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An Examination of International Teachers' Pedagogical Adaption to U.S. Secondary Mathematics Classes

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AN EXAMINATION OF INTERNATIONAL TEACHERS’ PEDAGOGICAL ADAPTATION TO U.S. SECONDARY MATHEMATICS CLASSES

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Curriculum and Instruction

by
Dennis A. Kombe
August 2016

Accepted by:
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ABSTRACT

Since the early 1990s, there has been a considerable uptick in the recruitment of international teachers to the U.S. to teach subject areas that experience perennial teacher shortages, including mathematics, science, special education, and languages, in hard-to-staff, high needs urban or rural K-12 schools. However, research is only starting to emerge that considers the social and pedagogical transition processes of these teachers. This study examines how international secondary mathematics teachers negotiate dialectics, and tensions, between their perceptions of effective mathematics teaching practices in their home contexts as compared to expectations in U.S. public schools, and relatedly, how international teachers’, and their students’ perceptions of classroom interactions relate to mathematics learning experiences. The study uses partially mixed, concurrent, dominant status mixed-methods research design to explore teachers’ transitional processes and develop profiles of teachers’ interpersonal behavior. Data analyses are grounded on interpretive phenomenological analysis (IPA) (Smith, Flowers & Larkin, 2009) and descriptive statistics.

This study’s findings add to a scholarly base that points to difficulties international teachers encounter during the socialization process into their new school contexts. This study also questions assertions on the transferability of teacher effectiveness and posits the need for closer consideration of hitherto unexplored connections between international teachers’ mathematical knowledge for teaching (MKT) and the concomitant need to address intercultural awareness, classroom culture, and the set of norms that govern and contribute to discourse and interactions in mathematics
classroom settings. Implications for practice, and suggestions for ongoing professional
development necessary to meet the specific needs of international mathematics teachers
are discussed.
ACKNOWLEDGMENTS

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CHAPTER 1
INTRODUCTION

Introduction

Since the early 1990s, there has been a considerable uptick in the recruitment of international teachers to the U.S. to teach subject areas that experience perennial teacher shortages, including mathematics, science, special education, and languages, in hard-to-staff, high needs urban or rural K-12 schools (Dillon, 2009; Dunn, 2013). Whereas new teachers face a gargantuan task of adapting to new schools, curricula, students, and social environments (Johnson & Kardos, 2002), for many international teachers, foray into teaching in the U.S. is often fraught with apprehension as they struggle to adapt to U.S. schools’ functional structures, variations in internal and external assessment programs, communication – both written and verbal, pedagogy, and parent-teacher as well as student-teacher interactions (Hutchison, 2005; Waite, 2009; Kuhn, 1996).

This study extends research on international teachers’ acculturation processes by examining assumptions of transferability of teacher effectiveness (Dunn, 2011), and addresses international teachers’ acuities on instructional processes in mathematics classrooms. This study specifically seeks to understand how international mathematics teachers negotiate dialectics, and tensions, between their perceptions of effective mathematics teaching practices in their home contexts as compared to expectations in U.S. public schools, and relatedly, how international teachers’, and their students’ perceptions of classroom interactions relate to mathematics learning experiences. Findings afford a better understanding of successes, challenges, and pitfalls international teachers encounter as they look for ways to effectively work with students in U.S.
secondary mathematics classrooms. Results from the study provide guidance for the orientation, induction, and ongoing professional development necessary to meet the specific needs of international mathematics teachers who commonly serve students from historically underserved communities (Sparks, 2013).

For the purposes of this study, I define international teachers as those who were born, received teacher education, and have previously taught in countries other than the United States, but who are currently practicing in a United States’ public school system on a temporary basis as cultural exchange teachers on J-1 visas. Such teachers are designated as non-immigrant aliens by the United States Department of State and are expected to return to their countries of origin after a specified fixed period of employment, often between 3 and 5 years.

**Background and Rationale for the Study**

In the United States, the recruitment of international teachers (ITs) is a fairly recent phenomenon. Two rationales are often provided for the recruitment of ITs into public schools. First, as the Visiting International Faculty [VIF], one of the forerunners in international teacher recruitment in the U.S., notes, ITs can serve as cultural ambassadors, sharing cultural experiences with students, faculty, and the community (Visiting International Faculty, 2015). VIF sees this as a way to expand school community members’ horizons, and to inspire students to develop a passion for global learning through an appreciation of cultures beyond the shores of the United States. Correspondingly, a hope is that, at the end of their exchange visit, ITs, on their return home, will use their experiences to build bridges of mutual understanding between their
local communities and the schools they worked in while in the U.S. There are no current studies of the extent to which this rationale may be workable.

The second and perhaps more pragmatic argument for ITs in U.S. public schools is that they alleviate staffing deficits, especially in schools which experience high teacher turnovers (Ingersoll & Perda, 2010). Such deficits became increasingly pronounced after passage of the No Child Left behind (NCLB) Act of 2001, which required that classrooms be staffed by “highly qualified” teachers (HQT), with demonstrated core academic subject matter competence (US Department of Education, 2002). Today, school districts can access candidates for teaching positions from multiple sources, including teacher education programs, alternative programs of certification, as well as teacher recruitment organizations such as Teach for America (TFA). For some school districts, however, especially districts with high needs urban and rural schools, the HQT requirements coupled with high staff turnover have all but eliminated the cushion of supply relative to teacher demand (Ingersoll & Perda, 2010). To close the personnel gap, some schools have opted to hire ITs (Hutchison, 2001, 2005; Dunn, 2013; Bartlett, 2014).

The American Federation of Teachers (AFT) reports that, as of 2007, there were an estimated 19,000 ITs in U.S. public school classrooms (American Federation of Teachers, 2009). In the decade between 2001 and 2010, over 100,000 ITs were recruited to teach in American public schools (Bartlett, 2014), compared to about 33,000 TFA teacher corps members recruited in the 24-year period since the organization’s founding in 1990 (Teach for America, 2014). Though the number of ITs makes for a tiny portion of the entire U.S. teacher workforce, to those districts and schools that rely on ITs to cover
local teacher recruitment shortfalls, providing the supports necessary to meet the needs of newly recruited teachers is absolutely essential. Given projections on mathematics, science, languages, and special education teacher shortages in high-needs schools (U.S. Department of Education, 2015), the recruitment of ITs is likely to continue.

**Problem Statement**

Inherent within the international teacher recruitment community is an assumption that teachers, with limited introductory professional development, can be as effective when supplanted from one cultural context to the next or from one country to another (Dunn, 2011). However, studies indicate that cross-national movements introduce ITs to new and unfamiliar environments that require the acquisition of a new set of social and academic skills (Miller, Ochs & Mulvaney, 2008; Brown, Dashwood, Lawrence & Burton, 2010; Fee, 2010). To be effective, these teachers need to overcome a variety of obstacles that stem from a move between different education systems and cultures. These challenges provide researchers interested in cross-cultural education in general, and mathematics education researchers in particular, opportunities to examine the transferability of teacher effectiveness as teachers move from one cultural context to the next or from one country to another. Currently, though ITs are slowly becoming a feature of the U.S. public school teacher pool, research is only starting to emerge that examines the social and pedagogical transition processes of these teachers as they strive to become more effective in their new instructional settings.

An examination of literature points to two areas of persistent concern to ITs. These are: adapting to pedagogical expectations in the U.S. schools, and managing
student-teacher interactions to ensure effective teaching and learning (Shady, 2014; Fee, 2010; Rhone, 2007; Dunn, 2011; 2013; Marzano, Marzano, & Pickering, 2003). Though often mentioned, these issues are seldom explicitly explored. Rather, current studies on cross-national teachers focus largely on broad policy issues and ideas related to effective teaching. Such issues include international teacher migratory patterns and impacts on sending and receiving countries, as well as protocols for recruitment (Miller, Ochs & Mulvaney, 2008; McNamara, Lewis & Howson, 2007; Appleton, Morgan & Sives, 2006), connections between induction or lack thereof to teacher performance (Miller, 2008), implications of hiring ITs from a human resource perspective (Oloo, 2012), pedagogical in-congruencies for science teachers (Hutchison, 2001), and narratives of international teachers’ transitional identity (Nganga, 2011). What is missing is a window into an international teacher’s classroom and an exploration of the interactions that happen on a day-to-day basis with teachers teaching mathematics – especially to high school students.

This study focuses on secondary mathematics ITs for several reasons. First, mathematics is considered to be an essential component of the school curriculum in many countries around the world and a requirement for student promotion between grade levels, and hence compulsory for most students. Whereas the sequencing of specific mathematical content, the structure of mathematics curricula, and broadly acceptable processes in teaching and learning mathematics might vary by context, expectations of what mathematics students need to know and could apply to problem contexts at specific milestones appear to be reasonably similar (Mullis, Martin, Foy & Aurora, 2012; OECD,
2016). At the same time, there is apprehension related to mathematics. For many students as well as adults, mathematics is perceived to be one of the more difficult subjects to learn (Boz, 2008). Mathematics teachers are often viewed less favorably by their students than teachers of other subjects (den Brok, Taconis & Fisher, 2010) and their classes are often prototypically seen as subject-oriented rather than student-oriented (Maulana, Opdenakker, den Brok & Bosker, 2012). The compulsory nature of mathematics, which is an international phenomenon, results in classes populated by students with varying degrees of motivation, and calls for teachers to better understand both students and context if they are to make mathematics learning meaningful (Ladson-Billings, 1995).

Simultaneously, there are pressures within the U.S. education system for reform in how teachers engage students in mathematical thinking, and for increased performance on high-stakes mathematics tests, which often forms a major component for evaluating and comparing students, teachers, schools, districts, and educational systems. For ITs, this coupling of learners with varied levels of motivation, perceptions of the appropriateness of teaching approaches for given contexts and sets of students, relations between student-teacher interactions, pressures to meet predetermined performance goals for both students and teachers, adaptation to challenges posed by current mathematics education reform environment, and teachers’ negotiations of worldviews of what it means to teach mathematics makes for an interesting area of study.

Though research shows that constructing pedagogical knowledge for teaching is a highly contextual and interactive process between the teacher, students, and mathematical content (Horn, 2012), we lack research insight regarding the connections between ITs’
mathematical knowledge for teaching, classroom interaction, and beliefs about mathematics teaching and learning. Additionally, research suggests that the teacher-student interactions are a primary mediator of instructional practice and significantly influence student outcomes (Hamre, et al., 2013).

With continued recruitment of international mathematics teachers, it is necessary for researchers to explore the unique orientation and transitioning experiences of ITs, as well as examine what happens in classrooms as they work to engage students in urban and rural settings. To do this, we need to understand ITs pedagogical experiences, their transitional challenges, and their perceptions of professional development programs which support newly hired teachers. Further, we also need a more informed understanding of ITs’ perceptions of what qualities are necessary for effective mathematics teaching in the U.S.

**Purpose of Study**

The purpose of this study is to explore two aspects of international teacher adaptation; that is, international teachers’ cross-cultural perceptions on effective mathematics teaching practices, and relatedly, teachers and students’ acuities of the student-teacher interactions and its influence on mathematics learning. In the first case, this study seeks to understand the cross-cultural experiences of international high school mathematics teachers, and to examine the teachers’ perceptions of the transition to teaching in the U.S. Working on the assertion that a teacher’s actual enacted teaching practice stems from a complex amalgamation of social and cultural influences, and the teacher's beliefs about mathematics learning and teaching (Barkatsas & Malone, 2005),
this study specifically looks at teachers’ perceptions of effective teaching by drawing on their home context experiences, and how they realign their beliefs and practices to what they perceive as reasonably good teaching based on their understanding of the frameworks of teaching in their U.S. teaching context. This study considers steps ITs take to develop competencies appropriate to teaching in U.S. public schools.

The second aspect of the study focuses on student-teacher classroom interactions. According to Brown (2001), interactions in the classroom are predicated on expectations by both teachers and students, and influence teacher and students’ behavior (Frasier, Fraser & Creswell, 1995). The resultant classroom environment and interrelationships shape the nature of acceptable intellectual contributions to classroom discourse, contribute to equitable practices, and help students develop a sense of belonging, which allows for mathematical engagement and learning (Horn, 2012). This study, therefore, considers the relationship between participant ITs and their students of the classroom environment, and their conception of the role these interactions play in enhancing or frustrating learning in high school mathematics classes.

**Research Questions**

This study is driven by the following broad question and secondary research questions:

1. How do international mathematics teachers negotiate dialectics, tensions, and understandings of effective secondary mathematics teaching practices within the contexts of their classroom environments in U.S. public secondary schools?

Specifically:
a. How do home context mathematics teaching experiences compare to teachers’ experiences and expectations of secondary level mathematics teaching in U.S. public schools?

b. In what ways are pedagogical adaptations reflected in day-to-day mathematics teaching and learning?

c. What are international secondary mathematics teacher’s perceptions of classroom interactions?

   i. To what extent do students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their mathematics classes?

Theoretical Framework

A cross-national change in teaching contexts for international mathematics teachers calls for a reevaluation of one’s previously held ideals on the nature of schooling, the essential processes of schooling, and of what it means to teach mathematics. Much of what teachers know experientially prior to their transnational move is informed by their experiences as students and practitioners within their education systems. These ideas constitute the teachers’ worldview. According to Simon (2009) a person’s worldview refers to the sum total of their beliefs, understandings, and deeply held commitments. Worldviews provide us with “presuppositions about what the world is really like and what constitutes valid and important knowledge about the world” (Cobern, 1994, p. 5) and act as filters against which knowledge is assessed. Thus, our current worldview influences how we get to see and experience the world, our thoughts, actions,
perceptions, and emotions. A person’s worldview is also subject to change based on unfolding experiences and choices made in day-to-day living. Cobern (1994) points out that, through interactions with other members of society, we come to develop and share specific ways of ‘seeing’ and interpreting the world. Given that different societies will have different worldviews of what it means to educate a child, and of what productive learning interactions in a class look like, it is important for international teachers to consider differences in schooling processes, particularly their roles as teachers in their home school context as compared to roles they are expected to enact in U.S. schooling environments.

For mathematics teachers specifically, perceptions about the nature and role of mathematics influences how mathematics teaching and learning is characterized in classrooms (Dossey, 1992). Conceptions about the nature of mathematics vary on a continuum from absolutist to fallibilist. Absolutist viewpoints perceive mathematical knowledge as objective, timeless, value-free and culture-free, and as an incorrigible body of knowledge, which rests on the firm foundations of deductive logic (Ernest, 1991). From this perspective mathematical knowledge’s utility stems from its universal validity. These absolutist ideas are communicated in schools using mechanistic-instrumental strategies where students work on routine tasks, which may involve the application of specific procedures to arrive at unique, fixed, and objectively right answers. On the other hand, fallibilist views of mathematics see mathematical knowledge as the outcome of social processes, and embrace concerns about practices of mathematicians, mathematical history, and its applications to human activity (Ernest, 1996). Indeed, as reform
documents by the American Association for the Advancement of Science (1989) and the National Council of Teachers of Mathematics (1989, 2000, 2014) posit, mathematics is a growing and dynamic field where both processes and products are considered an essential part of the discipline. Hence, whether teachers conceptualize the nature of mathematics as static and abstract, or dynamic and changing based on experimentation and application, will influence how teachers approach teaching (Dossey, 1992). Furthermore, besides mathematical content, schools, through socialization, convey norms and values about school life and expectations of participants in the schooling process. In what has been termed the “hidden curriculum” (Snyder, 1971), participants in schooling processes convey complex, implicit messages about knowledge, values, and norms of behavior expected in and through the educational process (Skelton, 1997). Ideas related to school rules and codes of discipline, the learning organization, tracking, and the nature of student-teacher relationships, mask implicit messages about power relationships, and can be an informative way to understand connections between the hidden and formal curriculum (Skelton, 1997). Even though there is a presumption that underlying mathematical concepts are universally valid, international teachers will find that they have to unpack their assumptions and beliefs about the nature of mathematics and the relational nature of instruction.

Getting to understand the new cultures within a new context, however, is not always smooth and easy. There are cross-cultural issues which crop up and impact interactions that take place between the teacher, school, colleagues, and students. A situated learning theoretical framework lends itself to exploring relations between
individuals and new contexts. According to Lave and Wenger (1991), such theories of social practice emphasize the inherent social negotiation of meaning and explain how people come to think about relations that stem from socially and culturally structured worlds. From this perspective, participation and knowing are activities carried out by specific people within a given social cultural community. Lave and Wenger’s (1991) premise of learning as peripheral participation provides a useful tool for explaining how newcomers to a community of practice progressively become acquainted to the community’s worldview. Similarly, Nicholson (1984), who differentiated between varied levels of expatriate adjustment to new contexts, points out that those who go through absorption transition make identity adjustments by devoting their time to interacting with members of the new community, learning new skills, social behaviors, and frames of reference to meet the requirements of the new situation. Although Lave and Wenger do not address the question of portability of expertise for international teachers, they suggest that by becoming members of communities of practice, new members to the community can develop new ways of understanding, acting, and identification that will enable them to function effectively in their new contexts. In this sense, through the situative learning framework, we see that effective transition has less to do with the individual in isolation but rather interactions with members of the new environment, by adapting, and contributing to norms and cultures of the new context.

Finally, this study adopts a systems perspective on classroom communications to understand teacher-student interactions within the classroom. According to the systems theory (Creton, Wubbels & Hooymayers, 1993), the circularity of communications
implies that the behavior of the teacher influences and is influenced by the behavior of the students (Frasier, Fraser & Creswell, 1995). As such, teacher speech, verbalized and non-verbalized expectations, and overt behavior drive student action, which in turn elicit a teacher response. Both students and teachers come into the classroom with background information and expectations of how the classroom will unravel. These backgrounds are informed by prior experiences and filtered through their cultural worldview. Understanding these processes then, lays a framework for considering the relationship between international teachers and their students, their classroom environment, and their conception of the role such interactions play in promoting learning in high school mathematics classes.

**Positionality**

My interest in the transitional process for international teachers is based on experiences I had as a high school mathematics teacher in my home country of Kenya, as an expatriate mathematics and business studies teacher in Botswana, and as an international cultural exchange teacher in south eastern U.S. Prior to participating in the cultural exchange program, I presumed that mathematics, as a course of study, has universal language unhampered by local contextual practices. My assertions about mathematics were influenced by absolutist notions on the nature of mathematics. These ideas developed over time as a student in Kenya’s public school system, through my university’s teacher education program, and were subsequently cemented in practice as a junior high and high school mathematics teacher in Kenya and Botswana. My students’ classroom experiences did not differ significantly for the kinds of experiences I had as a
secondary school student. Given pressures of high stakes, terminal tests, the prevailing view was that excellent students were those who could memorize facts, efficiently execute procedures and use appropriate formulas for given questions, and could regurgitate information when needed (Hiebert, 2003). Teaching, therefore, represented a continuous cycle that involved step-by-step demonstrations of specific procedures, followed by repeated practice of the said procedures with a substantial number of questions from the class text (Smith 1996). Under the circumstances, I considered mathematical teaching expertise as one of the most portable teaching skills an educator could possess. As long as one had a sufficient knowledge of mathematical content, and could develop a good working relationship with students in their classes, actual teaching processes were not a problem. In moving between Kenya and Botswana, save for initial language difficulties, mathematics teaching expectations were very similar.

Upon arriving in the U.S., and after a three-day orientation with the Visiting International Faculty (VIF), I reported to my assigned school in south east USA. Based on experiences as a cultural exchange teacher in the U.S., I came to realize the need for a thorough reevaluation of my pedagogical know-how if I were to be effective in my new setting. Students found the lecture, followed by guided and independent practice teaching and learning process to be boring and disengaging. I had a hard time responding to the proverbial question, “why are we doing this?” Often times, disengagement resulted in classroom management challenges, and loss of instructional time. With time, through discussions with mathematics teacher coaches at the school, and as I got to know my students better, I came to realize that teaching no longer represented the simple
transmission of mathematical knowledge to my students; rather it required continuous reflection on and development of new ways of interacting with the content and intended audience. Over time I shifted my mindset from “I am the teacher, if you follow my directions, you will be fine” kind of teaching to one where I realized that each day I learnt something new from my colleagues and students, and these in turn informed revisions to my instructional processes. This change in perceptions, however, was, and still is an evolving process.

In conversation with other international teachers within my school district, it became apparent that teachers were having varied success in teaching mathematics at their schools. While a majority of international teachers I spoke to had some measure of difficulty with classroom management, some teachers observed that their mathematics classes were often hampered by issues ranging from classroom management, technological challenges, to a lack of understanding of the structure of mathematics curriculum in the schools they taught. For a number of teachers, despite their self-perceptions of being good teachers in their home countries, these teachers faced difficulties adapting to their new environments and were perceived by the local administrators as ineffective mathematics teachers. When viewed together with literature on international teacher adaptation, however, such experiences are far from unique.

This study, is therefore an endeavor to understand what other international mathematics teachers experience during their transition to teaching in the U.S., and how they overcome challenges related to the transition. Though it is expected that each international teacher will experience the transition differently depending on the context in
which he is teaching, there are expectations that such rich experiences could be informative to scholars looking at the international teaching experience. I approached the study from a constructivist perspective with the understanding that we arrive at new learning with an array of prior knowledge and experiences, and these affect how we respond to new information (Hyslop-Margison & Strobel, 2007). I endeavored to convey international teacher transitional processes as experienced by this study’s participants by presenting their voices and incorporating such methodological aspects as member checking.

**Overview of Sections that Follow**

The literature review in chapter 2 examines current scholarship on international teacher transitional processes, explores salient issues that mediate teacher-student interactions, and questions the significance of teachers’ worldview on mathematics teaching as they engage students in multicultural classrooms where students and teachers are drawn from different cultural backgrounds. This is followed in chapter 3 by a description of research methods, including survey instrumentation, data collection and analyses procedures, as well as a brief description of how findings were integrated and interpreted at the conclusion of the study. Chapter 4 provides an elaborated description of the study’s findings, followed by a discussion of the results and their implications on practice in chapter 5.
CHAPTER 2
REVIEW OF RELATED LITERATURE AND RESEARCH

International Teachers in the U.S.

The recruitment of international teachers to U.S. public schools is a relatively new phenomenon. Such recruitment is predicated on teacher shortages in high-needs, hard-to-staff, rural and urban schools that cater to students from socioeconomically disadvantaged backgrounds (Paul, 2005; Sparks, 2013). A search of literature on cross-national teacher recruitment shows that scholarly papers on the subject are few and far between; though such studies are steadily increasing (for a sampling see, Shady, 2014; Beck, 2010; Fee, 2010; Hutchison, 2006; Hutchison & Jazzar, 2007; Rhone, 2007; Dunn, 2011; 2013). Recent notable contributions to the subject include a consideration of case studies that highlight issues international science teachers face when they immigrate to teach in the U.S. (Hutchison, 2001; 2005), challenges to the neoliberal rationale for recruiting international teachers, particularly questions on the supposed benefits of multicultural education from an unprepared and under-supported group of teachers (Dunn, 2011, 2013), and a synthesis of teacher labor market trends and international teacher experiences in the U.S., with case analysis of Filipino international teachers in California (Bartlett, 2014). Other literature on the subject comes from dissertations that explore, for example, the Caribbean women teachers’ perceptions of their experiences in U.S. classrooms (Beck, 2010), pedagogical in-congruencies for international secondary science teachers (Hutchison, 2001), a narrative of international teachers’ transitional identity (Nganga, 2011), a case-study on complexities of teacher migration focused on
teacher perceptions of pedagogy, migration expectations, and local union representation (Edwards, 2014), and a quantitative study exploring the professional development needs of international teachers (Waite, 2009).

The combined literature sheds much needed light to an otherwise understudied phenomenon. Besides Hutchison (2001; 2005; 2006), who considers international secondary science teachers’ transitional issues, and Fee (2010) whose study focuses on Spanish speaking bi-lingual teachers, most studies do not consider instructional and interactional aspects of teaching, are not subject specific, and none specifically considers mathematics teaching.

**Challenges encountered**

The studies tell of international teachers’ personal, professional, and academic challenges – which are purported to have a bearing on their effectiveness. A common narrative among the studies’ findings is that while new teachers generally face a gargantuan task of adapting to new schools, curriculum, students, and social environment (Johnson & Kardos, 2002), for many international teachers, foray into teaching in the U.S. is fraught with apprehension as they struggle to adapt to new approaches to content and pedagogy, and the vastly complex instructional setting to which they are assigned (Kuhn, 1996). It is conceivable, as Nganga (2011) points out, that teachers, as products of a country’s educational system, are exposed to a myriad of experiences as part of their teacher education and classroom practice, which necessarily reflect the educational values and needs of their context. Teachers perceived as excellent in their home country contexts are not guaranteed success in a different country. To be successful in American
public schools, international teachers are expected to confront an incongruence that exists between their prevailing worldview of what it means to effectively teach mathematics, for example, and the curricular and/or instructional expectations required of them in their new setting. Even though the teachers undergo a rigorous selection process and have impeccable content knowledge (Dunn, 2013), surviving the culture shock and acquiescing to pedagogical norms of their new schools can be daunting. To bridge this gap, mentoring or induction programs are highly encouraged, and there are suggestions that such orientations possibly start prior to teachers coming to the U.S., and continue during the teachers’ initial year of teaching (Hutchison & Jazzar, 2007; Ingersoll & Strong, 2011; Biggs, 2010; Fee, 2010).

One could argue that transitional challenges are not unique to international teachers, and that even veteran American teachers face adaptation issues when they move from one school to the next – especially if the two schools serve different student populations. For example, Obidah and Teel (2001) describe the painful transformation that one teacher, a self-identified excellent teacher, undergoes as she works to settle in to a school that has a predominant minority population. To be effective, she is compelled to face her prejudices and misconceptions about race and students’ culture, and seek ways to resolve conflicts that arise from student-teacher interactions. Additionally, a longitudinal study by Bullough & Baughman (1995) of an experienced teacher who changed schools revealed the complex interactions of teacher and context as she strove to work with her new students effectively. The resultant self-doubt prompted her to shift the way she
thought about and implemented the curriculum to meet the needs of her students, and to
adapt to the culture of the school.

For international teachers, however, there is a semblance of double jeopardy; they
need to get accustomed to social norms inside and outside the school (Fee, 2010). As
Dunn (2011) aptly points out, difficulties international teachers experience are related to
“student behavior, culture shock, communication difficulties, new instructional strategies
and curricula, and students’ lack of cultural awareness” (p. 1394). Waite (2009), who
surveyed 152 international teachers to help identify specific professional development
needs of teachers in US public schools, corroborated these findings. Whereas teachers in
Waite’s study pointed to being knowledgeable about their content areas, they
acknowledged the need for professional development related to subject specific
pedagogies including ideas on the development of lessons that provide hands-on
experiences and incorporate instructional technology, cooperative learning strategies,
approaches to teaching culturally diverse classrooms, and establishing positive student-
teacher relationships. Interestingly, a substantial majority of teachers in Waite’s study did
not believe that cultural differences were a barrier to effective instruction, but noted
challenges associated with acclimatizing to the realities of teaching in urban schools, and
managing behavior in classrooms populated with diverse student populations as their
greatest challenge.

Such challenges are not limited to educators at the K-12 level only. Brown, et al.
(2010) argue that an increasingly globalized market for academics and a need for
institutions of higher education to attract the best and brightest, has resulted in global
cross-cultural movements of international higher education educators. In what they term as ‘crossing over,’ they describe difficulty experienced with pedagogical enculturation – in terms of teachers needing to confront and adapt to institutional cultures and habits. They posit that “these tensions often arise in relation to cultural specificity and cross-cultural interaction within the learning environment where one cultural practice may not transport across to another … [and where] teachers may be confronted with obvious differences such as different teaching and learning practices, differences in institutional operations and role expectations, to more implicit or subtle differences such as communication and engagement styles with students” (p. 323). They argue that with proper training, an acknowledgement of the strengths and prior experience that teachers bring with them, and an aligning of this knowledge with institutional exemplars, resources, teaching and learning principles, and expectations, international educators would be better positioned to meet the rigors of teaching in their new environments.

