking for three scholars to perform leadership roles that would facilitate the design, implementation and evaluation of this project. Even though, I was informally playing lead roles in my personal and professional life, I was unaware of my leadership qualities. It was not until I talked to Dr. Thomas, who was the Principal Investigator (PI) of this project that I felt encouraged to apply for this role. Fortunately, after the application and interview process, I was selected as one of the three scholars to lead the online PLC.

Our First Leadership Meeting

After our selection, Dr. Thomas called a face-to-face leadership meeting which was to be held at 5 pm on November 5th. It is important to mention here that this was the time when my husband and I were expecting our second child and I had my doctor's appointment the same day. I rushed to the meeting right after my doctor's appointment. Due to the rush hour traffic in downtown Atlanta, I was late for my meeting. I was nervous for being late for our first leadership meeting, and exhausted from running

around first from school to my doctor's office and then to GSU campus. As soon as I entered the meeting room, I felt welcomed and all of a sudden my nervousness disappeared. Dr. Thomas introduced me to the group that included three lead professors Dr. Junor Clarke, Dr. Vidakovic and Dr. Fournillier (who were the Co-Principal Investigators with Dr. Thomas), the other two selected lead teachers, and a Graduate Research Assistant (GRA). I knew everyone who was present at the meeting except for Melissa (one of the other two lead teachers) and Lisa (the GRA). The other lead teacher, Nancy, and I were the members of the same cohort at GSU and knew each other very well. Melissa, Lisa and Nancy are pseudonyms used to protect the anonymity of the people associated with this story (Ellis, 2004). I also had great relationships with the team of lead professors, all of whom had taught courses in the program. Dr. Thomas shared the mission and vision of the project and gave us all necessary information (including the phone numbers and email addresses) of the PLC participants. Everyone was excited and ready to start planning for our first Second Life (SL) meeting which was scheduled to be held on November 21st.

Dr. Thomas asked me to share the news of my upcoming childbirth with the group. I was somewhat worried about the group's reaction as there was so much to be done and I was about to be unavailable for a little while. To my surprise, everyone was very supportive and excited about the good news. I left the meeting feeling confident in my ability to serve as one of the lead teachers. At the meeting, I realized that my computer would not meet the technological requirements of downloading SL program. Being enthusiastic about getting started in my lead role, I bought a new laptop the very next day. However, I gave birth to our second child on November 10 and immediately

went on maternity leave from my school for the remainder of the semester. Nonetheless, given the online nature of our project, I was able to and fortunate to get back to work on the development of the online PLC in just after few days of giving birth.

Planning for the First SL Meeting

After the initial meeting, it was November 14th when I first checked my emails and realized that I had missed quite a bit of planning that had occurred via e-mails between the professors, Lisa our GRA, and my co-lead teachers, Nancy and Melissa. A brief description of the email communication and the actions that took place in my absence evinces what was taking place. In a November 9 e-mail sent to all UMEP scholars (who I will now refer as the PLC participants or teachers), Dr. Thomas announced our selection as lead teachers and also reminded everyone to download the Second Life (SL) program and create their avatars to prepare for the first meeting. She included our email addresses in her message and encouraged everyone to contact us directly for any questions and assistance. In addition, the LPs sent us (lead teachers) an email describing our roles, including the suggestion that each semester one of us should take the lead of becoming a primary point person and that we must switch this role to ensure an equal distribution of work amongst the three of us. The LPs also asked us to create a spreadsheet listing the PLC participants along with their avatar names and create an agenda for the first SL meeting scheduled for November 21. In the same email, the LPs shared the idea of recording SL meetings for which Lisa recommended software packages Camtasia and Fraps as two viable options of screen recording. The LPs later chose to use Fraps and assigned the task of recoding the meetings to Lisa.

In another email correspondence on November 11, one of the LPs made a suggestion that we archive the emails and discussions as data, so as to track the progress of the project. In response to this suggestion, Lisa created a group on the Google platform and invited the LPs and lead teachers to join. This Google group became the communication channel among the leadership team and a temporary archive for our online data. Nancy and Melissa coordinated over the phone and created a Google spreadsheet for PLC participants, in which they asked participants to indicate their technical difficulties or readiness with SL. The link to this spreadsheet was sent to all PLC participants in a welcome e-mail sent by Melissa on November 12.

In Effort to Catch Up with the Leadership Team

When I got back to work, which I began by checking my e-mail on November 14, I felt somewhat overwhelmed because the first meeting was quickly approaching and I wanted to be caught up and also contribute. I began by informing the leadership team (via e-mail) that I had recently given birth but was now able to get involved. Although the LPs did not expect me to join in so quickly, they were excited to have me back. I also e-mailed Nancy and Melissa at this time and asked them if we could hold a conference call to bring me up to speed with the planning for our inaugural meeting. Next, I downloaded SL on the new laptop that I had purchased just for this program. The same day, I attempted to create my avatar; however, I had missed the introductory meeting in October due to scheduling conflicts in which a GSU Instructional Technology expert had shown the PLC participants how to create avatars and navigate the SL platform. Now I had to familiarize myself with SL and the GSU Island where our meetings were going to be held.

As described in chapter 1, GSU owns an Island in Second Life called Five Points. I used the URL, sent by Dr. Thomas, to teleport myself to the GSU Island. Teleporting is a most frequently used way of travelling in SL, which allows avatars to instantly change locations. Once on the GSU Island, I started to walk around and get familiar with the navigation tools when suddenly, I noticed another avatar standing by the welcome center of the Island. In SL, you can see the avatar's names floating in the air right above their heads, but you do not see their real names. I could not recognize the avatar name and, instead of using the voice function, I asked for her real name by typing in the chat box. She also replied by typing, "This is Dr. Junor Clarke" (she had probably recognized me). Dr. Junor Clarke is one of the lead professors of this project. I was happy to know that my first interaction on SL was with one of my professors. Dr. Junor Clarke and I both navigated through different areas of the island including the Best Practice where our first SL meeting was scheduled.

Next day, I attempted to have a conference call with Nancy and Melissa to better understand how I could start contributing in the planning for our first meeting. That day, I was only able to talk to Nancy and we both decided to meet in SL later that evening. We logged into SL at the same time and practiced the use of various navigation tools such as walking, sitting, flying, teleporting, and using the loud voice chat. By then, I was fairly comfortable with the layout of the GSU Island and the basic functions and tools required to navigate in the SL world. I knew how to use voice chat, adjust the volume on the speakers, and send instant messages called IMs. Besides getting familiar with SL, I joined and even initiated planning-focused email correspondences between the LPs and the lead teachers, as well as, amongst the lead teachers. I had also started to proactively reply to

participants' emails inquiring about the technology, stipend and other aspects of the online PLC. Nancy, Melissa, and I planned together and built the agenda (Appendix A) for our first SL meeting. Nancy emailed this agenda to the LPs and asked for their feedback.

The LPs did not take very long in reviewing and approving the agenda. They proposed that we divided the participants into small groups before the meeting to maximize the actual meeting time. Agreeing with this suggestion, we divided the participants into three smaller groups, and one of us was assigned to lead the discussion in each group. The meeting was to take place in the main room of the Best Practice area on the GSU Island, and we decided to use the adjacent rooms for our small-group discussions. The meeting was to begin with a welcome and brief introduction, and then participants were to aggregate into their pre-assigned groups. Within the groups, participants were to introduce themselves, discuss their purpose and expectations pertaining to the online PLC, and raise any questions or concerns they had. After this, all group members were to reconvene as one big group for debriefing. The agenda, along with the group assignment, was e-mailed to the participants on the day before the first online meeting

The First Online Meeting

On the day of the first SL meeting, I was experiencing a mixed feeling of nervousness and excitement. I logged in well in advance of our meeting time. My practice time in SL had paid off and I was navigating through SL without any technical difficulties. It was Saturday morning and the meeting was scheduled for 10:00 am. We had asked the participants to log in 10 minutes prior to the meeting time, which would

allow everyone to settle before the meeting starts. Accordingly, the participants started logging in at about quarter to ten. The direct URL to the GSU Island was also emailed to the participants prior to the meeting time. Some participants conveniently reached to the Best Practice meeting room at the island, while others gathered at the welcome center (see Figure 4) and needed help with teleporting their avatars to the meeting room.

Figure 4: Welcome Center Five Points (GSU) Island in Second Life

A few participants got lost on the Island and could not find the meeting room. Since we could see who had signed into SL, Nancy and I made sure that all PLC participants who signed into SL that morning had reached the meeting room. We located all the participants and gave them quick instructions on how to teleport to the meeting room. It was interesting to see how some participants' avatars were just appearing in the room (if they chose the teleport options) while others were walking into the room creating a real life atmosphere in the virtual world. Within minutes, the meeting room quickly filled with avatars: 25 participant teachers, the GRA (Lisa), and 3 LPs. Lisa and the LPs were silent observers throughout the meeting. The room was filled with loud noises as some participants were chatting while others were asking for help.

Technical Difficulties Encountered during the First Meeting

As avatars were appearing in the meeting room, they were colliding, bouncing from the walls, and overlapping, considering their different levels of familiarity with SL. Where all this appeared to be funny at first, it started to cause a level of frustration for some participants. Different noises in the room also built the chaos: some participants started private conversations with each other; some had loud noises in their backgrounds, and some were expressing frustration from the technical difficulties they were experiencing. Nancy, Melissa and I were trying to resolve some of the issues, but some of the participants were attempting to resolve this issue on their own by constantly logging out and logging back in. One of the biggest problems we encountered during this first meeting was concerning the speakers because some participants, including Melissa, were unable to use the voice chat function. This forced them to use the chat box to type throughout the entire meeting.

Once most of the participants were seated, we started our meeting. We welcomed everyone to the first SL meeting and shared the vision of the online PLC project. Then, we each introduced ourselves. After our brief introductions, we attempted the breakout sessions as planned. Participants were to introduce themselves in their small groups. However, small-group discussion was difficult because we could hear the conversations in each other's groups. With avatars in three different groups talking at the same time, leading a discussion seemed like a nightmare. We later learned that the avatars had to be a certain distance apart on the island for small group discussion to operate as intended.

Despite of the chaos, I took attendance and made sure that everyone who attended the meeting was accounted for. Although two hours seemed a long time when considering the problems we encountered, we decided to follow the entire agenda. This first online meeting was utterly a new experience for me and I realized that facilitating an online meeting can be very exhausting and wearying. For over two hours, I was simultaneously communicating with the participants and my co-lead teachers using three modes (voice, chat box, and IM), which required presence of mind and quick reflexes. I kept record of who logged into and logged off out of SL for attendance purpose. I also attempted to troubleshoot some of the technical difficulties encountered by the participants by instructing them to adjust the volume on their speakers and check their microphone settings. After the meeting was concluded, the LPs asked us to include Lisa and collectively reflect on the first meeting and determine our next steps. Reynolds and Vince (2004) define collective reflection as a mean by which two or more people embrace the reflective process together and generate collective knowledge. We were all tired after this first meeting and needed some time to rest before our debriefing session. So, we scheduled a conference call in the latter half of the day.

Collective Reflection and My Contributions

As we reflected that evening, one of our biggest concern with the first meeting was how to troubleshoot the technological issues and challenges that our teachers have with SL. Nancy, Melissa, and I were worried that some of participants might get discouraged by the technical difficulties, but Lisa assured us that the level of frustration during our meeting was not to an extent that it would discourage participation. She also made valuable suggestions to resolve some of the technical issues we experienced such as

asking participant to: (a) adjust speaker volume, (b) turn speakers off when they are not in use to minimize background noise, and (c) use IM for private conversations. We unanimously decided to conduct meetings with smaller groups that were focused on the same subjects. We decided to survey participants at the beginning of spring semester and divide them into groups based on the mathematics courses they were teaching.

However, giving further consideration to the technical difficulties faced by a large number of participants, we decided to provide SL technical help sessions before the close of the semester. We scheduled three technical support sessions (with one of us leading each session). To further assist in organizing for this transition, I volunteered to create a Google spreadsheet for participants to register for a session. This was my first attempt to create a Google spreadsheet. In my spreadsheet, I created ten slots for each session. We did not want more than ten participants in each session so that we could provide more individualized help to the participants. I included the link to this spreadsheet in the mass email (shown below) that I sent to the participants as a follow up after our first SL meeting. After sending this email I also followed up with participants' inquiries and assisted them as needed.

Dear UMEP Scholars,

Reflecting on our first PLC meeting, we (leadership team) have decided to conduct small group meetings in the month of December. The objective of these meetings will be to familiarize with the second life program. Since, a good number of participants had trouble with the technical aspects of second life, we decided to have a 45 minute meeting in which the participants will get accustomed to use the voice chat, instant messaging (IM), teleport, and visiting different meeting places on the island.
Please click on the link below and add your name to one of the two available dates. There will be one more date which will be added soon. There is a slot of ten people for each date.
http://spreadsheets.google.com/ccc?key=tOP9FjXOXlrJuchPX0rL56Q&hl=en

Just In case the link does not work:

Please email me the date that you would like to attend. The two dates are Dec. 12th and Dec 19th from 11:00 to 11:45am.

On another note, I have created a google group for all the participants. If you have not received any email with the link to the google group, please check in your junk mail.

Thanks,

Rabia Shahbaz

My co-lead teachers and I shared our collective reflection (see Appendix B) and the list of attendees with LPs. Being on maternity leave allowed me to take on more responsibilities of the online PLC project as compared to Melissa and Nancy, who were teaching full time. Some of the additional tasks I took on included: (a) contacting participants who missed the first meeting and helping them join the PLC; (b) promptly replying to participants' e-mails, as the responses from the other lead teachers were delayed; (c) creating the spreadsheet by listing all SL participants (see Figure 5), which we started to use for attendance purposes; and (d) creating and maintaining the Google group (see Figure 6) for the participants of the online PLC.

Last Name	First Name	Scholar Year	Email Address	Second Life Avatar Name	Nov Meeting 11/21/2009
[redacted]	[redacted]	2009-2010	[redacted]	Alison Soup	present
[redacted]	[redacted]	2008-2009	[redacted]	Awonyi Batista	present
[redacted]	[redacted]	2006-2007	[redacted]	Charity Sharktooth	present
[redacted]	[redacted]	2009-2010	[redacted]	Cherrish Linette	present
[redacted]	[redacted]	2008-2009	[redacted]	Dawgii Aldrin	present
[redacted]	[redacted]	2006-2007	[redacted]	Dspun Starsmith	present
[redacted]	[redacted]	2009-2010	[redacted]	Ike Mint	present
[redacted]	[redacted]	2008-2009	[redacted]	Jojo Tyrellium	present
[redacted]	[redacted]	2005-2006	[redacted]	MadisonMurphy Pearl	present
[redacted]	[redacted]	2007-2008	[redacted]	Mai Souther	present
[redacted]	[redacted]	2009-2010	[redacted]	Marcel Violet	present
[redacted]	[redacted]	2009-2010	[redacted]	Paik Fairlady	present
[redacted]	[redacted]	2007-2008	[redacted]	Patrice Blackheart	present
[redacted]	[redacted]	2008-2009	[redacted]	Shaina Shoreland	
[redacted]	[redacted]	2009-2010	[redacted]	Spirited Violet	present
[redacted]	[redacted]	2008-2009	[redacted]	Sunshinemiller Bigboots	present
[redacted]	[redacted]	2007-2008	[redacted]	Teacher Magnifico	
[redacted]	[redacted]	2009-2010	[redacted]	TheLovelyMathematician Sereni	present
[redacted]	[redacted]	2009-2010	[redacted]	Sara Tryce	present
[redacted]	[redacted]	2007-2008	[redacted]	Zakk Nyoki	present
[redacted]	[redacted]	2006-2007	[redacted]	Zaynab Sahara	
[redacted]	[redacted]	2009-2010	[redacted]	Zuri Genesis	present
[redacted]	[redacted]	2009-2010	[redacted]	Ivygirl Kimmy	present

Figure 5: Second Life Meetings Attendance Spreadsheet

The Google group I created was similar to the one that Lisa had created for the leadership team. I invited all the participants and the leadership team to join this Google group. Once all members of the online PLC joined this group, this Google group became the "go-to place" for various things including: the posting of survey links, group discussions, the posting of meeting schedules, and making other announcement. This Google group is active even today, more three years after the conclusion of the project, and the participants as well as the lead professors use it for formal and informal communication. The feedback I received from the LPs gave me the impression that they were pleased with the quality of my work.

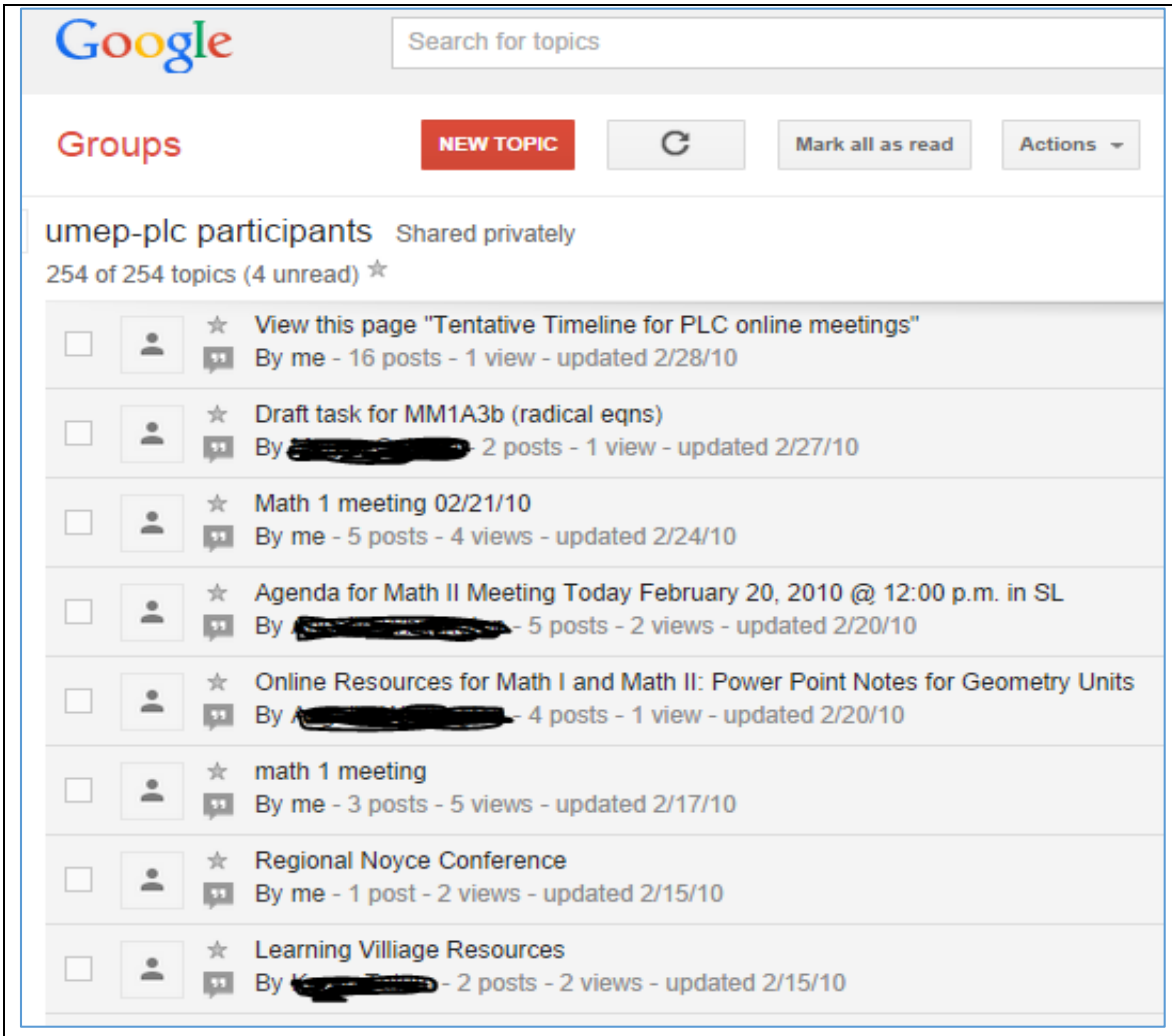

Figure 6: The Google Group for all participants of UMEP online PLC

As mentioned above, in December 2009, we held three small group meetings. The purpose of these meetings was to provide technical support to the participants in logging into SL, navigating their avatars, and in getting acclimatized to the 3D virtual environment of SL. We also decided to set norms for our meetings, such as using IMs for private conversations, raising our hands when we wanted to speak, and standing up while talking so others can identify the speaker. Setting the norms and social conventions for our online meetings was in compliance to the core characteristics of online communities as mentioned by Whittaker, Isaacs, and O'Day (1997). The first semester came to a close with the last technical support session on December 19th. By then, I started to feel more confident in my leadership abilities. In spite of my late start in the planning phase of the project, my persistence and investment of time allowed me to make major contributions in the development and implementation of this online community.

Spring 2010: UMEP Online PLC in Full Swing

In January of 2010, I returned to school and things started to get busier for me. I was in touch with Nancy and Melissa via phone and email. Since all of three of us were teaching high school, our schedules were about the same. As a result, we were connecting with each other mostly in the evenings and on weekends. Upon my return to school, I took the position of Math 1 subject team leader and started to facilitate our subject team meetings. Math 1 was the integrated mathematics course for 9th grade students. Since everyone was getting settled into the new semester, we asked the LPs if we could use January for planning and start our SL meetings in February, to which they agreed. Dr. Thomas scheduled a Skype meeting in February for the leadership team.

While we were planning for the spring semester, I was actively responding to participants' inquiries and concerns. I also helped the new PLC members, who joined us late, by getting them up to speed with the online PLC. Dr. Thomas and other LPs also relied on me for my prompt response and attention to detail. Below is the email that I sent to one of our new members who joined us at the beginning of the spring semester.

Hello [redacted]

Welcome to UMEP online professional learning community. I have added you to the umep-plc participants Google group which will keep you posted about the upcoming meetings and other resources. Also, feel free to post any comments or questions on this website. You will receive an email from noreplygooglegroup about your membership to the group. I am sending you the link as well. Please let me know if you come across any problem accessing the google group. Here is the link:

http://groups.google.com/group/umep-plc-participants

Also, we are currently focusing on making small groups for our upcoming meetings. I am sending you the link of the spreadsheet with your name added to the list. Please sign up for one or more groups based on your needs. Here is the link to the spreadsheet.

https://spreadsheets.google.com/ccc?key=0AlnG067caYRNdFhHUGY2VHA3R3BoX1lUT3lIelY5bVE&hl=en

Last but certainly not the least, download second life program to your computer if you have not done so. I need to know your Avatar name in order to add you to our meetings. You can contact me for any questions about second life program. The website address of second life is:
www.secondlife.com

Once again, welcome to the group.

Sincerely,

Rabia Shahbaz

As we had decided in the fall semester, we planned to conduct small group SL meetings based on participants' teaching assignments. My co-lead teachers and I unanimously identified the following groups: Math 1, Math 2, Algebra II, Trigonometry/Calculus, and New Teacher. Our first step was to divide participants into these groups, for which I created a Google spreadsheet (see Appendix C). The link to this spreadsheet was sent to participants in an email welcoming them into the new semester. Participants were encouraged to join one or more groups based on their teaching assignments and interests. I also included a category of 'Others' in the spreadsheet allowing participants to suggest additional groups.

After receiving participants' responses, Math 1 and Math 2 turned out to be the largest groups, and the second largest was the New Teacher group. The purpose for creating the New Teacher group was to support the last two cohorts of the program, one of whom was in their first year of teaching and the other was student teaching. The Algebra II and Trigonometry/Calculus groups were combined due to smaller group sizes. We then created a meeting schedule for the entire semester. We also divided our workload as facilitators, with two of us scheduled to facilitate one meeting. That school year, I was teaching Math 1 and was also the Math 1 subject team leader at my school, Nancy was teaching Math 1 and Math 2 courses, and Melissa was teaching Math 2 and Trig courses. Based on our experience and current teaching assignments, we decided that one of us would take the lead role in facilitating the meeting and other would be in the supporting role. We then set up a schedule dividing the lead role equally amongst the three of us.

In February, the leadership team (including lead teachers, the LPs, and the GRA) met via Skype and discussed the frequency of meetings, methods of data collection, and upcoming conferences. Dr. Thomas informed us that the LPs were willing to consider other platforms for holding our synchronous meetings in case SL failed to serve the purpose. The LPs also proposed that we present our UMEP online PLC project in the upcoming regional Noyce conference in Clemson, South Carolina. Upon our agreement, Dr. Thomas asked us to write an abstract of our presentation for submission and invite all PLC participants to attend this conference. Later, Dr. Thomas made registration and travel arrangements for all participants who desired to attend this conference. During this meeting, the LPs also approved our SL meeting schedule for the spring semester.

Beginning of the Same Subject Meetings in SL

Our meeting schedule this semester consisted of two small group meetings per month. I primarily facilitated the meetings for the Math 1 group, which was also our largest group. Figure 7 is a screen shot of one of our Math 1 meetings, my avatar is standing in the front of the room.

Figure 7: Snapshot of a Math 1 Meeting in Second Life

In our first Math 1 meeting, Nancy and I recognized the need for another online forum where teachers could easily share instructional resources (e.g., PowerPoint presentations, activities, lesson plans, tasks). The Google group did not allow us to create folders or organize files by topics. Right after our first Math 1 meeting on February 21, I sent a follow up email to the group (see below). In this email, I encouraged participants to continue sharing resources until we find a solution. Later, with participants' feedback, we decided to use Wikispaces, a free website space that allows people to create their own websites. Figure 6 is a snapshot of the Website that I created for Math 1 group using Wikispaces. A similar Website was created by Melissa for the math 2 teachers.

Dear Math 1 Group,
Thanks for your participation in our first math 1 meeting this semester. It was great to know that you all liked the resources. Also, it was wonderful to know that you all have so much to share with each other in terms of notes, tasks, projects, pretests and quizzes. Unfortunately, google group does not allow us to create a folder. But, we are going to look at other options such as a webpage where you can post the resources. Until we find another solution, please do not hesitate to share on umep google group. You can post under Files or Discussions.

I could not find the email that came to me from America Book Company about ordering a free preview version of passing math1 EOCT book. I will ask around at my school if anyone still has the link. I have also asked Dr. Thomas if we can order a book for everyone. I believe [redacted] mentioned the book Mastering the Georgia Accelerated Math course. I will keep you posted. Some of you asked about probability resources. There are some links that Angel had found earlier. I am posting them below.

1. Probability Unit: Spinners Learning Task Department of Ed Training
Video mms://mediam1.gpb.org/ga/2007\GA-DOE_SpinnerLearningTask1_558kbps.wmv
2. Data Analysis Unit: Using NBA Statistics for Box and Whisker Plots
http://illuminations.nctm.org/LessonDetail.aspx?id=L737
3. Math Support Student Notes/Video on Box and Whisker Plots
http://teachers.henrico.k12.va.us/math/ms/C1Files/05ProbStat/5-3BoxWhisker.html
4. Math Support Student Notes/Video on Probability and Determining
Sample Space http://teachers.henrico.k12.va.us/math/ms/C1Files/05ProbStat/5-5SampleSpace.html

Once again, thanks for your participation.

Rabia and [redacted]

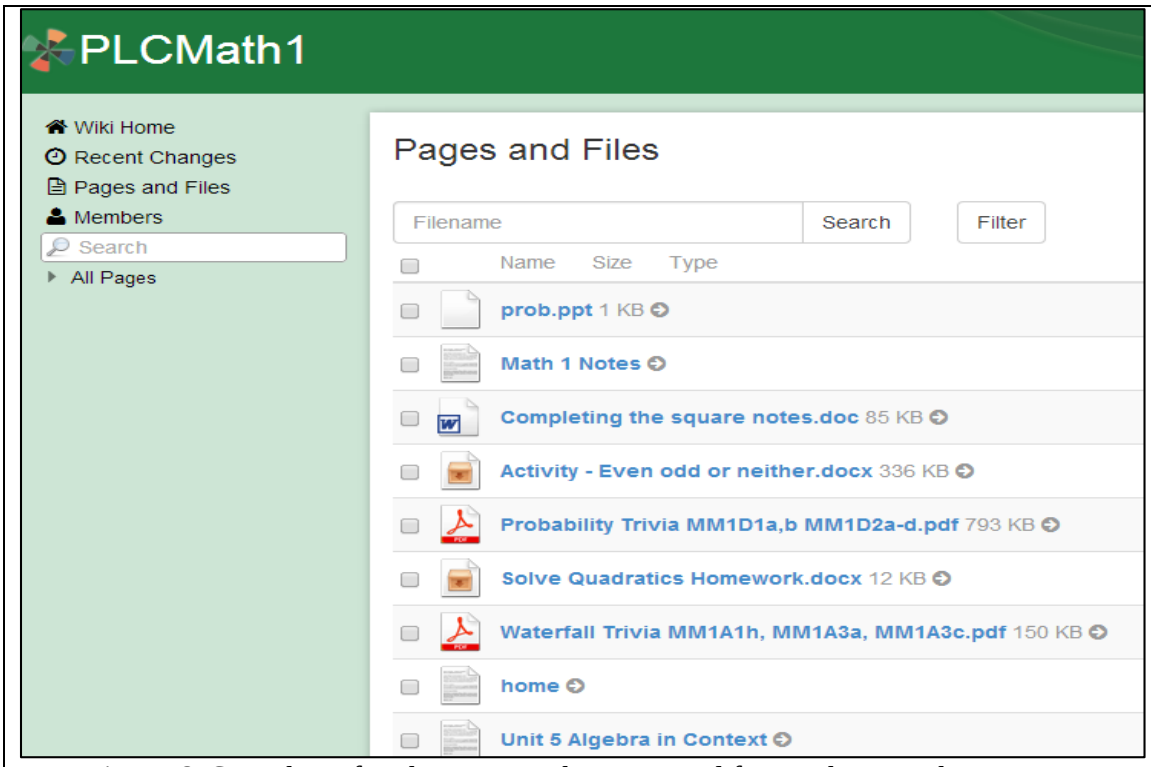

Figure 8: Snapshot of Wikispaces website created for Math 1 Teachers

The focus of our small group SL meetings was to provide teachers an opportunity to express their needs and share instructional resources with each other. We wanted teachers to collaboratively reflect on what was working and what was not working in their teaching and then brainstorm and share ideas. As an example, below is the meeting agenda for a math II SL meeting, which was held on February 20, 2010.

12:00 - 12:05 Log-in

12:05-12:15 Introductions/ Review Agenda

12:15-12:30 Break-Out Sessions
Topics: What is/isn't working in Math II?
What resources are needed/available?
What EOCT prep activities have you begun?
What EOCT prep materials are needed?

12:30-12:45 Report Out

12:45-1:00 Noyce Conference, Meeting Logistics, Posting Requirements

Depending on the focus of the meeting, a typical small group SL meeting would start with either a math problem or a reflective inquiry such as “How do you facilitate student’s self-reflection of how he/she is mastering the curriculum standards?” In some of our meetings we focused on specific standards as proposed by participant teachers whereas in other meetings we had general discussion around pacing guide, instructional resources, and standardized tests.

My Role as the Facilitator

As facilitators of the SL meetings, my role was to make sure that everyone had a chance to express themselves. I deliberately asked opening questions that would elicit critical reflection among participants. I also strived to create a positive and safe environment where participants felt comfortable in sharing their struggles and challenges. While facilitating these meetings, I realized that the relationship of trust among the participants, especially among the members of the same cohorts, was playing a major role in the successful implementation of this online PLC. The PLC participants were comfortable in seeking help and sharing their positive and negative experiences.

To lead by example, I openly shared my challenges and experiences in the classroom. Being a classroom teacher in a high-needs school, I could easily relate to the struggles faced by the participating teachers. I was also familiar with the challenges of teaching Math 1 course and the specific standards that students struggled with the most. I shared with the participants, the resources developed at my school and district level as well as the instructional strategies I implemented in my own classroom. Other participating teachers also shared valuable resources and strategies that they learned from other resources.

The SL not the only platform where teachers collaborated and shared ideas. Much of the asynchronous communication took place on Google group. On Google group, teachers felt comfortable in seeking advice from each other (e.g. one participant requested for suggestions on how to improve students' retention in math), sharing ideas they learned from other professional development workshops and trainings (e.g. one participant shared concept maps for math units, another shared interview techniques), and asking for help (e.g., one participant posted his challenges with classroom management and asked for strategies). As the spring semester progressed, our online meetings started to operate more smoothly. All participants had become comfortable in navigating through SL. The only technical difficulties that participants encountered at that point, were due to their internet connection or the settings on their sound system.

We scheduled two small group meetings in each month of the spring 2010 semester. As mentioned above, two of us were scheduled to facilitate each meeting. Since most of our planning took place via conference calls, besides planning for the upcoming meetings, we decided to set aside a time during the week where three of us could reflect on our progress and brainstorm ideas to make this PLC more effective for the participating teachers. With many roles that I was playing concurrently in my personal and professional life, I had to be very organized and punctual in completing my tasks. My inherent hardworking and persistent nature allowed me to work diligently in multiple roles. Many times, I initiated the phone meetings and also posted meting notes on the Google group that created for the leadership team. Besides our planning meetings, we the LPs held monthly leadership meetings via Skype. These leadership meetings played were crucial for the success of our project.

An important factor in the successful implementation of this project was the mentoring that my co-lead teachers and I received from the lead professors. The LPs advised us on how to collaborate with each other online and offline. They suggested different ways of increasing teachers' participation in the SL meetings. They also appreciated our efforts and provided constructive feedback. I realized the importance of dialogue in leadership. Our lead professors were clear in their expectations, open to new ideas, and supportive in our efforts of leading the online community. Our PI, Dr. Thomas, was always available for help and advice. She and other professors attended most of our SL meetings but tried to remain in the background and let us lead teachers be in the forefront with the participants.

In order to survey participants in an efficient manner and obtain their feedback before and after each SL meeting, I started to use a survey website. I found this website user-friendly and useful in designing surveys and analyzing results as compared to the Google spreadsheet. Based on the type of information required, I sometimes sent out survey links to all participants in a formal e-mail message while at other times, the survey was the "ticket out the door", the link of which was posted in the chat box at the conclusion of the SL meeting.