Analogous augments are made in Kim’s (2011) case study that considered the variations in pedagogical beliefs and practices of 6 U.S. and 6 international teaching assistants (TAs) in a university based mathematics department. He notes that though teaching assistants play an important role in helping undergraduate students adjust to rigors of college mathematics; they generally receive limited training and support to ensure effective university instruction. International TAs, especially, face greater challenges brought on by lack of pedagogical knowledge, difficulties stemming from cultural differences, and poor English language proficiency. More importantly, American and international TAs held different beliefs, and exhibited different teaching practices.
given their varied experiences, scholarly, and cultural backgrounds. Though the study sample was too small for generalization purposes, Kim’s findings support previous research which depicts a clear distinction in beliefs on mathematics teaching and learning held by international and American TAs. International TAs, especially, held the belief that good mathematics students are those who can adequately follow procedures and apply such procedures to solving mathematical problems. To international TAs, teaching, therefore, involves use of clear explanations and repeated use of increasingly complicated procedures to help students understand mathematical concepts.

In his book, *Teaching in America: A cross-cultural guide for international teachers and their employers*, Hutchison (2005) categorizes transitional issues affecting international teachers into three broad classifications which, he argues, require careful consideration as part of the new teacher induction. These are: Support system issues, Knowledge gaps, and Knowledge shifts. *Support system issues* relate to the many facets of a teacher’s life both inside and outside the school environs that might have direct or indirect influence on a teacher’s classroom effectiveness. Like Fee (2010), and Hutchison and Jazzar (2007), he describes the support systems as a form of mentorship, or an initial holding of hands to get a teacher acclimated to the school structure and to afford a point person to go to if in need of help, not only with school related issues but for help with physical and psychological needs, including finding a house, issues of transportation, and finances. Hutchison identifies *Knowledge Gaps* as specific ideas about American schools that are likely to be different from those international teachers experienced in schools outside the USA. Such gaps include: knowledge of the school’s functional structures (e.g.
an awareness of teacher responsibilities, documentation requirements, scheduling of
classes, notions of teacher autonomy, and focus for classes). Other gaps include an
understanding of internal and external assessments; dealing with language and
communication issues such as variations in accents, spelling, use of idioms, tone of
speech, humor or lack thereof; an ability to adopt multiple teaching strategies to reach an
increasingly rich and diverse student body; the importance of parent-teacher relationships
and the need to keep parents abreast of students’ progress; and the necessity to creatively
manage classroom interactions. He considers Knowledge Shifts to be based on the notion
that international teachers have to become active, perpetual learners, seeking out
opportunities for personal and professional development, active collaboration with
teachers at the school and colleagues beyond the school, and the development of a
network of official or unofficial mentors – especially in the teacher’s discipline.

**Mathematics Teaching and Teacher Beliefs**

**Conceptualizing good teaching**

What do we expect of international secondary mathematics teachers working with
students in U.S. public schools? Based on literature, an answer to this question
necessarily begins with the understanding that teaching mathematics is a complex
endeavor. What counts for good mathematics teaching looks different to different people
and is continuously evolving with changes in society. According to Wilson, Cooney and
Stinson (2005), teaching can be understood to be a culturally defined educational activity
shaped and constrained by the needs and expectations of the society, schools, and
individuals. Polya (1981) spoke of teaching as means to help students develop critical
thinking skills necessary to solve societal problems. To Polya, good teachers were those who had a deep love and understanding of the subjects they taught, knew instructional methods that could get students engaged in learning mathematics, and most importantly, did not try to cram knowledge down children’s throats by use of drills and skill development. With the development of mathematics standards in the early 1990s, ideas about good teaching took on a constructivist path as students were invited to participate in the learning process with both the teacher and students working to make sense of the mathematical concepts they were exploring (Wilson, et al., 2005).

According to the National Council of Teachers of Mathematics’ [NCTM] *Principles and standards for school mathematics* (2000) and subsequently *Principles to action* (2014), effective mathematics teaching takes into account classroom processes that encourage students to critically examine challenging mathematical ideas, to communicate, to question, and to justify their understanding of mathematical ideas with appropriate teacher support. Though there might be differences on specific classroom practices required to meet this challenging goal, what remains true is that successful mathematics teaching happens at the intersection of a tripartite relationship between the teacher, students, and subject matter (Horn, 2012). Based on assertions by the *Professional Standards for Teaching Mathematics* (NCTM, 1991) this relationship can be nurtured in an environment where students are availed engaging tasks and opportunities to represent mathematical ideas in a variety of ways, to think, talk, agree or disagree with the teacher and their peers, and to meaningfully make sense of the mathematics they are learning. Such classroom environments are undergirded by positive teacher-student
interactions where teachers promote genuine respect for all students as they relate to representations of the subject matter, and to one another (Franke, Kazemi & Battey, 2007). How teachers and students interact in the social context of the classroom, then, is critical to what the students learn about mathematics, and about themselves as doers of mathematics.

Wubbels (1985) distinguishes two important yet complementary aspects of mathematics teaching: First, the instructional-methodological aspect, which encompasses elements of teaching that include how to organize the instructional process, how to stimulate learning, and how to assess students to ensure learning takes place. Second, Wubbels (1985) posits a relational aspect of teaching, which looks into relationships between teachers and students and among students, and which accounts for the character of the classroom environment. In this facet of teaching, teachers build relationships with their students and develop safe and caring learning environments where each individual student is valued, their enthusiasm for mathematics embraced, and their intellectual contributions to classroom discourse accepted (Horn, 2012). Such interactional aspects of instruction contribute to equitable practices and help students develop a sense of belonging, which allows for mathematical engagement and learning (Horn, 2012). Similarly, Danielson (2013) breaks down the complex process of teaching into four domains of teaching responsibility, i.e., planning and preparation, classroom environment, instruction, and professional responsibilities. Wubbel’s (1985) relational aspect could be most closely associated with Danielson’s classroom environment domain, which includes creating an environment of respect and rapport, establishing a culture for
learning, managing classroom procedures, managing student behavior, and organizing the classroom’s physical space. This notion is supported by Lampert (2003), who has written extensively on mathematics teaching practice and notes that teaching is negotiated through teacher action as it relates to each individual student and the classroom collective. Such interactions and interrelationships that follow are not just important for students but can be important indicators of a teacher’s approach to behavioral issues in class, teacher stress, and teacher burn-out. Understanding how such relationships evolve in a given classroom can be a good source of information for targeted professional development (Wubbels, 2005).

**Mathematics pedagogical and content knowledge**

In addition to relational aspects of teaching, researchers have identified a number of elements that are specifically important to successful mathematics instruction, and that can be used to conceptualize mathematics teaching. Shulman’s (1986) seminal work made connections between three interrelated forms of knowledge that contribute to effective teaching and learning. These are content knowledge, including knowledge of the subject and its organizing structures; lateral and vertical curriculum knowledge; and pedagogical content knowledge – which includes a deep understanding of the variety of ways of representing and formulating subject matter to make it comprehensible to others. Since then, the body of research, theoretical models, and assessments developed to explore such connections has steadily increased. For instance, Hill, Ball, and Schilling (2008) proposed a model of mathematical knowledge for teaching (MKT) in which they conceptualized distinctions between subject matter knowledge and pedagogical content
knowledge (PCK). Further Ball, Thames, and Phelps (2008) argued that whereas teaching in general included managing a variety of tasks such as lesson planning, assessing students, communicating classwork to parents, managing homework, attending to concerns for equity, and dealing with site administrators, each of these tasks called for knowledge of mathematical ideas, and thoughtfulness about the nature of mathematical proficiency. Even though much of the work mathematics teachers do is mathematical in nature, they still need understandings of the content and content delivery if they were to explicate mathematical knowledge in ways that help others make sense of the mathematics and promote student learning.

Hauk, Toney, Jackson, Nair & Tsay (2014) extended PCK model and argued that while PCK is essential to understanding the interplay between content and pedagogy, in reality teaching does not happen in a vacuum. All teaching takes place in given contexts with situated historical social experiences and cultural practices. Such contexts share competing discourses by students, the teacher, curriculum, and school, and help shape the classroom culture, that is, the set of values, beliefs, behaviors, and norms that govern interactions in a classroom setting. Therefore, a teacher’s ability to initiate, norm, and revise classroom communication, and hence effectively teach mathematics, is shaped by intercultural awareness. Teaching, consequently, has to take into consideration classroom discourse, in the “big D” sense of the word as a way to promote effective teaching and learning mathematics. To date there have been no studies that have considered international teachers' mathematical content knowledge or pedagogical content knowledge. Given expected variations in school or classroom based cultures and norms,
we could presume the existence of differences in teachers' perceptions of social cultural elements that underlie 'Discourse' in mathematics classrooms in the US.

Teacher beliefs on mathematics teaching

A study by Correa, Perry, Sims, Miller, and Fang (2008) notes that how teachers organize their classroom environments and apply mathematics pedagogical practices is shaped by their beliefs on instruction and learning, and these beliefs are influenced by teacher preparation as well as culturally shared experiences. Using interview data, Correa and his colleagues’ study compared U.S. and Chinese elementary mathematics teachers’ beliefs about how students learn mathematics, and found that teachers in the respective countries held distinct beliefs about how mathematics should be taught and how students learn. Teachers in the U.S. related more to teaching based on students’ learning styles and using hands-on activities, whereas Chinese teachers indicated the belief that developing students’ interest in mathematics was vitally important, as was relating mathematics lessons to real-life situations. Interestingly, Correa, et al.’s (2008) assertions mirror those of Blomeke (2012) who observed that even though these beliefs will vary from one teacher to the next, broadly speaking, there is more commonality in how teachers implement pedagogical processes within specific regions than is often thought to be the case. According to Blomeke, because of society’s perceptions about what matters in mathematics education, some countries, such as those in Eastern Europe and Asia, tend to be more product driven, whereas countries with a western persuasion are more emphatic on process, and emphasize pedagogical arrangements that cater to students’ needs.
Irrespective of focus, lectures and group work were the most widely instructional method adopted across the board.

Ernest (1991) argues that teacher beliefs of mathematics teaching are influenced, not just by knowledge of mathematics, but by their personal philosophies on the nature of mathematics as a whole, their models of mathematics teaching (i.e. whether they perceive of themselves as instructors, explainers or facilitators), and their assertions of the process of learning mathematics. He argues that all these factors are, however, mediated by the strong influence of the social context, which is determined by expectations of others including students, colleagues, parents, and administrators. Relatedly, Swan (2006) differentiates among three pedagogical orientations and describes models of teaching one is likely to encounter in a classroom as:

The *transmission* orientation views mathematics as a series of ‘rules and truths’ that must be conveyed to students and teaching as ‘chalk and talk’ followed by individual practice until fluency is attained. The *discovery* orientation views mathematics as a human creation and encourages students to learn through individual exploration and reflection, while the teacher adopts a reactive, facilitating role. The *connectionist* orientation views mathematics as a network of ideas that the teacher and student must construct together through collaborative discussion. Here the teacher has a proactive role in challenging students. (p. 59)

Though researchers strongly believe that there is a relationship between teacher beliefs, pedagogical practices, and assertions on student learning (Stipek, Givvin, Salmon & MacGyvers, 2001), there are also indications that discrepancies exist between what
teachers profess to believe, and what they practice in their classrooms. This discrepancy is best illustrated by Hoyles (1992) who conducted a meta-analysis of papers presented at the annual meetings of Psychology of Mathematics Education (PME) between 1979 and 1991 to better understand “the positioning of the teacher within a framework of psychology of mathematics education” (p. 32). She observed inconsistencies in how researchers depicted the relationship between beliefs and practice, and alluded this discrepancy to variations in the very act of teaching which is shaped by the conditions within each classroom and decisions made by the teachers based on prevailing social practices, rather than cognitive structures. Citing Secada (1991), she observes that it would be improbable to attend to teacher beliefs and behaviors without giving due consideration to the function played by students in their classrooms. She notes “A failure to acknowledge this diversity in attempts at simplification inevitably rules out consideration of emotional, cultural and social issues, leaving a blandness which does not resonate with life in real classrooms with real teachers and real kids” (p. 37). She raises an interesting point by noting that rather than being decontextualized, all beliefs are situated, dialectical products of activity, context, and culture. Based on this assertion, she challenges the notion that we can separate what is believed from how it is believed, but rather acknowledges that it is very possible for one to hold multiple beliefs. As such any inconsistencies observed between espoused beliefs and enacted practice could then be best understood within the constraints or scaffolds of the context in which the teacher practices.
Teacher-Student Interactions

Sociocultural theory maintains that cognitive development originates in social interaction (Vygotsky, 1978). At the heart of teaching are classroom interactions between teachers and students that revolve around content aimed at helping students achieve a predetermined set of academic goals (Hiebert & Grouws, 2007). Such interactions, which are mediated by communication between the teacher and students and among students (Sarangi, 1998), contribute to experiences students have in a specific classroom, and play a significant role in determining learning trajectories and outcomes of students (Sanders & Rivers, 1996). Though teachers engage in many activities as part of their teaching responsibilities, (e.g., planning and implementing lessons, assessing students, managing the classroom environment, collaborating with other teachers, the administration and parents) their success at teaching is substantially dependent on the interactions they have with students on a daily basis (Hamre, et al., 2013).

Kesner (2000) notes that besides parents, there are very few other non-familial relationships that are as important to the child as those formed with teachers. Scholars who have considered the impact of student-teacher interpersonal relations and the classroom environment on students’ academic outcomes note that these relationships are essential to a child’s development and classroom experience. Existing student-teacher relationships are important indicators of the overall classroom atmosphere and are significantly related to motivation (Isenbarger & Zembylas, 2006), cognitive development (Goldstein, 1999), and achievement (Roorda, Koomen, Spilt & Oort, 2011). Much more learning takes place in environments deemed to be supportive, and
encouraging of academic risk-taking, than in situations where such ideals are minimized (Lomax, 2007).

Such interactions, however, do not take place in a vacuum. They are governed by
the organizational structures of schools, the status, and power accorded to the various
classroom levels and tracks in a school (Franke, Kazemi & Battey, 2007). How teachers
interact with 'more successful' and 'less successful' students offers a glimpse in to teacher
expectations, and can be suggestive of whether classroom discourse is task oriented or
procedural in nature (Sarangi, 1998). For example, almost four decades ago, Leder (1987)
showed that although there were few differences in the number of times teachers
interacted with students classified as high, average or low achievers, there were
differences in the quality of interactions seen. The weakest students tended to get more
wait time and the best students the least. The best students, however, were accorded more
engagement and attention time, particularly on process questions in mathematics.
Similarly, the lower achieving students were more likely to get close-ended, product type
questions while the higher achievers were afforded more open-ended, process type
problems. Leder argued that if such differential treatment persisted over a long period of
time, it was likely to have an impact on the mathematics attitudes and performance of
students with differing abilities when presented with complex mathematical problems.
Similarly, Eder (1981) posited that as early as the elementary school level, teachers
interact differently with students in classes perceived to have low, middle and high ability
students. Using classroom observations, interviews, and video data, she noted that
students in lower ability classes were prone to inattentiveness, disruptions and violations
of set classroom norms, which contributed to lower levels of achievement. In other words, students with learning difficulties were often placed in environments that were less conducive to learning and hence performed poorly on achievement tests, perpetuating a cycle of mediocrity. Baker (1999) examined teacher-student interactions and relationship quality among poor, urban, African-American elementary students and found that perceptions of a caring, supportive relationship with a teacher and a positive classroom environment were related to school satisfaction as early as third grade. Students with high and low school satisfaction interacted differently with teachers.

According to Sarangi (1998), it is through communication that connections are made between academic and social activities that transpire in any shared classroom space. Such communication can be characterized by patterns of interaction that happen in the dyad (Davis, 2006), and are the basis for development, maintenance, and change of interpersonal relationships. In shaping productive teacher-student interactions, the teacher plays a pivotal role by establishing a classroom climate that offers opportunities for conversations which open windows into students’ ways of thinking about specific mathematical ideas, accounts for the value students place on such ideas, and makes explicit the language students use to express such ideas (Franke, Kazemi & Battey, 2007). But such a climate is not dependent on the teacher alone, rather it develops through conversations between teachers and students as they negotiate norms that govern classroom interactions within their context of learning. These norms either support or constrain what students learn, and evolve throughout a school year as the norms are continuously renegotiated (Lambert, 2003). This is especially important given that
students enter the mathematics classrooms with background notions of what it means to do mathematics that are based on prior experiences from whence they define agreeable mathematical practices (Boaler, 2011). For the teacher, building relationships with students involves understanding who the students are, what experiences have shaped them, as well as letting students get to know one another and the teacher.

**Significance of teacher-student interactions – on students**

*Engagement and Achievement:* Research has shown associations between teacher and student relationships, student engagement, and academic achievement. Students' satisfaction with school experiences has been linked to their sense of belongingness, connection to school, and achievement (Shaunessy & McHatton, 2009). Chapman (2003) notes that engagement is related to students' willingness to participate in routine school activities, such as attending classes, submitting required work, and following teachers' directions in class (p. 2). More specifically, Skinner and Belmont (1993) observe that engagement has behavioral and emotional components, and assert:

Children who are engaged show sustained behavioral involvement in learning activities accompanied by positive emotional tone. They select tasks at the border of their competencies, initiate action when given the opportunity, and exert intense effort and concentration in the implementation of learning tasks; they show generally positive emotions during ongoing action, including enthusiasm, optimism, curiosity, and interest. The opposite of engagement is *disaffection.* Disaffected children are passive, do not try hard, and give up easily in the face of challenges. Disaffected children can be bored, depressed, anxious, or even angry.
about their presence in the classroom; they can be withdrawn from learning opportunities or even rebellious toward teachers and classmates (p. 572).

Evidently, fostering student engagement in classrooms requires careful planning (McTighe & Wiggins, 2005), a conscientious selection of instructional tasks, and an effective orchestration of mathematics discussions (Smith & Stein, 2011). Such engagement is possible where there is a perception of quality interpersonal relationship between teachers, students and their peers; where teachers take time for, express affection toward, enjoy interactions with, are attuned to, and dedicate resources to their students (Skinner & Belmont, 1993). Such sentiments are echoed by Aultman, Williams-Johnson, and Schutz (2009) who argued that cultivating positive personal relationships is considered one of the defining aspects of effectiveness and expertise in teaching. Such relationships make it possible for one to engage in pedagogical conversations that hold the interest and imagination of young people and serve to enhance students’ lives.

However, as Fraser and Walberg (2005) point out, even though previous research indicates a close relationship between students’ perceptions of the classroom environment and students’ outcomes, the link has often been stronger for attributes related to attitudes than to achievement. Similar views were conveyed in a meta-analysis by Roorda, Koomen, Split and Oort (2011) which revealed substantial associations between affective domain of teacher-student relationships and students’ outcomes. The study focused on engagement and achievement with the assertion that student engagement in classroom activities was a mediator between positive teacher-student relationships and academic achievement. The analyses found stronger associations between teacher-student
relationships and engagement than with achievement. They posited that the construct of engagement was more closely related to social adjustment and suggested that even though teacher-student relationships are important, they may not be sufficient, on their own, to improve students’ learning behaviors. Based on the attachment theory, Roorda and her colleagues hypothesized that the existence of a positive emotional relationship between children and their teachers allows for increased risk-taking, an exploration of the immediate environment, and is a necessary precondition for student engagement with learning tasks.

*Care and Behavior:* In a study by Doda and Knowles (2008) that sought to understand young adolescents’ perceptions about important attributes that gave them voice in the classroom, students indicated “a desire to have positive relationships with teachers who were seen as helpful, kind, happy, encouraging, patient, respectful, and non-judgmental, … who truly knew them as people … genuinely enjoyed them, and were committed to working with them to make success happen” (p.28). According to Doda and Knowles (2008), students in the study rarely called for teachers to be nice. To these students, taking a minute to understand their needs and aspirations was a greater motivator to learning than a need to complete specific curricular activities. Similarly, Howard’s (2001) qualitative study of urban elementary students’ perception of their classroom environment found that students esteemed caring teachers, the existence of community or family like classroom environment and the notion of education as entertainment – “their [teacher’s] ability to make learning a fun and exciting process” (p. 144) to be essential for a vibrant classroom environment. One could presume that these
are universally applicable principles that make sense in any classroom setting irrespective of the ethnic backgrounds of the students. Interestingly, students in Howard’s study appreciated strict teachers, whom they construed to care for their well-being and who demanded nothing but the best of their work.

_Intrinsic value for learning mathematics:_ Additionally, a study by Midgley, Feldlaufer and Eccles (1989), established that students' perception of the intrinsic value of mathematics changed based on the extent to which students thought their teachers were supportive. Students’ intrinsic value of mathematics increased when students moved from low support environments to high, and declined when they perceived a drop in teacher related support. The resultant teacher-student relationships had a powerful effect on students' adjustments to new curricular demands, attitudes towards mathematics, and their performance in the subject.

**Significance of teacher-student interactions – on teachers**

Teaching is by definition relational, and teachers’ entry and persistence in the profession is, in part, driven by the care they have for their students (O’Connor, 2008). Hargreaves (2000) observed that teachers implicitly associate their enjoyment in class and assessment of effectiveness to relationships and interactions they have with students. The same study showed that the degree of intensity in such relationships might change as one goes from elementary levels, where relationships are driven by strong emotional bonds with students, to secondary schools where teachers relate positive relationships to student acknowledgement and respect rather than overt loving or liking.
In a study that explored school related variables that contributed to teacher satisfaction, Shann (1998) found that teacher-student relationships were considered to be more important than school curriculum, job security, teacher autonomy, recognition of teacher achievement, and relationships at work. Concomitantly, perceptions of negative teacher-student relationships were associated with classroom conflicts, stress, poor academic achievement, moderate declines in teacher self-efficacy, and teacher turnover (Hamre et al. 2013; Chang & Davis, 2009; Ingersoll, 2003).

Lazarus (1991) posits a transactional model of stress and coping to assess teachers’ subjective interpretation of situations that trigger emotional responses in class. Based on this framework, Chang and Davis (2009) argue that teachers will judge relationships in class based on whether such relationships assist them in meeting their goals; including implementing the curriculum, perceptions of an ability to control how students relate to the curriculum, perceptions of an ability to manage problems as they arise in class. As such, student actions that are congruent to teacher goals lead to teacher perceptions of positive emotions associated with enjoyment. Incongruent actions result in feelings of anger or frustration (Split et al., 2011).

Most negative effects of teacher-student relationships stem from habitual ways in which teachers judge problematic behaviors and the unproductive actions they take to deal with relationships with problem students (Chang & Davis, 2009). With incidents of repeated behavior, teachers internalize these experiences with students and develop representational models that guide emotional responses in daily classroom interactions. These models and reactions have an impact on teacher wellbeing in the long run. Student
misbehavior and discipline problems have consistently been identified as key sources of teacher stress and burnout (Sutton and Wheatley 2003; Tsouloupas et al. 2010). Research further demonstrates that when teachers spend a substantial amount of their time on behavior management, and use ineffective, reactive strategies to deal with negative interactions, then there are heightened levels of stress (Clunies-Ross, Little & Kienhuis, 2008).

Additionally, Riley (2009) makes the case for looking at student teacher relationships from a multifaceted approach rather than unidirectional approach that only considers either students' or teachers’ perspectives. He also notes that understanding interpersonal relationships is a complex endeavor and argues that whereas student-teacher relationships can be demanding of more immediate consideration, in the long run the combination of student-teacher and collegial relationships might have a significant impact on the teacher's gradual change towards making more meaningful connections with stakeholders at schools.

International teachers and Teacher-student interactions

A persistent theme that emerges from studies on international teachers, not just in the U.S., but also in the UK, Australia, New Zealand, and so forth (Miller, Ochs & Mulvaney, 2008; Biggs, 2010; Brown, Dashwood, Lawrence & Burton, 2010; Fee, 2010; Hutchison, 2006), relates to difficulties in maintaining productive classroom environments, replete with positive teacher-student interactions. As Nganga (2011) aptly notes, “The story of teaching is related to the story of negotiating student relationships” (p. 136). Deductions from these studies contend that international teachers find teaching
in their home context to be very different from teaching in American schools. Coming from societies where teachers are revered and held in high esteem (Shady, 2014), they are ill prepared to meet the behavioral characteristics exhibited by students in American schools and often times deem student communication to be disrespectful (Beck, 2010; Nganga, 2011; Fee, 2010, Hutchison, 2005; Bartlett, 2014). It is apparent that international teachers’ views on classroom interactions are filtered through comparative lenses of experiences they had with students in the home school context. Admittedly, few of the teachers know much about the schools where they would be teaching before they get there. Culture shock notwithstanding, these teachers, who initially hold high expectations about what teaching in the United States would be like, are for forced to reevaluate the positions based on the context of schools they taught at. Behavioral approaches to managing the classroom, such as yelling, caning, and timeouts at the back of the class, which might have worked well in some home country contexts, are either considered illegal or frowned upon by the school administration (Beck, 2010).

From available studies, some teachers have a mixed view of student teacher relationships, acknowledging the open nature of communication between students and teachers, but admonishing the disrespectful way through which students went about these communications. As one participant in Nganga’s (2011) study observed:

The students, if I compare them to students in Africa, they are open. The students here are open. They will tell you whatever they want, they don’t hold anything back. Compared to Africa, in Africa the students they cannot even talk, if you don’t talk to them. If you don’t ask they won’t. And even if they talk to you
they’ll do it in a respectful way. But here, some, I’m not going to say all of them, most of them, they’re not respectful, they’ll tell you their mind (Teacher Charity in Nganga 2011, p. 136).

This compared to negative perceptions or an inner struggle to make sense of expectations teachers have of ‘common sense’ interactions they knew from students back home and what the teachers experience in US classes. For example,

I found them [students in the U.S.] to be kind of rude and disrespectful towards their teachers; too much freedom to do whatever they want and disrespect for their teachers. One of the shocks I got was that, they don’t say hello when they get to your room or bye when they leave . . . (Teacher Vera in Nganga, 2011, p. 135)

A more profound example of the resultant classroom interactions is provided by Bartlett (2014). She offers the following vignette of an observation of one of her participant’s Geometry class:

"Everyone, please pay attention," calls out New Urban High School tenth-grade math teacher Alma Cruz. Not a single student even pauses in conversation. Two girls at the back of the room are playing cards, a boy listens to his iPod so loudly everyone can hear it, and another boy is having a barely concealed cell phone conversation under his hoodie. A boisterous girl wanders from desk to desk making jokes and talking to friends. At one point, she grabs a boy's cell phone and takes a picture of herself with it. She flashes the image at other classmates and laughs loudly. Ms. Cruz carefully looks at no one in particular and repeats her request for attention.
She doesn't get it.

Actually, she doesn't really expect the full attention of her students. She proceeds, however, with her lesson as if everyone is listening. She stands determinedly by the overhead projector, carefully detailing the day's formulas and concepts. At the end of the day, she can check off another completed geometry lesson in the California state curriculum framework for a lesson no one heard. … She [however] glows when she speaks about students, who in her estimation, “want to learn” (p. 1 – 2).

Despite the fact that a majority of papers find problems with teacher-students interactions, and as the vignette suggest, teachers profess joy when they encounter students who show an interest in learning mathematics, seldom are specific suggestions made on what international teachers and administrators could do to better improve such relations. In a review of literature on generic competences necessary for effective teaching in multicultural classrooms, Wubbels, den Brok, Veldman and van Tartwijk (2006) posit the necessity for teacher behavior and strategies that employ clear and well placed instruction to gain students’ attention, facilitate engagement, and a basic attitude that requires high expectations of all students whilst being sensitive to within-group status differences. Though these teacher expectations appear to be broadly applicable to all classrooms, they note that aspects of competence that are especially expected in multicultural classrooms must necessarily include teachers, a) having high expectations of students, being interested in students’ perceptions and being aware of own cognitions, and behavior; b) creating and maintaining a positive relationship and a safe environment
through rewards, compliments, showing respect and confidence, and empathy; and providing some freedom and responsibility for students; and c) Promoting on-task behavior and creating and maintaining a productive, engaging learning environment through clear structuring, strong leadership, setting, communicating, and enforcing rules, and probing for student problems and understanding (p. 411). Wubbels et al. (2006) are quick to point out that though such expectations are generic to every classroom, identifying specific competencies for multicultural classrooms and prescriptions on how to develop such warm and supportive relationships in such classes might not be easy.