A Strange Experience in SL

By the middle of spring 2010 semester, almost all participants had become savvy in using SL, and the meetings were flowing smoothly. However, on March 20, 2010, I had one of the strangest experiences of my life—an invasion of our virtual island. A griefer (someone who deliberately harasses or irritates others in virtual environments) by the name of Janice Electra interfered with my ability to control my moves in SL. During

this invasion, my avatar started flying and I was unable to return to the meeting site. After much effort, I was able to teleport into the classroom, but there were strange noises, loud music, and eerie laughter. Assuming that I was the only one experiencing this, I called the co-facilitator to inform her of my technical difficulties, and she told me that other participants including herself were having the same problem. The two of us then tried to send messages to other participants asking them to meet at a different location. Later on during this invasion, my avatar was hijacked, moved to a strange place, and sexually harassed by a few male avatars. I felt sick and constantly attempted to teleport myself back to the GSU Island. Finally, I was able to return.

My co-facilitator and I communicated on the phone and decided to move the meeting place to another room on the GSU Island. Once we reached to the new meeting location, the participants started to join. The new room was quiet at first, but Janice Electra reappeared and it became chaotic again. It took about 45 minutes for everything to calm down allowing us to finally conduct our meeting. We later discovered that one of the participants had accepted a friend request from an unknown person, who happened to be a griefer. From this experience, we learned that we needed a back-up plan in situations like this. We developed a protocol that in a situation like this, all PLC members will check their e-mail and follow the directions sent by one of the lead teachers. This invasion also raised some privacy issues concerning our online PLC, and the LPs considered a private, password-protected area of the island. However, we continued to use the same area of the island. Luckily, there were no more issues with griefers.

My First Conference Presentation

The first conference that we attended as a group was the regional Noyce conference held in March 2010. All PLC participants were invited to attend this conference. Dr. Thomas made the travel and lodging arrangements and I handled all correspondence with the attending participants. Except for few participants everyone was available to attend this conference. The plan was to travel by road for which Dr. Thomas arranged a private coach. We informed all participants to gather at GSU on Friday at 3 pm. Once everyone arrived, we started our journey which lasted for little over two hours. This travel gave us the opportunity to interact with each other in a friendly environment. Some participants were meeting with each other for the first time and it was interesting (and amusing at the same time) to see the real people behind the avatars.

The conference program consisted of a reception on Friday evening and sessions on Saturday and Sunday. Nancy, Melissa, and I were scheduled to present our online PLC project on Saturday morning. After checking into our rooms, we attended the reception, which gave us a chance to socialize with Noyce scholars from other universities in the region. We decided to meet in my room later that evening to go over our presentation. Since it was a group presentation, before arriving to the conference we had prepared our individual sections of the presentation. I suggested that we go over the entire presentation together to check the flow and also calculate the time. It was about 9:30 pm when all three of us gathered in my room and we finished by 11 pm. This was going to be our first presentation at a regional level conference and we wanted to be well prepared and rested. However, being away from home I could not sleep very well.

Next morning, right after breakfast we went straight to the room that was assigned for our presentation. As we set up for our session, attendees quickly filled the room. Nancy started the presentation and introduced the online PLC project. She talked about the vision of this project, the leadership team and our use of SL as the platform for online meetings. When it was my turn, I made the presentation more interactive by spontaneously asking participants if they were familiar with SL. It turned out that majority of them did not know about SL, so I played the video clip of one of our SL meetings, which was recorded by Lisa. After seeing the avatars and watching us conducting a meeting in SL, the audience suddenly became livelier and engaged. Our LPs who were sitting in the audience also chimed in and talked about the incident when we were attacked by griefers. The presentation ended successfully with a long question answer session at the end. Dr. Thomas and other LPs also answered questions from the audience regarding the implementation of this project. After this trip, Dr. Thomas congratulated us and sent us the message below via email,

> The trip to the Noyce conference was a huge success. The feedback from the audience validated the prominence of the work you are doing as well as the need to continue to improve the delivery of this work in SL. (Personal communication, March 28th, 2010).

More Responsibilities

During second semester, Lisa had to leave the project due to personal reasons. To keep the operation running smoothly, I offered to take over her responsibilities of recording SL meetings and collecting data. The lead professors, who trusted in my leadership abilities and organizational skills, allowed me to take these additional responsibilities. I volunteered to take a heavier workload for several reasons: (1) I

appreciated the opportunity and the LPs' confidence in my leadership ability; (2) I considered myself "an amateur" in leadership and wanted to learn the tools of the trade; (3) I believed in this project and was enjoying my role as a facilitator of teachers' professional development. Even though at times I was tired and exhausted for teaching full time and playing lead roles at my school and online, the positive response of participants and even a small comment such as "Thanks, Rabia!" was enough to rejuvenate my energy.

Realizing the unequal distribution of work load in planning and facilitating SL meetings, which started to cause a slight friction amongst us lead teachers, Dr. Thomas arranged a conference call on a Saturday morning and discussed this issue with us. During this call, she discussed our strengths and our different personality types. When the issue of my strengths came up, she stated that I had strong leadership qualities that would always make me stand out as a leader despite of the group I was placed in. Although I was not aware of my leadership qualities at that time, I could reflect on my past and recalled that I was always an outstanding student. I participated in many extracurricular activities and competed in various academic and nonacademic competitions. After I got married and moved to United States, I took leadership roles in both my personal and professional lives whenever it was necessary. Knowing about each other's strengths and leadership styles made it easier for us to distribute the work load. Another highlight of this semester was my acceptance into the PhD program in mathematics education at GSU.

After the spring semester concluded, we started to prepare for the upcoming Noyce conference. The Robert Noyce Teacher scholarship Program holds a conference every year in Washington DC. The Noyce scholars along with their Principal investigators are invited to attend this conference from all over the nation. During our monthly leadership team meeting in May, we debriefed and planned for summer training (see meeting minutes in Appendix D). All team members agreed to continue using the SL platform for online meetings. I agreed with this particularly because of our familiarity with SL, I did not want the technological issues of introducing a new technology to shift the focus of our meetings. The leadership team met over the summer for additional SL training, and we later met at the Noyce conference in Washington, DC.

Fall 2010: Continued Evolution as a Teacher Leader

The fall semester started with a general session for the PLC members. The meeting agenda was e-mailed to the participants along with a tentative meeting schedule for the rest of the semester (see Appendix E). There were two small group and one general session scheduled for each month of the spring semester. Our general sessions were focused on teacher professional development (PD). This semester, we attempted to present PowerPoint presentations in our general sessions. We realized that using PowerPoints in SL is costly and tedious, as it involves converting and uploading each slide as a JPEG file (images). In one general session (see agenda in Appendix F), Nancy presented the idea of portfolio assessment as an alternative assessment of students' understanding, and I discussed the forthcoming initiative of common core standards in the state of Georgia. Melissa converted and uploaded the slides into SL.

In another general session, I attempted to present a PowerPoint on differentiated instruction. Differentiated instruction was one of the areas selected by participants for our PD sessions in the survey that was conducted at the beginning of the semester. This was an hour long presentation and I was the sole presenter. To obtain a quick poll of what participants already knew about differentiated instruction, I created a one-question survey in which participants were asked what they knew about differentiated instruction and what they wanted to learn. At the end of my presentation, I used another one-question survey to obtain participants' feedback about what they had learned from my presentation.

Conducting a PD session in SL was a unique experience. I could not see participants' responses behind their avatars. In SL, if participants stay inactive for a short while, their avatars bend over. I could see that the participants were listening as their avatars were showing hands and body movements. Moreover, the responses I received, for my one-question survey after the completion of my presentation, indicated that it was a learning experience for many participants. As one of the participant responded,

> I learned about specific strategies to facilitate differentiated instruction. I particularly like the strategy of an anchoring activity. I have several students in my classes that always complete their assignments before the end of class and ask for something else to do. I also have PEC students, so these presentations had several strategies I will incorporate into my instruction. (Personal communication, September 18, 2010).

In October, 2010, there was another opportunity for the PLC participants to attend a professional development conference focusing on the teaching and learning of secondary mathematics. Georgia Council of Teachers of Mathematics (GCTM) holds an annual conference in October which provides mathematics teachers a forum for networking and sharing ideas. Online PLC project covered our registration and travel

expense to attend this conference. Dr. Thomas and I met with the group at the conference and held our October general session. Nancy and Melissa could not attend this conference due to personal reasons.

Spring 2011: Focus on Standardized Testing

As the spring semester started, everyone's focus shifted towards standardized testing. Our middle school teachers, who were in their first year of teaching, were preparing their students for Criterion-Referenced Competency Tests (CRCT), ninth and tenth grade teachers for End of Course Tests (EOCT), and eleventh grade teachers for the Georgia High School Graduation Test (GHSGT). Dr. Thomas instructed that we provide teachers with information that would help them in preparing their students for these standardized tests. Since we had teachers from both middle and high school grades, instead of focusing on individual assessments, we decided to focus on the three strands that were common in all standardized tests: algebra, geometry, and statistics. We scheduled all three meetings and focused one strand in each meeting.

Towards the end of fall semester Nancy had to take the leave of absence from the online PLC work due to an urgent family matter. This left me and Melissa with all the work for the spring semester. Melissa was somewhat quiet during the online sessions, so I had to take the lead in all three meetings and discussion posts on Google group. Figure 9 is an excerpt of the email I sent to the participants at the beginning of this semester. Before the beginning of our meetings this semester, Melissa and I compiled the list of questions for each strand using the previously released test items. We included questions from grades 6 through 11. Every night before each meeting, we sent participants the list of questions that targeted the specific strand. The idea behind combining questions from

multiple grade levels was not only to meet the needs of both middle and high school teachers, but allow teachers to investigate the vertical progression of the mathematical concepts across various grade levels.

umep-plc participants ›

Online PLC-Spring semester

2 posts by 2 authors

me (Rabia change)

Dear UMEP Scholars,

Below is the plan, schedule, and requirement of our UMEP online PLC in spring semester.

There will be a face to face session on classroom management on Feb 26th from 9am to 2pm at COE. The session is mandatory for first and second year

teachers (scholars) as a component of completing your requirements of your Noyce contract.

Scholars who will attend this session might receive a separate stipend. Please direct any inquiries to Dr. Thomas about this session.

There will be three online sessions this semester on second life. Scholars will have to attend all three sessions in order to be eligible for receiving a stipend of $600. Each session will cover one strand of mathematics from middle to high school grade level. The focus of these sessions will be standardized assessments, CRCT and EOCT. We will use Backwards Design model and use released items and content descriptors of last year assessments to discuss resources and delivery of content in our classrooms. The schedule for these sessions is:

Session #1	Wednesday, March 2nd	7:00pm-8:15pm
Session #2	Thursday, March 10th	7:00pm-8:15pm
Session #3	Thursday, March 17th	7:00pm-8:15pm

The tentative date for Noyce Scholars Reception is Thursday, March 31st from 5:30pm to 7:00pm.

Sincerely,

Rabia Shahbaz, [redacted]
Leadership Team

Figure 9: Email Sent to PLC participants at the Beginning of Spring 2011 Semester

We followed the same structure in all three meetings. At the beginning of each meeting, Melissa and I assigned participants four to five test items from the list. The participants were instructed to align these items to the Georgia Performance Standards (GPS) and the grade level(s), solve the problem, and then identify common students' misconceptions related to each problem. After giving teachers time to complete this task, the group reconvened. We then asked them to share their responses. It was interesting to

find different ways of answering the same question. It was also interesting to see the commonality in our opinions regarding students' misconceptions. We discussed the causes of these misconceptions and ways to strategically address them in our daily instructions. Teachers could also see how some misconceptions that students develop in early grades become a hurdle in their learning in later grades. Planning and facilitating these meetings also helped me as a teacher to understand this vertical progression of math skills. I became more familiar with the mathematics course sequence and curriculum across multiple grade levels.

Early in the semester, Dr. Thomas arranged a face-to-face PD session on classroom management for our first and second year teachers. A professional consultant facilitated this session at GSU on one Saturday. The session was informative and engaging at the same time. The consultant gave participant teachers many tips on how to effectively manage their classrooms and provide students a healthy and positive learning environment. After our last meeting of the semester, I asked all participants to reflect on their overall experience of being a part of this online PLC. The responses I received showed that participants valued the support provided through the online forum and particularly found the last semester informative and relevant to their role as mathematics teachers. As posted by one of the participant,

> I think we have done a lot that are more relevant to what we do during the past couple of weeks than that years' sessions. I like the way the on-line PLC is going. Too bad it is the last session! (Personal Communication, March 17th, 2011).

Another participant posted his reflection as,

> The umep online meeting is a unique experience. Personally it was a window to new way of interaction, one that showcases technology's utility. Ideas were shared, resources were shared, and yet even experiences were shared among cohorts each of whom was distance apart from the other. As some of my colleagues have expressed, the online meetings served as a support group among other things. Teaching in these times is a formidable task and being an educator in my second year, I know firsthand how valuable a support group can be for a novice educator. I am very much so elated to have been a part of this feat. Thank you team, and best regards. (Personal Communication, March 18th, 2011)

My Development into a Teacher Leader outside the Online Context

The online PLC project had many embedded opportunities which developed me professionally in my role as the subject team leader at my school. As one of the lead teachers of this project, I attended and presented at various regional and national conferences. I also had the opportunity to co-speak with Dr. Thomas at a symposium on retaining mathematics teachers. Attending these conferences and participating in the PD sessions gave me a wealth of information and exposed me to the latest research in mathematics teaching and learning. I shared these ideas with my colleagues formally and informally by volunteering PD at my school. In June 2012 (after the conclusion of the online PLC project), Dr. Thomas invited me and two other PLC participants to share our success stories at the annual Noyce conference held in Washington DC. The title of our presentation was, “Why I Remain Committed to Teaching in a High Need School: Perspectives of Three Scholars.” Later that year, I was invited by a local university to serve on a panel of successful mathematics teachers in high-needs schools. My role as the teacher leader expanded from my school to the district level as I was invited to join multiple projects initiated by the math office of our school district.

My early exposure to common core standards, in one of the conferences, gave me a head start in understanding this initiative and preparing myself to embrace the new shift in the paradigm of teaching and learning of mathematics. With the implementation of common core, the first challenge that our district's math office encountered was the alignment of their standards with the common core state standards. I was invited to join the team of teachers who was assigned this task. After aligning standards, we created new pacing charts and instructional calendars. I worked with our district's assessment office in aligning and creating new math assessment items in accord with the new standards. I also participated in teachers' PD and provided yearlong support to our district's Algebra I teachers during the first year of common core implementation.

From Subject Team Leader to the Head of the Mathematics Department

In fall 2012, I took sabbatical leave from my school to concentrate on my PhD. Initially my leave was for one semester, but I had intended to extend it until I complete my degree. However, before the end of the first semester, my school Principal contacted me and offered me the position of mathematics department chair. My school Principal wanted me to join their leadership team and find ways to improve our students' success rate on standardized tests. I gladly took the position and returned to my high school in January, 2014. The previous department chair was given the title of math instructional coach position. With my appointment, I immediately took over the administrative responsibilities. At first, my algebra I teachers who used to be my peers a year ago had trouble accepting me in the leadership position and I somewhat faced the challenges of being the *primus inter pares* (First among Equals).

Of note is that my school is a “priority school,” which means that it has been identified as one of the lowest-performing schools in the state (in the bottom 3%). Therefore, the teachers at this school were faced with multiples challenges on daily basis. When I was appointed the math department chair, besides performing other administrative duties (such as ordering supplies, handling inventory etc.). I was expected to provide teachers with instructional support while holding them accountable for fulfilling their responsibilities and complying with school-wide initiatives in addition to the administrative duties. With so many responsibilities, I still had to win my colleagues’ trust. The leadership skills I had developed from my experience of leading the online PLC equipped me with the attributes of an effective leader. I listened and responded to the needs of individual teachers. I created a positive and safe environment for all mathematics teachers at my school that was based on the relationship of trust. I also encouraged teachers to collaborate with each other and share strategies and resources. I also mentored the new mathematics teachers in our department.

Fullan (1994) advocates the competency of teacher leadership at multiple levels: (1) knowledge of teaching and learning (pedagogy); (2) collegiality; (3) engagement in life-long learning and growth; (4) awareness of change processes within the educational contest and the larger community; and (5) a moral perspective toward the profession. Leading the online PLC of mathematics teachers from different grade levels and different school districts gave me an in depth knowledge of teaching and learning mathematics, I knew how to work collaboratively and collegially with my colleagues. I had also developed a passion for teachers support and professional development. Lieberman and Miller (2005) identify two types of teacher leaders: one who learned to lead from the

classroom through “demonstration” rather than remonstration and one who leads from the “middle space” that exists between teachers and administrators to engage in leading peer teachers and adult learners. In my department chair role, I transitioned from the first type to the second.

Summary

As I reflect on my journey of leading an online PLC of in-service and pre-service mathematics teachers, I recognize many factors that were essential in my development. The first factor was my desire to live up to the expectations of the professors who led the project; the second factor was my belief in community and in sharing; the third factor was centered on my personal circumstances, which allowed me to focus on my profession; and the final factor was the concurrent leadership role I held within my school and district in addition to the potential for growth that participation in this project would grant me. The continuous encouragement and support I received from the project PI played a tremendous role in the project’s success. Leading the mathematics department at my school has been challenging and rewarding at the same time. The training and experience I gained by leading the online PLC prepared me for this new leadership role. I hope my story serves as encouragement for other teachers, administrators, and college professors to create communities for teachers, such as the online PLC, which would provide them the structure for collaboration and a platform to develop their leadership skills.

6 FINDINGS AND IMPLICATIONS

The major challenge of analyzing autoethnographic data is that the data are "ongoing," which according to Dethloff (2005), develops and crystallizes over time. According to Rambo (2007b),

> Even as lines are being laid down, erased, or added to—even as a serviceable representation seems to emerge from the manuscript—the person or process the writer is trying to describe shifts, perhaps subtly, because the subject, the autoethnographer, or both change position. (p. 540)

While writing this dissertation, I am continuing to evolve as a teacher leader (TL). Currently, I am in my ninth year of teaching high school mathematics in a priority school, and have been serving the role of mathematics department chair for the last one year. This study, however, is not about affirming that I have developed; rather it focuses on the factors that contributed in my development specifically the ones associated with my experience of leading an online professional learning community (PLC) of mathematics teachers. The interpretation of autoethnographic data requires researchers to delve into their personal experiences so as to provide others an understanding of their culture (Creswell, 1989). Writing and interpreting my experiences have enabled me to identify some of my strengths and my weaknesses, which have resultantly improved my abilities and skills as a teacher leader.

In this chapter, I expound upon the themes that emerged as I analyzed my autoethnographic data. I use Kegan's (1980) leadership development framework as a lens to examine my growth into a teacher leader. I revisit my research questions and use them as a guide to illustrate my findings. I discuss the implications of my study on theory, research, and practice. Lastly, I summarize the study and provide recommendations for future research. As suggested by Patton (2002), I attempt to maintain a balance between

description and interpretation and use "sufficient description to allow the reader to understand the basis for an interpretation, and sufficient interpretation to allow the reader to understand the description" (p. 503,504).

The analysis of my study started as I transformed my data into a coherent story (Thorne, 2000), narrated in chapter 5. The method I used to analyze this autoethnographic data is *qualitative content analysis*. In many recent studies, qualitative content analysis has been used as a general term to encapsulate different strategies used to analyze text (Powers & Knapp, 2006). The type of qualitative content analysis incorporated in this study is *directed content analysis*. In directed content analysis, initial coding starts with a theory or relevant research findings, the researchers then immerse themselves into the data allowing additional themes to emerge (Hsieh & Shannon, 2005). The initial themes I used from the literature on teacher leadership included the *variety of roles played by TLs* and the *challenges they face* in implementing these roles. I also used the themes from the literature on designing and implementing online PLCs, which included the *format and purpose of online PLCs* and the *role of facilitators* in building trust and promoting critical inquiry among participants. As I immersed into my data, the additional themes emerged such as *mentoring*, *principles of adult learning*, and *distributed leadership*. These themes were then grouped together as I answered my main and sub research questions.

Theme 1: The Variety of Roles Played by Teacher Leaders

Analysis of my data yields the multifaceted roles I played as a TL and how I developed in these roles. As the lead teacher of the online PLC, I planned and facilitated our online meetings, collaborated with my co-lead teachers and lead professors (LPs), and maintained a platform for participants to reflect and share asynchronously. As the

subject team leader at my school, I played similar roles by facilitating a PLC of Math 1 teachers. The literature on designing and implementation of online PLCs highlight the important role played by facilitators in promoting higher level thinking and maintaining an appropriate flow of discussions (Barrett, 2001; Collins & Berge, 1996; Hodes, 201; Rovai 2001). Moreover, the facilitators play an important role in promoting a sense of community by developing trust among all members.

Table 1

Analysis of the Roles I Played as the Teacher Leader

Roles of TLs	Evidence from the Data
Promote higher level thinking	My co-lead teachers and I started every online meeting by posing either a challenging math problem or a reflective question for discussion: For example: “How do you currently assess your student's mastery of mathematics with respect to the curriculum standards?” or “How do you facilitate a student's self-reflection of how he/she is mastering the curriculum standards?”
Build trust among participants	There was an inherent trust among participants who belonged to the same cohorts. There was a sense of community among all members of this online PLC, developed by our common goal of teacher support. I as the facilitator acknowledged participants’ concerns and provided them support as needed. My comments such as, “I understand that this is a valid concern” and “We will try to provide you the support that you need” built participants’ trust in sharing lesson plans and teaching strategies with each other as well as asking for help.
Provide technical support	Albeit the tech support sessions increased participants’ comfort level with SL, one or two participants faced technical difficulties in every online meeting. As a facilitator, I accommodated their difficulties and provided them technical support. For example: “Participant: My mic got issues. Me: That’s okay! You can use the chat feature.” In another meeting, “Participant: I can’t hear anyone. Me: Try to adjust the volume. There is a speaker button next to the talk button.” After the graduate research assistant was no longer working with project, I took over the technical support side of this project. I recorded videos, prepared reports of survey results, and compiled data.

Handle the managerial tasks	I assumed the managerial role by maintaining the attendance logs and other data. I also managed the Google group, sent invitations, and provided necessary information to the new members.
Collaborate with the co-lead teachers	The LPs promoted collaboration among the lead teachers. We were required to reflect collaboratively after each meeting. My co-lead teachers and I set aside a time every week to debrief and plan together. As I took more responsibilities of the project, I started to initiate these meetings and share meeting notes with the lead professors.
Facilitate professional development (PD)	One of my biggest accomplishments, as the facilitator of the online PLC, was conducting teacher PD sessions in the virtual world of Second Life (SL). I conducted one session on the implementation of common core standards and another on differentiated instruction. These experiences developed my interest and confidence in providing teacher PD at my school and district level.
Share resources and experiences	As the facilitator of the online PLC, I was always willing to share my personal experiences with the participants. Being a classroom teacher in a high needs school, I could easily relate to the challenges they faced as new teachers. For example, in response to a participant's concern about students' misbehavior my comment was: "Make your students "like" you by showing that you care for them…research shows that students perform better for teachers they like more." I shared my resources and instructional strategies with other Math 1 teachers. I also created a website for our group of Math 1 teachers where they could share resources.
Content expert	Planning and preparing for the meetings, especially the ones that focused on standardized tests from grade 6 thru 12, gave me an overview of the mathematics curriculum across multiple grade levels. Through our discussions of students' misconceptions and instructional strategies to address these misconceptions, I gained a deeper understanding of students' difficulties in mathematics. As of result of leading this online PLC, I further developed my content expertise in mathematics. This deepening of my content knowledge was a key component of my appointment to lead the mathematics department at my school.

Theme 2: Format of and Purpose of Online PLCs

Many researchers have analyzed the purpose and structure of existing online PLCs, and provide guidelines for designing and implementing effective online PLCs. Some of these guidelines as suggested by Lock (2006) are: (1) Develop living and dynamic images that would encourage teachers to be active learners; (2) Create an environment that involves knowledge construction; (3) Provide a safe and trusting space; and (4) Select flexible and reliable technology. Additionally, Hodes et al. (2001) emphasize the importance of clear goals and aligned tasks in the successful implementation of online PLCs. The success of our online PLC is accredited to its clear focus and use of research-based implementation strategies.

Table 2

Analysis of the Characteristics of UMEP Online PLC

Characteristics	Evidence from the Data
Clear goal and purpose	The UMEP online PLC was designed with the mission of providing the participant teachers a platform for collaboration and support. Teachers shared their challenges and exchanged strategies and resources during synchronous SL meetings as well as shared ideas and reflected asynchronously through discussions posted on the Google group.
Engaging virtual environment	Our online PLC used SL, a 3D virtual environment, which emulates real life. The avatars and 3D environment made our meetings lively and interesting.
Safe and trusting space	Besides the one incident when our island was invaded by griefers, the GSU Island on SL provided us safe and trusting environment for online meetings. A private Google group was used for asynchronous discussions and postings.
TLs as facilitators	The LPs of this online PLC selected three teachers to lead this online PLC, a peer mentoring concept developed by Swan and Dixon (2006). We (lead teachers) had experiences similar to those of the participants and understood the challenges faced by the new teachers. The participants also felt comfortable in sharing their needs and asking us for help.

Theme 3: Challenges Faced by TLs

The literature on teacher leadership highlights several challenges faced by TLs in implementing their roles. Some of these challenges are: isolation, lack of support and mentoring, lack of training, no incentives, and no definitive conceptualization of the teacher leader role (Frost & Durrant, 2003a; LeBlanc & Shelton, 1997; Newsom, 2010; Ovando, 1996; Smylie & Denny, 1990). According to the literature on online professional learning communities, the facilitators of online PLCs face the challenge of engaging all participants in reflective dialogues and inquiries. My challenges as the facilitator of the online PLC were somewhat unique to my personal situation. The training and experience I received from the online PLC prepared me for my teacher leader role in the face-to-face context at my school, and I did not face the usual challenges of teacher leaders as highlighted in the literature.

Table 3

Analysis of the Challenges I Faced as the Teacher Leader

Challenges	Evidence from the Data
Personal challenges	Due to personal reasons, I missed the first two weeks of planning for the online PLC project. As I returned, I had to catch up with the leadership team, contribute my share in planning, become familiar with SL, and prepare myself for the lead teacher role. My determination and hard work helped me in not only recovering the lost time, but also to make major contributions towards the implementation of this project.
Team dynamics	During second semester of the online PLC project, a slight friction developed amongst us three lead teachers. The cause of this friction was the unequal division of work and differences in our personalities. With the departure of our graduate research assistant and the unavailability of one of the lead teachers, my role became more critical in the successful completion of this project.

Primus inter pares (First Among Equal)	I faced the challenges of being the primus inter pares in both online and my local school contexts. My commitment, perseverance, and positive attitude helped me in maintaining the momentum I gained during the planning phase of this online PLC, and I continued to develop in my lead teacher role. Ultimately, I became the point person of the online PLC project. At my school, I was promoted from the subject team leader to the head of the mathematics department. Where becoming the first among equals was an acknowledgment of my leadership qualities, I faced some initial challenges of acceptance by my peers in both contexts.

Theme 4: Mentoring

One major theme that was consistently present in my story was mentoring. Pitton (2006) describes mentoring as "an intentional pairing of an inexperienced person with an experienced partner to guide and nurture his or her development" (p. 1). The mentoring that I received from the LPs played an important role in my development into a teacher leader. This mentor-mentee relationship is best described by Leader Member Exchange (LMX) theory. The LMX theory explains the dyadic relationships formed between a leader and his or her inner circle of subordinates. The leaders give their inner circle of subordinate high levels of responsibility, more rewards and attention, and access to resources; in exchange, the subordinates work hard to build and sustain their leaders' trust and respect. The literature reports positive outcomes of LMX theory for the leaders, followers, and the organization overall (Chen, Lamb, & Zhong, 2007; Graen & Uhl-Bien, 1995; Ilies, Nahrgang, & Morgeson, 2007). The leaders in my story were the lead professors, who were at higher developmental stage, and the inner circle of subordinates consisted of us three lead teachers. This dyadic relationship between my lead professors and myself helped me moved to a stage where exchange based on self-interest transforms

into mutual commitment to the vision, mission, and objectives of the work unit (Schermerhorn, Hunt, & Osborn, 2011). Through this experience of leading an online PLC, I developed the passion for promoting teachers' professional learning and for engaging in adult education, which led to my involvement in PD for the mathematics teachers at my school and in my school district.

Additionally, Gareis and Nussbaum-Beach (2007) assert that online mentoring holds considerable promise in addressing the needs of novice teachers, reducing attrition, and improving teacher effectiveness. As I analyzed my data, I found four different directions of this mentor-mentee relationship in our online PLC: (1) Among participant teachers; (2) Among the lead teachers; (3) Between LTs and participant teachers; and (4) Between TLs and LTs.

Table 4

Analysis of Mentor-Mentee Relationships in the Online PLC

Mentor-Mentee	Evidence from the Data
Among Participant Teachers	The online PLC provided teachers a forum to collaborate and share with each other. Participants shared their challenges and gave each other ideas and suggestions on how to deal with those challenges. These words of advice and even phrases like "I completely understand what you are going through" were comforting to the new teachers. On February 12, 2011, one of the first year teachers posted the following message on the Google group: "Normally I am in charge of remedial kids at my school. But one of the regular math teachers got injured and I have been asked to take over her classes. It's been one week already and I am totally worn out. It is chaos upon chaos. Last Friday, I was about to break down and cry. I had to press the button to help but I have pressed it for so many times that I am becoming a laughing stock. No more button pressing..." A quick response to this message was posted by another first year teacher, then a second year teacher, a lead professor and then one of the lead teachers. The post of the second year teacher is shared here for an example: "I feel your pain. I also have a mild

	mannered personality. However, I have had to toughen up and be firm, not mean and yelling… Preparing your lesson plans and teaching strategies is the "good" thing to do, but in reality, procedures and routines have helped me out tremendously. The downside for you is coming in in the middle of another teacher's classroom. My best advice is to over plan for each class, no downtime. Have extra assignments/ worksheets available at all times."
Among LTs	One of my co-lead teachers (Nancy) and I were among the first cohort of this scholarship program. Being in the same program, we had developed a relationship of trust between each other. All three of us had different strengths and weaknesses and different leadership styles which helped us as a team. My co-lead teachers took the responsibility in the first couple of weeks of planning when I was unavailable due to my personal reason. Nancy and I filled in for Melissa many times as she had other commitments and was unavailable for some time due to personal sickness. In the last semester, when Nancy had to leave due to family needs, Melissa and I fulfilled all the responsibilities. Besides filling in for each other, we learned from each other's strengths and skills.
Between LTs and Participant Teachers	Our main goal as the lead teachers of this online PLC was to support teachers in their everyday role as mathematics teachers. We listened to their needs and provided them support. Nancy and I had the most teaching experience. We shared our learning experiences and classroom management strategies with new teachers. To the same message as mentioned above, Nancy responded: "In addition, you may try the strategy of addressing the unsung leader first. This is the person who puts everything into play and sets the class up for misbehavior. A couple of days of this will help the others get the picture. Also, as a short term fix to get their attention give them an assignment that most of them can be successful on. Really go out of your way to praise those who do well and those who sincerely try to complete it. Grade it quickly and give it back. Keep in mind that the goal is to motivate not retaliate…"
Between LPs and TLs	The lead professors were an integral part of the PLC project. They attended all SL meetings, read every email and discussion post, provided us constructive feedback, and appreciated our efforts. The project PI, Dr. Thomas, mentored us (lead teachers) at every step of the way. She listened to our issues and advised us on how to handle challenging situations. When some friction developed amongst us due to the unequal distribution of work, Dr. Thomas talked us through it and helped us understand each other's personalities. It was this mentoring from the LPs that supported me as I started to perform lead roles in my school and district level.

Theme 5: Adult Learning

Another theme that emerged from the analysis of my data was adult learning. As we planned our online meetings, my co-lead teachers and I focused on the needs of the participants. We continuously sought our participants' feedback, in the form of surveys and reflections, as a guide to plan for our meetings and profession development sessions. Our focused discussions and PD sessions that targeted participants' needs motivated participant teachers to be actively involved in this online community. According to Knowles (1984) and Lieb (1991), adult learners are driven by goals and that learners will be motivated to learn if those goals are tied to things they need to perform well in their social roles. The analysis of my data reveals that my co-lead teachers and I were in compliance with the six principles of adult learning theory as outlined by Knowles (1970).

Table 5

Analysis of Data From the Perspective of Adult Learning (AL)

Principles of AL	Evidence from the Data
Adults are internally motivated and self-directed	The purpose of the online PLC was to support its participants in their roles as mathematics teachers. The participant teachers ranged in their teaching experience from 0 to 4 years. The first year and pre-service teachers needed support with classroom management and instructional strategies. Teachers who were beyond their first year of teaching needed support with the instructional resources. All participants were motivated to be engaged in a community where they could learn and share with each other in a safe and trusted environment.
Adults bring life experiences and knowledge to learning experiences	Adult learners have variety of experiences of life which represent the richest resource of learning. My co-lead teachers and I shared our experiences and also encouraged participant teachers to share their experiences with each other. I consistently encouraged participants to share on the Google group and Math 1 website.

Adults are goal oriented	Our PLC meetings were designed to support the participants by helping them achieve their individual goals. In response to one of the survey questions posted at the end of the semester, "Did the Noyce program provide an avenue in which you felt supported and encouraged to succeed", one of the participants stated: "Yes. This first year has been very trying and the sessions during the first semester gave me an avenue to vent as well as get great strategies and classroom management ideas. I am sure that some of the scholars could detect the frustration in my voice. Some of them reached out to me when I really needed. I will be so very grateful."
Adults are relevance oriented	As mentioned previously, we kept the focus of our meetings and PD session on the needs of teachers. We constantly asked for their feedback during meetings and through surveys. For example, "Me: I have recently attended a workshop on differentiated instruction, would love to share what I learned Participant: That would be great! I have classes with half honors and half who are repeaters. Me: Should we focus differentiated instruction in our next general session then? Another Participant: Sounds good!"
Adults are practical	The online meetings were not the place where participants just vent their frustration, rather it was a platform where participants found solutions for their challenges. In response to a survey question about how the online PLC had supported participants, one participant wrote: "I liked sharing resources and information about our experiences in the classroom. There were several suggestions that I was able to incorporate in the classroom. Also, just being a support group for the many frustrations that we run into as teachers was most helpful. The one thing that did not work for me in the beginning was getting to second life. I will have to get a new PC."