Summary

In presenting a review of literature, this chapter examined relevant scholarly work carried out thus far on general international teacher adaptation to schools, within the U.S. and elsewhere, considered the social-cultural influences of mathematics teaching and teacher beliefs on everyday classroom instructional processes, and explored the significance of teacher-student interactions on both students and teachers. Additionally, the chapter looked at some common approaches that have been used to study teacher-student interactions.

Based on identified gaps in literature on international teachers’ cross-cultural perceptions and adaptations of effective mathematics pedagogical practices, and relatedly, teachers and students’ acuities of the student-teacher interactions and its influence on mathematics learning, this study proposes a mixed-methods approach to exploring these processes. Details of the proposed research method, as well as data collection and analysis procedures are presented in chapter 3 below.
CHAPTER 3

METHODS AND PROCEDURES

Introduction

In this study, I explored two aspects of international teacher adaptation; that is, international teachers’ unique transitional experiences to effective mathematics teaching in U.S. public secondary schools, and relatedly, teachers and students’ acuities of the student-teacher interactions, and the influence of such interactions on mathematics learning. To better understand these elements, I worked with a sample of eight international high school mathematics teachers in the south eastern region of the United States. Data collection included semi-structured interviews; video annotations of participants’ actual classroom instructional sessions; and an online survey on interpersonal teacher behavior. In this chapter, I describe the methods and procedures used to collect, analyze, and make interpretations of data.

Overview Research Design

This study addressed the following research questions:

I. How do international mathematics teachers negotiate dialectics, tensions, and understandings of effective secondary mathematics teaching practices, within the contexts of their classroom environments in U.S. public secondary schools?

Specifically:

a. How do home context mathematics teaching experiences compare to teachers’ experiences and expectations of secondary level mathematics teaching in U.S. public schools?
b. In what ways are pedagogical adaptations reflected in the day to day mathematics teaching and learning?

c. What are international secondary mathematics teacher’s perceptions of classroom interactions?

i. To what extent do students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their mathematics classes?

To better understand this phenomenon, this study used a partially mixed, concurrent, dominant status mixed-methods research design (QUAL+ quan) (Leech & Onwuegbuzie, 2009; Teddlie & Tashakkori, 2009). The concurrent nature of the study design allowed for a two-part data collection and analyses plan where both qualitative and quantitative data were collected simultaneously. However, one approach (in this case qualitative) was dominant and guided the study, while the secondary approach (in this case quantitative) played a complementary role availing means to broaden our understanding of a subsection of the phenomenon under consideration, i.e. classroom interactions and perceptions of the mathematics classroom environment (Small, 2011).

More specifically, qualitative data and analyses were used to respond to research questions I(a) and I(b), while both qualitative and quantitative data (mixing) were used to answer the final research question, I(c).

Rationale for mixed-methods design

According to Leech & Onwuegbuzie (2009), “mixed methods research represents research that involves collecting, analyzing, and interpreting quantitative and qualitative
data in a single study or in a series of studies to investigate the same underlying phenomenon” (p. 267). When considered in isolation, quantitative studies are largely based on positivist or post-positivist paradigms (Creswell, 2009), and could either be confirmatory in nature – driven by established theories to generate and test hypotheses, or descriptive – with the goal of exploring phenomenon or ascertaining relationships that exist between a set of variables (T Teddlie & Tashakkori, 2009). Though considerable information could be gleaned from examining descriptive and inferential properties of quantitative data analyses, one of the shortcomings of quantitative studies is that they tend to be close ended. Many a quantitative study will offer nominal information about the settings in which the research is conducted, the researcher’s specific interpretations, as well as voices of participants as a way to get to the reasoning behind the numerical data (Creswell & Plano Clark, 2011).

Qualitative studies, on the other hand, primarily come from a constructivist paradigm and use inductive reasoning to argue from the particular to the general (T Teddlie & Tashakkori, 2009). Qualitative studies are often exploratory and seek to develop an in-depth understanding of a particular phenomenon. Such understanding, however, is deeply embedded in the theoretical lens with which one orients the study, which guides the nature of questions asked, determines types of evidence collected, the type of analysis and presentation (Creswell, 2009). Data collection techniques are varied and include, but are not limited to, participant-observations, interviews, and artifact collection (T Teddlie & Tashakkori, 2009). In contrast to quantitative approaches to research, sampling methods are largely purposive, making use of a small number of participants who provide detailed
information about research questions under consideration (Teddllie & Tashakkori, 2009). To ensure credibility and trustworthiness, qualitative researchers use triangulation, member checks, and provide a detailed description of the theoretical orientation, the research participants and study context. Based on these descriptions, readers are accorded an opportunity to reflect on the extent to which the study findings relate to their own contexts.

When used in tandem, mixed-methods designs are complementary and draw on the strengths of qualitative and quantitative methods, making use of statistical and text analyses to examine and explain the salient features of a phenomenon (Ivankova, Creswell & Stick, 2006). Even though mixed-methods research is philosophically associated with a pragmatic paradigm – which rejects the traditional division between qualitative and quantitative approaches and advocates for the centrality of the research questions as guide to research method (Teddllie & Tashakkori, 2009) – this study acknowledges the need to describe or to interpret human experience, as lived by the experiencer, as a useful source of qualitative evidence, with quantitative data playing a complementary role (Mayoh & Onwuegbuzie, 2015). Specifically, this study uses interpretive phenomenological analysis (Smith & Osborn, 2003) as well as descriptive analysis to better understand the international teacher transitional experience. This allows for an in-depth examination of the contexts within which the teachers experiences occur, as well as simultaneously address confirmatory and hypothesis based questions, making space for stronger inferences about the phenomenon under consideration (Teddllie & Tashakkori, 2009).
Working on the assertion that a teacher’s actual enacted teaching practice stems from a complex amalgamation social and cultural influences, and the teacher's beliefs about mathematics learning and teaching (Barkatsas & Malone, 2005), this study sort to avail teachers space to reflect on their transitional experiences and provide rich descriptions of how they adapted to teaching in U.S. classrooms. The study primarily utilized qualitative approaches to explore teachers’ perceptions of effective teaching by drawing on their home context experiences, and considering how they realigned their beliefs and practices to what is perceived as reasonably good teaching based on their understanding of the frameworks of teaching in their American teaching context.

Additionally, this study sort to gain a fuller understanding of international teachers’ classroom environment. Thus, to better appreciate international teachers’ classroom contexts, two sets of data were collected and analyzed. Teachers were accorded an opportunity, through qualitative interviews and video data, to reflect on their current classroom contexts and how such classroom interactions enhance or frustrate learning in high school mathematics classes. Surveys were simultaneously administered to both teachers and their students, and quantitative data analyses conducted to develop both profiles of teachers’ interpersonal behavior, and an understanding of the extent to which students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their mathematics classes. The study, hence, makes used of mixed-methods approaches to address the final research question which relates to classroom environments. The qualitative aspect of the study was the primary source of data and was accorded greater
weighting than the quantitative aspect (Leech & Onwuegbuzie, 2009). This partially mixed, concurrent, dominant status design is subsequently represented as QUAL + quan (Leech & Onwuegbuzie, 2009; Mayoh & Onwuegbuzie, 2015). Ensuing qualitative data analyses follow interpretive phenomenological analysis (IPA) (Smith, Flowers & Larkin, 2009; Smith & Osborn, 2003) and, where applicable, descriptive statistics. Findings related to classroom contexts and interactions from both phases will be integrated during the discussions phase of the study.

**Context of the Study**

To help readers gain a fuller picture of the social-educational foundation of teachers’ transitional experiences, this section provides information on the context within which the study was carried out, as well as participants’ background information.

**Access to study site**

No current database exists which points to locations and numbers of international teachers in the south eastern region of the U.S. To gain access to teachers and students, the study used a combination of purposeful and convenience sampling to identify participant international mathematics teachers. As a criterion for inclusion, potential participants were limited to high school mathematics teachers who were born, received teacher education, and had previously taught in countries other than the United States, but who were currently practicing in the United States public school system on a temporary basis as cultural exchange teachers. Such teachers are designated as non-immigrant aliens by the United States Department of State and are expected to return to their countries of origin after a specified fixed period of employment. Additionally, as a graduate student
with limited funding, and for convenience, I limited the potential geographical radius of interest to a three state region in southeastern U.S.

Participant recruitment began in October of 2015. Initial contacts (emails and phone calls) were made with principals in a number of schools in the region that had been known to have international teachers in previous years. Additionally, I contacted two recruitment agencies working in the region seeking access to their teachers. One of the agencies responded and sent out a research participant solicitation email to their teachers, and asked them to contact me if interested in participating in the study. I also talked to a number of international teacher contacts I knew, who were not necessarily teaching mathematics, but who were working in schools to help gather contact information for potential participants. After discussions with various teachers who showed interest, I got in touch with their requisite site administrators and school district officials, and discussed the study objectives and protocols. Though a number of potential sites came up, I settled on Serrano County School District (pseudonym). The school district was ideal because it was convenient; it had a sufficient number of international teachers who came from different countries and who came through two recruitment companies operating in the region. The teachers were also distributed across the district’s three high schools. Before gaining access to students and teacher participants, I sought clearance from the following parties: Clemson’s Institutional Review Board (IRB), Serrano County School District’s Assistant Superintendent for School Services, the three high school principals, and participating teachers.

The school district
Serrano County (pseudonym) is a rural district found in a region renowned for hunting, fishing, water-sports, and golf. A 2016 report commissioned by the state’s Department of Employment and Workforce notes the county’s demographics comprised 48.8% Caucasians, 45.4% African-Americans, 4.3% with mixed ethnicity, 1.2% Asian, and 1.3% of other ethnicities. Though rooted in agriculture, the county has in recent years seen a boon in manufacturing. It also hosts one of the largest air-force bases in the country.

The Serrano County School District (pseudonym) is fairly new, a result of consolidating two erstwhile neighboring school districts. Though officially designated as an urban school district, about 49% of the residents live within city limits while 51% live in the surrounding rural community. The district currently enrolls a little over 17,000 students in grades PreK – 12. Based on state Department of Education data 79% of all students enrolled are eligible for free and reduced lunch. The school district has sixteen elementary schools, seven middle schools, three high schools, one alternative learning program, an adult education program, a Career Center, and an Early Head Start program. In addition to regular course offerings at the secondary level, the district offers Advanced Placement courses and International Baccalaureate programs, as well as career and technology classes. At the time of the study, the district had a number of international elementary, middle, and secondary teachers of mathematics, science, special education, and foreign languages. Each of the three high schools had between 2 and 6 international mathematics teachers from different countries, placed at the schools by either of two recruitment agencies operating in the region.
School contexts

*Serrano High School*, the largest of the three high schools in the school district, is a comprehensive magnet high school. The school’s website notes that Serrano High School was founded in 1939, became integrated in 1971 and moved to its current location in 1983. The current campus, which has undergone recent renovations, houses four classroom sites, a career center, and the state’s largest environmental center. The school’s report card notes that as of 2015, the school had an enrolment of 2,341 students. The school’s student body make up is 48% male and 52% female, and with a 68% total minority enrollment. The State report card notes that of these students, 70.4% receive free or reduced lunch, 21.6% are served by gifted and talented programs, and it has a four-year cohort graduation rate of 83.1%. In addition to regular course offerings, 9.8% of enrolled students take courses in IB/AP programs. Serrano High School has been designated as a state model school and is one of thirty model schools nationwide supported by a national organization funded by The Bill and Melinda Gates Foundation. According to the 2014 state Department of Education report card, the school received an “average” absolute rating and an “at-risk” growth rating. At the time of this research, there were six international mathematics teachers at the school, five of whom participated in the study.

*Woodbury High School* was founded in 1996. The school has an approximate enrollment of 1,230 students in grades 9-12. With a much smaller campus than Serrano high School, Woodbury’s location has been classified as fringe rural. The school’s student body make up is 49% male and 51% female, and with a 60% total minority
enrollment. The State report card notes that of these students, 83.7% are economically disadvantaged, 19.2% are served by gifted and talented programs. There are no IB/AP programs. The four-year cohort graduation rate is 83.0%. As of 2014, a majority of students (64.1%) from that year’s graduating class went on to two- or four-year college or technical colleges to pursue associates degrees, certificates, or diplomas. The school had 2014 absolute rating of “at-risk.” There were 4 international mathematics teachers at the school at the time of the study. All four initially agreed to be a part of the study, but two subsequently dropped out.

_Timberlake High School_, like Woodbury High school, is a fringe rural school with an approximate student enrolment of 1,170. According to the _US news and world report_, the student body makeup is approximately 50% male and 50% female, and the total minority enrollment is 76 percent. Of these students 73.6% are considered economically disadvantaged. Though there are no AP/IB programs, the school serves 20.9% of its students in gifted and talented programs. The school’s 2015 four-year graduating cohort is the highest among the three high schools at 89.2%. Interestingly, only 25.4% of students who graduated in 2014 from the school went on to pursue post-secondary education. Like the other two schools in the district, Timberlake has an absolute rating of ‘at-risk.” The school’s two international mathematics teachers initially agreed to participate in the study but one subsequently dropped out.

**Participants**

Serrano County School District had 12 international secondary mathematics teachers from six countries. Of these, two agreed to participate following personal
communication after introduction by other non-mathematics international teachers. One responded to the research participant solicitation email sent by a teacher recruitment company. Access to the remaining teachers was granted by school principals after approval by school district officials. An initial tally of participants included 11 international high school mathematics teachers from six different countries. With time, however, 3 withdrew leaving a sample of 8 international mathematics teachers. There were indications that those who withdrew perceived the research process as taxing and they were not willing to avail time for various aspects of the study, or access to their students. It was also apparent that some felt dispensable, and were afraid that discussions of their work could be politically sensitive and, if not positively received, could lead to their terminations. Study approval by the school district did not calm their fears.

Consequently, final study participants were 8 international cultural exchange teachers from 4 countries (the Philippines, Jamaica, Kenya, and Peru) working in the U.S. on J1 visas, and certified to teach mathematics in grades 7 – 12. This number of participants is in line with suggestions by methodologists that studies looking at phenomena from a phenomenological perspective have sample sizes with between 6 and 10 participants, depending on the nature and focus of the study (Teddlie & Tashakkori, 2009; Onwuegbuzie & Collins, 2007). For survey purposes, the participant sample also included 362 student participants drawn from teachers’ classes.

It should be noted that 6 of the 8 teachers were on their second tour of teaching in the U.S., while 2 (Ramirez and Torres) were on their first tour. State department rules indicate that international cultural exchange teachers can be afforded up to 3 years of
teaching in the U.S., with the possibility of having this period extended to a maximum of 5 years. After this maximum regulatory period, they are expected depart from the U.S. and to go back home. They are subject to at least two years of home residency before they can reapply for any subsequent available position with teacher recruitment companies (U.S. State Department, 2016). The duration of their stay (see Table 3.1 below), and willingness to reapply to teach in U.S. schools could be an indication of their success and might not necessarily be indicative of all international teachers currently working in U.S. schools.

In keeping with IRB and school district requirements, each participant teacher signed two consent forms prior to the start of the study and kept one for themselves (Appendix C). Student participants for this study were contacted through their classroom teacher and provided with a parental information letters and consent forms (Appendix B) and student assent form (Appendix A). All study related activities were coordinated with the classroom teacher in order to protect instructional time.

Participant teachers’ biographical information was assembled from the demographic section of the teacher questionnaire (see Appendix E). Such information included participants’ nationality, age group, credentials, and years of teaching experience – both total years of experience and years of experience teaching in the U.S. To ensure confidentiality, the names of the participants have been changed. Table 3.1 below offers a brief overview of each teacher’s profile.
Participants’ background information

Ramirez: Mr. Ramirez, from the Philippines, is in his late 30s. Reflecting on his background, he reveals he never liked mathematics as a high school student. Compared to the other courses he took in high school, he performed relatively poorly in mathematics. As he notes “when I was in High School, I best in them all except math, that is why I majored in math … and I am excelling now” (Ramirez). His interest in mathematics teaching did not develop till he got to college. The decision to become a mathematics teacher was primarily driven by a need to validate his ability to understand, or better yet,
teach mathematics. Thus, he enrolled in a teacher education program during his junior year of college and got certified to teach high school mathematics.

To date, he has 15 years of teaching experience, four of which have been in the U.S. at Serrano High school. His previous teaching experience in the Philippines was at a large, merit based, public magnet school that offered engineering and science oriented classes. Students admitted to the school were deemed to be “good kids … the best” (Ramirez). Compared to other public schools, the magnet school had substantial funding and he got access to a number of resources, including laptops, projectors, and trips to conferences which were considered a luxury in many parts of the country. In the Philippines he taught advanced statistics, was a professional development presenter on math teaching strategies, and has authored a text on how to use ‘megastat,’ a statistical analysis software, and basic calculators in class. This is his first tour of teaching in the U.S. While at Serrano, he has always taught Algebra 2 and Probability and Statistics to juniors and seniors.

Ramirez’s interest in international teaching followed a winding path in reaction to his prevailing circumstances. Initially, as a single man, he had been reluctant to pursue international teaching. He had turned down offers from Singapore, Thailand, and the United Kingdom. However, his financial circumstances changed with marriage and the birth of his daughter. Thus, when an international teacher already in the U.S. recommended him for consideration by a recruiting company working in the region, and they got in touch with him to gauge his interest, he accepted the offer from the American
recruitment company in an effort to take advantage of the better pay. His choice to become an international teacher was, therefore, driven by purely financial reasons.

**Santos:** Mr. Santos, a native of Peru, lays claim to over 26 years of high school mathematics teaching experience. He is the oldest of the participant teachers. He graduated from college with a degree in engineering, and a math minor. Besides engineering work, he had stints working a variety of jobs including as a college administrator, a driving school director, a book salesman, an SAT instructor, and a private language trainer of corporate managers seeking fluency in British English. He never fully embraced identities that came with these roles and was particularly unimpressed by work he did as an engineer. He viewed his work as a mechanical engineer as “dirty and noisy!” (Santos). Throughout his career he always held part time instructional positions, largely teaching English as a second language. Thus, the lure of the classroom seemed to lurk in the background. His move to full time teaching started with adjuncting college level classes before a subsequent move to an elite catholic high school in Peru, where he taught mathematics and English using the IB curriculum.

He is currently a math teacher at Woodbury High School, in the fourth year, of his second tour of international teaching in the U.S. Prior to moving to Woodbury, he taught math at Serrano High school for three years. He credits his first tour at an urban high school on the south eastern coast with availing him tools to deal with at-risk students. His maxim is that “everything you do in the classroom and interest you show in them [students], can change their lives” (Santos). Besides the U.S. he also has a year’s worth of mathematics teaching experience in China.
Naya: Ms. Naya, who is in her early 40s, is from the Philippines and has been teaching for 21 years. 13 of these years were at public schools in the Philippines, 2 years at a private school, and 6 in schools in the U.S. Naya notes that her interest in mathematics teaching came from two sources. First, as a student, she was really good at mathematics, an interest that persisted in to college. Secondly, she has familial ties in education, and consequently teaching seemed like a natural fit for her and an expectation from her family. As she puts it “most in our family are teachers, and they are all math teachers ... I have a brother and two of my sisters are also math teachers, so they are the big influence ... even my cousins are also math teachers!” (Naya). In thinking about her previous teaching experiences in the Philippines, she notes:  

My first year of teaching was really funny because we do have a minimum number of classrooms, with big number of students. But my first year was good because I was in a private school. So I have only about forty to fifty students in a classroom and we do not have any problems with the classrooms. But when I transferred to a public school that was when I had experience teaching under the umbrella tree, with just a loose board, with a chalkboard, and just a chalk with me … I already had about a minimum of 50 and a maximum of even 60, 65, I think, 60, 65.

Naya got introduced to international teaching by a friend who had come to the U.S. earlier, and who, incidentally, is currently working in the same school with her. Initially, Naya, who had never travelled out of the country was not interested in international teaching. But with subtle encouragement from friends and family members
she filled out relevant application forms, went through the vetting process and was granted a position at a middle school in the U.S. This is her second tour of teaching in the U.S. Her first tour ran from 2008 to 2011. She then returned home to a private school teaching position. After a requisite two-year home country stay, she applied and started her second tour in September 2013. She currently teaches Algebra 1 – CP and repeaters’ classes – and Geometry at Serrano High school.

*Sandra:* Ms. Sandra, a native of Jamaica, is in her late 40s. Besides Mr. Santos, she is the only other participant who has international teaching experience in a different country other than the U.S. – having taught in the UK for 3 years. This experience places her in a unique position to understand what it means to move to teach in a country besides one’s country of origin. She notes the key to her success is an understanding that whenever she moves between countries she has to relinquish the notion that she is an expert teacher. Instead, she says:

> Every time I move from one country to the next, I already know, I have that mindset that, "I'm no expert, I'm new to this country. I need to learn. I need to learn about the grade book, how do you record your grades? I need to learn how you do attendance. I need to know." So you go back to that novice stage. And, I find it takes me no time, as long as I learn the system, but I need to learn before I can say, "I am an expert now." … Sometimes it's scary.

Like the other teachers in the study, Sandra attributes her interest in mathematics teaching to a budding problem solving ability she had during her formative schooling years. She states that because she was good at math, she could solve mathematical
problems when “so many others couldn't process the information” (Sandra). She cherished being able to help other students when she was still a student. Upon graduating from high school, she went straight into teacher training college, and then to a university to get her Bachelor's. She taught in Jamaican public high schools for 6 years, while studying part-time for a master’s degree before moving to the U.S.

Sandra’s interest in international teaching was primarily driven by financial reasons – a favorable compensation rate compared to Jamaica, and by professional development goals. Coming from a relatively under resourced country, she wanted to develop competences on incorporating technology in to her teaching. When 3 years of her first tour were over, she moved to the U.K, taught for 3 years, then reapplied and was granted a position at Serrano High school for her second tour. She currently teaches CP Algebra 2 and CP Geometry.

**Noel:** Mr. Noel is a high school mathematics teacher from the Philippines who credits his path to teaching to a confluence of factors, many of which relate to his early schooling experiences. He reckons he is good at mathematics and sciences and could very easily have pursued engineering – especially given a fondness with tinkering with electronic products early in his life. He notes that while at elementary school, he struggled with mathematics / arithmetic and had difficulty comprehending such foundational concepts as percentages, ratios, decimals, and so on. Much of the turnaround in ability could be credited to mathematics and physics teachers at the high school level, whom he thinks, play a critical role in students’ development. This notion of the teacher as a guide is so vitally important to his self-perception. Perhaps shaped by the role
mathematics and physics teachers played in his own redefinition and/or rejuvenation as a mathematics and science student, he sees his role and responsibility – or for any teacher for that matter – as helping nurture and cultivate students’ personal development. His perceptions about his identity as a teacher are complex and at times contradictory. He describes himself as “bad”, “strict”, “tough”, and “serious”, but yet “funny” and “caring.” In addition to college cost considerations, this caring is what precluded his decision to become an engineer.

Interest in international teaching was aroused by a colleague who had gone through one such program in Texas and encouraged him to apply. Comparatively speaking, the move to teach in the U.S. was made enticing by the simple prospect of visiting the U.S., because, well “everybody wants to go to the U.S.!” (Noel). Additionally, there were opportunities for better pay, new experiences, new culture, and exposure to instructional technology. Noel currently teaches Algebra 2 to honors students at Serrano High school. This is his second tour in the U.S.

Sofia: Ms. Sofia, from the Philippines has broadest range of academic qualifications. Based on data retrieved from the demographic section of the teacher survey, Sofia states that her academic credentials include a “BS in Accountancy, BSE Math, MA in Teaching Math, MA in Educational Management, [and a] Ph.D. in Educational Management” (Sophia, survey data). She has been teaching for 21 years, and has also held a number of administrative positions, including Dean of a College of Education, and as a division supervisor in her country’s Department of Education where
she was in charge of program implementation, classroom observation, monitoring, and supervision.

Sofia does not discuss reasons why she chose to pursue teaching, despite having attained degrees in accountancy and mathematics, but notes that the goal of teaching is universal, which is to help students learn. To get a better sense of her reasons for pursuing international teaching, she explains:

This is my second time here in the United States. The first time I came here with the same program, I was a supervisor in Math that time, and just decided to come in here. The real reason I came here the first time – that was 2005 to 2008 – is for, honestly speaking, financial reasons. Because we have three children and I'm the breadwinner, we call it breadwinner in my country. My oldest daughter wants to take up nursing and it is a very expensive course. So with my salary, even I am a supervisor that time, but my salary with my husband's salary, who's working in the bank, is not enough to like cover all the expenses and I don't want to be tied up with all the debts after graduation. She still has two siblings to send to college as well. So I resigned from a job, it was a real tough decision and... But I really made that tough decision to send them to a good college.

She adds:

The second one is that, because I'm working with the Department of Education, so I want to learn how education here in America, because Philippines seem to be benchmarking the curriculum in America. So I want to really see what is really happening here, and plus the technology. Of course, we're way, way behind
America, so these are the things that really propelled my desire to teach here. And
the last one is, of course, to travel and see the place.

In her first tour, and portions of her second tour, she taught middle school
mathematics. This academic year Sofia was transferred to Serrano High school as an
International Baccalaureate (IB) and CP Geometry teacher.

Awiti: Mr. Awiti was born and raised in Kenya. His interest in mathematics could
be traced back to his formative schooling – as early as the 6th or 7th grades. But it was not
until his high school years that he became interested in mathematics teaching. Though he
had about three teachers while at secondary school, one of them “clicked” (Awiti) and
significantly influenced his interest in pursuing teaching as a career. This teacher made
mathematics very simple, and had the ability break down complex mathematical concepts
in to bits that could be easily understood. To Mr. Awiti, the teacher made mathematics
“relevant and fun” (Awiti) – an aspect of teaching to which he aspires. He received his
teacher education credentials through a teacher education program in Kenya, and is dual
certified to teach Mathematics and Economics (Business Studies). Prior to leaving
Kenya, he taught in both areas of certification; 5 years at a private school and 1 year at a
public school setting.

Knowledge of international teaching opportunities came through a friend. Interest
in international teaching was driven by a need to experience how laptops, computers,
promethean and smart boards, and other technological advances found in schools in the
West were used in classrooms. As he notes “My biggest interest was actually to be able
to get my hands on the technology… I wanted to come over here and see; how does this
work in a classroom set-up” (Awiti). He also saw this as an opportunity to improve his teaching skills. Mr. Awiti is currently teaching Pre-Calculus, Probability and Statistics, and Discrete Mathematics to juniors and seniors at Timberlake High School. He is in the third year of his second tour of international teaching in the U.S.

**Torres:** Ms. Torres, who is in her late 30s, was born and raised in the Philippines. She did not always want to be a math teacher. Her career of choice had been mass communications, specifically, journalism, or alternatively, accounting. However, prior to enrolling in college she noticed that the education department at the college was doing well, and that enrolling in education was less costly than going to the school of journalism. She decided to go along with education and opted to pursue a mathematics teaching major. She currently has 14 years of cumulated teaching experience. All of her teaching experiences in the Philippines were with private schools.

Unlike other participant teachers, Torres did not get international teaching information from close associates, rather she stumbled upon a site that offered teaching positions in the U.S. When she applied, her credentials were approved relatively fast, but she had to wait 3 years before she could get a teaching position. She is on her first tour of teaching in the U.S. and is currently teaching CP Algebra 2 and Probability and Statistics at Woodbury High School.