Theme 6: Distributed Leadership

Another major theme that prevailed in my data was distributed leadership. The distributed leadership is a community based model in which more than one individuals having expertise at any level or in any position can initiate and influence interactions in a professional learning community (Gronn, 2002; Spillane & Diamond, 2007). The distributed leadership model recognizes teacher leaders as vital to strengthening the school operation and the learning process for students. In her report on turning good

teachers into great leaders, Dozier (2007) recommend teachers to actively involve with peers and professional organizations; use data to fuel reform; communicate and build relationships; and learn the language as required during discourse and deliberation. The online PLC gave participant teachers a forum to build relationships and develop leadership skills.

The lead professors of the online PLC project selected three teachers (including myself) to lead and facilitate the online community. Our selection was based on our performance as UMEP scholars and our repute at our school districts. We three had proven records to be great mathematics teachers, but were novice in our leadership skills as we embarked this journey. The LTs supported and mentored us throughout the project. The experience and training I received while leading this online PLC helped me in taking over many lead roles at my school and across my school district. During and after this project, many participant teachers also got appointed as department chairs and team leaders at their respective schools. The online PLC provided all participant teachers a forum to develop their leadership skills in a safe and trusted environment. The opportunities of collaborative reflection, peer-mentoring, access to resources, and professional learning made participant teachers more resourceful and confident in their roles. Participants attended local and national level professional development conferences and some had the opportunity to present along with the lead teachers as well as the lead professors.

The Analysis of Data Using Kegan's Framework

Recently, adult developmental theories have been used to advance the understanding of leadership development. Likewise, in this study I have used constructive developmental theory (CDT) to understand and examine my development into a teacher leader. CDT is a stage theory that encapsulates the construction and development of meanings and meaning making processes in the lifespan of an individual. To further narrow my focus on the various phases of my development and the contributing factors, I used Kegan's (1980, 1982) developmental framework. Kegan's framework of adult development is aligned with existential phenomenology. Adams (2006) describes an existential-phenomenological model of life span development as one where "change comes about as a consequence of an opening to experience which leads the person to reflect on their situation in the world, the givens of existence and their responsibility for their life" (p. 277).

Kegan (1980) uses five stages (also referred to as "orders of mind") to examine the cognitive development in one's life. The last three of these stages—the interpersonal, the institutional, and the interindividual—epitomize most adults' levels of development; consequently, the analysis of my development is centered on these three latter stages. I examine my professional growth by comparing my mental processes and leadership skills with the attributes associated with these developmental stages.

Interpersonal Stage

According to Kegan (1980, 1982), individuals at interpersonal stage believe in building relationships with others based on mutual trust, commitment, and respect. Upon my selection as one of the lead teachers of the online PLC project, I was introduced to

other members of the leadership team. As I mentioned before, it was the time when my husband and I were expecting our second child. The lead professors of this project had trust in my commitment and capability to handle this responsibility. It was this trust that made me go above and beyond my responsibilities. I quickly learned about our lead professors' vision of this project and their expectation of our role as lead teachers. I respected the autonomy given to us by the lead professors and started to perform my role diligently to keep their trust in my abilities as the lead teacher.

Working in a shared leadership model with two other lead teachers was a new experience for me. I knew Nancy as a peer from our master program, but Melissa and I were strangers for each other. After our first face-to-face leadership meeting, we three interacted via phone and internet until we all had a chance to travel together to attend a conference. I also had to develop a relationship of trust and respect with the participants of the online PLC and win their confidence in my changed role from a peer to a peer leader.

According to Kegan, individuals at interpersonal stage can hold their interests and interests of others simultaneously. In my lead teacher role, I developed from the stage, where individuals negotiate to only satisfy their personal needs, to a stage where I started to sacrifice my personal needs over the benefit of the institution. I focused on meeting the needs of our participants. I considered their availability while making our meeting schedules. I provided technical support sessions to increase participants' comfort level with the technology. I promptly attended to participants' needs and inquiries. I developed and maintained online resources, such as the Google group and a website on Wikispaces for Math 1 teachers. One major challenge that individuals at interpersonal stage face is

their inability to resolve conflicts. According to Kegan, individuals at this stage rely on others to resolve their conflicts. As we lead teachers developed a conflict regarding the division of work, we had to reply on our lead professor (Dr. Thomas) to resolve this conflict for us.

Under the guidance and mentoring of our LPs, we started to grow professionally, resolved our differences, worked collegially, and focused on each other's strengths rather than the weaknesses. The experience and opportunities I received while leading the online PLC equipped me to go above and beyond the expectations of my role as the subject team leader. In both lead roles (online and offline), I started to emerge as the *First among Equals*, a term used for the unofficial or hidden leader of the group. Besides forming positive relationship with my peers and colleagues at work, I had developed positive and informal relationships with my co-lead teachers and the LPs, especially with the principal investigator (PI). The LPs were happy with my performance and approved me for taking on additional responsibilities of the project. They also provided me with opportunities to attend and present our project at various national conferences. The mentoring I received from the LPs developed me to the institutional stage.

Institutional Stage

According to Kegan (1980, 1994), individuals at the institutional stage of development are characterized by having their own beliefs, a greater degree of self-awareness, and self-actualized independence. It is in this stage of development that individuals develop the qualities of authentic leaders. According to Chandler and Kram (2005), individuals in the institutional stage can handle conflicts and consider alternative perspectives as sources of creative solutions rather than threats to their own points of

view. Chandler and Kram (2005) further state that though the individuals in institutional stage have problems handling negative feedback, they are more likely to adapt to unfamiliar and challenging situations than those in the interpersonal stage. There were many instances while leading the online PLC where I faced unfamiliar and challenging situations such as the instance where the GSU Island on Second Life (SL) was invaded by griefers who harassed our avatars. My co-lead teacher and I did not give up and after trying to control the situation for a little while; we were able to conduct our meeting at another location on the Island. In general, creating surveys, meeting schedules, and conference presentations were all new ventures to which I started to adapted fairly quickly.

Additionally, Chandler and Kram (2005) state that individuals in the institutional stage cultivate informal relationships that facilitate personal learning and growth. While leading the online PLC, I learned that individuals work at different paces, have different priorities and opinions. I learned that in order to work successfully as a team one has to be flexible and collegial in her or his leadership style. Another skill I improved on while leading this online PLC was my written and verbal communication. My emails became more clear and explicit, my language in the survey questions became more professional (see Appendix G), and I started to ask more meaningful and thought provoking questions during the online meetings.

Interindividual Stage

The next stage in Kegan's (1980) developmental framework is the interindividual stage, which is the highest order of development. Kegan states that those at interindividual stage have an increased ability to adapt their behavior based on new

information and handle the conflict among individuals and institutions. Kegan reported that 3% to 6% of the adults he studied were between institutional and interindividual stages and no one was fully developed to the interindividual stage. In my opinion, by not reporting any individual at the interindividual stage, Kegan wanted to convey the message that individuals continue to evolve and develop during their life time and that this process never ends or reaches an ultimate stage of development.

Chandler and Kram (2005) add that individuals at interindividual stage want to learn so they could add value to their organization. While leading the online PLC and in my role as the teacher leader within my school district, I reached to a point where I wanted to expand my professional knowledge and become more beneficial to my colleagues and students at-large. I volunteered for mathematics teacher professional development at my school so as to share the resources and strategies I learned from attending regional and national conferences. According to Chandler and Kram (2005), individuals at this highest stage develop nurturing relationships with others and are able to mentor those at earlier stages. The administrators and peers at my school started to see my potential as a teacher leader and involved me in several developmental and planning committees at my school and across the school district. I was then promoted to the mathematics department chair position at my school.

Currently, in my new role as the head of the mathematics department, I mentor all mathematics teachers at my school. I strive to develop a positive and nurturing environment in which all teachers are encouraged to perform leadership roles in various capacities. Following the leader member exchange theory, I have developed an inner circle of my subject team leaders whom I mentor and train as lead teachers. These subject

team leaders facilitate their small PLCs that consist of teachers teaching the same subject in mathematics. As I am continuing to grow in my role as the lead teacher, I distribute this leadership role among my peers.

Findings

In this section, I revisit and answer my sub and main research questions. I start by answering my sub questions which lead to the answer of my main research question. My main research question was: "If and how did my experience of leading an online professional learning community of mathematics teachers contribute to my development into a teacher leader?" The following were the sub questions:

1. What were the benefits and challenges of leading an online PLC, and what were the outcomes of these benefits and challenges on my development?
2. If and how did I transfer my role as a teacher leader from an online context to the face-to-face PLC at my school?
3. What role did mathematics play in my development into a teacher leader?

1. Benefits and Challenges of Leading the Online PLC

The UMEP online PLC had many embeded benefits for its participants. This PLC was designed with the mission of supporting the UMEP scholars who were teaching mathematics at high-needs urban schools. The role of the lead teachers of this online PLC was well defined. There was an incentive in the form of stipend for all participants and an additional stipend for the lead teachers. The lead professors mentored and supported the lead teachers. This online PLC not only provided its participant teachers a platform to collaborate and share resources, but a safe environment for developing our leadership skills.

Other benefits of leading this online PLC included access to resources, trainings, and networking opportunities. We had the chance to attend and present our project at various local and national conferences. Attending conferences gave me the opportunity to learn about effective strategies for teaching and learning mathematics, new research in K12 mathematics education, and skills to facilitate teacher professional development (PD). The outcomes of these benefits on my role outside the online PLC were: improved leadership skills, enhanced content knowledge, and confidence in facilitating teacher PD at my school and school district.

While there were many benefits of leading the UMEP online PLC of mathematics teachers, there were a few challenges. My first challenge, as I embarked this journey of leading the online PLC, was to make up the first few days of our planning time that I lost due to personal reasons. As I returned to work, I tried to quickly get up to speed with not only the technology involved in using SL, but also in planning for our first online meeting. I sustained the momentum that I gained, in order to make up for my lost time, through the completion of this project as a result of which I excelled in my role and evolved into a TL both inside and outside the realm of internet.

The second challenge was to resolve the technical difficulties encountered by the participants especially during our first meeting. Many participants had just created their avatars in Second life (SL), but were not familiar with the tools and features of how to communicate and navigate in the SL world. To quickly address this challenge we offered technical help sessions and provided individual help to participants. The outcomes of these help sessions was much smoother online meetings moving forward.

Other challenges dealt with the unequal division of work amongst us three lead teachers that resulted due to our personal circumstances interfering with our leadership roles from time to time, and the minor conflicts in our decisions about meeting schedules and agendas. Creating and planning SL meeting schedules and agendas which would cater participant's needs was another challenge that we had to deal with while planning for our meetings. The outcomes of these challenges were an increased ability in handling conflicts and adapting to change. In addition, my work load increased as I started to take more responsibility of the online PLC project, involved in several leading roles at my local school and district level, and began my PhD journey. The positive outcomes of these challenges were that I gained confidence in taking lead roles, learned how to multitask and work more efficiently, learned how to be flexible when working as a team, and how to accommodate with different personalities.

2. Transferring my Teacher Leader Role

Transferring my lead teacher role outside the context of online PLC happened naturally. At the time I was leading the online PLC of mathematics teachers, I was also playing the role of a subject team leader at my school. My school operated on small PLCs, which consisted of teachers who taught the same subject. As the subject team leader not only did I facilitate PLC meetings, I was also a liaison between the school administrators and the 9th grade math teachers. The 9th grade is considered as a critical year in the academic career of high school students. With the higher turnover of teachers in the 9th grade academy at my school topped with the adoption of new mathematics standards in the year 2008 and again in 2012, my role became very critical in supporting and mentoring 9th grade math teachers at my school.

With my experience of leading the online PLC, I went above and beyond the expectations of my subject team leader role at my school. I introduced the idea of vertical teaming by collaborating with Geometry teachers at our school. I shared valuable resources with all mathematics teachers in our department. I also volunteered to facilitate content-specific PD for mathematics teachers. My early exposure to the common core initiative (at a regional Noyce conference) gave me a head start in understanding the common core mathematics standards. I worked on several projects with our district's math office facilitating the implementation of common core standards in Algebra I.

3. Role of Mathematics

One of the TLs' roles appeared in the literature on teacher leadership is that of a content expert. My strong foundation and understanding of mathematics content played a vital role in my development into a TL. In 2009, I was offered the subject team leader position at my school because of my deep understanding of the Algebra I content. In a study conducted in the year 2000, Snell and Swanson observed several TLs and concluded that teachers who demonstrated high levels of instructional expertise, collaboration, reflection, and sense of empowerment became leaders or, were permitted by peers to lead. It was due to my expertise in the math content that I was invited to work on several projects at the district level.

As mentioned previously, from the time I entered the teaching profession, there had been two major shifts in the mathematics standards. In 2008, the State of Georgia implemented Gerogia Performance Standards (GPS) which replaced Quality Core Curriculum (QCC). The GPS introduced a shift from traditional to integrated approach of teaching mathematics. Again, in 2012, Georgia joined the "Race to the Top" initiative

and adopted Common Core Standards in Mathematics and English. This adoption not only resulted in major shuffling of standards across grade levels but required a paradigm shift in the teaching and learning of mathematics. With these major changes, school districts were required to develop new resources, build new assessments, and provide PD to teachers. The importance of mathematics as a discipline and the research driven shifts in the teaching and learning of mathematics required more mathematics teachers to take lead roles in supporting and embracing the change. I believe that my trajectory of becoming a TL had been different if I was not a mathematics teacher.

Role of the Online PLC in my development into a Teacher Leader

Leading the online PLC of mathematics teacher was essential to my development as a TL. Due to the training and experience I received through the online PLC, I did not face the usual challenges of isolation, lack of training and absence of mentoring at my school as I started to get involved in the TL roles. The mentoring I received from my lead professors was a major factor in my progress beyond the institutional stage of leadership development. The lead professors chose the three lead teachers based on the peer mentoring concept of Swan and Dixon (2006) teachers learn better from their peers. Although we (the lead teachers) were given the task of planning and implementing the PLC, the lead professors were always available to advice and mentor.

The online PLC also provided me with a safe and positive environment to embark on my leadership journey, allowing me to develop the skills and abilities required to lead a team. An example of such skills is effective communication, which I developed by communicating synchronously and asynchronously with the participants and leadership team. With more involvement in this project, I had to take the lead in several mass

communications with LPs as well as the participants. According to Sheryl Turkle (as cited in Preece, 2000), people who lack confidence in face-to-face situations often become more confident online and lose their inhibition. Since English is not my first language, communicating asynchronously helped me with building confidence and skills in professional communication. Also, the positive response from the participants encouraged me and even their small compliments such as “Thanks for the good work, Rabia” (posted by one of the participants during a SL meeting) made me go above and beyond my responsibilities.

Leading the online PLC also developed my skills of facilitating teachers’ PD. My first PD was a presentation in SL on differentiated instruction. The fact that the participants could only hear my voice and see the movements of my avatar made this first presentation less intimidating to me. This presentation then became the beginning of many PD sessions that I facilitated online and face-to-face. Leading the online PLC of mathematics teachers from different schools and across multiple districts exposed me to a wide range of best practices in teaching and learning of mathematics. In addition, leading discussions on mathematic concepts across multiple grade levels allowed me to see the vertical progression of mathematics standards. Knowing this vertical progression of standards improved my teaching of mathematics as I learned how to better prepare my students for their next mathematics courses.

According to Zand (1997), leaders foster a learning environment for the subordinates and learn in the learning of subordinates. Leading the online PLC was a learning experience for me, which helped me in becoming a content expert in mathematics. In 2012, when state of Georgia adopted common core standards in

mathematics and teaching, I was not only prepared to embrace this change as a classroom teacher, but was also ready to provide instructional support to other high school mathematics teachers in my school district. I worked extensively with my school district in aligning our old standards with the new common core standards, preparing instructional calendars and resources for teachers, reviewing new benchmarks, and providing teacher PD. As a result of my work with the math office, I gained the status of a TL in my school district.

Leading the online PLC had many embedded opportunities and incentives for all participating teachers, such as a stipend, resources, a support system, and ongoing PD. The online PLC provided its participants access to a variety of instructional strategies, exposure to new education research, and networking opportunities with mathematics teachers across school districts. Many participants started to perform formal and informal leadership roles at their local schools. Many participants received the opportunities to speak and share their success stories at national level conferences.

Implications of the Study

The literature on TLs emphasize the complex yet a very important role of TLs in K−12 education. However, this literature overlooks the processes and factors which develop and nurture TLs. Indicating this void in the literature, Caine and Caine (2000) state that even studies highlighting “a supportive environment” as an important factor in the development of TLs do not illustrate the nuances and intricacies of the processes by which these environments influence teacher leadership. In the current study, I have attempted to fill this gap in literature by providing an emic view of the culture of an online professional learning community and my role as the TL. The narrower focus of

this study was to understand my personal and professional development as a TL and the broader focus was to understand the factors that develop TLs. By writing this autoethnography, I have gained a deeper understanding of myself and the culture of teacher leadership (a notion referred as ontological authenticity by Guba & Lincoln [1989]). Besides being the source of personal development, this study contributes to the literature of autoethnography and teacher leadership. Below, I sub-categorize these implications of this study into three sections: implications for research, implications for practice, and implications for theory.