**Data Sources and Analyses**

Data for the study came from a variety of sources including interviews, surveys, and video annotations. Digital copies of all data collected and analyses performed were stored on my secure laptop, and synced to a secure back-up storage on the cloud. Videos
were also stored on my laptop and backed up on an external hard drive which was securely locked away at my office. Procedures for qualitative and quantitative data collection and analysis are provided below.

**Qualitative Phase**

The qualitative phase of the study considered the questions on how international mathematics teachers develop competencies germane to teaching mathematics in U.S. public secondary schools as well as international teachers’ perceptions classroom interactions. Data collection and analyses from this phase of the research focused on the research questions I, (a), (b) and (c). Responses to these research questions provide insights into processes of international mathematics teacher’s adaptation to teaching in the United States, their conceptions of ideal mathematics instruction in their home contexts and the negotiations necessary to align home context values with interactional expectations in the context of U.S. public schools.

*Semi-Structured Interviews with Teachers*

To get a clear sense of individual teacher’s practices and contexts in which they teach, I conducted two interviews: an initial in-depth, semi-structured interview with each participant teacher using an interview protocol I had designed (see Appendix F), and a follow-up interview to clarify as well as offer additional insights on both qualitative and quantitative data collected thus far. These interviews formed the foundation for qualitative data. In conducting the interviews, my goal was to offer teachers an opportunity to discuss the acculturation process necessary to acclimate to teacher expectations in the U.S., including their reflections on how teachers manage the teacher-
student interrelationships and consideration of teacher professional change as they worked to develop competencies necessary to effectively provide instruction to students in secondary schools around the U.S. The semi-structured interviews covered aspects of teachers’ educational and instructional backgrounds, as well as notions classroom instruction related to affective, organizational, and pedagogical components of mathematics instruction. The goal was to explore how international mathematics teachers develop practices that promote beneficial interactions with students, as well as how they negotiate their perception of effective mathematics teaching as experienced in their home contexts, and in relation to immersions in U.S. public schools. The interviews were conducted in November of 2015 and, on average, lasted about 60 minutes. All interviews were conducted at the school premises either during planning time or after school. To ensure trustworthiness, each teacher was provided with an electronic copy of their interview transcript and asked to confirm or modify their responses (Silverman, 2006).

*Annotated Video of classroom Instruction*

As a second qualitative data source, in addition to the interviews, teachers were asked to videotape and annotate a mathematics lesson. The main objective of the videotaped class and related annotation was to have teachers point to specific aspects of the transitional process that could be observed in an actual instructional session, rather than simply rely on recall of events that took place years prior. As Borko, Jacobs and Pittman (2008) note, videos play a unique role in helping capture the “richness and complexity of classrooms” (p. 418). Video annotations and video-stimulated recall interviews are noted to produce both insightful and useful data for examining the way
people experience events or interactions (Nguyen, McFadden, Tangen & Beutel, 2013) and have been used in education (Kaur, 2013; Morgan, 2007; Patrikainen, Vesterinen & Toom, 2010; Rowe, 2009) as well as healthcare related studies (Coleman & Murphy, 1999; Paskins, McHugh & Hassell, 2014).

A decision was made early on that only the space at the front of the class would be recorded and students omitted from the videos given a general reluctance by parents about having their children video recorded. The final video products show only the front of the class, including the board. Classroom interactions are audible and one could decipher what is taking place in class, but not see actual students’ faces. On rare occasions, depending on the placement of the camera, one could see the backs of students sitting in first one or two rows of class.

For this study, after recording an instructional session, I asked teachers to view the videos in their own time and annotate sections of the video they deem particularly informative and then articulate connections they saw between interview responses and the lesson under review. Specifically, I requested that in annotating the videos, they point out and explain features of the lesson that made salient variations in instruction between their home contexts and the current teaching context. I also asked teachers to identify aspects of instruction that best explicated their transitional process, in relation to pedagogical choices and interpersonal relationships, as a way to make more salient ideas brought forth in the semi-structured interviews. Teacher responses to the video annotations process was dismal as a majority did not provide elaborated responses that would make explicit the distinctions between instructional practices that changed with
context. Hence, in the findings that follow, videos do constitute observational data on classroom organization, ongoing instruction, classroom discussions, and student-teacher interactions, but not necessarily teacher reflections on these aspects of the classroom environment.

Follow-up Interviews

Follow-up interviews were scheduled after interview transcription, video annotation, and survey data analyses to help clarify feedback obtained during member checks, and gain nuanced understandings of teachers’ perceptions of the responses obtained from the quantitative phase of the study. At the completion of survey data collection, I prepared numerical and graphical profiles of each teacher’s interpersonal profile based on teachers’ and students’ responses. During the follow-up interview, I presented and explained each of the two profiles (based on students’ responses and the teacher’s responses) and sought their reaction. I pointed to items showing agreement and items where the teachers and students had differences. No specific predetermined interview questions were used. Instead I invited teachers to make observations based on profiles presented and their perceptions of their classrooms. Follow-up interviews were conducted at the school premises in April of 2016 and lasted about 45 minutes.

Qualitative data analysis.

All data analyses were conducted on Microsoft Word and Microsoft Excel applications to help highlight, organize, and help sort out emerging themes. The qualitative data analysis indicated below followed an analytic process suggested by Smith, Flowers and Larkin’s (2009) Interpretative Phenomenological Analysis (IPA).
IPA examines how people make sense of major life experiences and is concerned with their perceptions of their lived experiences (Smith & Osborn, 2003; Smith, et al., 2009). Smith and colleagues note that IPA builds on the descriptive phenomenology as envisaged by Husserl by systematically and attentively reflecting on the everyday lived experience. IPA is also strongly influenced by the hermeneutic phenomenology of Heidegger and acknowledges that phenomenological inquiry marks the beginning of an interpretative process. IPA combines a hermeneutics of empathy – a need to see what it is like to stand in participant’s shoes and see experiences from their perspective, and a hermeneutics of questioning – “wanting to stand alongside the participant, to take a look at them from a different angle, to ask questions and puzzle over things they are saying” (Smith, et al., p. 36). This interpretivist framework of inquiry supports the ontological perspective that it is possible to have multiple realities that are constructed and can be altered by the knower (Laverty, 2003). Hence, rather than focus solely on descriptions and categorization of participants’ narratives, understandings and interpretations of such narratives have to take in to account historical, social, and political contexts that shape and organize participants’ experiences (Lopez & Willis, 2004). Additionally, because a researcher’s expertise and knowledge base is both useful and necessary to interpretative phenomenological research, and shapes specific ideas about how the inquiry needs to proceed, bracketing, as described by descriptive phenomenologists, is considered inconsistent and questionable (Lopez & Willis, 2004; Mayoh & Onwuegbuzie, 2015). Researchers are, however, urged to make explicit their preconceptions and explain how these preconceptions influence the inquiry.
Detailed analyses of particular cases of lived experiences begin with the premise that when people are engaged with major events, they reflect on these experiences and how significant these experiences are to their lives (Smith, et al., 2009). As such, when a participant provides an account of an event, it is their way of evoking and trying to make sense of their lived experiences. However, in order to understand their participants’ experiences, researchers need to interpret such accounts. IPA recognizes that making sense of participants’ experiences is a two faceted approach which is dependent on accounts, as provided by participants, and the researcher’s interpretations of such accounts as a way to understand participants’ experiences (Smith, Jarman & Orsborn, 1999). As an analytic approach, IPA begins with a “detailed examination of each case and then cautiously moves to an examination of similarities and differences across cases, so producing fine grained accounts of patterns of meaning for participants reflecting upon a shared experience” (Smith, Flowers & Larkin, 2009, p. 38).

For this study, all audio tapes of interviews were fully transcribed soon after interviews to allow for easy recollection and shape interpretations. Interview transcripts were sent back to participant teachers for member checking to ensure the interviews captured the teachers’ views on the subject. None of the participants recommended changes to transcripts.

This study followed the six step analytic process suggested by Smith, Flowers and Larkin’s (2009). First, I got immersed in data by reading and re-reading each interview transcript, to get a sense of the whole, familiarize myself with each participant’s world, and to actively engage with the raw data (Hycner, 1985). I made notes on any
recollections and observations I had made during the interviews and bracketed these so as to focus on the participant. Next, after several rounds of readings of each transcript and listening to audio recorded interviews, I then conducted a line-by-line exploratory analysis of the semantic content in each teacher’s transcript (Smith, Flowers & Larkin, 2009). Lines or statements of interest, relevant to the research question were underlined, and matching exploratory notes and comments made on each transcript. Additionally, I took notes on contradictory ideas and amplifications. See Figure 3.1 below.

Figure 3.1 Sample exploratory notes and comments on a participant’s transcript.

These notes were expanded and elaborated on as appropriate with each subsequent reading. For step three, all underlined text were then copied to a spreadsheet.
By analyzing initial notes, and checking to ensure statements noted had specific meanings related to research question, all redundant statements from the interview eliminated. See Figure 3.2 below.

**Figure 3.2** Sample delineated statements from a participant’s interview transcript.

Working with research questions in mind, and by comparing delineated statements to exploratory and descriptive notes made, statements were then clustered together and preliminary emergent themes identified. This aspect of the analysis was the most interpretative. To stay rooted in the participant’s world, themes were written as phrases based on verbatim texts and transcripts of each participant, so as to reflect the participant’s voice, and the researcher’s interpretation. All themes were color coded and patterns of similarities and connections among emerging themes explored. See Figure 3.3 below.
Figure 3.3 Sample clustering of delineated statements into preliminary emergent themes.

Preliminary emergent themes were then organized and reorganized to find connections and cluster of related themes that represent similar understandings (Smith, Flowers & Larkin, 2009). Emergent themes with similar, or at times opposing but related, ideas were then grouped together to develop ‘super-ordinate’ themes. Super-ordinate themes are higher level abstractions that define broad ideas that connect a cluster of themes. These sub-ordinate themes can apply to each participant in a study but are likely to manifest differently across cases (Smith, Flowers & Larkin, 2009, p. 166). At the completion of this analysis, I developed a table of super-ordinate themes and related themes that described the experiences of each participant international teacher. See Table 3.2 below.
Table 3.2
Sample participant’s table of super-ordinate themes and related themes.

<table>
<thead>
<tr>
<th>International teachers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>· Presumed content and teaching experts?</td>
<td></td>
</tr>
</tbody>
</table>

Teacher Identity

| · Rooted in background, education, career and family |  |
| · Closely tied to professed love for classroom teaching |  |

Transitioning to teaching in the U.S.

| · It is tough |  |
| · Is an emotional process – requires resilience |  |
| · All about survival, endurance, and crises management |  |
| · Needs immersion |  |
| · Requires support (family, agency, colleagues) |  |

Adaptation

| · Learning is inevitable … “I just wanna learn” |  |
| · One has to blend in to new environment “No Choice” |  |

Adjustments

| · Students: to teacher’s style of teaching |  |
| · Teacher: Classroom contexts / Tracked classrooms |  |
| · Both: Language barriers to conversations and/or rapport building |  |
| · Challenge / Contrast: Dealing with demanding parents |  |

Managing Learning Environment

| · Requires diligence |  |
| · A negotiated process - establish a culture of respect |  |
| · Student teacher interactions: “Soft but tough” |  |
| · Mean business: Insistence on student accountability |  |

Mathematics Teaching: A multifaceted Process

| · Mathematics Teaching is diagnostic |  |
| · Mathematics Teaching requires heart, nurturing |  |
| · Mathematics Teaching needs to prepare students for life after school |  |
| · Mathematics Teaching calls for motivating, catching attention, and making connections explicit |  |
| · Mathematics teaching can be very procedural |  |
| · Mathematics teaching can be contradictory - Math is universal … [IB] what kind of math is it? |  |

Universal teacher expectations, but with a local flavor

| · A good teacher is like a coach, gardener, orchestra conductor, entertainer |  |
| · Teaching in the U.S. - It's just a different culture |  |
| · Teaching in the U.S. - Expanded role / multiplicity of roles |  |

Compared to my home country …

| · Resources - Abundant and under-appreciated |  |
| · Students: unmotivated, lazy, lacking persistence |  |
For the fifth and sixth steps, I considered each subsequent set of qualitative data on its own merit (Smith, et al., 2009) and developed tables of themes for each participant until all cases were analyzed. I then conducted a cross-case analysis to check for patterns across cases. This process resulted in a reconfiguring and reconsolidation of themes. The reorganization implied that some previously found themes were deemed redundant and eliminated. By so doing emergent categories about teacher experiences and students-teacher interactions were developed.

**Member checking.**

To member check this process, I worked with a doctoral candidate who had no previous experience with either secondary mathematics education or international teacher experience. We met and discussed the IPA data analysis process. The graduate student member checked two of the eight teacher transcripts. I selected transcripts for member checking based on the potential for rich data and disparity in participant teachers’ perceptions of the international teaching experience. The graduate student independently went over the same procedure, and sorted out line items of significance, clustered such items and developed general themes for the first transcript. We then met after the first analysis and discussed areas of convergence and notable differences. Insights developed were then put in place when conducting analysis on the second transcript. Individual descriptions were then prepared for each teacher based on interview transcripts and developed themes. I checked with my independent member checking graduate student to ensure the case report captured the essence developed in themes and that it was reflective.
of the teacher’s descriptions noted in transcripts. The member checking graduate student did not conduct a cross case analysis or make a broader interpretation of data.

**Quantitative Phase**

**Data collection.**

The quantitative phase addressed embedded research question I(c)(i) which uses the Questionnaire on Teacher Interactions (QTI) to consider the extent to which students’ perceptions relate to teachers’ perceptions of themselves and their classroom environment. Teachers and their students, after consultation with the building administrators, were invited to complete the QTI surveys, which were administered using Qualtrics, an online survey platform (Qualtrics, 2016). Each teacher had a minimum of two classes complete the survey (Wubbels, Brekelmans & Hooymayers, 1993). Participant students were given a parent information letter detailing project objectives about two weeks prior to taking the survey. In addition, on the day of the survey, verbal instructions were provided relating the nature of the study, and students given a chance to opt out of survey participation. Most of the survey responses were collected between November and December, 2015, and were scheduled so as not to coincide with standardized testing, holidays, grading periods or other school based activities. One teacher completed one of her class’s surveys in November 2015 and the second class in February 2016. No identifiable individual student data were collected.

To prompt for a more honest response from teachers and students, the researcher communicated the objectives of the study and reiterated that information gathered was essential to understanding the nature of interpersonal relationships between teachers and
students. Additionally, teachers were be encouraged to assure students of their anonymity, to explicitly point out that results from the study would not impact classroom instruction, and to ask students to be as truthful as possible. Woodbury and Timberlake High Schools had chrome books in every mathematics class as part of the instructional setup and used these laptops to administer the survey. To minimize disruptions emanating from movement to and from the computer lab, I availed tablets for survey administration at Serrano High School. Both teachers and students took between 15 and 20 minutes to complete the survey.

**Instrumentation:** *Questionnaire on Teacher Interactions (QTI).*

The Questionnaire on Teacher Interaction (QTI) is a survey tool that was developed by Wubbels, Creton and Hooymayers (1985) to ascertain teacher perceptions of themselves, and students’ perceptions of their teachers’ interpersonal behavior. Wubbels et al. framed interactional behavior from the systems theory of communication (Watzlawick, Beavin, & Jackson, 1967). The theory posits reciprocal communication within the classroom, where a teacher’s implicit and explicit messages and behavior have an effect on students’ behavior and responses, which in turn drive teacher behavior. Additionally, they conjectured that perceptions of teachers and students of the teacher-student interactions could be mapped and studied using the *Model for Interpersonal Teacher Behavior* (MITB), which was modeled on the Interpersonal Diagnosis of Personality (Leary, 1957) and adapted to education (Wubbels, et al., 1985). Similar to MITB, QTI has two dimensions; that is *Proximity* (a continuum of levels of cooperation) and *Influence* (a continuum of levels of dominance). These dimensions are further split
up into 8 scales, including leadership, helpful/friendliness, understanding, students’ freedom and responsibility, uncertainty, dissatisfaction, admonishing, and strictness (Wubbels & Brekelmans, 2005). The dimensions and scales are graphically represented in Figure 3.4 below. The boundaries for each sector are not strict and it is highly possible that teachers will express varying degrees of interpersonal behavior from each sector.

![Figure 3.4 Model for Interpersonal Teacher Behavior (Wubbels & Brekelmans, 2005)](image)

The QTI survey was originally developed in the Netherlands and had 77 items (Wubbels et al., 1985). The survey has since been translated into several languages and cross-validated in a wide variety of educational contexts, ranging from elementary schools (Scott & Fisher, 2004) to higher education settings (Coll, Taylor & Fisher, 2002; Van Oord & Den Brok, 2004). The American Version of the survey was formulated in
1988 (Wubbels & Levy, 1991), has 64 items, and has been shown to have adequate reliability and validity, for both primary and secondary education students (e.g. den Brok, 2001). For this study, two versions of the survey were administered – one for students and one for teachers. To differentiate between the teacher and student versions of the survey, item phrasing were changed from “My teacher …” on the students’ survey to “I …” on the teachers’ survey. For example, whereas the students’ survey would include an item such as “My math teacher talks enthusiastically about math,” this was rephrased on the teacher version to “I talk enthusiastically about math.” The QTI has a 5-point Likert scale based on frequency, and rated from “Never” at the lower end of the scale to “Always” at the higher end of the scale. For quantitative analyses, each choice on the Likert scale is translated into numerical values from 1 – 5. Items on the questionnaire are pooled into eight scales to produce aggregated scale (sector) scores. According to Wubbels and Levy (1993), teachers’ and students’ versions of the QTI have acceptable reliability and validity when used with students in grades 7-12. Table 3.3 below shows descriptions of scales and sample survey questions for each of the eight scales on the students’ survey.

Table 3.3

*Typical items for QTI scales*

<table>
<thead>
<tr>
<th>Scale (Sector)</th>
<th>Description of scale: The extent to which a teacher ...</th>
<th>Typical Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC—Leadership</td>
<td>... notices what’s happening, leads, organizes, gives orders, sets tasks, determines procedures, structures the classroom situations, explains, and holds attention.</td>
<td>My teacher talks enthusiastically about math.</td>
</tr>
<tr>
<td>CD—Helpful/Friendly</td>
<td>...assists, shows interest, joins, behaves in</td>
<td>My math teacher is friendly</td>
</tr>
</tbody>
</table>
a friendly or considerate manner, makes or takes a joke, inspires confidence and trust.

CS—Understanding ... listens with interest, empathizes, shows confidence and understanding, accepts apologies, looks for ways to settle differences, and is open with students.

SC—Student Freedom & responsibility ... gives opportunity for independent work, waits for class to let off steam, gives students choice and responsibility.

SO—Uncertain ... behaves in an uncertain manner and keeps a low profile, apologizes and waits to see how the wind blows.

OS—Dissatisfied ... waits for silence, expresses dissatisfaction, looks unhappy, keeps quiet, and criticizes.

OD—Admonishing ... gets angry, takes students to task, expresses irritation and anger, forbids and punishes.

DO—Strict ... keeps tight reigns on class, checks, maintains silence, exacts norms, and strictly enforces rules.

My math teacher trusts us

My math teacher gives us freedom in class

My math teacher seems uncertain

My math teacher thinks we cheat

My math teacher looks down on us

We need our math teacher’s permission before we can speak.

Quantitative data analyses.

All quantitative data were analyzed using JMP 12. Data were screened for accuracy of input, means, and standard deviations. Of the 398 students who started the survey, only 362 students managed to complete it. Students with incomplete survey responses were deleted from the students’ data set. From the demographic portion of teachers’ questionnaires, I computed frequency counts and related descriptive statistics, for example, age of teachers, proportion of male v female teachers, and average years of teaching in the U.S. as compared to total years of teaching experience.
Scale and dimension scores from students in each teacher’s class were aggregated to generate a class mean. A review of studies that have used the instrument indicate “high reliability in terms of internal consistency of scale scores and validity in terms of the representation of the two-dimensional model”, with reliability coefficients of the eight scales (Cronbach’s α) generally above 0.80 (Wubbels, et al., 2006, p. 416). Cross-national internal reliability and validity has also been found to be satisfactory (Wubbels & Brekelmans, 2005). For the present sample, internal consistencies (Cronbach’s α) were calculated on students’ responses. Table 3.4 reports the reliability of each of the eight scales of the QTI for the individual student score (n = 362), and the class mean-score (n = 17). Data suggests that students’ QTI responses had satisfactory reliability, with scale coefficients ranging from .584 (strict) to .882 (understanding) when individual students are the unit of analysis, and between .774 (student freedom and responsibility) and .964 (leadership) when responses are aggregated by class.

Table 3.4
Reliability (Cronbach’s Alpha) for QTI Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number of items</th>
<th>Cronbach’s α</th>
<th>Students survey (n = 362)</th>
<th>Class (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC—Leadership</td>
<td>7</td>
<td>.867</td>
<td>.964</td>
<td></td>
</tr>
<tr>
<td>CD—Helpful/Friendly</td>
<td>8</td>
<td>.838</td>
<td>.917</td>
<td></td>
</tr>
<tr>
<td>CS—Understanding</td>
<td>8</td>
<td>.882</td>
<td>.961</td>
<td></td>
</tr>
<tr>
<td>SC—Student Freedom &amp; responsibility</td>
<td>8</td>
<td>.605</td>
<td>.774</td>
<td></td>
</tr>
<tr>
<td>SO—Uncertain</td>
<td>7</td>
<td>.835</td>
<td>.914</td>
<td></td>
</tr>
<tr>
<td>OS—Dissatisfied</td>
<td>9</td>
<td>.873</td>
<td>.961</td>
<td></td>
</tr>
<tr>
<td>OD—Admonishing</td>
<td>8</td>
<td>.824</td>
<td>.915</td>
<td></td>
</tr>
<tr>
<td>DO—Strict</td>
<td>9</td>
<td>.584</td>
<td>.789</td>
<td></td>
</tr>
</tbody>
</table>
To examine students’ and teachers’ perceptions of international mathematics teachers’ interpersonal behavior, the following data analysis procedures were applied. First, I calculated mean scores of scales and dimensions and standard deviations based on students’ responses to the QTI survey. Students’ perceptions on the QTI scales were then aggregated to the class level prior to comparing it to the previously found interpersonal behavior related typology (Brekelmans, Levy, & Rodriguez, 1993). For teachers’ data, I computed both an overall scale and dimension score for all teachers, as well as individual teacher scores.

Given that the objective of the quantitative facet was not to provide inferential statistics but rather to develop each teacher’s interpersonal profile, and to understand the extent to which students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their mathematics classes (research question I(c)(i)), I compared descriptive results for the influence and proximity dimension scores between student perceptions and teacher perceptions. Previous studies indicate that the typology of teacher behavior is positively related to the amount of discrepancy in QTI scores, i.e. the more teachers and students disagree about the teacher’s behavior, the more likely they are to display Uncertain/Tolerant, Uncertain/Aggressive, Drudging, and Repressive behavior (Wubbels, Brekelmans & Hooymayers, 1993). Concomitantly, teachers with effective classroom environments tend to be more realistic and offer a more accurate reflection of their classroom behavior, and hence will have a much smaller discrepancy between self-
reports and students’ perceptions. Such teachers are more likely to be characterized as Directive, Authoritative, or Tolerant/Authoritative.

**Mixing data**

According to Creswell (2009), mixing data in a mixed methods study involves consideration of when qualitative and quantitative data sets will be jointly taken into account. Creswell and Plano Clark (2011) identify three ways to mix the data to provide the researcher with a clearer understanding of the problem. These include a sequential connection where one stage of the study builds on findings from an initial stage; a merging or convergence of data, where the two data sets are kept separate through the data collection and analysis but brought together at the interpretation stage; or embedding a supplemental dataset within a larger study so that one type of data provides a supportive role for the other dataset.

In this partially mixed, concurrent, dominant status mixed-methods research design, mixing involves integrating data at the interpretation stage and focuses exclusively on the classroom context research question. I used the quantitative data to help substantiate teachers’ assertions on classroom interactions and hence provide a more elaborated understanding of teachers’ descriptions of their interpersonal behavior in mathematics classrooms. Descriptions of summaries of statistics analyses as well as teacher interpersonal profiles were compared to findings and interpretations from thematic analysis for both individual teachers and on a cross case basis. Johnson & Onwuegbuzie (2004) note that even though qualitative and quantitative data could be merged and the results used as a basis to either corroborate or contradict stated findings,
the ultimate goal is to expand understandings of a given phenomenon. Knowledge acquired for both sets of data can work as a basis for strong acknowledgement of findings, or require the researcher to modify interpretations accordingly (Creswell & Plano Clark, 2011).

**Limitations**

There are a number of limitations that the reader should be aware of. First, all participants were drawn from one rural school district in the southeastern region of the United States. Finding international mathematics teachers from the region who were willing to participate and forthrightly discuss professional instructional disappointments was a challenge. To assist the reader in evaluating the meaning and insights of this study for their purposes, I provided contextual descriptions of schools and teachers. Even though participants were diverse and had different stories about their transitional process, they were restricted to the south eastern region of the United States. Their transitional experiences might not necessarily be generalized to the entire country (Shadish, Cook & Campbell, 2002).

Secondly, working on the understanding that teaching is highly context dependent, there are limitations that stem from dissimilarities in teachers’ experiences after arriving in the U.S. Such variables include elements of history and maturation (Shadish, Cook & Campbell, 2002), number of years of teaching in the U.S., nature of induction teachers received, teacher support services available, and school climate – each of which might outweigh teacher behavior and impact perceptions of interactions with students. Indeed it should be noted that 6 of the 8 teachers in this study were on their
second tour of teaching in the US, and hence it is likely that their depictions of the transitional process could be different and perhaps more or less emotive than when they encountered the process for the first time. By the time the study was carried out, participants had been in the United States for, on average, about 5 years. It is possible that, in retelling their transitional events, narratives of the transitional process might have been peppered by time and intervening experiences. Tversky & Marsh (2000) have noted that retelling stories of events that took place in the past can be biased by the perspectives from which one is narrating the story and hence might reorganize the story’s information to meet the retelling goal.

Finally, even though teachers recruited to the district came through two different teacher recruitment companies, their portrayals of the orientation and induction processes does appear to eclipse practices by each individual recruitment company. Whereas this might be true for the current participants, such similarities might not translate to teachers in different locations and working under the aegis of different recruitment companies and school district contexts.
Chapter 4
FINDINGS

Introduction

Chapter 3 summarized methods used to analyze data for this study. In this chapter, I present findings from data analyses on how international teachers adapted to teaching mathematics in U.S. secondary mathematics classrooms. This study was grounded by the following overarching research question: How do international mathematics teachers negotiate dialectics, tensions, and understandings of effective secondary mathematics teaching practices within the contexts of their classroom environments in U.S. public secondary schools? To focus the study, findings specifically address the following sub questions:

a. How do home context mathematics teaching experiences compare to teachers’ experiences and expectations of secondary level mathematics teaching in U.S. public schools?

b. In what ways are pedagogical adaptations reflected in the day to day mathematics teaching and learning?

c. What are international secondary mathematics teacher’s perceptions of classroom interactions?

   i. To what extent do students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their mathematics classes?
Based on analyses of data, four superordinate themes emerged related to research questions. See Table 4.1 below. The four superordinate themes – *Teacher transitional experiences; Perceptions of mathematics teaching; Pedagogical adaptations;* and *Classroom interactions* – relate to participants’ views of the transitional process and mathematics teaching. These superordinate themes shed light on comparisons between participant teachers’ home context mathematics teaching experiences, their encounters, expectations, and adaptations to teaching secondary mathematics in U.S. public schools. The themes also offer insights into teachers’ and students’ understandings of classroom interactions. In the findings that follow, given the lackluster teacher response to video annotations, themes and participant teacher citations are drawn primarily from analysis of initial and follow-up interviews.

Table 4.1
*Emergent superordinate and related themes*

<table>
<thead>
<tr>
<th>Superordinate Themes</th>
<th>Themes</th>
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<tbody>
<tr>
<td>Teacher transitional experiences</td>
<td>1) Divergent views on orientation and induction</td>
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<td></td>
<td>2) Transitioning requires support</td>
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<td>3) Disrupted teacher roles and expectations</td>
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<td>4) Resource based differences</td>
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<td>5) Challenges</td>
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<td>i) Language</td>
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<td>ii) Tensions between personal philosophies on set assessment criteria</td>
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<tr>
<td>Perceptions of mathematics teaching</td>
<td>1) “Maths is Maths”</td>
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<td></td>
<td>2) “You don't only teach the content”</td>
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<td></td>
<td>3) Atypical mathematics curricula</td>
</tr>
<tr>
<td>Pedagogical adaptations</td>
<td>1) “Back home, just more of a lecturer; here, I need to do a lot of differentiated instruction”</td>
</tr>
</tbody>
</table>
Figure 4.1 below shows associations between these four superordinate themes.

Findings [as depicted in Figure 4.1] allude to the centrality of the transitional experience in helping teachers acclimatize to teaching in the U.S and concomitantly, their resultant capacities to effectively manage aspects of mathematics instruction denoted by the remaining three superordinate themes. Transitional experiences new international teachers have when they move to teach in the U.S. will vary from one teacher to the next. These experiences – including information and supports accorded – are not necessarily subject specific, but have a bearing on the relative ease with which teachers adapt to teaching in U.S. classrooms. Each teacher brings varied beliefs on the nature of mathematics and mathematics teaching, assertions about instruction and assessment, and expectations for classroom interactions. Hence, how they adapt to teaching in U.S. secondary classrooms depends in part on their transitional experience, and the symbiotic relationship between the three interrelated themes on mathematics teacher’s knowledge for teaching (i.e. teacher understanding of the nature of mathematics and mathematics teaching, pedagogical adaptation, and classroom interactions).
As Figure 4.1 denotes, whereas the transitional experience plays a central role in helping teachers acclimatize to teaching in U.S. classrooms, all other aspects of instruction will vary, to a degree, depending on the extent to which teachers deem it necessary to modify and adapt the remaining three aspects of instruction to meet the instructional demands of their new teaching environment. Changes in beliefs will influence, or be influenced by expectations for, and ongoing implementation of classroom instruction, together with interactions teachers have with students in classrooms. There is no quantifiable way to denote the level and significance of each aspect of the transition. The sizes of the shapes denoting superordinate themes have no implicit meaning.

Figure 4.1 Diagrammatic representation of four super-ordinate themes
In the sections that follow, I present findings related to the four superordinate themes, and expand on ideas denoted in Figure 4.1. Findings that follow are organized into five sections. To make sense of, and situate the teachers’ experiences with the international teaching context, I provide a backdrop that informs participants’ broad views on reasons for pursuing international teaching opportunities. Secondly, I present findings on the transitional experience, focused on how teachers’ home context teaching experiences compare to teachers’ experiences and expectations of U.S. public schools. Next, I proffer participants’ views on beliefs and perceptions about mathematics teaching, as well as pedagogical adaptations necessary to effectively meet expectations of secondary level mathematics teaching in U.S. public schools. Finally, I present findings on participants’ understanding of teacher-student interactions, and how these influence classroom interrelationships in their mathematics classrooms.

**Background: Why International Teaching?**

In this section I present findings related to teachers’ decisions to take on international teaching. Though tangential to the study’s research questions, understanding these rationales sheds light on participant teachers’ backgrounds. The section covers factors that informed participants’ decisions to join the international teacher corps.

*International teaching – an avenue to personal advancement*

Participants in this study posited a number of reasons for taking up international teaching. Participants heard of international teaching opportunities through relatives, friends, and colleagues, or came across newspaper or online ads seeking teachers for positions in schools in the United States. Interest in international teaching consequently
got sparked, as participants pointed out, when “a friend of mine told me about the link of
the group that I came with” (Awiti), or because “I have a teacher who [applied to] teach
in Texas, he's encouraging me to apply” (Noel), or “one of my classmates … came here
first, and then after she's done with the programs, she went back [and became a recruiter
for an international teacher placement company] … when that opportunity was given or
shared, so I took advantage of it” (Sofia). In some instances, participants note that they
saw job positions ads posted in local newspapers and decided “it was a recruiting agency,
it was advertised in a newspaper back home, and I applied” (Sandra). Additionally, given
that application materials were available online and did not cost anything, some teachers
either simply applied to see what would happen or yielded to pressures by close
associates who nudged them to pursue such opportunities. For instance, Torres notes,

I was looking online, I saw this webpage about an opportunity to teach in the US,
and so I said, "Maybe I could try and see if I can have an experience abroad
teaching other students with different culture." The website has an introduction of
teachers who are already in the US and teaching, and then I was reading and I was
scrolling over how they described their experiences. And then it says there that if
you are interested just fill out an application there. And so I went ahead and filled
it out, and then I just answered the questions right there and then, questions like
"Are you interested?" Of course yes. And then, "Can you describe your teaching
experiences in your country?" And then, "What is your major?" So I went ahead,
since it's free, it's not requiring me to put any bank information. So I was like,
"Okay. Let me go ahead. There's nothing wrong. I don't think there's something
that they will be taking from me." So I went ahead and then after a week, I received an e-mail and they said that they have reviewed my application, and they said that I am eligible for teaching here. … I was not that serious about this job. When I applied for it, I was just trying.

As part of the application process, teachers submitted an online application to the various recruitment agencies where they:

[Filled] up the information needed in there, then the [recruitment agency] asked for the ... our transcripts, and everything to be scanned and sent to them. Then after how many months ... we started in July, I think, then come January the following year, they made a schedule [for face-to-face interviews]” (Naya).

At the interview, teachers were invited to respond to questions about classroom situations and their responses video recorded. “You are given some situations in the classroom and [asked] how are you going to handle such situations … or what are your plans? And after a certain year, what do you see yourself … [questions were] more on the management” (Naya). After this “the video was sent to American schools” (Awiti).

Once a decision was made to take up international teaching, participants pursued opportunities to teach in the U.S. with deliberation and with specific goals in mind. One primary reason given for moving to teach in the U.S. was financial, noting the big differential in earnings between salaries in their native countries and the pay given to public school teachers in the U.S., as well as benefits accruing from advantageous currency conversions.
Secondly, teachers were driven by a need to expand their repertoire of teaching skills and gain exposure to classroom instructional technology. Schools in the U.S. were considered far more advanced in instructional terms and made greater use of technology that rivaled the best private schools back home. As Torres points out “the resources and the teaching tools that they provided … are exemplary because if these tools were given to us in our country, you will be in a very exclusive private school where only rich people can afford.” Teaching in the U.S. was thought to parallel an extended and immersive personal professional development opportunity where teachers would learn newer and perhaps better pedagogical strategies for teaching mathematics, gain access to hitherto inaccessible instructional tools such as smartboards, graphing calculators, and computers, and attain status as experts on their return back home. This sentiment is best illustrated by Awiti who notes:

I wanted to see “how do you integrate technology in teaching?” Now the experience that I had Kenya, we don't have much technology. We're not that exposed... Probably I'd say, it's the costs; we are still not able to afford that kind of technology back in our classes. I was interested in trying to improve my own teaching skills. Trying to expand on my experience. And I decided the best thing that I can be able to do, for me to be able to make use of my knowledge and gain more knowledge, experience wise, was to seek a school that has all these facilities. The best place I thought about was move to developed countries’ high school. … [When I go back home, I will have the] educational background also of an American institution, and also have the work experience on an American
school setup, I'll be bringing a very big change in whichever institution that I'll end up teaching in (Awiti).

Teachers also spoke of using the opportunity to “experience new culture” (Torres; Noel), and share their culture with students in American classrooms. As cultural exchange teachers, they hoped to contribute to an expanded view of students’ understandings of the countries from whence they came. A final reason given for the move to the U.S. is illustrated by Noel who laconically notes “U.S. is U.S.; everybody wants to go to the U.S., [and] experience U.S.” The opportunity to travel and see places they would otherwise not have been able to travel to was an added bonus to the international teaching experience.

**Teacher Transitional Experiences**

The sections that follow address themes directly associated with the transitional experience. Each of the superordinate themes in Figure 4.1 is broken down in to constituent themes, each of which is separately considered.

The first superordinate theme relates to participant teachers’ views of the transitional process. In this section, findings address perceptions associated with the following research question: *How do home context mathematics teaching experiences compare to teachers’ experiences and expectations of secondary level mathematics teaching in U.S. public schools?* Figure 4.2 below shows that five constituent themes related to transitional experiences. Each theme could be viewed as having a unidirectional association and flowing inwards and contributing to the central superordinate theme.
Findings in this section demonstrate variations in experiences between teaching in the home country context and, more specifically, processes taken to ‘blend in’ to teacher expectations in the U.S. Though the section does not focus exclusively on mathematics teaching, participants note that these ideas on transitioning play a crucial role in understanding subsequent classroom processes.

In interviews, participants variously described the transitional process as “exciting” but also “tough”, “stressful”, “overwhelming”, “hard”, “exhausting”, “a struggle”, and of having feelings of “swimming against the river.” As noted on Figure 4.2, transitional themes developed include divergent views on orientation and induction, ideas that transitioning requires support, an expanded view of teachers’ roles without the requisite unmitigated respect, variations in context based schooling processes, and
challenges emanating from both language differences and philosophical assertions on assessment. These themes are elaborated on below.

*Divergent views on orientation and induction*

The first theme of the transitional experience relates to orientation and induction. For participants in this study, there were divergent views on orientation and induction process. Some teachers were complimentary of the orientation program – crediting the process with helping them prepare for American classrooms, while some were critical – believing not much was gained by participating in the orientation sessions. Orientation sessions were provided by recruitment companies immediately upon teachers’ arrival in the U.S., at hotels where teachers were initially accommodated. Participation in orientation in part depended on when a teacher arrived in the country. For those who arrived in the country before the official start of school, orientation varied from three days to week-long sessions. A “majority of the facilitators were experienced teachers, retired teachers” (Awiti). Sessions touched on “classroom management and the do's and don'ts, the policies, district policies, school policies, the law and the state, and the things that you need to do as a teacher, … [and cautioned teachers on possible scenarios such as] you do not touch a kid, do not give a ride to the students” (Noel). Of the eight teachers, Naya, Sofia, Sandra, and Awiti were complimentary of the process noting that the sessions made them aware of what to expect of students’ behavior and “prepared [them] mentally to accept basic things” (Sandra). In addition, teachers were exposed to broad transitional ideas that were tangential to school processes, some of which teachers took issues with including discussions on “culture shock, talking distance, time
difference, [conversions of] inches to centimeters, Fahrenheit to Celsius [most of which were deemed] a waste of time!” (Santos). Ramirez notes, because of jetlag “during those sessions, during those orientations, I was half way awake, half awake, half sleep” and couldn’t necessarily remember details of the orientation sessions. Teachers such as Torres, who arrived after schools had started did not receive any orientation, rather they were sent out to schools with the assertion “you came here as a trained teacher, there is the classroom, go … you’re on your own.” In one instance, Noel, during his first tour of teaching in the US, was not availed orientation. Instead teachers in the cohort were provided informational packets to read and dispatched out to schools. In any case, sessions when offered, were “general because all [teachers] came there; Math, languages, science, all teachers coming from different countries” (Ramirez) with no subject specific meetings to address content and broad curricular variations and expectations for American classrooms.

Despite the divergence in perceptions about orientation, there was commonality of experience with the induction process. All teachers were required to attend first year teacher induction programs offered through their respective districts. During induction, teachers were “just provide[d] the same training just like the American teachers or new teachers” (Noel). There was “nothing local in the district that says, "since you're from a different country, this is the culture for children, this is what you're expected to see, this is how they behave, these are acceptable norms, these are not."” (Sandra). The undifferentiated induction programs implied that “much was taken for granted” (Sandra) as local administrators did not necessarily understand the inimitable orientation needs
participants had as new international teachers. There were also practical implications on
the day-to-day undertakings to contend with. These related to questions on how exactly
schools were run in the U.S., the language used to describe simple and often mundane
processes that guide the functioning of schools, and the role – besides instructional – that
teachers played in this process. For instance, in reflecting about his first year experience,
Ramirez notes:

I don't know anything about how to set up, how the referrals work, what the
blocking means, because in the Philippines, teachers ... no, no, students go by the
schedule. Something like one hour per subject. Here I think one and a half. I don't
know about that. And you got planning, a one block planning – what was that, and
I don't know about that. Even for lunch, the lunch schedule I don't know about it.
What else that I don't know of ... checking attendance on the internet, I don't know
about that. I am good at computer but not all. I mean the technicalities, the
powerschool, the echalk, I don't know the ins and outs.

Teachers felt a gap existed between discussions held at orientation and/or
induction, and experiences they had in actual classrooms contexts. For instance, Naya
explains that whereas information provided at orientation and induction gave them a
frame of reference, actual classrooms were quite different. She notes “it is not really as
when you are in that ... the thing ... when you are really in that situation, it would really
be different, but you already have an idea about what to expect.”
Teachers spoke of being overwhelmed by initial classroom interactions. The following description offers a glimpse into the existing dissonance between induction discussions and actual classroom experiences.

It’s just... You just don't really feel how... the intensity. When they said, "Okay, students will be like this, will be like that," you can't really feel the intensity of how it is, unless you're already in the classroom … we were given that sample rules and policies and consequences and then this and that, instructions, but the real drama is totally different! (Sofia).

Teachers spoke of the need for sessions with specific and relevant information, especially in relation to classroom management. As Noel notes:

Actually the main thing in here is not about the content because you are prepared already when you had your education, but then it's the classroom management. It's always about the discipline and the structure, like what do you do when students act out? Like a specific example, like what you need to do if there's a situation in this classroom? How would you better handle that? Something like that. All about classroom management.

Transitioning requires support

A second theme in the transitional experience was the need for support with acclimation. In addition to orientation and induction processes noted in the preceding section, teachers observed the necessity for a frame of reference from which to orient their expectations of classroom interactions. Settling down to teach in the U.S., however,
came with a sense of discomfiture as the new schools were “completely like another world” (Santos).

Unique among participants in the study, Sandra acknowledged that as a sojourner to a new teaching context, rather than expect the new schools to conform to ideas she had about school interactions, she had to find ways to “blend in” to her new environments. She realized “I am what's different and I need to adjust, I need to accept that this is not home.” She took the view that irrespective of her years of teaching experience, she would adopt the stance of a novice and learn as much as she could about processes in the new school. Her view was that:

I'm new to this country. I need to learn. I need to learn about the grade book, how do you record your grades? I need to learn how you do attendance. I need to know. "How do I use this machine? Have I ever seen anything like this before?" Sometimes it's scary.

For the other participants there was an indication that transitional process was made easier by available support systems from colleagues, the recruitment agencies, but most importantly, other international teachers in the respective programs. School districts had varied levels of supports offered in the form of teacher coaches, mentors, and professional development opportunities. Awiti’s head of department, for example, played such a vital role as a mentor and instructional coach. As Awiti notes:

My head of department who also happened to be my mentor teacher, so the mentor teacher would always come to my classroom to observe how I was teaching and then she would always give me hints or give me thumbs up on
something that I did good, something that I need to improve on. So that kind of
contact with my mentor made me to be able to also improve my teaching skill, to
realize that, "Okay, this is how I'm supposed to do it. This is how it is supposed to
be done."

Torres could count on administrators providing help, if she asked, but not the
other way around. She observes “I had asked them so many times for assistance and yes,
they had assisted me with that … if I did not, then I don't think they would.” Staffers
from recruitment agencies would stop by on occasion but such visits lacked consistency.
Experienced colleagues, whether local or international, could be counted on to offer
opinions and strategies on approaches to teaching certain courses, sections, or lessons.
Other international teachers who had been in the schools for a while longer were an
invaluable resource. Ramirez, for example, credits his “learning the ropes” to a number of
Filipino teachers who were at the same school with him. He notes:

The good thing [was] we have ... we are four Filipino teachers here at Serrano
High before. So somehow like they mentored me, how to do and make things
easily… I [could] ask what they said and what they are working on. So they help
me a lot.

Outside of school, teachers relied on an extended network of other international
teachers to make sense of the transitional process and cope with accompanying stresses.
Teachers would get together with other international teachers and share ideas, or vent, as
a way to cope with difficulties related to their jobs. For instance Sandra notes:
What we tend to do is on a Friday after school, not necessarily vent, but yes, vent, get it out. Go to the tennis courts, and we play for an hour or two. Play, you get tired, you sit down and you talk about little Jimmy, or Bob, or Mary or Sue. What they did all week to drive you crazy. Okay, now, just get it out. Monday, you're ready again, and I find... I mean a lot of teachers that we meet up and do that, it helps.

Such support structures were a useful way to help teachers adjust psychologically to teaching in U.S. classrooms because “it helps you a lot if you have someone to vent your frustrations with because you're on the same boat” (Noel). For some teachers, though, support structures were not available. In such cases, there were feelings of isolation. As Santos lamented “nobody gave me any advice, nobody, even my co-workers … I felt isolated, and that’s reality … nobody gave me any advice at all” The resultant feelings of isolation prompted him to rethink international teaching and consider moving back to Peru.

*Disrupted teacher roles and expectations*

In addition to themes on orientation and induction, as well as supports, a third theme in the transitional experience relates to teacher roles and expectations. Whereas the first two themes of the transitional experience could be attributed to teacher questions on: What do I need to know to get ready for my classes?, and where can I get help when needed?, the third theme expands on participants’ perceptions of variations in roles and expectations between their home context teacher practices and expectations within the
broader context of U.S. schools. Two differences posited related to teachers’ overall workload and disparities in understandings of teacher and student roles and expectations.

There was a view that the workload in the U.S. schools was significantly more than they had encountered in their previous schools. Developing engaging lessons, keeping up with necessary administrative paperwork, maintaining regular contact with parents through emails and phone calls, in addition to scheduling parent conferences, addressing students’ discipline, working with, and adjusting to needs of resource students were all new experiences that significantly expanded their roles as teachers in a way that they had not encountered before. Classroom management and mathematics instruction were deemed two distinct responsibilities. As Awiti would point out “here you are supposed to teach but at the same time you are supposed also to manage your classroom.” To Noel, this dual role was challenging and exhausting, so much so that at the end of the day, all he wanted to do was “take a nap.” There were protestations that:

The issue is how to manage everything altogether at one time, call parents out. You have to prepare a lesson that would be enough from bell to bell, to make them busy and occupied all the time. Because if there is a lull, then something will happen. Then that's it. Then because of that, so you will give them papers, papers, and papers, and it's hard to manage them. Call parents, document everything. Write a referral slip. Which you don't do in my country. I never did that in my country. Well, I call parents, we have parent conferences, but we have scheduled parent meetings not as frequent as this, that you... It's really a must to call the parents. We don't do that in my country (Sofia).
Moreover, teachers’ understandings of teacher and student roles and expectations did not match reality in class. Participants noted that they came from school contexts where, by virtue of their positions as teachers, there was an expectation of unqualified respect and, perhaps, submissiveness from students. Noel sums this up when he notes “In my country, you are the king inside the classroom.” It was tough adjusting to a reality where students were more forthcoming and outspoken than students from their previous schools where teacher respect was warranted. This dilemma is illustrated by Ramirez who remarks:

In the Philippines, in our country, they look up to you if you are a teacher. I mean you have the authority, you have the power. It's not something that you grab them or something, but whatever you say, it's like you teaching from the Bible. Here, unlike here, no matter how you stretch your voice out, something like these students listen to me or not, it don't matter.

Compounding this difficulty was a belief that students took advantage of the new teachers’ lack of knowledge of school processes and disciplinary procedures to misbehave. To assuage the problem, teachers expected reciprocal respect – a belief that “I'm being nice to them so I expect them to be nice to me as well” (Torres). Being questioned in class, or being “cussed at” (Noel) by students was an unexpected affront.

**Resource based differences**

Another teacher transitional experience was associated to the availability of resources for instructional purposes. Teachers were in admiration of the available resources, better facilities, and according to Noel’s view of school processes, “it's more
organized for me, it's easier” when compared to what they had back in their countries. Differences included better infrastructure, classroom technology, and comparatively smaller class sizes. As Torres would point out, “our country is over-populated, so most of the buildings in our country are not enough to handle most of the students that are in there” and hence, adds Naya, “I had experience teaching under the umbrella tree, with just a loose board, with a chalkboard, and just a chalk with me … [and] a minimum of 50 and a maximum of even 60, 65 [students].” Similarly, Sofia notes:

I have 65 kids in a class and we don't have classroom. We just held classes in a chapel because that's a newly built, established high school. Sometimes we did our classes under the shade of the trees. Here, they have a lot. They have everything: Calculators, graphing calculators. Even our colleges there don't have graphing calculators. We don't have this. We don't have TV, we don't have computers. Because some schools and some of the schools that I taught they have mobile laboratory that each one of them could be supplied with their laptop; we don't have those privileges. Sometimes, our students just sit on the floor. We don't have enough chairs.

She adds:

Not everything is free because first of all, we don't have free lunch, we don't have free meals, we don't have free transportation, our books, when I was teaching in the high school, one book for seven students.

Although in some instances basic education was provided for free to all students, supplementary resources had to be provided by parents. According to Sandra:
Parents have to pay out a bus fare, a taxi fare. And boarding, some schools offer boarding where the children live on the school compounds. And it's not cheap. The textbooks parents have to pay for, they are not cheap.

In reflecting on their experiences in American schools, there was a perception that students were provided an abundance of resources to help improve instruction and promote students’ success. These resources by comparison, would only have been available in rich private schools.

We have the Promethean board, and then we also have Chromebooks which are really not ordinary tools or materials that a normal student can have on a daily basis. The resources and the teaching tools that they provide us are exemplary because if these tools were given to us in our country, you will be in a very exclusive private school where only rich people can afford (Torres).

Teachers argued that because schools provided a lot of resources to classrooms, there was an underappreciation of the benefits that could accrue from fully utilizing these resources. As Sandra sees it:

They don't get, in terms of comparing education, how valuable things that seems so tiny to them, might be to the same teacher, or the same student in another country. I share with my colleagues, I said, "A pencil, or a notebook, a binder that you just have thrown all these used binders, would mean so much to one student in Jamaica. But here, you walk around the hall you can pick up a dozen pencils in no time."

Noel adds:
We don't have enough resources in the Philippines, but my kids are interested to
learn. I myself, go to school without breakfast. Here, you're given breakfast or
lunch free. There, we have to borrow each other's pencil or pen. Here, the teacher
gives you the pencil or the paper.

Despite the abundance in resources, there were also views that these were
underappreciated.

**Challenges**

A final theme in the transitional experience is associated with specific challenges
participants encountered that were linked to classroom communication and tensions over
participants’ perceptions on assessments and grading policies.

*Language:* Language has two important functions in classroom interaction and
mathematics teaching: it is a medium for mathematical meaning making, and plays a
crucial role in the classroom discourse in a pedagogical sense (Schleppegrell, 2010). The
twin aspects of communication and discourse are integral to mathematics learning within
classrooms. For participants in this study, breakdown in communication could be
attributed to variations in language use and intonation. None of the teachers had English
as a first language, and each, to a certain extent, encountered complaints that their accents
were a hindrance to students’ understanding of lesson ideas. As Awiti notes:

Some of them had problems probably with my accent, yeah, because some would
say that my accent was too deep. I don't know what that means, too deep. But
some of them would not be able to understand how I spoke because they would
say my English sounded like British English … so some of them would not be able understand me.

Participant teachers acknowledged that English was in some cases a second or third language that had been acquired while at school. Hence, they were more comfortable with the written word as opposed to conversational English. Such difficulties resulted in having barriers to a native ease of communication and snags in developing rapport with students. As Torres points out, communicating in a non-native language requires a constant mental back-and-forth trying to develop the appropriate phrasing and terminology that makes explicit ideas being communicated. However, this does not come out as natural. She notes,

When it's your native language, you just blurt it out without thinking twice. So, that's my main challenge. How to organize the thoughts first because it's not your natural or native language that you talk to them.

These difficulties were not restricted to students alone, conversations with administrators and colleagues were, at times, a challenge. Ramirez comments that “our previous principal talked so fast I could not even understand what he said.” Being able to communicate with students was not restricted to instructional aspects alone. In some cases participants conversely believed that because they did not speak or use slang like their students did, developing rapport was a little harder. As Naya points out “if I can speak their language, if I can speak their slang, if I can speak how they formulate their words that only them can understand then I think I can be able to go with their flow.”
At times differences were an informative part of learning. Sofia paints a picture of an instance that enabled her show her students how their differing backgrounds resulted in different pronunciations of the same words. She notes:

I remembered one time, the students were laughing at me when I pronounced, because of the slope, the rise over the run, and because I pronounced rise as "rice" and they were laughing at that, and instead of being angry, being mad at their reaction I told them, "You know guys? I told you at the start that I can't speak like you." So I informed them that this is our alphabet. We don't have a "Z" in our alphabet, that's why when it is spelled this way, because it's R-I-S-E, we also read that as rice, as "s". So it's informative. I told them, "So that's the reason why I'm here class so that you would see, you would be exposed that... American English is not the only language in the entire world. We have different languages, we have different alphabets and here, what's the beauty here is I could teach you in the Math, but you could teach me with your language, as well. So I would appreciate if you would tell me, 'Ms. Sofia, this is how it is read.' Just do it politely and we both learn from each other. I would appreciate it so much."

Conversational language notwithstanding, participants were confident in the belief that mathematics is universal and hence has a common language. As Ramirez suggest:

And good thing is I teach math and math is a universal. Whenever I say the same thing here, even in your country and even in my country. What I call them ... even though I am not really good in speaking English, but I do speak good in terms of math. So you should learn from me in math. I may not teaching here for English.
However, there were times when the universal nature of mathematical language was brought in to question. In one such occasion, Torres discovered that students in her classroom were having difficulties understanding concepts taught because, as a resource teacher in her class pointed out, the mathematical language used was different from the day to day conversation English students were accustomed to (Schleppegrell, 2007; Adams, 2003). She observes that:

I had some resource students in my classroom and they always tell me, "We do not understand." So I thought they were talking about how I speak or how my accent is. … [but I came to realize that] it's not the language, it's the nature of the subject itself." When they say they don't understand, it means the words that I am using are not the particular words they use every day inside the classroom. So they are not used to using the words relative to being a Math teacher, they're not used to the words that they are hearing.

Adjusting to language proficiencies came with time. As students and teachers got used to each other and acclimatized to their modes of speech, they were better able to relate to each other and reduce language problems.

_Tensions between personal philosophies and set assessment criteria_: A second challenge to the transitional process has to do with perceptions on assessment protocols. Teachers proffered a philosophy of assessment that tied students’ grades to performance – as determined by the number of correctly solved problems in a class assignment. Participants especially took the view that many of the assessments they provided were summative and evaluative in nature. Grades given were expected to provide a direct
correlation to the relative percentage of content a student understood. Hence, a student earning a 50% would indicate that the student was able to correctly solve about 50% of the items on a test of quiz, or teacher assigned task. Based on experiences from their home countries, there was an expectation that tests and quizzes were to be long, cognitively challenging tasks, with a significant number of items to be completed within a short period. Sofia for example notes that “tests would have 100 questions to be done in one hour … without calculators.” Torres, too found it hard to reconcile expectations for assessments based on previous experiences and what was deemed the norm in her American school. She notes that when students complain of her assessment practices, her response is:

Yes ... "I don't care if other teachers give you a 100 with a 10 question long test, I'll give you 30 questions and that's my long test." So, I mean, yeah. That's, some of the students are amazed, "how can you be giving us 30 questions, 40 questions?" And then you would see... 'Cause sometimes I cover some teachers' classes when they're out and then they would turn in some work and it says long test and quiz, three quizzes all in one day. And I said "This is your long test?" "Yes" "This is all three quizzes?" "Yes". And I'm like "Wow" and my quiz takes like one in a week or sometimes two in a week, that's just quizzes and this teacher has done four quizzes in one day [chuckle] I mean, so the reliability of the data that they enter towards the students' grade are also questionable too!