Implications for Research

The study implies the role of PLCs in cultivating leadership among teachers. The current literature on teacher leadership emphasize the need of PLCs (whether face-to-face or online) as formal structures where TLs can collaborate and inspire other teachers. This study expands this literature by illustrating the reciprocal role of an online PLC in the growth and development of a TL. The study also contributes to the research on designing and implementing online PLCs. More research must be conducted in designing and implementing online PLCs as effective platforms for mentoring teachers and developing teacher leaders.

Another implication of this study is that it promotes the idea of autoethnography in leadership development. York-Barr and Duke (2004) provide a leadership model for teachers that consist of four questions: (1) “Who am I? (2) “Where am I?” (3) “How do I lead?” and (4) “What can I do?” This study presents autoethnography as a medium to answer these questions. By self-reflecting on personal experiences, TLs enhance their understanding of themselves and their culture, which promotes leadership.

Implications for Practice

Another important implication of this study is that it provides others a useful insight into the culture of online PLCs and the role of TLs. The development of TLs is essential for K-12 education especially in the high-needs urban schools, where mentoring and collaboration can retain high quality teachers. School administrators and researchers must develop PLCs or other formal structures to provide teachers a safe and open environment where they can develop their leadership skills. This study may benefit researchers, university professors, and school administrators in designing effective online PLCs and creating opportunities for developing TLs. According to researchers (such as Darling Hammond, Bullmaster & Cobb, 1995; Heller & Firestone, 1995), to understand teacher leadership we must understand the contexts in which they operate, and to develop teacher leadership to its fullest potential we must develop the work context of TLs. The study reinforces the need of properly structured PLCs that function on distributed leadership model as a forum for strengthening teacher leadership skills.

Implications for Theory

Kegan's (1980) framework of adult development has been used to understand the general phenomenon of leadership (McCauley, et al., 2006), mentoring (Chandler & Kram, 2005), and coaching (Pinkavova, 2010). This study expands the use of this framework to examine the development of TLs. Kegan's framework is based on constructive developmental theory which uses stages or orders of mind to assess the development of an individual. According to Kegan and Lahey (1984), the factors that shape decisions individuals make and their overall behavior can be understood by

applying a developmental lens. Through this developmental lens, I was able to examine and qualitatively measure my growth into a teacher leader.

The study also introduces the use of LMX theory in understanding the processes that develop teacher leadership. LMX theory explains how one factor such as mentoring plays a role in the development of TLs. If implied in schools, LMX theory requires school principals and administrators to choose a group of TLs for implementing school policies and reform intiatives. The administrators must provide these TLs mentoring, ongoing professsional development, accesss to resources, and platforms to perform their leadership roles. Each TL can then develop his or her inner circle by mentoring a group of teachers. If properly implemented, this can have a gradual yet effective ripple effect of developing leadership skills among all teachers, thereby bringing reforms in public education.

Recommendations for Future Research

For future research, I recommend the use of developmental stage theories in understanding the phenomenon of teacher leadership. I found Kegan's description of developmental stages broad and general. Also, categorizing adult development in three stages can be vague and overly simplified. There is a need to classify the continuum between stages into sub stages. I recommend developmental psychologists to build frameworks using multiple developmental theories to better understand the phenomenon of leadership development. I also recommend teacher leaders to use autoethnography as a tool for self-development by using self-reflection, and inspiration by narrating these reflections.

Summary of the Study

The current study is a highly personalized narrative that chronicles my journey from (1) scholar to (2) novice mathematics teacher to (3) lead teacher of an online professional learning community (PLC) of mathematics teachers to (4) teacher leader and mathematics department chair at the public school at which I teach. My purpose of conducting this study was two-fold: (1) to develop and enhance self-understanding, and (2) to construct a cultural understanding of a teacher leader's development in the role. I chose an autoethnographical research method, which involves both a process and a product, to guide the current inquiry. As a process, I strengthened my sense of self-awareness, which involves "a deep understanding of one's emotions, as well as one's strengths and limitations and one's values and motives" (Goleman, Boyatzis, & McKie, 2002, p. 40). As a product, this autoethnography presents a model for teachers and administrators to foster the development of teacher leadership. Besides meeting the dual purposes of this study, this self-examination aims to fill the void of personal reflections in the literature on teacher leadership and highlight the role of professional learning communities in developing leadership skills among teachers.

Several key elements, as presented in this autoethnography, guided my journey: (1) my relocation to the United States in the year 2000; (2) the instability of the family business, which led me to the teaching profession; (3) becoming a recipient of Urban Mathematics Educator Program (UMEP) scholarship at Georgia State University (GSU), which provided me with valuable training related to teaching mathematics in urban school settings; and (4) being chosen as the lead teacher of the UMEP online PLC, which evolved me into a teacher leader. I have developed in my professional career from a

classroom teacher to the head of the mathematics department. However, this is not about proving that I have developed, rather it focuses on the factors that contributed in my development specifically the ones associated with my experience of leading an online PLC of mathematics teachers.

Autoethnography allowed me to use the data from the online PLC and my memory based reflections to narrate my story which was used as the data to analyze my growth and answer my research questions. Several themes emerged as I analyzed my data such as factors involved in the effective design and implementation of online PLCs, variety of roles played by teacher leaders, mentoring, adult learning, and distributed leadership. I then examined my development using the lens of Kegan's developmental stages. I found that my personal circumstances and the opportunity to lead the online PLC developed me from the interpersonal to the institutional stage of development. Further, with the mentoring and training I received while leading the online PLC developed me to a stage between institutional and interindividual. Kegan associates institutional and interindividual stages with leadership attributes and report that only a small fraction of adults reach and operate at these stages. Nonetheless, these stages provide a continuum of adult development and that most adults spend their lives in between stages.

I found the categorization of these stages to be somewhat oversimplified. I strongly suggest the three stages of adult development to be further categorized into sub stages to measure growth in between stages. Analysis of data, using the themes that appear in the literature on teacher leadership reveal, reveal that my strong mathematics foundation contributed to many leadership roles that I played at my school and school

district. My experience of leading the online PLC helped me in facing the challenges (such as lack of training, mentoring and trusted environment), otherwise faced by teacher leaders. I was able to transfer my leadership skills from the online context to the face-to-face PLC at my school. The recent changes in the mathematics curriculum have escalated the need of teacher leaders' content expertise and leadership role.

REFERENCES

Adams, M. (2006). Towards an existential phenomenological model of life span human development. *Existential Analysis*, *17*(2), 261-280.

Adam-Wiggan, T.K. (2010). Realities, risks, and responsibilities: A critical narrative inquiry and autoethnographic exploration of biculturality among black professional women (Doctoral Dissertation). Retrieved from http://libres.uncg.edu/ir/asu/f/Adams-Wiggan,%20Trudi_2010_Dissertation.pdf.

Agar, M. H. (1991). *Speaking of ethnography*. Newbury Park, CA: Sage.

Anderson, L. (2006). Analytic Autoethnography. *Journal of Contemporary Ethnography*, *35*(4), 373-395.

Atkinson, P. (1997). Narrative turn or blind alley? *Qualitative Health Research*, *7*, 325-344.

Attard, K., & Armour, K.M. (2005). Learning to become a learning professional: Reflections on one year of teaching. *European Journal of Teacher Education*, *28*(2), 195-207.

Avolio, B. J., Gardner, W. L., Walumbwa, F. O., Luthans, F., & May, D. R. (2004). Unlocking the mask: A look at the process by which authentic leaders impact follower attitudes and behaviors. *The Leadership Quarterly*, *15*, 801−823.

Barab, S. A., MaKinster, J. G., Moore, J. A., & Cunningham, D. J. (2001). Designing and building an on-line community: The struggle to support sociability in the inquiry learning forum. *Educational Technology Research and Development Journal*, *49*(4), 71-96.

Barker, R.A. (1997). How can we train leaders if we do not know what leadership is? *Human Relations*, *50*(4), 343-362.

Barnett, M. (2001). Issues and trends concerning electronic networking technologies for teacher professional development: A critical review of the literature. *Educational Technologies Research and Development*, *49*(4), 71-96.

Barone, T. & Eisner E. (1997). Arts-Based Educational Research. Retrieved from http://www.public.iastate.edu/

Barth, R. (1988). Principals, teachers, and school leadership. *The Phi Delta Kappan, 69*(9), 639-642.

Barth, R. (2001). Teacher leader. Phi Delta Kappan, *82*(6). 443-500.

Beck, D. E., & Cowan, C. C. (1996). *Spiral dynamics: Mastering values, leadership, and change*. Lymington, UK: Blackwell Publishing Ltd.

Blank, R. K., & Alas, N. (2009). *Effects of teacher professional development on gains in student achievement: How meta analysis provides scientific evidence useful to education leaders*. Paper presented at Society for Research on Educational Effectiveness (SREE). Washington, DC.

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research in education: An introduction to theory and methods* (3rd ed.). Needham Heights, MA: Allyn & Bacon.

Boone, E., Hartzman.M., & Mero, D. (2006). Targeting a reform strategy. *Principal Leadership* (Middle School ed.), *6*(10), 42–46.

Boyd, V., & McGree, K. (1995). Leading change from the classroom: Teachers as leaders. *Issues…About Change, 4*(4). Retrieved from http://www.sedl.org/change/issues/issues44.html

Bullough, R. V., Jr., & Pinnegar, S. (2001). Guidelines for quality in autobiographical forms of self-study. *Educational Researcher*, *30*(3), 13-22.

Burns, J. M. (1978). *Leadership*. New York: Harper and Row.

Burns, M. (2002). From compliance to commitment: Technology as a catalyst for communities of learning. *Phi Delta Kappan, 84*.

Cahnmann-Taylor, M., & Siegesmund, R. (2008a). Arts-based research in education: Foundations for practice. New York: Routledge.

Caine, G., & Caine, R. N. (2000). The learning community as a foundation for developing teacher leaders. *National Association of Secondary School Principals (NASSP) Bulletin*, *84*(616), 7–14.

Chandler, D.E. & Kram, K.E. (2005). Applying an adult development perspective to developmental networks. *Career Development International*, *10* (6/7), 548-566.

Chang, H. (2008). *Autoethnography as method*. Walnut Creek, CA: Left Coast Press, Inc.

Chen, Z., Lam, W., & Zhong (2007). Leader-member exchange and member performance: A new look at individual-level negative feedback-seeking behavior and team-level empowerment culture. *Journal of Applied Psychology*, *92*(1), 202-212.

Childs-Bowen, D., Moller, G., & Scrivner, J. (2000). Principals: Leaders of leaders. *National Association of Secondary School Principals (NASSP) Bulletin*, *84*(616), 27–34.

Clandinin, D. J., & Connelly, F. M. (1994). Personal experience methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 413-427). Thousand Oaks, CA: Sage Publications.

Clark/Keefe, K. (2002). A fine line: Integrating art and fieldwork in the study of self-conceptualization and educational experiences. *The Alberta Journal of Educational Research, XLVIII* (3).

Coffey, A., & Atkinson, P. (1996). *Making sense of qualitative data: Complementary research strategies*. Thousand Oaks, CA: Sage Publications.

Cohen, R. M. (1991). *A lifetime of teaching: Portraits of five veteran high school teachers.* New York: Teachers College Press.

Colbert, J., Brown, R., Choi, S., & Thomas, S. (2008). An investigation of the impacts of teacher-driven professional development on pedagogy and student learning. *Teacher Education Quarterly, 35*(2), 135–154.

Collins, M. & Berge, Z. L. (1996). Facilitating interaction in computer mediated online courses. Retrieved from http://repository.maestra.net/valutazione/MaterialeSarti/articoli/Facilitating%20Interaction.htm

Conrad, D. (2005). Building and maintaining community in cohort-based online learning. *Journal of Distance Education, 20*(1), 1-20.

Cook-Greuter, S. R. (2004). Making the case for a developmental perspective. Industrial and commercial training, *6*, 275-281.

Cranton, P. (2006). Understanding and promoting transformative learning (2nd ed.). San Francisco: Jossey-Bass.

Crotty, M. (1998). *The foundation of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: Sage Publications.

Darling-Hammond, L. (1994). *Professional development schools: Schools for developing a profession.* NY: Teacher College Press.

Darling-Hammond, L. (1998). Teacher learning that supports student learning. *Educational Leadership*, *55*(5), 6-11.

Darling-Hammond, L., Bullmaster, M. L., & Cobb, V. L. (1995). Rethinking teacher leadership through professional development schools. The Elementary School Journal, *96*(1), 87–106.

Darling-Hammond, L. & Richardson, N. (2009). Research review / teacher learning: What matters? *How Teachers Learn*, *66*(5), 46-53.

Darling-Hammond, L., & McLaughlin, M. W. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan*, *76*(8), 597–604.

Darling-Hammond, L., Wei, R. C., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional learning in the learning profession: A status report on teacher development in the United States and abroad.* Washington, DC: National Staff Development Council.

Dash, S. Kramer, R.M., O'Dwyer, L.M., Masters, J., & Russell, M. (2012). Impact of Online Professional Development on Teacher Quality and Student Achievement in Fifth Grade Mathematics. *Journal of Research on Technology in Education*, *45*(1), 1-26.

Day, D. V. (2000). Leadership development: A review in context. *Leadership Quarterly*, *11*(4), 581−613. Dede, C., Ketelhut, D. J., Whitehouse, P., Breit, L., &

McCloskey, E. (2009). A Research agenda for online teacher professional development. *Journal of Teacher Education, 60*(1), 8-19.

Denzin, N. K. (1989). *Interpretative ethnography*. Thousand Oaks, CA: Sage Publications.

Denzin, N. K. (1997). *Interpretive biography*. Newbury Park, CA: Sage Publications.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (1994). *Handbook of qualitative research.* Thousand Oaks, CA: Sage Publications.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2000). *Handbook of qualitative research* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Denzin, N. & Y. Lincoln (Eds.). (2005). *The Sage handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.

Dethloff, C. H. (2005). *A principal in transition: An autoethnography* (Doctoral Dissertation). Retrieved from http://repository.tamu.edu/

Dewey, J. (1933). *How we think: A statement of the relation of reflective thinking to the educative process.* Boston: D.C. Heath.

Donavant, B. (2009). The new, modern practice of adult education: Online instruction in a continuing professional education setting. *Adult Education Quarterly, 59*(3), 227-245.

Dozier, T. K. (2007). Turning good teachers into great leaders. *Educational Leadership, 65*(1), 54-58

Drath, W., & Palus, C. (1994). *Making common sense: Leadership as meaning-making in*

communities of practice. Greensboro, NC: Center for Creative Leadership.

Dufour, R. (2004). What is a professional learning community? *Educational Leadership*. *61*(8), 6-11.

DuFour, R. & Eaker, R. (2008). *Revisiting professional learning communities at work: New insights for improving schools.* Bloomington, IN: National Educational Services.

Duncan, M. (2004). Autoethnography: Critical appreciation of an emerging art. *International Journal of Qualitative Methods*, *3*(4).

Eigel, K. M., & Kuhnert, K. W. (2005). Authentic development: Leadership development level and executive effectiveness. In W. Gardner, B. Avolio, & F. Walumba (Eds.), *Authentic leadership theory and practice: Origins, effects and development Monographs in Leadership and Management* (Vol. 3, pp. 357−385).

Eisner, E. W. (1997). The promise and perils of alternative forms of data representation. *Educational Researcher*, *26*(6), 4-10.

Ellis, C. (2004). *The ethnographic I: A methodological novel about autoethnography*. Walnut Creek: Rowman and Littlefield Publishers.

Ellis, C. & Bochner, A. P. (2000). Autoethnography, personal narrative, reflexivity. In N. K. Denzin & Y. S. Lincoln (Eds.). *Handbook of qualitative research*. Thousand Oaks, CA: Sage Publications.

Ellis, C. & Bochner, A.P. (Eds.). (2002). *Ethnographically speaking: Autoethnography, literature and aesthetics*. Walnut Creek: Alta Mira Press.

Ellis, C. & Bochner, A.P. (2006). Analyzing analytic autoethnography: An autopsy. *Journal of Contemporary Ethnography*, *35*, 429-449.

Ellis, C., Adams, T.E, & Bochner A.P. (2011). Autoethnography: An overview. *Forum: Qualitative Social Research, 12*(1).

Fassett, D.L., & Warren, J.T. (2007). *Critical communication pedagogy.* Thousand Oaks, CA: Sage Publications.

Feldman, A. (2003). Validity and quality in self-study. *Educational Researcher, 32*, 26-28.

Finley, S. (2003). Arts-based inquiry in QI: Seven years from crisis to guerrilla warfare. *Qualitative Inquiry*, 281-296.

Fournillier, J, Thomas, C.D., Junor-Clarke, P. A., & Vidakovic, D. (2011). Multi-user virtual environments: A platform for professional development and research on mathematics teacher retention in an urban environment. *Journal of the European Teacher Education Network, 6*(1), 127-143.

Frost, D., & Durrant, J. (2002). Teachers as leaders: Exploring the impact of teacher led development work. *School Leadership and Management, 22*(2), 143-161.

Futrell, M. H. (2011). Redefining leadership: Working together to change America's education paradigm and prepare for tomorrow's world. *Journal of School Leadership, 21,* 635-648.

Garber, D. (2004). Technical evaluation report 34: Growing virtual communities. *International Review of Research in Open and Distance Learning, 5*(2).

Gardner, H. (1995). *Leading minds: An anatomy of leadership*. New York: Basic Books.