Reconciling their experience that average grades in the home country contexts were in the 50-60s range, and the fact that highest scoring students back home seldom got
“no more than 93%” (Sofia), to school and district norms which indicated that grades had a floor of 61 – irrespective of work done in class, was a problem. The resultant tension implied that teachers complied with the demand, even though they felt that they could not justify such grades. Sandra succinctly summarizes this dilemma as:

There is a grading policy, which I totally detest, but there is nothing I can do, it's mandatory. If a child doesn't show up and they're on your register, they cannot get under 61%. I think it's still my biggest challenge, even now. I don't practice giving them grades because, "Hey, it looks good on paper" … [numerical grades are not] just the important thing to students, but to their parents and administrators. And I don't know, it probably goes very high up. Policy makers, what are we looking at, just numbers? Or is there anything physically happening? … I'm not used to a teacher passing student; I'm used to student working to pass.

Participants believe this mandate to ‘give’ students grades they may not necessarily have earned, coupled with a mismatch between students’ effort and expected grades, leaves the teachers in a quandary. But to adjust to context based expectations, teachers go with the mandate and cede to sentiments such as “I am only doing my job” (Santos).

Additionally, for one teacher, in reflecting on practices from ‘back home,’ unlike in the U.S., grades were connected to students’ behavior and could be reduced for misbehavior. Upon arriving in the U.S., such demands for student accountability were met with resistance. For instance, “In the Philippines when the student is misbehaving, their grade can greatly be affected … here, when students are misbehaving, you cannot
hold their grades against them with their behavior” (Torres). Torres has, however, found a way to factor in grades as part of a behavior management system, because considering the alternative does not appear palatable. She notes according to her colleagues, to foster a more cooperative learning environment “sometimes you give them treats, sometimes you give them candies” And I'm like, "Oh, no, I don't like that." And so, I tell them, I'll give you extra points” instead.

**Perceptions about Mathematics Teaching**

The second superordinate theme relates to participant perceptions about mathematics teaching. Similar to the previous themes on transitional experiences, the current theme correspondingly addresses the question: *How do home context mathematics teaching experiences compare to teachers’ experiences and expectations of secondary level mathematics teaching in U.S. public schools?* Figure 4.3 provides a diagram noting the three themes associated with beliefs on mathematics teaching. As noted previously, each theme could be viewed as having a unidirectional association, flowing inwards and contributing to the central superordinate theme on perceptions and beliefs about mathematics teaching. The relative sizes of the shapes have no implicit meaning.
However, whereas findings on sub-themes ascribed to the transitional experiences above could be broadly applicable to any international teacher irrespective of content taught, in this section I present assertions specifically attributable to participant teachers’ perceptions on mathematics teaching. Taken together, the first two superordinate themes provide indications of teachers’ backgrounds, their transition to teaching in the U.S., and their views on similarities and differences between home and the American contexts that inform their mathematics teaching experiences.

**Maths is Maths**

The first theme on perceptions on mathematics teaching is the notion that irrespective of context, mathematics is universal. In reflecting on their mathematical
knowledge, beliefs and dispositions, participants noted that a foundational aspect that allowed them to move across continents and teach in the U.S. was the essential assertion that “Math is the same everywhere” (Sofia). It did not matter where on the planet one taught, the basic mathematical principles were the same, and hence “whenever I say the same thing here, even in your country and even in my country” (Ramirez) the underlying ideas will be the same. Teachers held the belief that what they were teaching was fundamentally the same. And so “because Maths is Maths” (Awiti) teachers glossed over connections between mathematical knowledge and teaching, noting “the content of what was expected of me, that itself was no big issue” (Awiti), and “when you know the concept, you already know what to do” (Noel). Participants held the perception that with their credentials, and experience teaching mathematics in their respective local contexts for a considerable period of time, they had requisite skills to be effective mathematics teachers in the U.S. As Sofia notes “I know Math is the same everywhere and because I taught already, I think... I could just deal with that.”

Despite indicating universality in mathematics, especially for traditional mathematics courses – Algebra, Geometry, Pre-calculus, and so on, one participant teacher exposed to new, international curricula was astounded by the teaching expectation. Sofia, who had in previous years taught at middle schools, was assigned to the International Baccalaureate class even though, she notes, she had no knowledge and experience with the curriculum. As she saw it:

I was just shocked that I was picked out and chosen to handle this IB … [I had] no choice because I'm new to this school and I want to, although … when it was
presented to me, I just asked what kind of Math is it? IB … is a different thing because it's a different language, it's a different setup so it's also a big transition for me.

In addition to the universality of mathematics, there were contradictory stances on assertions that mathematics has a universal language. Ramirez for example notes that:

Good thing is I teach math and math is a universal. Whenever I say the same thing here, even in your country and even in my country. What I call them … even though I am not really good in speaking English, but I do speak good in terms of math. So you should learn from me in math … my job is to teach math.

To Ramirez, irrespective of the spoken language, there is commonality in the language of mathematics that should make it possible for students to understand basic mathematical precepts. This notion, however, ran contrary to discoveries made by Torres, who found the specificity of mathematical language proved to be a hindrance to students learning. Using specialized language was often at odds with students’ ability to make connections with the day-to-day aspects of language as they knew it. For instance, Torres observed that students would always complain that they did not understand what they were being taught. On closer examination, she discovered:

It’s not the language, it's the nature of the subject itself. When they say they don't understand, it means the words that I am using are not the particular words they use every day inside the classroom. So they are not used to using the words relative to being a Math teacher, they're not used to the words that they are hearing.
You don’t only teach the content

In addition to assertions that mathematics was universal, participants held a belief that the goals of teaching, irrespective of context, were very similar. They viewed teaching as a multifaceted process that not only conferred mathematical knowledge on students, but prepared students for life after school. In addition to student engagement, participants argued that the mathematical experiences students had in class had to make sense and have some bearing to students’ lives outside of school. To Naya, providing content knowledge was important but not enough. She notes that as a teacher “you have to think also about giving them something else that they need, like experience. Provide them with situations in real life, that they can have the thing that they are learning be applied. I want to let the students see, really, the importance of math in their lives. Why are we learning math? That is the very important thing.” Ramirez compared the algorithmic nature of solution processes in mathematical tasks to life principles. He notes:

It is all about applying the knowledge to real life. Math in reality, we are going to use this in our lives. What I tell my students was, if you do good in math, something like math will develop your higher order thinking skills. It will develop your critical thinking. So if you do good in math, in life you do have better decision, you do follow steps, you follow directions. So if you do good in Math, you follow directions, same thing in life you follow directions and you are going to win the prize.
There was, hence, an assertion that “you don't only teach the content” (Noel), rather you expose students to myriad ideas that present a view outside the classroom that exceeds formal mathematics learning. These ideas were in some instances used as a distraction (Sandra) or as part of “incidental learning, incidental teaching” and a tool for student engagement (Sofia). According to Sandra:

Talk to them about culture, different culture … Just getting their attention, and find a way to entertain what they want. If they wanna talk to me about food, today they were talking about Thanksgiving, and I put the timer on, five minutes. Just explain to them, "We didn't celebrate Thanksgiving in Jamaica." Some of these students have never left their immediate town …. And so, just sharing with them about different parts of the world. Sometimes what I find is, say for example, telling them about Jamaica. For five minutes, I've grasped that attention for the next 30.

Examples used in classroom discussions tended to reflect this notion of broadening students’ knowledge horizons beyond school mathematics and limited experiences they’d had. Topics such as the military (Santos), travel and cultures (Awiti, Sandra), currency conversions and related arithmetic (Sofia), careers beyond the service industry (Sandra), and life in general (Naya) were purposefully infused into lesson presentations.

Mathematics teaching could also be viewed as diagnostic and involved identifying and remedying students’ knowledge gaps. Sofia, for example, observed that despite teaching upper level students, it was not un-common to see students who had difficulty
reading, could not comprehend word problems, and who still performed basic numeric operations “by counting fingers.” For her, understanding that students brought different abilities and “intelligences” to class, implied she had a prerogative to identify and iron out deficiencies that have accrued through the students’ schooling life. Similarly, Sandra viewed her primary purpose as diagnosing and implementing classroom processes that could remedy such problems because, as she surmises, "I'd rather fix what is going on with them."

*Integrated mathematics curricula*

Another aspect of mathematics teaching that came to focus was the structure of the curriculum and the sequencing of courses. Of the eight participant teachers, seven had previous experiences working with mathematics curricular that were integrated. There were philosophical distinctions in perceptions about which curricula structures accorded students the most benefit: an integrated curriculum similar to what a majority of participants had erstwhile experienced, or a discipline base curriculum that they were exposed to in the U.S. Teaching distinct mathematics disciplines as opposed to a unified course were variously considered to be a benefit, and a deterrent to effective teaching and learning. Teachers who saw course integration as beneficial, speculated that students were accorded a better opportunity to see connections between the various courses and that “kids are more rounded that way, they tend not to forget so much over a long period of time” (Sandra). Those who held a contrary opinion argued that when mathematics was broken down in to different disciplines “it makes it to be clearer because you do an in depth learning of that particular section of math as compared to when it's just bunched up
together.” (Awiti). This seemed especially important to teachers who saw the consolidation of courses as a means to standardizing performance by essentially requiring all students take the same course content, and pass the same national examination as opposed to having courses tailored to meet students’ abilities and future career needs. In this respect, Awiti argues:

[By separating courses] it also gives you an opportunity if you are a student and probably you are not very good when it comes to geometry, then you could still be able to find a way of learning some math algebra. And for those who may not be able to do very well in algebra could probably take statistics instead of doing calculus or pre-calculus (Awiti).

Likewise, perceptions about the structure of the curriculum and it’s relation to national exams steered how teachers structured their teaching. In addition to learning set objectives, intermediate assessments (school based examinations) were useful for ranking purposes, national examinations were really high stakes because opportunities for further education and post-secondary activities stemmed from performance at these examinations. Teaching was necessary to help students pass these exams.

**Pedagogical Adaptations**

The third superordinate theme relates to pedagogical adaptations and how teachers’ views on aspects of practice in mathematics instruction varied from experiences they had in their home contexts. Findings from this section relate to the following research question: *In what ways are pedagogical adaptations reflected in the day to day mathematics teaching and learning?* Whereas the previous themes posited results that
addressed broad ideas on transitional experiences and international teachers’ beliefs about mathematics teaching, in this section I tender findings on teachers’ perspectives on instruction. Figure 4.4 below shows the three themes associated with the superordinate theme.

![Diagram of themes]

*Figure 4.4 Themes associated with pedagogical adaptations.*

To give readers an overview of participants’ approach to instruction, and to lay out the context in which such instruction took place, I will first provide a profile of the classroom settings, based on classroom observations and video data, and then elaborate on themes related to pedagogical adaptations.

**Classroom and instructional context.**

The following is an overview of participant teachers’ classroom contexts and approach to instruction as noted on submitted video and classroom observations. In all teachers’ classroom contexts, seats were organized by rows, facing a Promethean board,
which was typically positioned at the front of the class. Each class also had a white board on one of the side walls. The white boards for the most part contained the day’s agenda, standards and objectives, with a section left for either the teacher or students to work on. Classrooms also had an assortment of mathematical formulae, inspirational posters, and products of students’ work on the walls. In Mr. Ramirez’s class, the board also had table with summary performance data for his three classes indicating numbers of students in each class with grades A – D, and the overall class grade. With the exception of a sample non-American flag (Awiti) most classes were undistinguishable from classes headed by American teachers.

Each participant teacher noted that the lesson recorded was indicative of a typical way they taught mathematics. A review of teachers’ videos indicates that all eight teachers largely followed a traditional paradigm of instruction (Banilower, Boyd, Pasley, & Weiss, 2006; Weiss & Pasley 2004). Instruction was primarily based on direct instruction. Lesson sequences followed a predictable pattern; students worked on warm-up problems when they got to class. After reviewing the warm-up – often by teacher and for correctness, the teacher then reviewed the day’s lesson objectives and introduced or continued the lesson, as appropriate. Much of the lesson was presented in presentation form (as a series of PowerPoints drawn for class text resources (Sofía, Sandra, Ramirez, Naya) or sequential pre-made teacher guided smartboard notes (Awiti, Noel, Torres). Students were expected to take notes while the teacher demonstrated sample problems. Using lower level information gathering questions (Boaler & Brodie, 2004), the teacher then walked students through a series of procedures to solving specific problems. There
were minimal variations in tasks given and expected paths to obtaining solutions, though Awiti in his interview notes that “if there's a different way that we can be able to do something then, whenever we solve, any problems in class and my student probably has a different way of solving the same problem, I give them the opportunity to come in front in the classroom.” For the one videoed session, this aspect was not immediately apparent. When technology was used (graphing calculators and chrome books), it was more for computational purposes, or as a shortcut approach to solving the problems. For instance, in Mr. Ramirez’s video, he took time to show students “the calculator way” to solving multi-step equations with demonstrations of key calculator strokes. On occasion, a student or a number of students were invited to the board to try to replicate teacher’s procedures, with the teacher correcting sections where students showed errors. After guided practice and notetaking, students were provided questions from class texts, on the board, or on worksheets to attempt on their own. Students had opportunities to ask questions, but these were often related to procedural rather than conceptual aspects of the lesson. During independent practice, the teacher walked around the classroom, offering help to students who were ‘stuck’ at some specific aspect of the task. At the end of class, papers were collected for grading. For these specific class recordings, none of the teachers gave homework assignments. Torres though, had initially started the lesson by noting she will be checking homework while students worked on the warm-up, but she never got around to doing this.

There were two variations to this process; Awiti’s student involvement and Santos’s use of video. Though Awiti’s lesson was similarly structured like the other
seven participants, the focus of the lesson and approach to student engagement was different. For instance, during the warm-up segment, rather than simply go over questions, he allowed time for students to discuss and come to a consensus on the solutions to given questions. He would interject from time to time with guiding questions, but on the whole students worked on problems on the board with the rest of the class error checking and offering suggestions to help resolve problems on the board. Additionally, while conducting instruction on box and whisker plots, he used a combination of conceptual as well as procedural questions to assess students’ learning. Students were engaged, asking questions that went beyond calculator steps or procedural aspects. Twice in the lesson, however, there were gaps in explanations he proffered. For instance his descriptions of the scaling of a whisker plot as well as the notions of positively or negatively skewed graphs were inadequate. Finally, though he did have prepared notes on the board, he did not work sequentially through the notes, rather he had students access these on their chrome books. Students could access questions for independent practice on their chrome books as well, which had access to the class texts’ online resources.

Though Santos’s video was largely a review lesson on measures of central tendency, sections of the lesson were presented in a rather haphazard manner. The lesson started with a warm-up on exponential operations, then moved on to computing means of grouped and ungrouped data. This was followed by a brief quiz that required students to use the class text to define statistics terms. At the end of the quiz, he told students “OK guys, now we are going to watch a video, and that’s it for today.” Students then watched
an 8 minute video from YouTube on independent and dependent variables and waited for class to dismiss for the day.

What follows are findings related to participants’ pedagogical adaptations to secondary mathematics instructions in U.S. schools.

*Back home – just more of a lecturer, but here I need to do a lot of differentiated instruction*

The first theme on pedagogical adaptation relates to variations in instructional processes. There was an acknowledgement that, by comparison, classes in their native countries called for a different approach to instruction when juxtaposed with classes in the U.S. Given the relatively large class sizes, and meager classroom resources, using the lecture method appeared to be the most convenient way to teach back home. As Noel observes, “They can't do jigsaw strategy in a classroom, they can't do scavenger hunt because the room is packed, so you tend to just do lecture method … in the Philippines [for example] you are just more of a lecturer.” Participant noted that much of the teaching was focused on skill development. For some teachers, this notion of skill development translated to classes in the U.S. As Santos argues, “skill development is more important … [and] as a result of developing skills, the students will understand.” Similarly, Torres notes that “math is skills, it's not memorizing. It's not. It's skill. So you have to work, work, work, and they [students] don't like it.” It is not immediately clear if her note on memorization is to be synonymous to understanding – where for a students to truly understand a concept, they would have to engage in repeated practice, an aspect she acknowledges, students don’t necessarily like. For Sandra, despite arguments to the
contrary, she found using drill even in U.S. classes to be an effective way for her to teach mathematics and that it had helped her students retain much of the information in class. Her assertions were “just … drip feed and guide, guide, guide, guide, guide” as a way to help students learn mathematics.

Teaching in the U.S., on the other hand, called for a wider array of varied instructional strategies. The challenge in instruction revolved around seeking ways to get students engaged in class because “if they enjoy the work, the activities that you give them, [and if] they can connect it, and feel that they can use it outside the classroom that would make the teaching instruction effective … the main battle here is how to catch the attention of the students because if they feel not motivated, I don't think learning is taking place” (Sofia).

To achieve these goals, participants spoke of taking up differentiated instruction. Sandra, for example, observed that “differentiation is a must … and especially in American classrooms, [but] not so much in Jamaica.” Differentiation as an instructional process called for lots of preparation. As Noel notes “I had to wake up at night and prepare, make differentiated instruction … [or] stay more than an hour, almost every day in the classroom, preparing for the next day.” Incidentally, despite teachers’ call for differentiation, they did not elaborate on what that entailed and how they implemented differentiated instruction in their classrooms. Differentiation appeared to be a buzzword – all teachers talked about it, but none quite noted how they differentiated instruction in their classes. Teachers knew they had to differentiate more, and that this was different from what they did in their native countries, but they could not account for the
differentiation in class activities. Teachers also noted that they had worked on implementing collaborative activities, having students participate in scavenger hunts within the schools (Ramirez, for example, had a large, school based, QR code readable scavenger hunt that helped students review material for previous classes), solving jig-saw puzzles, working on puzzles, “just anything to have them work on seeing stuff, because they [students] are real visual in here” (Sandra). Fears of chaotic classroom environments impeded some teachers’ use of collaborative activities. As Torres states “in this setup that I have right now, in the class setting that I have right now, I can never make them form into groups where they can work harmoniously … I cannot describe myself as a teacher [for whom students] can conduct a perfect harmony among themselves.”

There was an assertion that, despite calls for differentiation, and similar to teaching processes in their native countries, mathematics teaching tended to be very procedural. As Ramirez succinctly notes irrespective of context, “in math you just show and tell. You show how to do it, the kids will have to retell it.” The only distinctions were in the resources one could use in class. In American classes there were more tools available to help students work thorough procedural components of problems compared to similar classes in their native countries. Such working involved having teachers help students understand foundational concepts by breaking down every procedure to its smallest constituent parts, and such parts considered one by one. As Sofia explained “you've got to dissect everything, like every detail of it because if you don't do that, well, the good ones, the stronger ones could get it, but those even in the IB, not everybody there is really that good on the same level.” As the videos portray, a tremendous amount
of time was expended helping students develop competencies solving particular mathematical problems.

Technology

Another aspect of pedagogical adaptation was the use of technology in mathematics classes. Technology was a big motivator for international teachers’ pursuit to teach in the U.S. According to Sandra, the experience of using classroom technology was really important because, as she notes:

I mean, Jamaica is what? Third world? We're getting there, but not there as yet. A smart-board, all of that. Many schools in Jamaica doesn't even have a laptop in the principals' office, let alone a regular computer.

As such having technology such as chrome books, graphing calculators, smart boards, and TVs in class was “a really are the good thing” (Naya). The availability of technology was viewed as a resource that could enhance mathematics teaching. However, as Noel remarked “technology is always helpful ... but if it's just there and they're [students] not gonna apply themselves to what they are learning then it's useless.” Teachers note having familiarized themselves with instructional technology slowly and over time. For instance, Awiti’s embrace of technology was part of means to increase his repertoire of instructional skills. He notes:

I identified that I don't have to give lecture kind of lesson, I don't have always to move to each and every student to be able to help them learn, so you can be able to also teach different... To teach using different methods. And then use technology, much, much of the technology. As I said, my interest was actually for
me to be able to use the technology, but when I came, it took me a while for me to
be able to start using the technology.

Of the eight teachers none was more attuned to using technology in an
instructional sense than Awiti. Teachers viewed the use of technology from two
perspectives. There was technology used for lesson presentations, especially the
promethean board, and to a lesser extent the newly introduced class sets of Chrome book
laptops. There were also graphing calculators used in class to aid with computations,
graphing functions, and statistical work. Participants viewed technology paradoxically as
being potentially beneficial, and detrimental to mathematics instruction. Potential
benefits stemmed from a reduction in redundancies from continued calculations and an
elimination of errors. Awiti, in reflecting on his first year experience makes the
connection between procedural teaching and how technology helped ease stresses related
to repeated calculations. He notes:

[When] I came, I was given a senior class, and I had to teach probability and
statistics. So these are students who've already been through other maths courses,
and in these other maths courses, I believe much emphasis was laid on the use of
the calculators. So when I was now trying to teach them the long way of finding
the mean of group data, or finding the standard deviation, where you have to first
of all find the mean and then subtract each and every X variable from the mean,
that in itself was stressing the student. And you will be able to cover a whole
board just with one problem, that in itself was a stressful experience, and I also
realized, it was also stressing me up … because by the time you're getting to the
point where you now have to find the square of the difference of the standard
deviation and the variable, you've lost quite a number of them. And most of them
would just switch off as soon as you started subtracting the mean from the X
variable, they switch off!

Calculators were seen as a tool to ease computational processes and not much
else. When used – as noted in teachers’ classroom videos, focus was on steps students
needed to take to arrive at a correct answer, with minimal exploration of the underlying
mathematical principles. Technology was also used as a motivator. By easing burdens
related to mathematical processes, teaching and learning became “easier ... and a lot of
fun!” (Awiti). In instances where students are allowed to bring electronics to class, the
use of cellphones for example, is a motivator. According to Torres, “nowadays
technology plays a little role inside the classroom, so when you tell them you can use
your cellphone afterwards that motivates them, if they finish their work, some sort of
that.”

_Frustrations with students’ mathematical knowledge_

A final aspect of pedagogical adaptation relates to students’ mathematical
knowledge. In the first two themes on pedagogy, participants discussed how they
changed their instructional strategies to meet students’ needs in American classrooms and
discussed the importance of technology to classroom instruction. Here I offer
participants’ frustration with the idea that students in many cases were inadequately
prepared to tackle grade level mathematical tasks. There was disappointment with
students’ basic conceptualization of fundamental mathematical concepts – particularly
number sense and fractions. Teachers assigned to junior and senior level classes found themselves having to revert back to teaching foundational concepts such as fraction sense. Teachers held different views of this shortcoming. Some showed exasperation at having to reteach foundational concepts. For instance, as Santos describes:

You see on the board there, you see on the board there? [Pointing towards the white board where a fraction 5/6 is written in parenthesis]. I wrote 5 over 6, and they couldn't multiply. They can't, these are juniors, these are 11th graders. They can't multiply fractions. They can't! So I said OK, Look, you multiply straight across. But now we have the calculator, they said "how do we type that in a calculator?" They don't know how to change a fraction to a decimal, they don't know the three forms of fractions, they don't know. They don't know that! So that is why I was writing it that way [pointing to (5/6) on the board]. OK, so 5/6 make sure you put it that way on the calculator, put it in the parenthesis, it will give you a decimal. When you get a decimal, got back to MATH, press #1 to give you back to fractions. And so it's like, because it starts way back in probably middle school... 80% [of my students] don't know anything about fractions. Anything! So I have to re-teach from the very basics.

Given such deficiencies, it became improbable to teach students actual grade level content. There was a sense that students were doing just enough because “they just need to graduate” (Sandra) and most likely had limited aspirations beyond their high school education. Teachers were only there to help move them along.
On the other hand some teachers were more patient, taking time to address such deficiencies while teaching current content. As Awiti would note, “even the students who may still have issues or probably problems with certain stuff, or certain areas or math that they are supposed to have already learned before. I'll be very patient with them and still be able to refresh or review some stuff that they supposed to have learnt some time back on other courses.” Hence, whereas such knowledge gaps were a problem to the teaching and learning taking place in class, solutions varied by teacher.

**Classroom Interactions**

The fourth and final superordinate theme of the study relates to student teacher interactions. The superordinate theme addresses the final two sub questions of the study which are: *What are international secondary mathematics teacher’s perceptions of classroom interactions?*, and *To what extent do students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their mathematics classes?* Findings include results from qualitative and quantitative data on teachers and students’ perceptions of interactions and the teachers’ interpersonal behavior. In this section, I first present findings from two themes based on an analysis of teachers’ reflections on their notions of classroom interactions. This is then followed by results from survey data on teacher interpersonal behavior.
Students: forthright, comparatively unmotivated, and more diverse

As part of the adaptation process, making sense of who their students were, and how to best interact with them was an integral part of understanding the classroom interaction process. Students, in general were more physically imposing than students teachers previously had. They were “a little taller, they're taller than the regular students that I've had” (Torres), and “look[ed] like college students in my country” (Noel). They were forthright, “very opinionated, they wanna say whatever they wanna say … [unlike in the Philippines where] before students do something they always ask you first” (Noel). Teachers ascribed different perceptions to that forthrightness; some viewed it as disrespectful (Sandra, Sofia, Naya), while others saw this as part of a broader American culture where people spoke their minds (Awiti, Torres). There was an understanding that
“here, students act differently … I have to learn about my students” (Awiti). It was not enough to consider them as a monolithic group, rather there was an indication that, classroom composition was rather heterogeneous. As Torres observes “there are so many types of students nowadays. Unlike before, there's just smart and there's slow but now you have resource students, you have diversity in culture students, somewhat like that or so I can't really... It's always different each day” and each student within the class unique in their own way. Expect for a few model students, distinctions between those in tracked classrooms designated as honors, and college prep especially, were deemed more behavioral than attributable to predetermined mathematical prowess (Sofia).

Teachers also held a negative view of the general student population, though they were complimentary of their own students. They described students variously as “privileged” (Noel), with “no aspiration” (Sandra), were “unmotivated” (Torres), “lazy” (Ramon), and “lacking in persistence” (Sophia). Compared to students from their home countries, who had to do a lot with relatively few resources, students in American classrooms appeared reluctant to put forth effort and get their work done. The prevailing sense was that students attitude to learning was "I need to pass this class, but I don't need to work …you need to pass me" (Sandra). With an even more cynical view, Sofia observed:

These kids are just lazy, super lazy. If there is a word, not my IB, but for the general, if there is a word more than that, they're just more than lazy … they easily quit. They don't have that perseverance to pursue. Not like us, we're trained
for that because life is hard in my country… Student motivation here is just very hard.

Students were thought to have an apathetic attitude towards mathematics and were more generally divested from education. Students appeared impervious to educational opportunities and did pay as much attention to their overall grades because of the possibility of findings jobs at the completion of high school. All these ideas notwithstanding, some teachers took a different tact to addressing students’ lack of motivation. Noting care and attention to students’ needs, Naya notes:

A lot of students in here, from what you have heard, you have to tell them anything just to … you can praise them. They need a lot of encouragement, they need a lot of motivation, any word, positive word that they could hear would help a lot. So even just a small effort that you are seeing, you have to give praise and praise and praise.

Similarly, as Awiti notes, getting students to participate required an understanding of who they were. As such he allows for free expression in class, encourages questions, and is cognizant of the fact that “if they could be able to talk to me freely and I could be able to talk to them freely … [then] once we were able to break that barrier of me being a distant or them being distant from me 'cause I'm a teacher, it became easier.”

Managing classroom settings – a difficult negotiation

For international teachers, managing classroom interactions implied managing the classroom environment. Participants had an understanding that “being a Math teacher it's your responsibility to always supervise your student and see what they're doing” (Awiti).
Participants, however, considered classroom management to be one of the toughest aspects of transitioning to teaching in the U.S. Regardless of having been in the U.S. for a number of years, this continues to be an ongoing challenge. As Naya notes “classroom management, that is [still] my weakness, really” To Torres classroom management remains “the number one challenge here in the US [because] … I can’t control my class!”

Teachers argue that despite having had large class sizes with, 50 or 60 students, previous experiences with classroom management – prior to moving to the U.S. – were not a problem. Students did as they were told. It would be fool hardy to presume there were no concerns with students in their native countries. As Naya observes, “you cannot say that you have a perfect classroom, some students will still act out, but it was easy for me to just tell them to stop” or simply “move them to the front of the class” (Ramirez). Where applicable, corporal punishment was doled out and “yes, and you [could] get away with it!” (Noel). By comparison, classes in the U.S. had fewer students but more disruption. Participants initially viewed classroom management as extra layer of responsibility rather than an integral part of instruction. Awiti, for example, asserts “here you are, you are supposed to teach but at the same time you are supposed also to manage your classroom.” Coupled with having inclusion students, the challenge could at times get too big. Santos sums this up thus:

I had big classes with, for example, 5 IEPs, or 12 behaviors, a student with profiles like this. So I am talking about 12 or 17 in a class of 35, you can become crazy! I came with experience and I was shocked. Can you imagine if I didn't have any [teaching] experience and I came to America and I had 35 kids? 12
troublemakers, and 5 IEPs? I would have quit in one month. I can deal with 3
troublemakers. But 12 are too much to me.

Though managing classroom interactions continues to be an issue for teachers,
there is consensus that teachers have a responsibility to ensure smooth running
classrooms if learning is to take place. How that is done varies from one teacher to the
next. Santos, for example, prefers to get to know students and use that relational aspect to
motivate students to do the right thing in class. As he posits “do I have to write referrals?
3 or more referrals, they will be in trouble and they will be expelled … that's not the
solution.” Instead he practices individualized attention to students. Crucial to this process
is to know who each student is and to

Follow-up [with them outside class], the birthdays you have to keep …
[understand] what’s the goal of each kid, call the kids by name, and show interest
in every kid. Every kid is ... some kids don't talk. But those are the target. I want
to communicate with this mute kid (laughs).

For other teachers, it requires a change in attitudes and an understanding that they are
dealing with students who need a firm hand of guidance, but that not everything they say
should be viewed as a personal affront on the teacher, rather one needs to be the adult,
show even temperament, and be tactful in dealings with students.

As a teacher, you have to build rapport with the students, even if you don't want
to. If they disrespect you, you have to just find a way tactfully to let that child
know you're not offended. It's, "You're a child, I'm an adult. We'll deal with this
problem this way. Let's fix it."
She adds:

Entertain, talk to them about culture, different culture. Some of these students have never left their immediate town. A lot of them have never gone to [the state capital], which is less than an hour drive. And so, just sharing with them about different parts of the world. Sometimes what I find is, say for example, telling them about Jamaica. For five minutes, I've grasped that attention for the next 30.

Participants also spoke of the need for accountability. There was an assertion that students needed to understand that when in class, all the work they did had to be accounted for. Sofia, for example demanded that all students complete all class assignments, but also made the demand on herself to ensure all assigned work was graded and returned on time. Rules had to be established and expectations managed to ensure all students learn. As Awiti notes, “I am firm on that "If you break the classroom rules or the schools rules, then you have consequences that have to be adhered to ... and I stick to that and the students know it.” But there has to be flexibility to allow for student expression. For instance, Torres argues not all noise is bad because “sometimes whenever they talk, like when they talk about the work they're doing, even if it's noise, when you hear them discussing how the work should be done, sometimes it gives you a different perspective of how they are thinking relative to Math.”

Finally, one had to establish a culture that promotes work, and reciprocal respect. This had to be done from the first day of the semester. Sofia, for example, explains:

I set that culture since day one, and I was consistent in dealing with it. I established this culture of respect. I never yelled at my students and I deal with
them nicely every day, since day one, even if they're misbehaving, I never yelled at them. I don't raise my voice. If there is somebody disrespecting I said, "I am very nice at you, I'm so polite, I don't deserve that disrespect. Can you talk to me nicely?" That's the first culture that I establish. So you can never hear yelling in my class. … I'm not authoritative but I am just consistent about... I'm not lenient, I'm not really lenient because I have my rules. It depends on how you execute these rules. It's not that I'm authoritative in implementing it. It's still soft voice, it's still this, but we just have to follow the rules.

*Perceptions of Classroom Interrelationships*

Participants took different approaches to addressing student-teacher relationships. On the one hand, some teachers believed that establishing social-emotional distance, adopting a hands-off approach to students, and interacting on the basis of instructional / mathematical content alone was the best way to deal with classroom interactions and maintain distance between teachers and students. For instance, as a teacher in the Philippines, Torres had perceived of herself as a guide, mentor, and a facilitator, who was willing to “hear their [students’] problems.” However, in the U.S. such a position became untenable. As a classroom teacher, she notes, “some students would also approach me about their problems but I don't wanna hear them, I always recommend them to go to the guidance office.” This was because she believed the closer she got to students here, the greater the possibility that students would be less respectful of her as a teacher. Maintaining social distance was one way to ensure she remained authoritative and/or strict with her students in class.
On the other hand, some teachers adopted an attitude of care and embraced the idea of forging better and closer classroom relationships. There was an understanding that developing relationships would be beneficial for both teachers and students. As Santos would note, if you “treat students like human beings and their attitudes will change … sometimes no matter how much you know and the student don't [won't] pay attention” until they know that the teacher cares for them. To Sandra, a teacher has “to make them [students] want to be there, create that atmosphere for them to want to come to class.” Developing such relationships called for necessary, and on-going, negotiations with students. For instance, Awiti realized that his classes were comprised of students with varying degrees of cognitive and social abilities. He encouraged participation by opening lines of communication, he listened to his students’ opinions and encouraged them to ask questions, he provided opportunities for students to take the lead in classroom discussions, and learned what to give and what to expect from students. Such efforts were considered fruitful in the long run as students would always stop by to let him know how much they appreciated his classes.

Student teacher interactions were also linked to the school context. In an environment where administrative support was minimal, and students and teachers relationships considered antagonistic, there were more chances for poor student teacher relationships. For instance, Santos on his first two school assignments, had been posted to school contexts where he believed administrators were not as responsive to his or his students’ needs. Each day was a challenge as he struggled to make sense of the class assignments and manage students’ behavior in class. He wondered why “they gave [me]
the worst students. I don't know why they did that. The worst students. (Pause) Maybe the teachers wanted to let me get fired, or make me quit!” In ensuing months, however, even though students in his class “were very disrespectful and very mean to [him] at the beginning, they changed.” He took time to learn about his students, showed that he cared about them, and showed an interest in every student in his class. Slowly, students came around and progressively had an attitude change. To him, focusing exclusively on content is a little like “fighting with a wild animal every day … [because students with negative attitudes] … they can lay, they can eat, they sleep, and they talk, so instead of becoming a teacher, you become a baby sitter.”

Two of the participants questioned whether there were racial undertones to underlying the way students responded to them. These teachers, Ramirez and Naya, posited that in addition to language disparities, some students were not responding to them and were not following directions provided by the Filipino teachers.

**Distribution of mathematics teachers’ interpersonal profiles**

This final section addresses the quantitative aspect of the study and offers finds that specifically answer the question: *To what extent do students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their mathematics classes?* The objective of this nested quantitative facet was not to provide inferential statistics but rather to develop each teacher’s interpersonal profile, and to understand the extent to which students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their
mathematics classes. Previous studies indicate that the typology of teacher behavior is positively related to the amount of discrepancy in QTI scores, i.e. the more teachers and students disagree about the teacher’s behavior, the more likely they are to display Uncertain/Tolerant, Uncertain/Aggressive, Drudging, and Repressive behavior, and vice versa (Wubbels, Brekelmans & Hooymers, 1993).

To get an overview of teachers and students’ perceptions of the international teachers’ interpersonal behavior, I computed descriptive statistics for the eight scales and the influence and proximity dimensions based on teachers’ and students’ responses to the QTI survey. Scale scores are reported on a range from zero to one (Wubbels, Brekelmans & Hooymers, 1993). A scale of ‘one’ indicates that all behaviors in the scale are always displayed. A scale of ‘zero’ denotes the opposite – the absence of scale behaviors.

Table 4.2
Descriptive statistics of the QTI scales for students’ and teachers’ data

<table>
<thead>
<tr>
<th>Scale</th>
<th>Students survey (n = 362)</th>
<th>Teacher Survey (n = 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC—Leadership</td>
<td>0.71 (SD = 0.18)</td>
<td>0.88 (SD = 0.08)</td>
</tr>
<tr>
<td>CD—Helpful/Friendly</td>
<td>0.70 (SD = 0.17)</td>
<td>0.75 (SD = 0.13)</td>
</tr>
<tr>
<td>CS—Understanding</td>
<td>0.72 (SD = 0.19)</td>
<td>0.89 (SD = 0.10)</td>
</tr>
<tr>
<td>SC—Student Freedom &amp; Responsibility</td>
<td>0.48 (SD = 0.12)</td>
<td>0.42 (SD = 0.09)</td>
</tr>
<tr>
<td>SO—Uncertain</td>
<td>0.39 (SD = 0.16)</td>
<td>0.26 (SD = 0.07)</td>
</tr>
<tr>
<td>OS—Dissatisfied</td>
<td>0.41 (SD = 0.17)</td>
<td>0.35 (SD = 0.09)</td>
</tr>
<tr>
<td>OD—Admonishing</td>
<td>0.42 (SD = 0.16)</td>
<td>0.32 (SD = 0.04)</td>
</tr>
<tr>
<td>DO—Strict</td>
<td>0.53 (SD = 0.12)</td>
<td>0.64 (SD = 0.07)</td>
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</tbody>
</table>

Results indicate that analogous to prior research, participant teachers consistently rated themselves higher on attributes that reflected positively on their interpersonal behavior (leadership, helpful/friendly, and understanding scales), and lower on scales with negative attributes (dissatisfaction, uncertainty, and admonishing). Table 4.2 above
shows the overall scaled means and standard deviations for students’ and teachers’ scores on the QTI. Correspondingly, to offer a visual representation, these scores were depicted on a graph with the scale scores representing the shading on each sector. Figure 4.6 provides this graphical representation based on aggregated teachers’ and students’ perception of international teachers’ interpersonal behavior.

Figure 4.6 Teachers’ and Students’ perceptions of international teachers’ interpersonal behavior.

According to students, their international teachers were generally more cooperative – as characterized by moderately high scores on leadership, helpful/friendly, and understanding scales, and less hostile – given the low uncertainty, dissatisfaction, and admonishing sores. Teachers perceived themselves as stricter ($M = .64$) than did their students ($M = .53$). To get an illustration of the teachers’ interpersonal behavior based on the two dimensions of the QTI, scores for the Influence and Proximity dimensions were computed (362 students, 17 classes, 8 teachers). Students perceived their teachers as
being moderately dominant and often cooperative (DS = .32, CO = .64). See Table __ below.

Table 4.3
Descriptive statistics for students’ and teachers’ perceptions of Influence and Proximity measures

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Students (n = 362)</th>
<th>Teachers (n = 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>Min – Max</td>
</tr>
<tr>
<td>DS—Influence</td>
<td>.32 (.30)</td>
<td>-0.98 – 1.13</td>
</tr>
<tr>
<td>CO—Proximity</td>
<td>.64 (.69)</td>
<td>-1.56 – 1.91</td>
</tr>
</tbody>
</table>

Note: Dimension scores of Influence and Proximity range between -3 and +3. These numbers represent, in case of Influence, the degree of Influence from -3 (submission) to +3 (dominance) and, in case of Proximity, the degree of Proximity from -3 (opposition) to +3 (cooperation). For most studies, these scores range from 0 – 1. An interpretation of the range of scores is 0–0.5 (moderately positive), 0.5–1 (positive), and >1 (very positive). (See den Brok et al., 2006 and Maulana et al., 2013 for a more detailed overview of the dimension scores).

Results indicate that teachers’ ratings on the two dimensions were almost twice as high as their students’ ratings. Based on dimension scores, these types of teachers are perceived as tolerant authoritative (Wubbels, Brekelmans & Hooymayers, 1993). Wubbels and colleagues suggest that teachers with these profiles have classrooms that are well structured, pleasant and task-oriented. Such teachers are enthusiastic and open to students’ needs; they are much more involved with their students and will tend to ignore minor classroom disruptions, choosing to concentrate on the lessons (Brekelmans, Levy, & Rodriguez, 1993). An analysis of each of the eight teachers’ interpersonal behavior profiles shows minor variations to this characterization. None of the teachers had behaviors that could be considered uncertain/tolerant, uncertain/aggressive, repressive or drudging.

In addition to numerical data noted in Table 4.4, each teacher received an individualized numerical and graphical profile similar to the one depicted in Figure 4.6.
After a brief discussion on quantitative aspects of the display and the related interpretation, teachers were asked for a qualitative interpretation of the survey findings.

### Table 4.4

*Mean QTI scale scores for eight teachers on combined teachers, individual teacher, and their students’ score.*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Teachers all</th>
<th>Teacher Actual</th>
<th>Class 1</th>
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<tbody>
<tr>
<td><strong>DC—Leadership</strong></td>
<td>Ramirez</td>
<td>Santos</td>
<td>Naya a</td>
<td>Noel</td>
<td>Sofia b</td>
<td>Awiti</td>
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<td><strong>SC—Student Freedom &amp; Responsibility</strong></td>
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Note: a. Naya had 2 Algebra 1 classes, which after cleaning up the raw dataset, were indistinguishable and hence combined in to one class. b. Of the 8 participant teachers, 7 had two classes complete the QTI survey, while 1, Sofia, had results from three classes: 2 IB and 1 Geometry. Analyses form one of the IB classes with 10 students was not included because findings were substantially similar to what is currently presented.
In follow-up interviews, after a review of profiles developed above, teachers variously described themselves as “strict” (Naya) or “authoritative” (Sofia), but also as “lenient” (Noel) and “flexible” (Awiti). Teachers were largely in agreement with findings from the survey instruments. They noted that the differential between what students observed of their behavior was lower but “understandable” (Torres). The perception that students scored them significantly lower than the way they graded themselves was attributed to “students’ honesty” (Torres). Though fascinated by the findings, they did not disagree with their students’ perceptions of their interpersonal behaviors. Participants also observed distinct patterns of behavior when students were in class – as part of a collective, and when they were alone. In isolation, students were more friendly and respectful as compared to when they were part of a class. In as much as participants portrayed themselves as firm with their classes, there was also need to provide space where students could “have an opportunity to be able to express themselves” (Awiti).

Summary

This chapter presented results that addressed how international mathematics teachers negotiated dialectics, tensions, and understandings of effective secondary mathematics teaching practices within the contexts of their classroom environments in U.S. public secondary schools. As the findings suggest, even though each participant teacher experienced the transitional process uniquely, there were commonalities of issues noted. Chief among these were skepticism about orientation and induction processes meant to prepare them for classroom instruction, appreciation of greater access to technology and other instructional resources, context related challenges that included
classroom management, language differences, varied perceptions on assessment and grading, and adjustments to students’ forthright and opinionated behavior. Additionally, even though teachers noted the need to diversify their teaching strategies, it is not immediately apparent that they had been successful in doing so, as most followed a traditional paradigm to instruction – akin to what they used in their home contexts. Participants cared for their students and reported affable classroom interactions, but classroom management remained a point of concern.
CHAPTER 5
DISCUSSION AND IMPLICATIONS

Introduction

This study examined two aspects of international teacher adaptation; that is, international teachers’ cross-cultural perceptions on effective mathematics teaching practices, and relatedly, teachers and students’ acuities of student-teacher interactions. The study was based on the assertion that a teacher’s actual enacted teaching practice stems from a complex amalgamation social and cultural influences, and the teacher’s beliefs about mathematics learning and teaching (Barkatsas & Malone, 2005). The study specifically looked at how eight international participant teachers drawn from four countries (Philippines, Kenya, Peru, and Jamaica) compared and contrasted perceptions of effective teaching between their home context experiences and how they realigned their beliefs and practices to what is perceived as good teaching based on their understanding of the frameworks of teaching in their U.S. teaching contexts.

Furthermore, the study considered student and teacher perceptions of the classroom instruction, of the classroom environment, and their conception of the role these interactions play in enhancing or frustrating learning in high school mathematics classes. Data for the study comprised semi-structured interviews, observations and video annotations of participants’ actual classroom instructional sessions, and an online survey on interpersonal teacher behavior. Data analyses followed an analytic process that included descriptive statistical analysis of survey data responses and interpretative phenomenological analysis (IPA) of qualitative data. In this partially mixed, concurrent,
dominant status mixed-methods research study, integration of mixed data focused exclusively on the classroom interactions research question.

Chapter 4 presented detailed findings on the transitional experiences of the eight participant teachers. In this chapter, I situate findings within scholarship on international teacher adaptation and effective mathematics teaching as presented in chapters 1 and 2. This discussion of key learnings corresponds to the research questions and sub-questions to provide a clearer view of the international teachers’ transitional experiences. Three broad themes addressed include perceptions of cross-cultural mathematics teaching, pedagogical adaptations, and classroom interactions. Though participants’ perceptions are discussed together, and where necessary distinguished from each other, their transitional experiences are presented on the basis of themes and sub themes developed from chapter 4. It should be noted that in discussions on the findings that follow, while themes from cross-cultural mathematics teaching and pedagogical adaptations are derived qualitative data analyses and findings, the classroom interactions aspect of the study is mixed.

This chapter starts with a brief reintroduction of participants, followed by a discussion of the findings on teachers’ transitional experiences. I then reflect on implications of the study and make recommendations for practice, as well as directions for future research.

**Why International Teaching?**

This section offers an overview of international teachers’ motivations for engaging in mathematics teaching in the U.S., and helps provide a nuanced understanding of their transitional experiences. Participants in this study came from varied backgrounds
and brought with them different experiences to U.S. classrooms. Much like U.S. teachers, participant international teachers’ routes to mathematics teaching were markedly varied (Ingersoll & Perda, 2010). These included circuitous paths by career changers; participants who chose education degrees as a way to mitigate higher costs related to degrees leading to alternative careers; familial influences that nudged some participants to pursue education; and teachers’ positive early schooling experiences. Irrespective of the pathway taken, most were motivated by a professed appreciation for teaching, the school environment, and care for students. Their identities were tied to the notion that teachers play an important role in children’s academic development (Ayers, 1995; Flores, 2003). Participants had been exposed to an assortment of experiences, which necessarily reflected the cultural and educational values, practices, and needs of their countries, and shaped their identities and views of what it means to be a teacher (Nganga 2011). For instance, for Ramirez and Noel, experiences as faculty members in what they deemed to be some of the best schools in their home countries was seen as an indicator of their teaching effectiveness. This study found, however, no simple linkages between teachers’ perceptions of excellence in their native countries and success in teaching in the U.S. Teachers who perceived themselves as excellent in their home country contexts were not necessarily guaranteed success while in the U.S.

Motivation to engage in international teaching was driven primarily by financial considerations, and supplemented by a need to expand participants’ repertoire of teaching skills, as well as to gain exposure to classroom instructional technology. Studies conducted in Canada, Australia, the United Kingdom, United States, and New Zealand
have indicated that salary differentials and expectations of a higher quality of life have produced a cadre of skilled and experienced teachers seeking a better life for themselves and their families (Miller, Ochs & Mulvaney, 2008; McNamara, Lewis & Howson, 2007; Appleton, Morgan & Sives, 2006; Hutchison, 2005; Oloo, 2012). It is therefore not surprising that financial considerations would be an important determinant of the decision to take on international teaching, even though benefits would only accrue for a limited time period (Bartlett, 2014). Similarly, teachers were motivated to improve their pedagogical skills – especially in relation to the use of classroom technology, to share their culture with students in U.S. classrooms, and to travel and see places they would otherwise not have been able to travel to. These findings are in line with conclusions by Appleton, Morgan and Sives (2006) whose study on the international teacher migration suggested that in addition to financial motivations (particularly attributed to teachers moving from developing to developed countries), teacher professional development and opportunities for travel were seen as particularly important. Similarly, Bartlett (2014) concurs with the notion that teachers were likely to migrate from less developed countries in an effort to supplement their incomes and improve their living standards, compared to those in developed countries whose move to the U.S. was motivated by amity, a sense of adventure, and travel opportunities.

**Perceptions on cross-cultural mathematics teaching**

This section addresses the first research sub-question, which is: *How do home context mathematics teaching experiences compare to teachers’ experiences and expectations of secondary level mathematics teaching in U.S. public schools?* Findings
from this study indicate that experiences inform teachers’ perceptions on a few levels: a broad instructional level that can impact teachers’ instructional choices and a more focused, mathematics-specific level that informed participants’ mathematics pedagogy. Both of these levels will be discussed in detail below, but the primary factors operating on the more broad instructional level included participants’ desire to ‘blend in’ to teacher expectations in the U.S., orientation and induction processes and other support structures within or outside school, teacher roles, expectations and responsibilities; resource availability; and challenges related to language and assessment. These transitional experiences might not necessarily be unique to mathematics teachers, but could be applicable to international teachers in other disciplines moving to teach in the U.S. The second aspect of teacher experiences was more directly linked to participants’ perceptions of mathematics teaching and learning and included such issues as perceived universality of mathematics content in tension with local teaching and learning contexts, prioritization of mathematics content, and relationships between mathematics content and mathematics pedagogy.

Transitional experiences

Participants variously described the transitional process as “exciting” but also “tough”, “stressful”, “overwhelming”, “hard”, “exhausting”, “a struggle”, and of having feelings of “swimming against the river.” As prior research indicates, for international teachers, surviving culture shock and adjusting to norms of their new schools is a daunting process (Dunn, 2013). According to participants in this study, the school context, culture, roles, and processes they encountered were diametrically different from
what they experienced in schools in their native countries. Participants voiced concerns about the significantly larger teacher responsibilities they assumed in U.S. schools when compared to expectations from similar positions in their home countries. One such concern included an increased need to deal with discipline, and address behavior problems in their classrooms – which were populated by students with many different needs. There were also requirements for more administrative paperwork (often tied to students’ discipline, or related to accommodations for resource students), and a greater need to maintain contact with parents. These were all new experiences that significantly expanded their understanding of their roles as teachers.

Furthermore, teachers’ expectations for student-teacher roles were problematized. Each of the participating teachers came from local contexts in which the teacher relationship with students was more authoritarian than in the U.S. This means that, from a local perspective, teachers are generally—at least on the surface—accorded unquestioned and unqualified respect. Further, teachers in these local contexts expect to control instructional communications as well as unchallenged student obedience. Because we tend to act in ways that are informed by our formative socio-cultural environments (Hofstede, 1991), participating teachers’ expectations were congruent with the much more formalized and authoritarian interaction patterns they knew from their local contexts; teachers expected drastic asymmetric power relations between themselves and their students. It was thus a difficult negotiation for participating teachers when they were confronted with more flattened power dynamics in their U.S. classrooms.
These findings on transitional experiences related to variations in school context expectations, expanded teacher roles, and differences in student-teacher relationships are not entirely new. Hutchison (2001; 2006) posits that many of the transitional issues new international teachers face could be traced to systemic knowledge gaps. He defines these as structural and organizational functions in U.S. schools that are likely to be different from those experienced in schools outside the U.S., and which new international teachers have to adjust to. Examples of such differences include knowledge of structure, functions, and roles of different members of a school community; distinctions in the structure of courses, use of text books, and scheduling of classes; notions of teacher autonomy; variations in internal and external assessments; and expectations for teacher-student relationships. According to Brown, Dashwood, Lawrence and Burton (2010) the extent to which an international teacher struggles in the transitional process could be dependent on how different the new environment is from their previous academic points of reference. If the difference between the two educational contexts is too big, one is more likely to struggle with the adaptation process. For participant teachers, though initial engagement with schools was tough, and even with continued struggles with classroom management, with time, teachers have become accustomed to norms and expectations of the schools in which they are placed. As Santos pointed out, after working with the schools and having encountered and dealt with challenges before, “now it is a piece of cake. I do my job, I copy the objectives, do everything, correct papers, put the grades on the computer, prepare my classes ... so no problem.” Similarly, Lave and Wenger (1991) assert that newcomers to a community of practice progressively become
acquainted to the community’s worldview through an inherent social negotiation of meaning as they try to make sense of their new socially and culturally structured worlds. Learning through participation becomes a crucial way to get apprised with activities carried out by specific people within a given social cultural community. For teachers in this study, learning, as anticipated, became an inevitable part of the process of transitioning.

**Perceptions of mathematics teaching**

The second aspect of participants’ transitional experiences was more directly linked to *perceptions* on mathematics teaching. Participants in this study were experienced mathematics teachers. At the time of the study they had, on average, 17 years of teaching experience. They were also arguably successful international mathematics teachers – given that 6 of the 8 had been given chances at a second tour of teaching in U.S. classrooms, and all 8 had their annual contracts with the school district renewed over the years. In reflecting on their mathematical knowledge, beliefs and dispositions, participants noted that a foundational aspect of what they perceived to be the nature of mathematics that allowed them to move across continents and teach in the U.S. was that “Maths is Maths” (Awiti), and thus “Math is the same everywhere” (Sofia). Indeed, as the National Research Council (Kilpatrick, Swafford & Findell, 2001) notes, mathematics content is universal and has utilitarian as well as esthetic characteristics. Because of this universal aspect of the subject content, participants believed that, having been prepared in mathematics and education, and having taught in their local contexts for a considerable period of time, they were sufficiently equipped to effectively teach in the
U.S. Participants glossed over connections between subject matter knowledge (SMK) and pedagogical content knowledge (PCK), noting “the content of what was expected of me, that itself was no big issue” (Awiti), and “when you know the concept, you already know what to do” (Noel). To them, because content presented in classes was similar, then the processes for teaching mathematics were expected to be similar.

This notion has, however, been challenged by Bartlett (2014) who argues that, in addition to subject matter knowledge, localized ideas on instruction, and cultural affinity between teachers and members of the community could significantly impact teachers’ approach to instruction, their expectations, norms, and interpersonal relationships.

Indeed, previous studies have indicated that, in a No Child Left Behind era where core subject matter academic competence has been prioritized (U.S. Department of Education, 2002), the question of whether or not international teachers have sufficient subject matter knowledge has not necessarily been a point of concern (Waite, 2009; Hutchison, 2005; Dunn, 2011). However, for international teachers, other aspects that go into mathematics teaching, particularly PCK, and including cultural and relational aspects of instruction (Ladson-Billings, 1995) have received lesser attention even though these ideas are privileged in U.S. classrooms.