Gareis, R.C., & Nussbaum-Beach, S. (2007). Electronically mentoring to develop accomplished professional teachers. *Journal of Personal Evaluation in Education, 20,* 227-246.

Goleman, D., Boyatzis, R., & McKee, A. (2002). *The new leaders: Transforming the art of leadership into the science of results*. London: Little Brown.

Gibb, J., & Gibb, L. (1967). Humanistic elements in group growth. In J. Bugental (Ed.), *Challenges of humanistic psychology*. New York: McGraw-Hill. (pp. 161-170).

Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership: Development of the leader-member exchange (LMX) theory of leadership over 25 years. *Leadership Quarterly, 6*, 219-247

Graves, C. (1970). Levels of existence: An open system theory of values. *Journal of Humanistic Psychology. 10*(2), 131-155.

Gronn, P. (2002). Distributed leadership as a unit of analysis, *The Leadership Quarterly*, *13*(4), 423-451.

Grossman, P., Wineburg, S., & Woolworth, S. (2001). Toward a theory of teacher community. *Teachers College Record, 103*(6), 942-1012.

Guba, E.G., & Lincoln, Y.S. (1989). *Fourth generation evaluation*. California: Sage Publications.

Gutierrez, C., & Bryan, C. (2010). Online community becomes a pathway to teacher leadership. *Journal of Sustainable Development*, *31*(1).

Hayano, D. M). (1979. Auto-ethnography: paradigms, problems, and prospects. *Human Organization, 38* (1), 99-104.

Heider, K.G., 1975. What do people do? Dani auto-ethnography. *Journal of Anthropological Research, 31*, 3-17.

Heller, M. J., & Firestone, W. A. (1995). Who‘s in charge here? Sources of leadership for change in eight schools. *Elementary School Journal*, *95*, 65–86.

Helsing, D. Drago-Severson, E. & Kegan R. (2004). Applying constructive-developmental theories of adult development to ABE and ESOL practices. *National Center for the Study of Adult Learning and Literacy*. Retrieved from http://www.ncsall.net/fileadmin/resources/ann_rev/rall_v4_ch5.pdf

Hodder, I. (2004). The interpretation of documents and material culture. In N.K. Denzin and Y.S. Lincoln (Eds.), *Collecting and interpreting qualitative materials* (2nd ed.), (pp. 155-175). Thousand Oaks, CA: Sage.

Hodes, C., Pritz, S., Kelley, P., & Foster, J. (2011). Developing an online community of in-service teachers. *Contemporary Issues in Technology and Teacher Education*, *11*(3), 313-323.

Holt, N. L. (2003). Representation, legitimization, and autoethnography: An autoethnographic writing story. *International Journal of Qualitative Methods*, *2*(1).

Hord, S. (1997). *Professional learning communities: Communities of continuous inquiry and improvement*. Austin, TX: Southwest Educational Development Laboratory.

Hsieh, H.F. & Shannon, S.E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*. *15*(9), 1277-1288.

Hughes, P. (2012). An autoethnographic approach to understanding Asperger's syndrome: A personal exploration of self-identity through reflexive narrative. *British Journal of Learning Disabilities*, *40*, 94-100.

Hunter, A. M. B., Lewis, N. M., & Ritter-Gooder, P. K. (2011). Constructive developmental theory: An alternative approach to leadership. *Journal of American Dietetic Association*, 1804-1808.

Ilies, R., Nahrgang, J. D., & Morgeson, F. P. (2007). Leader-member exchange and citizenship behaviors: A meta-analysis. *Journal of Applied Psychology, 92*(1), 269-277.

Jonassen, D.H., Peck, K.L., & Wilson, B.G. (1998). *Learning with technology: A constructivist perspective*. Columbus, OH: Prentice-Hall.

Jones, S. H. (2005). Autoethnography: Making the personal political. In Norman K. Denzin & Yvonna S. Lincoln (Eds.), *Handbook of qualitative research* (pp.763-791). Thousand Oaks, CA: Sage.

Jones, L., Stall, G. & Yarbrough, D. (2013). The importance of professional learning communities for school improvement. *Creative Education*, *4*(5), 357-361.

Johnson, S. M. (2006). *The workplace matter: Teacher quality, retention, and effectiveness*. Washington, DC: National Education Association.

Josselson, R. & Lieblich, A. (1993). *The narrative study of lives*. Cambridge, MA: Sage Publications.

Joyce, B. & Calhoun, B. (2010). *Models of professional development: A celebration of educators.* Thousand Oakes, CA: Corwin Press.

Katzenmeyer, M. & Moller, G. (2001). *Awakening the sleeping giant: Helping teachers develop as leaders.* (2nd ed.). Thousand Oakes, CA: Corwin Press.

Kegan, R. (1980). Making meaning. The constructive-developmental approach to persons and practice. *The Personnel and Guidance Journal*, *58*, 373-380.

Kegan, R. (1982). *The evolving self: Problem and process in human development.* Cambridge, MA: Harvard University Press.

Kegan, R. (1994). *In over our heads: The mental demands of modern life.* Cambridge, MA: Harvard University Press.

Kegan, R., & Lahey, L. (2001). *How the way we talk can change the way we work: Seven languages for transformation*. San Francisco, CA: JosseyBass.

Kemmis, S., & McTaggart, R. (2005). Participatory action research: Communicative action and the public sphere. In N. K. Denzin & Y.S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 559-603). Thousand Oaks, CA: Sage Publications.

Kennelly L & Monrad, M. (2007). Easing the Transition to High School: Research and Best Practices Designed to Support High School Learning. Retrieved from http://www.betterhighschools.org/docs/NHSC_TransitionsReport.pdf

Killion, J. & Harrison, C. (2006). *Hiking the lead: New roles for teachers and school-based coaches.* Oxford, OH: NSDC.

Killion, J. (2000). Log on to learn: To reap benefits of online staff development, ask the right questions. *Journal of Staff Development, 21*(3), 48-53.

Knowles, M. S. (1970). *The modern practice of adult education; Andragogy versus pedagogy.* Broadway, NY: The Association Press.

Knowles, M. S. (1984). *Andragogy in action.* San Francisco, CA: Jossey-Bass.

Kohlberg, L. (1969). Stage and sequence: The cognitive developmental approach to socialization. In D. Goslin (Ed.), *Handbook of socialization: Theory and research*. New York: Rand McNally.

Kuhnert, K.W. & Lewis, P. (1987). Transactional and transformational leadership: A constructive developmental analysis. *Academy of Management Preview*, *12*(4), 548-657.

Lambert, L. (2003). Leadership redefined: An evocative context for teacher leadership. *School Leadership & Management, 23*(4), 421-430.

Laske, O. (2006). On leadership as something we are rather than something we have: Introducing instrumentation to strengthen the integral approach for use in organizations. Retrieved from http://integralleadershipreview.com/

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, England: Cambridge University Press.

Lazarre, J. (1996). *Beyond the whiteness of whiteness: Memoirs of a white mother of black sons.* Durham, NC: Duke University Press

LeBlanc, P. R., & Shelton, M. M. (1997). Teacher leadership: The needs of teachers. *Action in Teacher Education, 19*, 32-48.

Lee, D. H.L. & Shaari, I. (2012). Professional identity or best practices?—An exploration of the synergies between professional learning communities and communities of practices. *Creative Education, 3*(4), 457-460.

Lewis, C. B. (2007). *Identity: Lost, found, and (re)constructed through healing narratives---an autoethnography of tragedy, travail, and triumph.* Columbus: OH: Ohio University.

Lieb, S. (1991). Principles of adult learning. Retrieved from http://www.lindenwood.edu/education/andragogy/andragogy/2011/Lieb_1991.pdf

Lieberman, A., Saxl, E. R., & Miles, M. B. (1988). Teacher leadership: Ideology and practice. In A. Lieberman (Ed.), *Building a professional culture in schools.* New York: Teachers College Press.

Liu, W., Carr, R. L., & Strobel, J. (2009). Extending teacher professional development through an online learning community: A case study. *Journal of Educational Technology Development and Exchange, 2*(1), 99-112.

Lock, J.V. (2006). A new image: Online communities to facilitate teacher professional development. *Journal of Technology and Teacher Education, 14*(4), 663-678.

Loevinger, J. (1976). *Ego development*. San Francisco: Jossey-Bass.

Loucks-Horsley, S., Hewson, P., Love, N., & Stiles, K., (1998). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press.

Manen, M. V. (1990). *Researching lived experience: Human science for an action sensitive pedagogy*. NY: State University of New York Press.

Manno, C., & Firestone, W. (2008). Content is the subject: How teacher leaders with different subject knowledge interact with teachers. In M. Mangin & S. Stoelinga (Eds.), *Effective teacher leadership: Using research to inform and reform* (pp. 36–54). New York: Teachers College Press.

Manus, A. (1996). Procedural versus constructivist education: A lesson from history. *Educational Forum,* 60, 312-316.

McCauley, C.D., Drath, W.H., Palus, C. J., O'Connor, P.M.G., & Baker, B.A. (2006). The use of constructive-developmental theory to advance the understanding of leadership. *The Leadership Quarterly*, *17*, 634-653.

Mercado-Garza, R. (2008). *From being considered at-risk to becoming resilient: An autoethnography of abuse and poverty.* (Doctor of Philosophy), Texas A&M.

Mirny, A., Wiske M.S., Joo, J., Cunningham, G., Daniels, D., Farid, A.B., Gordon, F., Madani, R., & Nissen, S.C. (2010). Global networked learning: A New Form of collaboration action research. Paper presented at the American Educational Research Association (AERA), Denver, CO. Retrieved from http://wideworld.harvard.edu/en/pdfs/AERApaperfinal.pdf

Moro, P. (2006). It takes a darn good writer: A review of the ethnographic I. *Symbolic Interactionism*, *29*(2), 265-269.

Moustakas, C. (1990). *Heuristic research: Design, methodology, and applications*. Thousand Oakes, CA: Sage Publications.

Muncey, T. (2005). Doing autoethnography. *International Journal of Qualitative Methods*, *4*(3), Article 5. Retrieved April 7, 2006, from http://www.ualberta.ca/~iiqm/backissues/4_1/pdf/muncey.pdf

Murphy, J. (2005). Connecting teacher leadership and school improvement. Thousand Oakes, CA: Corwin Press.

Murphy, E., & Laferrière, T. (2005). Identifying and Facilitating Group-Development Processes in Virtual Communities of Teacher-Learners. Retrieved from http://itdl.org/journal/apr_05/article03.htm

Newsom, S. K. (2010). *Narratives of the Development of Urban Teacher Leaders.* (Doctor of Philosophy), University of Tennessee.

Neyman, V. L. (2011). *Giving my heart a voice: Reflection on self and others through the looking glass of pedagogy: An Autoethnography*. (Doctor of Education), National-Louis University.

Odell, S. J. (1997). Preparing teachers for teacher leadership. *Action in Teacher*

Education, 19(3), 120-124.

Ovando, M. N. (1996). Teacher leadership: Opportunities and challenges. *Planning and Changing, 27*, 30-44.

Oxford, R. (1997). Constructivism: Shape-shifting, substance, and teacher education. *Peabody Journal of Education, 72*(1), 35-66.

Patton, M.Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage.

Patton, M. Q. (2002). *Qualitative research & evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Pelias, R.J. (2004). *A methodology of the heart*. Walnut Creek, CA: AltaMira Press.

Piaget, J. (1954). *The construction of reality in a child*. New York: Basic Books.

Popp, N., & Portnow, K. (2001). Our developmental perspective on adulthood. In R. Kegan, M. Broderick, E. Drago-Severson D. Helsing, N, Popp, K. Portnow & Associates (Eds.), *Toward a "new pluralism" in the ABE/ESOL classroom: Teaching to multiple "cultures of mind" — A constructive developmental approach*. Cambridge, MA: National Center for the Study of Adult Learning and Literacy.

Portnow, K., Popp, N., Broderick, M., Drago-Severson, E., & Kegan, R. (1998). Transformational learning in adulthood. *Focus on Basics, 2*(D), 22-27.

Preece, J. (2000). *Online Communities: Designing Usability, Support Sociability*. Chichester: John Wiley & Sons.

Prestera, G., and Moller, L. (2001). Facilitating asynchronous distance learning: Exploiting opportunities for knowledge building in asynchronous distance

learning environments. Conference proceedings from *Mid-South Instructional Technology Conference*, Middle Tennessee State University, April 7-10. Retrieved from: http://www.mtsu.edu/~itconf/proceed01/3.html

Prewitt, T. R. (2010). *More than pretty faces and mini skirts: An autoethnographic story of female sport hostess experience.* (Doctor of Philosophy), University of Tennessee.

Pinkavova, E. (2010). Keeping our heads above water: applying Kegan's 'orders of consciousness' theory in coaching. *International Journal of Evidence Based Coaching and Mentoring*, *8*(1). 14-21.

Pitton, D. E. (2006). *Mentoring novice teachers: Fostering a dialogue process* (2nd ed.). Thousand Oaks, CA: Corwin Press

Rambo, C. (2007a). Handing IRB an unloaded gun. *Qualitative Inquiry, 13*, 353–367.

Rambo, C. (2007b). Sketching as autoethnographic practice. *Symbolic Interaction, 30*, 531–542.

Reed-Danahay, D. E. (1997). *Auto/ethnography: Rewriting the self and the social*. NY: Berg.

Reichstetter, R. (2006). Defining a professional learning community. E & R Research Alert, Report No. 06.05.

Richardson, L. (1994). Writing: A Method of inquiry. In D. Denzin & Y. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 516-529). Thousand Oaks, CA: Sage Publications.

Rost, J. C. (1991). *Leadership for the twenty-first century*. Westport, CT: Praeger Publishers.

Rovai, A. P. (2001). Building community at a distance: A case study classroom. *Educational Technology Research and Development Journal*, *49*(4), 33–48.

Ryman, B., Hardham, G., Richardson, B., & Ross, J. (2009). Creating and sustaining online learning communities: Designing for transformative learning. *International Journal of Pedagogies and Learning*, *5*(3), 32-45.

Saarnivara M. (2003). Art as inquiry: The autopsy of an [art] experience**.** *Qualitative Inquiry*, *9*(*4*), 580-602.

Saarnivara M., & Bochner, E. (2003). An introduction to the arts and narrative research: Art as inquiry**.** *Qualitative Inquiry*, *9*(*4*), 506-514.

Schein, H. (1992). *Organizational culture and leadership* (2nd ed.). San Francisco, CA: Jossey-Bass.

Schermerhorn, J. R., Hunt, J. G., & Osborn, R. N. (2011). *Organizational behavior* (11th ed.) (p. 253). New York, NY: Wiley.

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action.* USA: Basic Books Inc.

Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions.* San Francisco: Jossey-Bass.

Scott-Hoy, K. (2000b). With people, passion, paint, and palette: Artistic autoethnography. In P. Willis, R. Smith, & E. Collins (Eds.), Being, seeking, telling: Expressive approaches to qualitative adult education research (pp. 322-344). Flaxton, Queensland, Australia: Post Pressed.

Self. (n.d.). In Merriam-Webster's online dictionary. Retrieved from http://www.merriam-webster.com/dictionary/self.

Shalin, D. (1986). Pragmatism and social interactionism. *American Sociological Review, 51*, 9-29.

Shamir, B. Eilam, G. (2005). "What's your story?" A life-stories approach to authentic leadership development. *The Leadership Quarterly, 16*, 395-417.

Shamir, B., Dayan-Horesh, H., & Adler, D. (2005). Leading by biography: Toward a life-story approach to the study of organization science. *Leadership, 4*, 577-594.

Sherer, P.D., Shea, T.P., & Kristensen, E. (2003). Online communities of practice: A catalyst for faculty development. *Innovative Higher Education, 27*(3), 183-194.

Sirotnik, K. A., & Kimball, K. (1996). Preparing educators for leadership: In praise of experience. *Journal of School Leadership, 6*, 180-199.

Slattery, P. (2004). The educational researcher as artist working within. *Qualitative Inquiry*, 7(*3*), 370-398.

Sledge J.R. & Morehead P. (2006). Tolerated failure or missed opportunities and potentials for teacher leadership in urban schools? *Current Issues in Education, 9*(*3*).

Smith, H.W. (1975). *Strategies of social research: The methodological imagination*. Englewood Cliffs, NJ: Prentice-Hall.

Smith-Sullivan, K. (2008). *The autoethnographic call: Current considerations and possible futures.* (Doctor of Philosophy), University of South Florida.

Smylie, M. A. (1995). New perspectives on teacher leadership. *Elementary School Journal, 96*(1), 3-7.

Smylie, M. A., & Denny, J. W. (1990). Teacher leadership: Tensions and ambiguities in organizational perspective. *Educational Administration Quarterly, 26*(3), 235–

259.

Smylie, M., Conley S., & Marks H. (2002). Exploring new approaches to teacher leadership for school improvement. In J. Murphy (Ed.), *The educational leadership challenge: Redefining leadership for the 21st century, 102nd Yearbook of the National Society for the Study of Education, Part II* (pp. 162-185). Chicago: National Society for the Study of Education.

Snell, J., & Swanson, J. (2000). The essential knowledge and skills of teacher leaders: A search for a conceptual framework. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Sparks, D. (2005). Leading for transformation in teaching, *learning, and relationships. On common grounds: The power of professional learning communities.* Bloomington, IN: Solution Tree Press.

Sparkes, A. C. (2002b). Autoethnography: Self-indulgence or something more? In A. Bochner & C. Ellis (Eds.), *Ethnographically speaking: Autoethnography, literature, and aesthetics.* New York: AltaMira.

Spillane, J. P., & Diamond, J. B. (2007). *Distributed leadership in practice.* New York: Teachers College Press.

Spry, T. (2001). Performing autoethnography: An embodied methodological praxis. *Qualitative Inquiry*, *7*(*6*), 706-732.

Stinson, A. B. (2009). *An Autoethnography: A Mathematics Teacher's Journey of Identity Construction and Change.* Doctor of Philosophy, Georgia State University, Atlanta.

Stronge, J. M. (2007). Qualities of effective teachers (2nd ed.). Danvers, MA: *Association*

for Supervision and Curriculum Development.

Suominen, A. (2003). *Writing with photographs, reconstructing self: An arts-based autoethnographic inquiry.* (Doctor of Philosophy), Ohio State University.

Swan, K., & Dixon, J. (2006). The effects of mentor-supported technology professional development on middle school mathematics teachers' attitudes and practice. *Contemporary Issues in Technology and Teacher Education*, *6*(1).

Thorne, S. (2000). Data analysis in qualitative research. *Evidenced Based Nursing*, *3*, doi:10.1136/ebn.3.3.68.

Torbert, W. R. (1987). *Managing the corporate dream: Restructuring for long term success.* Homewood, IL: Dow Jones-Irwin.

Torbert, W. R., & Cook-Greuter, S. (2004). *Action inquiry: The secret of timely and transforming leadership*. San Francisco, CA: Berrett-Koehler.

Usdan, M, McCloud, B., & Podmostko, M. (2001). Leadership for student learning: Redefining the teacher as leader. *School leadership for the 21st century initiative*. Retrieved from http://www.iel.org/programs/21st/reports/teachlearn.pdf

Vasconcelos, E. F. d. S. (2011). "I can see you": An autoethnography of my teacher-student self. *The Qualitative Report*, *16*(2), 415-440.

Vrasidas, C., & Glass, G. V. (2004). *Online professional development for teachers.* USA: Information Age Publishing Inc.

Wall, S. (2006). An autoethnography on learning about autoethnography. *International Journal for Qualitative Methods*, *5*(2), 146-160.

Wall, S. (2008). Easier said than done: Writing an autoethnography. *International Journal of Qualitative Methods*, *7*(1), 38-53.

Wasley, P. A. (1991). *Teachers who lead: The rhetoric of reform and the realities of practice.* NY: Teachers College Press.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, UK: Cambridge University.

Wenger, E. C. & Snyder, W. M. (2000). Communities of practice: The organizational frontier. Harvard Business Review.

Wenglinsky, H. (2000). *How teaching matters: Bringing the classroom back into discussions of teacher quality.* Princeton, NJ: The Milken Family Foundation and Educational Testing Service.

Wenglinsky, W. (2002). How schools matter: The link between teacher classroom practices and student academic performance. *Education Policy Analysis, 10*(12), 1–30.

West, R.E. (2010). A student's guide to strengthening an online community. *Tech Trends, 54* (5), 69-75.

Whittaker, S., Issacs, E., & O'Day, V. (1997). Widening the net. Workshop report on the theory and practice of physical and network communities. SIGCHI Bulletin, *29*(3), 27-30.

Wolcott, H. F. (1994). *Transforming qualitative data: Description, analysis, and interpretation*. Thousand Oaks, CA: Sage Publications.

York-Barr, J., & Duke, K. (2004). What do we know about teacher leadership?: Findings from two decades of scholarship. *Review of Educational Research, 74*(3), 255–316.

Yulk, G. (2006). *Leadership in organizations* (6th ed.). Upper Saddle River, NJ: Pearson-Prentice Hall.

Zand, D. E. (1997). The leadership triad: Knowledge, trust, and power. New York: Oxford University

Zigarmi, P., Betz, L., & Jensen. D. (1977). Teacher preference in and perceptions of inservice. *Educational Leadership, 34*, 345-55.

APPENDICES

Appendix A

Tentative Agenda

Georgia State University College of Education Department of Secondary Mathematics-Robert Noyce Scholars Online Professional Learning Community

Date: November 21, 2009

Time: 10:00 a.m. – 12:00 p.m.

Meeting Place: Online www.secondlife.com in Second Life at Georgia State University Five Points inside classroom building

Objectives:

- Establish online learning community in Second Life (SL)
- Determine who cannot participate in SL due to technology restraints
- Establish SL friendships between Noyce Scholars
- Generate working list of professional support needs of Noyce Scholars for future meeting topics
- Acclimate Noyce Scholars to resources available in SL

10:00-10:10 Allow everyone to log on and settle in seats. Each participant should try to have a conversation with at least one other Noyce Scholar to ensure that voice communication is working. If voice communication will not work, try to chat using the keyboard.

10:15-10:20 Allow everyone settle in seats.

10:20-10:40 Welcome. Give brief description of vision for SL and possibly a mini-lesson.

10:40-11:10 Break Out Sessions: Break out into 3 small groups as listed in Excel spreadsheet. Each small group session will start with introductions. Please give your avatar name first, then your real name, and year you graduated. Also please tell the subjects you are currently teaching. Please tell one thing you hope to get out of this online professional learning community and/or a concern or question you have.

- Group 1 goes with Asa Marabana ([redacted]).
- Group 2 goes with Ellen MacBain ([redacted]) .
- Group 3 goes with Sophi Brunswich (Rabia Shahbaz).

11:10-11:15 Groups report back to meeting room for summary of group discussions.

11:15-11:35 Summary Discussion

11:35-11:45 Closing Remarks from Leadership Team, Meagan O. and GSU advisors

Appendix B

Reflections from First Online PLC Meeting

Attendance:

Following UMEP scholars attended the meeting on Nov. 21st:

[redacted]

General Observations

The first online PLC meeting had a great turn out. About 25 people were present for the meeting. The meeting place was full of talking just as if the meeting place would be in real world. In the whole group meeting, there were a large number of people in the room. The talking created lots of confusion and frustrations for some participants. Meg contributed that she did log instant messaging to support this. We were concerned that this first impression may cause Scholars to be reluctant in participating in the next meeting. However, based on Meg's observations, she did not think the frustration level of participants reached this point.

Many participants could not operate their voice chat. This is very frustrating, especially when a good part of the meeting is happening via voice chat. In future, for the online PLCs to work, each participant will need a certain level of proficiency with the use of the hardware, SL interface, and idiosyncrasies of the program.

Planning and Adjustments for Future Meetings

Meg suggested that instant messaging (IM) be the norm for communication between a pair of participants when in a whole group meeting rather than voice chat or local chat. This would allow for two people to talk to one another without distracting the others in the meeting. Only the participants who are sending the IM are aware of this conversation, but the messages can still be logged for data collection. This would create the need for all participants to learn the shortcut to IM using the right click on person method and IM method. Also, everyone may not know that when you close the communication box, the chat comments will still appear in a bubble at the bottom. Whole room chat is a double bar while private IM chat is a single bar on the left.

We decided that the next meeting be in small groups with the main focus being for each participant become more proficient at communicating in SL using voice chat. This would include learning how to use the active speaker box and volume controls. Meg suggested that

Scholars could experiment with how far speakers could be before the voices could not be heard. This would be useful when deciding how to break out into small groups or pairs. Also, scholars could simulate the speaker to whole group dynamic and practicing having private conversations using IM. They could also practice teleporting and using the map. We are thinking that the next meeting will be small group with one member of the leadership team facilitating. The objective will be to work out some of these familiarity issues. A list of 3 dates in December will be created in Google docs. Then we will send an email asking participants to sign up for a date.

We discussed a format for collecting data from participants on their perceptions or concerns about the PLC meeting. We also discussed developing a web page in something like Wiki. A web page could be used to post agendas, announcements, resources, and web links in preparation for each meeting. This could also be the place for summary notes from the meeting. A link could be posted to a Google forum page that has few questions for scholars to answer in a form. This form would be like an exit slip that Scholars complete after the meeting. It would then download their answers in a Google doc spreadsheet (Meg offered to help us with this one). This would allow for scholars to give more organic feedback. In addition, the Wiki page would have a discussion tab for Scholar discussions about whatever comes up during the month. Feedback could be solicited from others or comments could be posted on a particular topic from the last meeting. This would be very similar to the Web CT discussions from school.

Flexible grouping within a meeting was also discussed. Think-pair-share could be used for certain activities such as mentor-mentee discussions. Homogeneous grouping same subject, experience level, or gender could be used depending on what is planned. Heterogeneous grouping could be used when discussing topics or journal articles.

We experimented with the media boxes on the island. We were hoping to be able to use them to present websites such as Learning Village, Okefenokee Resa http://www.ngresa.org/MathResources.htm , etc. during the meetings. Also, for power point presentations, we found that it costs to download Power Points in SL. This may be an issue that we need help on from the advisors. Meg tried to drag an image onto the board to display. It would not work. We are thinking we need creator of these display boards to help us with this. Were these display boards created by the Georgia State IST department?

Appendix C

Small Group Assignment Spreadsheet

PLC Small Groups

File Edit View Insert Format Data Tools Help All changes saved in Drive

	A	B	C	D	E	F	G	H
1	PLC Small Group Assignment							
4	Last Name	First Name	Math 1	Math 2	Algebra 2	Trig/Calculus	New Teacher	Others
5	[redacted]	[redacted]	x				student teacher	culturally relevant/student interests incorporated into lessons
6	[redacted]	[redacted]	X	X				
7	[redacted]	[redacted]				x		
8	[redacted]	[redacted]	x					
9	[redacted]	[redacted]	X				X	Classroom Mgmt.
10	[redacted]	[redacted]	X					
11	[redacted]	[redacted]				X		
12	[redacted]	[redacted]			x			
13	[redacted]	[redacted]	X					
14	[redacted]	[redacted]	X					
15	[redacted]	[redacted]			X			
16	[redacted]	[redacted]	X					
17	[redacted]	[redacted]		X				
18	[redacted]	[redacted]	X	X			X	
19	[redacted]	[redacted]	X	X				Homework/Studentbased class activities
20	[redacted]	[redacted]	X					
21	[redacted]	[redacted]						
22	[redacted]	[redacted]		X			student teacher	Math 1 Support
23	[redacted]	[redacted]	X					
24	[redacted]	[redacted]				x	X	
25	[redacted]	[redacted]		X				
26	[redacted]	[redacted]				x	x	
27	[redacted]	[redacted]		X		X		
28	[redacted]	[redacted]		x				x (stats)

Appendix D

Meeting Minutes from UMEP-Leadership Team Meeting

Date: 05/10/2010
Time: 8:30 p.m - 9:40 p.m.
Place: Skype
Participants: [redacted]

· Meeting time on Monday at 9:00 pm is good for a significant number of scholars (9-10 Math II) scholars.
· GSU training session has not been scheduled b/c no time is convenient for all right now.
· All scholars agree to keep using SL...comfort level is up, people have downloaded software, offers options for sharing,
· [redacted] survey scholars on what worked and what did not work.
· [redacted] how can format be changed to meet your needs better as a teacher
· [redacted]-said would like to attend but having trouble getting on line...
· [redacted] would like list of those who attended 2 or more meetings this semester.
· Checked schedules of scholars to try and schedule time for training with [redacted]: lots of schedule conflicts
· [redacted] will contact [redacted] regarding videotaping. Professors will meet to discuss how to fill role of data collection.
· [redacted] will contact [redacted] regarding getting clips from her of previously taped meetings.
· *Relevant Information that was requested at meeting*: Scholars who may need to attend 1 or more meeting in May: [redacted]

Upcoming GSU Meetings:

· May 24, 2010 @ 4:00 p.m. Scholars with [redacted]. Final roster for payment, NSF presentation draft, ideas for poster presentation
· June 30 @ 1pm. SL Training @ GSU. Leadership Team with [redacted] and also to talk about research

Appendix E

Agenda

Georgia State University Noyce UMEP Scholars Online PLC
General Session #1 August 14, 2010 11:00 a.m.
Second Life (SL) - Best Practices Classroom Building

Dear Scholars,

Welcome back to our online UMEP PLC. We (leadership team) are very excited to begin this semester. Based on the feedback received from you at the end of spring semester, we have decided to have one general session each month. We will also have two small group meetings each month. If you have not done so already, please take few minutes during the meeting to fill out the spreadsheet about your teaching assignment this semester. The links are in the agenda below. We will use this information to develop content for meeting.

The focus of the meetings in our general sessions this semester will be professional development concentrating on the instruction. Whereas, the small group meetings will focus more on the content. We will also share our tentative schedule for our fall meetings with you and will try to accommodate any conflicts. The expectation of this semester is that each scholar will attend one or more meetings each month to be eligible for the stipend.

Below is the agenda of our general session:

- Welcome
- Technology/Communications Check
- Meeting Norms and Scholar Participation Expectations
- Each scholar is expected to participate in Monthly General Session meetings
- Each scholar is expected to participate in at least one Small Group
- Scholars complete surveys
    - Schedule Conflicts Survey https://spreadsheets.google.com/viewform?hl=en&formkey=dFdhS3pDaHBqeE9wNmc4RzJPbXF1QUE6MQ#gid=0
    - Teaching Class Schedule Survey https://spreadsheets.google.com/ccc?key=0AkRB1WTKNuizdHBoMHRZdzZGMkpfTlloSnBQY0RUNXc&hl=en&authkey=CNeVtf8K#gid=0
- Professional Development Needs Discussion
- Professional Development Assignment for Next Meeting
- Schedule Conflict Survey Results
- Closing

General Sessions and Small Group Meetings *Tentative* Schedule

Georgia State University Noyce UMEP Scholars Online PLC

Fall 2010

***Tentative* Schedule**

Georgia State University Noyce UMEP Scholars Online PLC

Fall 2010

AUGUST

Saturday, Aug 14th

General Session #1

11:00am-12:00pm

Monday, Aug 23rd

General Session Make-up and Small Group #1

9:00pm-10:00pm

Saturday, Aug 28th

Small Group #2

11:00am-12:00pm

SEPTEMBER

Wednesday, Sep 8th

Small Group #3

9:00-10:00pm

Saturday, Sep 18th

General Session #2

11:00am-12:00pm

Wednesday, Sep 22nd

Small Group #4

9:00pm-10:00pm

OCTOBER

Wednesday, Oct 6th

Small Group #1

9:00pm-10:00pm

Saturday, Oct 16th

General Session #3

11:00am-12:00pm

Wednesday, Oct 27th

Small group #2

9:00pm-10:00pm

NOVEMBER

Wednesday, Nov 3rd

Small Group #3

9:00pm-10:00pm

Saturday, Nov 13th

General Session #4

11:00am-12:00pm

Wednesday, Nov 17th

Small Group Meeting #4

DECEMBER

Wednesday, Dec 1st

Small Group Meeting #1,2

9:00pm-10:00pm

Saturday, Dec 11th

General Session #5

11:00am-12:00pm

Wednesday, Dec 15th

Small Group Meeting #3, 4

9:00pm-10pm

Appendix F

Session Agenda

Georgia State University Robert Noyce Scholars
Online Professional Learning Community General Session
November 13, 2010

Agenda

· **Welcome**

· **Warm-up**

How do you currently assess student mastery of mathematics with respect to the curriculum standards?
How do you facilitate student self-reflection of how he/she is mastering the curriculum standards?

- **Update on National Science Foundation Profiles Request** (see UMEP Google Group Postings for details)
  http://groups.google.com/group/umep-plc-participants/browse_thread/th...

· **Using Skills Based Portfolio Assignments to Assess Students' Mathematical Thinking: A Summary and Preliminary Analysis for GSU Noyce Scholars**
Presented by [redacted]
· Discussion

· **Common Core Georgia Performance Standards: What, Why, When? How?**
Presented by Rabia Shahbaz
· Discussion

· **Suggestions for Activities for General Session Meeting**

· **Closing Comments**

Appendix G

UMEP Online PLC-Research Survey

Dear UMEP Scholars, as you know that UMEP online PLC is an extension of Robert Noyce Scholarship Program. The focus of this online PLC is to increase teachers' retention in high needs schools. We are now in the research phase and would like to collect some data on the effectiveness of this community. Please take few minutes out of your very busy schedule and complete this survey by Monday, Feb 28th. Your honest and thoughtful feedback will be greatly appreciated. We would like to thank you in advance for completing this survey in a timely manner.

Please tell us your name, number of years teaching, and approximate number of online PLC meetings attended thus far.

Are you serving the role of a leader in your school? If yes, in what capacity?

Do you feel that the virtual environment developed into a space in which you felt a part of a community.. please explain why or why not.

Please list the benefits of the virtual environment.

Please list the drawbacks of the virtual community.

Did the benefits outweigh the drawbacks for you?

Did the Noyce program provide an avenue in which you felt supported and encouraged to succeed.. please provide examples.

What aspect of program would you change? - why

What aspect of program would you keep? -why

Would you continue to access the virtual environment if it was not required to receives a monetary stipend?

Rate the probability that you will remain in the teaching profession after the completion of the program

- 100%

- more than 50%
- less than 50%
- 0%

Rate the probability that teaching in an Urban environment will be your career.

- 100%
- more than 50%
- less than 50%
- 0%