Researchers have, however, argued for a better understanding of Discourses that explicate relations of power and authority which might be indicative of students’ participation in classroom mathematical practices on the one hand, and their history of participation in the practices of their local communities and broader communities on the other hand (Cobb & Hodge, 2002). Thus, teachers’ mathematical knowledge for teaching
should go beyond the overlap between pedagogy and mathematics, and has to be amenable to context based norms, values, and practices that govern instruction in their new environments. Proclamations such as “Maths is Maths” (Awiti) – which only consider specialized content knowledge, or “when you know the concept, you already know what to do” (Noel) – which minimize the importance of pedagogical content knowledge are inadequate for evaluating teachers’ knowledge for teaching. Broader conceptions of international teachers’ mathematical knowledge for teaching should, of necessity, have to include assertions of intercultural knowledge – where understanding students in their classrooms, and their larger contexts as participants in the local community and wider society become part and parcel of the classroom discourse structure (Cobb & Hodge, 2002, p. 256). It is anticipated that as teachers develop better understandings about who their students are, and use that knowledge to develop and implement instructional strategies that are cognizant of linkages between students, mathematics content, and the curriculum, their MKT should grow (Hauk, et al., 2014). As Ball and Forzani (2011) would argue, how students interact with mathematics and dispositions they develop about mathematics “depends fundamentally on what happens inside the classroom as teachers and learners interact over the curriculum” (p. 17). Supporting students’ development of mathematical knowledge calls for teacher practices that not only help make connections between students’ personal experiences and mathematical principles, but also engage students in worthwhile tasks and discourse (NCTM, 2014).
A final aspect of mathematics teaching that was salient to IT’s transitional processes was the structure of the curriculum and the sequencing of courses. Of the eight participant teachers, seven had previous experience working with mathematics curricula that were integrated. There were philosophical distinctions in perceptions about which curricula structures accorded students the most benefit: an integrated curriculum similar to what a majority of participants had erstwhile experienced, or a discipline base curriculum that they were exposed to in the U.S. Teaching distinct mathematics disciplines as opposed to a unified course were variously considered to be a benefit or a deterrent to effective teaching and learning. Teachers who saw course integration as beneficial speculated that students were accorded a better opportunity to see connections between the various courses and that “kids are more rounded that way, they tend not to forget so much over a long period of time” (Sandra). However, Awiti argued that, when mathematics is broken down into different disciplines, “it makes it to be clearer because you do an in depth learning of that particular section of math as compared to when it's just bunched up together.” (Awiti). This discipline based approach to curriculum development and implementation seemed especially important to teachers who saw the integration of courses as a means to standardizing performance by essentially requiring all students take the same course content, and pass the same national examination. As noted above, once participants received their teaching assignments, it was expected that they had to provide instruction in accordance with the district curricula definitions and/or state standards. Hence, despite the philosophical assertions on the nature of the curriculum, there was nothing much they could do about what needed to be taught.
Pedagogical Adaptations

The second broad theme considers international mathematics teachers’ pedagogical adaptations. This theme offers understandings related to the following research sub question: *In what ways are pedagogical adaptations reflected in the day-to-day mathematics teaching and learning?* Data analyses yielded interesting findings on teachers’ approach to mathematics instruction. One such finding was that, whereas teachers had mostly used a teacher-centered, lecture-based approach to teaching in their home context, once in the U.S., they made efforts to broaden their pedagogical practices—specifically by attempting differentiated instruction.

In interviews, participants observed that in their home countries, given large class sizes, limited resources, and authoritarian power structures, much of the teaching was done using the lecture approach. As Hutchison (2005) suggests, the lecture method is considered the best-suited instructional method for international teachers’ home contexts because students are generally quiet, obedient, hardworking, and hence considered easier to teach. In using lecture-based approaches teachers express a perspective which epitomizes the nature of mathematics as a series of ‘rules and truths’ that must be conveyed to students, and where teaching is by ‘chalk and talk’ followed by individual practice until fluency is attained (Swan, 2006). Once in the U.S., on the other hand, teachers realized that they had to significantly vary their pedagogical approach and practice.

*Dilemma*
Part of the dilemma related to student engagement and motivation. As Sofia indicates “if they enjoy the work, the activities that you give them, [and if] they can connect it, and feel that they can use it outside the classroom that would make the teaching instruction effective … the main battle here is how to catch the attention of the students because if they feel not motivated, I don't think learning is taking place” (Sofia). How teachers responded to this dilemma varied by individuals. Of the eight participants, Awiti came to an understanding early on that individualized and collaborative strategies were an important way to get students to engage with mathematics lesson. He notes:

Over here, group work is important, pair work is important. So once I identified that I don't have to give lecture kind of lesson, I don't have always to move to each and every student to be able to help them learn, so you can be able to also teach different … to teach using different methods … [sometimes I provide] individualized instruction especially after I have given my guided instruction (Awiti).

Some teachers, fearing chaotic classrooms, kept a tight reign over classroom activities, limiting occasions for collaborative work. As Torres pointed out:

In this setup that I have right now, in the class setting that I have right now, I can never make them form into groups where they can work harmoniously … I cannot describe myself as a teacher [for whom students] can conduct a perfect harmony among themselves (Torres).

Participants hence recognize that they have to alter their instructional practices, but there is a delicate balance between adopting more student centered approaches that allow
students opportunities to collaborate and a fear of that such freedoms would result in classroom management problems. Further complicating the adjustment was a variation in expectation between teachers and students about who adjusts to who. As Ramirez would point out, “in the Philippines, it's something like "this is how I teach, so you will need to adapt," here, the teacher will adapt with the learning his or her students” (Ramirez).

These findings are consistent conclusions made by Waite (2009) who sought to identify international teachers’ professional development needs (not restricted to mathematics teaching) and found that about seventy five percent of the respondents needed support with instructional strategies for diverse students. Just like participants in this study, teachers in Waite’s study discovered that they had to pay greater attention to how students learn than they had done erstwhile and needed to take steps to ensure that in addition to teaching content, students needed to be motivated, engaged, and wanted to see meaning in what they are doing.

**Differentiation**

One aspect of pedagogical adaptation that comes up time and again is the notion of differentiated instruction. According to Tomlinson (2014) differentiated instruction is both a philosophy and a way of teaching that takes cognizance of students’ unique experiences, readiness, and interests to plan for and implement instruction. In differentiated classrooms, both individual and collaborative activities are encouraged, students get to work on worthwhile tasks and are given a voice in identifying and solving problems in class as a way to develop a sense of community. For participants in this study, ideas about differentiated instruction was a like buzzword that stemmed from a
district mandated initiatives. As Naya pointed out, “they’re [school district] big on
differentiated instruction.” Participant international teachers were aware that they were
expected to differentiate more, and that this was different from what they did in their
native countries, but they could not describe or account for how this looked like in class
activities. Though encouraged, participants viewed this approach to instruction as more
suited for U.S. classrooms but not necessarily their home countries (Sandra). Participants
such as Noel also saw differentiating instruction as hard work, so much so that sometimes
“[he] had to wake up at night and prepare, [to] make differentiated instruction.” Though
one video recorded session might not have necessarily been indicative of the teachers’
overall approach to instruction, an analysis of videos teachers submitted indicated that
rather than differentiate, a majority of teachers followed a traditional paradigm of
instruction (Banilower et al. 2006; Weiss and Pasley 2004). Teaching was primarily
based on direct instruction. Lesson sequences followed a predictable pattern; students
worked on warm-up problems when they got to class. After reviewing the warm-up –
often by teacher and for correctness, the teacher then reviewed the day’s lesson objectives
and introduced or continued the lesson, as appropriate.

It is not immediately apparent if norms of instruction participants portrayed are
indicative of teaching seen among all teachers (local and international) at the three
participating high schools. But given the calls for differentiated instruction, it stands to
reason that there was an expectation that all teachers within the district would adopt
instructional processes that called for greater students’ involvement and engagement than
was case. In a sense teachers did have to adapt to teaching in the U.S., but changes noted
do not seem to have strayed far from pedagogical practices they might have enacted in their home countries.

*Focus on skill development*

Furthermore, irrespective of calls for differentiated instruction, there was an assertion that helping students develop *skills* necessary to solve given mathematical problems was more important, in the short run, than having them develop conceptual understanding of mathematical concepts. It would appear that despite calls for differentiating instruction, participant teachers preferred to adopt skills-based instructional strategies. As Santos would argue, “skill development is more important … as a result of developing skills, the students will understand.” Similarly, Torres notes “math is skills, it's not memorizing. It's not. It's skill. So [students] have to work, work, work.” And as Sandra explained, after trying different, student centered teaching strategies, she had resorted to “just … drip feed and guide, guide, guide, guide, guide” as a way to help students learn mathematics. Similarly, Ramirez indicated that “in math you just show and tell ... you show how to do it, the kids will have to retell it. Same thing here in the United States.” It is possible that some of these attitudes to teaching stem from a frustration participants had with their students’ mathematical knowledge. For a majority of participants, it was inconceivable that students at the junior and senior secondary levels were still struggling to conceptualize foundational mathematics concepts such as fraction operations. Focus on skills was, perhaps, one way to address such shortcomings. Nonetheless, at a time when calls are being made for mathematics teachers to adopt a reform agenda which emphasizes problem-solving, creativity, and classroom discourse as
a means of improving both understanding and dispositions towards the mathematics (NCTM, 2000), participants in this study appeared to be maintain a more traditional approach to instruction.

Technology

An additional aspect of international mathematics teachers’ pedagogical adaptation was the use of technology in the classroom. For participants in this study, the need to gain an immersive experience working with instructional technology in U.S. classrooms was noted as one of the reasons for choosing to pursue international teaching in the U.S. As Awiti stated “My biggest interest was actually to be able to get my hands on the technology… I wanted to come over here and see; how does this work in a classroom set-up?” Classroom technology, in this case, encompassed the use of desk top computers, chrome books, graphing calculators, interactive smart boards, and TVs. Compared to their home contexts where such resources were minimal or non-existent, having such technology opened up a new way to approach instruction. According to NCTM (2014) tools and technologies available in class form part of essential resources that can be used to help students learn and make sense of mathematical ideas, reason mathematically, and communicate their mathematical thinking.

For participants, familiarizing and acclimatizing to using technology in class took time. When used, technology served a number of purposes including presentation and computation. Using graphing calculators, for example, served to ease redundant computational burdens. In some cases, understanding key strokes was part of what Ramirez would call “the short-cut method” to solving given mathematical problems.
Besides computations, teachers did not indicate whether they used available tools to explore the underlying mathematical principles. In the videos submitted, both Noel and Ramirez take students through steps to finding solutions to given math problems on graphing calculators. Scholars on mathematics education would argue though that, when Noel, for example, shows students how to find the intersection of two linear equations on a graphing calculator, rather than simply following calculator key-strokes to find the $x$ and $y$ values, there are great opportunities for classroom discussions that could have students explore similarities and differences between the lines, and how changing specific values in the equations affect the graphs, and hence provide students opportunities to explore the related mathematical principles (NCTM, 2014). These deeper discussions were not observed.

**Classroom Interactions**

The final aspect on international teacher acclimation relates to student-teacher interrelationships and power structures that govern such relationships. The section attends to the following research sub questions: *What are international secondary mathematics teacher’s perceptions of classroom interactions?*, and *To what extent do students’ perceptions of international teachers’ interpersonal behavior and classroom environment correspond with the teachers’ perceptions of themselves and their mathematics classes?*

Classroom interactions, and particularly difficulties with classroom management, is a recurrent theme in studies looking at international teacher acculturation (Miller, Ochs & Mulvaney, 2008; Biggs, 2010; Brown, Dashwood, Lawrence & Burton, 2010; Fee, 2010; Hutchison, 2006). For participants in this study, despite having taught in the U.S.
for a number of years, this is an aspect of the U.S. classroom experience that they continue to grapple with. Hutchison (2005) depicts managing classroom interactions as a litmus test of international teachers’ survival in U.S. classrooms. For participant teachers, U.S. students’ attitudes and behavior stand in stark contrast to students they had back home who, despite the large class sizes and meager resources, were obedient, respectful, and much easier to manage. While acknowledging that not all students fit this description, there was a prevailing view that many of their American students were disengaged, calling them “unmotivated” (Torres), with “no aspiration” (Sandra), “lazy” (Ramon), and “lacking in persistence” (Sophia). Participants, nonetheless, had an understanding that the teacher has a responsibility to manage the learning environment to ensure all students have the opportunity to learn mathematics. Accomplishing this required that international teachers address the needs of a more diverse group of students whose attitudes, behaviors, and patterns of communication are very different from those they had in their home countries.

This process of readjusting their attitudes and beliefs about ways to better interact with students was integral to perceived success teaching in the U.S. Having taught in the U.S. for a number of years, different participants approached this task by taking varied approaches to negotiating with students. These included setting up a culture that promotes accountability and reciprocal respect (Sofia); being firm about established rules, but flexible with students by allowing them opportunities for self-expression and chances to correct misbehavior (Awiti); negating punishment as a way to manage students’ behavior, but focusing on showing care and getting to understand each student’s
needs in order to get them to do the right thing in class (Santos); and understanding that not everything students do or say should be taken as a personal affront on the teacher, but rather, in addition to being firm about rules and consequences, one has to develop rapport with students, establish open channels of communication, and clearly have students know that “You're a child, I'm an adult, we'll deal with this problem this way... let's fix it.” (Sandra). In a sense these adjustments reflect teachers’ reorientation towards schools and students where the cultural influence promotes smaller power distances than one they had in their home countries. One where being firm is essential, but behaviors depicting teacher dominance (in the sense that students always follow teacher direction) may not be as fruitful as promoting cooperative interactions.

These observations are made salient when one considers findings from the QTI survey. An examination of distinctions in scores between students’ and teachers’ responses to the Questionnaire on Teacher Interactions (QTI) provided a better sense of the extent to which students’ perceptions of international teachers’ interpersonal behavior and classroom environment corresponded with the teachers’ perceptions of themselves and their mathematics classes. There were differences on the two dimensions Influence (degree of teacher dominance), and proximity (degree of teacher cooperation) of the QTI survey which indicated variations in perceptions of teacher interrelationships. In line with literature, teachers scored themselves higher on either dimension (Maulana, et al., 2012; den Brok & Levy, 2005). A closer examination shows that teachers rated themselves more than twice as high on the influence dimension (Students $M=.32$, Teachers $M=.73$),
and almost twice as high on the Proximity dimension (Students $M=0.64$, Teachers $M=1.04$). See Table 4.3.

In either case, though there was a discrepancy in teachers’ self-perceptions and students’ perceptions of proximity and influence in the student-teacher relationship, the perceptions were moderately positive for students, but highly positive for teachers. Similarly, all eight participant teachers’ profiles showed that they held very positive perceptions about their leadership, helpful/friendly, and understanding behaviors, and were stricter than their students thought. Concomitantly they rated themselves much lower on negative aspects including admonishing, dissatisfied, and uncertain behaviors, and believed that they accorded their students less freedom and responsibility than their students felt. This could be the result of wishful thinking for teachers who might have wanted to be perceived in a more socially desirable way (Maulana, et al., 2012). The wishful thinking could also be attributed to a delicate balance teachers were making where they still wanted to maintain a high power distance by exerting dominant interpersonal behaviors, but at the same time they wanted develop closer relationships with students by being sensitive to students’ needs and exhibiting more cooperative behaviors than students experienced. Wubbels, Brekelmans and Hooymayers (1993) describe teachers with these profiles as tolerant authoritative. Such teachers have classrooms that are well structured, pleasant and task-oriented; they are enthusiastic and open to students’ needs; they are much more involved with their students; and will tend to ignore minor classroom disruptions, instead choosing to concentrate on the lessons. Though international teachers in this study might not necessarily describe their classroom
environment in such positive light – and will argue that they still struggle with classroom management – their classroom environments are certainly seen in a positive light by their students. Students may not have rated the teachers quite as high as the teachers rated themselves on classroom interrelationships, but their ratings were moderately positive and none of the teachers’ classes viewed their teachers in negative terms.

Participants did not dwell much on the connections between student-teacher interactions and mathematics learning. Efforts at developing better relationships were connected to energies expended developing better systems of classroom management and related instructional processes. Such efforts were initially perceived, and continue to be viewed as challenging and stressful. Part of this stress stemmed from having to adjust to who the students were, and acclimatizing to the socio-cultural realities of instruction in the U.S. Adjusting to new roles and expectations in their schools took time and called for an understanding of the school contexts, the students, their needs, and backgrounds. As Noel would point out, the more teachers interacted with students, the better they got at managing classroom situations based on experiences they had. Building rapport with students took on an almost familial aspect. To get students to behave as expected, teachers would at times be firm and “show consequences” for misdeeds, sometimes they would “raise [their] voices at them”, or “you nag sometimes” (Noel).

**Conclusion**

In summary, as Bartlett (2014) would argue, even though there are similarities and understandings about broad structures of schooling and notions of teaching, how teachers interact with content, pedagogy, and contexts is highly localized. Give that
teaching is relational (O’Connor, 2008; Reichert & Hawley, 2013), and actual enacted teaching practice stems from a complex amalgamation social and cultural influences (Barkatsas & Malone, 2005), international teachers’ adaptation to U.S. schools could not necessarily be limited to relations between teachers and their students in class. Such adaptations are reflective of expectations of associations international teachers have with their students, colleagues, administration, and the community. Perhaps adjusting to effective mathematics teaching and to cultural ways of communication and interactions that emanate from work with students in their classrooms, could be tantamount to adjusting to norms and expectations of the schools and communities in which the schools are located. Though international teachers bring a divergence of experience to their new contexts, it is expected that overtime, they will develop knowledge of, and take into account students’ cultural values if they are to be successful. At the end of the day, while mathematics is universal, all teaching and learning happens at a local level.
Implications and Recommendations

This study is significant because it contributes to discourse on international teachers’ transitional process as they migrate to teach Mathematics in U.S. high schools. Participant teachers were accorded an opportunity to discuss how their native country teacher experiences, beliefs, and pedagogical philosophies impacted their implementation of mathematical practices in U.S. classrooms. As noted in chapter 1, international teachers play an important role in helping alleviate personnel gaps in high needs schools that stem from either a low supply of teachers or high teacher turnover (Ingersoll & Perda, 2010; Hutchison, 2001, 2005; Dunn, 2013). Often times these teachers are recruited as a last resort to teach in schools that provide education to students who come from under-resourced communities (Bartlett, 2014). International teachers bring with them extensive knowledge and experience having taught high school mathematics in their home contexts. However, based on this study’s findings, adapting to U.S. schools’ functional structures and to teaching American students can be a challenge. It may not necessarily imply that teachers are unprepared to teach in their new settings; rather, there is an understanding that because teachers move across cultures, each of which has a different worldview on what it means to be a mathematics teacher, such experiences and practices might not be definitively portable across cultures. As has been noted in studies that have looked at the international teacher experience, adjusting to teaching in the U.S. requires relearning new approaches to working with students and reevaluating beliefs of what counts as effective [mathematics] teaching (kumek, 2009; Hutchison, 2005). This means that right from the beginning of the international teacher experience, it is
inevitable that teachers will encounter situations that call in to question their teacher beliefs on mathematics teaching, and might find that actual classroom realities are significantly different from what they have known from working in their native countries. Adjusting to the social cultural aspects of teaching in new contexts might not be easy and will take time.

Mathematics knowledge for teaching

This study, however, is unique in the sense that it sheds light on the importance of paying attention to other aspects of the teacher expertise and experience besides specialized mathematical content knowledge. An important understanding developed by the study is that even though mathematics content may be “universal”, how to teach the content is context-dependent. That is, MKT, particularly mathematics PCK, are not universal. This notion runs counter to prevailing views among stakeholders that content knowledge, as a primary indicator of teacher competence, will suffice for teachers changing teaching contexts. Based on this study’s findings, that is no always the case. It is essential that in welcoming international teachers to U.S. schools, and in developing induction and professional development programs for these international teachers at the school district level, due consideration is given to a broader view of mathematical knowledge for teaching. Specifically, school leaders will need to focus attention on facilitating teachers’ understanding of who students in their classroom are, both inside and outside the school context. Additionally, consideration has to be given to anticipated classroom culture, as well as the set of acceptable values, beliefs, behaviors, and norms that govern discourse and interactions in mathematics classroom settings. These ideas
touch on cultural and relational aspects of instruction which have received lesser attention thus far – even though they are crucial to easing international teachers’ adaptation process, and in helping them implement instruction that meets the diverse needs of students in their mathematics classrooms. Finding ways to enable new international teachers adopt and implement instructional strategies that are cognizant of students’ social-cultural backgrounds, and ensure that their students not only learn mathematics but also develop positive dispositions about mathematics as an area of study is of crucial importance.

*Pedagogy*

According to Brown, Dashwood, Lawrence and Burton (2010) it is expected that teachers will vary their pedagogical strategies when they move from one instructional context to the next. However, the extent to which an international teacher’s pedagogy changes in the transitional process could be dependent on how different the new environment is from their previous academic point of reference. It was interesting to note that though teachers came from four different countries, had diverse backgrounds, and were based at different schools within the same district, there was not much variation in eventual instructional processes among the eight teachers. Even though participants posited a need to vary their instructional methods, their eventual enacted practices do not seem to have deviated much from the nature of instruction they note that they provided in their native countries. It is possible that the instructional methods used were indicative of the broader instructional norms within the school, and/or district. This aspect was, however, not explored.
Transitional experiences, orientation, and supports

This study’s findings also add to a steadily increasing scholarly base that points to notions of culture shock and difficulties that international teachers encounter during the socialization process into their new school contexts. Similar to Beck (2010), Waite (2009), Kumek (2009), and Hutchison (2001; 2005), this study shows that teachers need varied sources of support when acclimating to the demands of teaching in U.S. schools. Whereas it is true that international teachers are experienced teachers, they do have unique needs that have to be addressed if they are to be effective at their new assignments. One crucial way to support international teachers’ adjustment processes is through orientation programs established by the recruitment companies and requisite induction conducted at the school districts (Siler, 2012). Orientation can be thought of as a process of acquainting teachers with school and district policies, rules, traditions and educational offerings (ERIC, n.d). Teacher induction, on the other hand, entails a time of transition that helps newcomers join a given school context and its community of teachers, and helps them become socialized to norms practices, and expectations within the school or district (Feiman-Nemser, Schwille, Carver & Yusko, 1999). These socialization processes, whether formalized or not, play an important role in helping new teachers enhance their skills, survive initial hurdles to effective teaching, and succeed as teachers (Ingersoll, 2012). For participants in this study, however, it was not immediately apparent that these orientation sessions mitigated transitional issues they encountered. Whereas some participants saw orientation as an important and useful way to get familiarized with the rigors of teaching in the U.S., others view information provided as
insignificant and had to rely on supports provided by more experienced international teachers, American colleagues, and mentors at their schools. Without a defined standard or expectation for orientation for incoming international teachers, the benefits teachers get from such sessions continue to varies significantly, depending not only on when a teacher arrives in the country, but also the practices set forth by the recruitment companies, induction and mentoring processes established by the schools and districts, and vitally, the nature of information provided during these sessions.

Where offered, supports need to start early, while teachers are still in their home countries, and continue immediately after teachers arrive in the country – during orientation and induction (Hutchison & Jazzar, 2007). Rebore (1995) as cited in Robinson (1998) suggests a four phase induction program that starts in the summer and concentrates on orienting the new teachers to the school, school district and community during the summer months, and is followed by frequent collaborative meetings between new teachers and mentors for support and feedback during the school year. The induction program culminates in a self-evaluation of the new teacher’s performance in the spring semester. Moir and Gless (2001) have also suggested that induction programs have a shared vision that focuses on high quality instruction, and a commitment to new teacher learning and mentorship. Even though participants in this study note that they learned a lot from informal communications with other international teachers, formalized mentoring relationships should be open to any teacher – American or otherwise – who has “strong interpersonal skills, credibility with peers and administrators, a demonstrated curiosity and eagerness to learn, respect for multiple perspectives, and outstanding
instructional practice” (Moir & Gless, 2001, p. 112). In addition to mentorship, team-based supports and collaboration with other mathematics teachers would provide a venue for local discussions of context, avail a better understanding of the informal nature of student-teacher interactions, and help new international teachers better appreciate and address the needs of immersion students. For teachers like Santos and Sofia, who in their first tour found themselves alone in their new school districts, an online support group that links teachers across districts – whether formalized by the recruitment agencies or developed at a more localized and informal level by teachers themselves – might provide relief to feelings of isolations and despondency.

Whereas participants in this study indicated the need for an immersive program where, prior to entry in their own classrooms, teachers are allowed a brief period of time shadowing an American teacher and discussing aspects of the classroom management protocols that might be effective for the classrooms in which these international teachers will be teaching. It is doubtful that such a proposition would be tenable given that most recruitment companies are managed on a for-profit basis.

It is essential that school leaders take time to understand the social cultural needs of their teachers. Though there is an assumption that teachers are experienced and can settle in to new context with ease, such transitions take time and require supports. Hence, it will be necessary for site administrators to provide an environment that allows for exploration and mistakes initially, but with the goal of improvements in all facets of instruction. Undoubtedly, with proper orientation, focused induction, and adequate
support structures within schools, this learning process, and hence transitional process, would be made less arduous.

These supports, however, do not negate the prerogative for international teachers to be self-reflecting and aware of the shortcomings they might have as new teachers and make tentative steps to anticipate such challenges. Sandra, for instance, notes that part of her success adapting to her school is an understanding that, whenever she moves between countries, she has to relinquish the foundational idea that she is an expert teacher. The transition requires that teachers have a curiosity about their new environments, be proactive in seeking ways to better understand the functional nature of systems and relations in their new schools, and become persistent learners.

**Further Research**

One potential research question that stems from this study is the need to develop some measure of what counts as adequate orientation and induction support for incoming international teachers. Since the orientation and induction processes play such a fundamental role in helping international teachers’ adapt to teaching in the U.S., it is important that stakeholders (recruitment companies, school district officials, site based teacher coaches, and building administrators) who design and implement such orientation programs be interviewed and an expectation set on what kinds of knowledge teachers would require in order to ease their transitional challenges. Participants in this study observed the need for an immersive program that starts preparing them for the exigencies of classroom life well before they arrive in the U.S. Such a study that would help make the connection between teacher needs, and potential school expectations can help develop
professional developments plans that are cognizant of more thoughtful approaches to orientation and induction. Such sessions should more realistically and portray aspects of instruction that teachers are likely to encounter once they get to their own schools.

A second potential for further studies is consideration of teachers’ mathematical knowledge for teaching. Hauk, et al. (2014) have argued that, besides MKT and PCK, there is need to better understand classroom discourse, in the “big D” sense of the word as a way to promote effective teaching and learning mathematics. To date there have been no studies that have specifically focused on international teachers' mathematical content knowledge, pedagogical content knowledge, or social cultural elements that underlie 'Discourse' in mathematics classrooms in the US.

Finally, it would appear that adapting to U.S. schools is tantamount to adapting to the prevailing school and community cultures of the contexts in which international teachers find themselves. For teachers who manage to stay longer, each subsequent year appears easier. A longitudinal study that tracks different teachers in different teaching contexts could provide indications of what the transitional experience is like at different points of a teachers’ stay in the U.S. Having such knowledge might be useful in anticipating and mitigating difficulties that crop up during the initial year of a teachers’ experience in the U.S. The sooner such challenges are ironed out, the better situated the teacher is to address his/her students’ learning needs.
Appendix A

Child/Minor Agreement to Be in a Research Study
Clemson University

An Examination of International Mathematics Teachers’ Pedagogical Adaptation and Teacher-Student Interpersonal Relationships in High School Mathematics Classes.

You are being invited to be in a research study. Below you will find answers to some of the questions that you may have.

Who Am I?
My name is Dennis Kombe, a student at Clemson University. I am currently working on this research project as part of my doctoral degree.

What Is It For?
The purpose of this research is to better understand how your international mathematics teacher interacts with students in your class and how such interactions influence how you learn mathematics.

Why You?
You have been selected to participate in the study because your mathematics class is currently being taught by an international mathematics teacher.

What Will You Have to Do?
· You will complete an electronic survey sometime during the semester. This survey will take about 20 minutes to complete.
· Your teacher will also record a math class session. Your participation in this study, therefore, will involve a video recording. The video record will be analyzed for research and will be securely stored for 5 years. After that, the video records will be erased.

What Are the Good Things and Bad Things that May Happen to You If You Are in the Study?
· There are no direct benefits to you from participating in this study. We hope, however, to better understand the successes and challenges international mathematics teachers encounter as they interact with students in American secondary mathematics classrooms.
· I do not anticipate any risks or discomforts resulting from your participation in this research study.
What If You Want to Stop? Will You Get in Trouble?

- Your participation in this study is voluntary. You may stop at any time. Participating in this study will not affect your grade in school.

Do You Have Any Questions?

- You can ask questions at any time. You can ask them now. You can ask later. You can talk to me or you can talk to someone else at any time during the study. Here are the telephone numbers to reach us 843-817-8129, Dennis Kombe, Teaching and Learning Department.

By being in this study, I am saying that I have read this form and have asked any questions that I may have. All of my questions have been answered and I understand what I am being asked to do. I am willing and would like to be in this study.

A copy of this form will be given to you.
Appendix B

Parent Permission Form

Clemson University

An Examination of International Mathematics Teachers’ Pedagogical Adaptation and Teacher-Student Interpersonal Relationships in High School Mathematics Classes.

Description of the Research and Your Child’s Part in It

Dennis Kombe is inviting your child to take part in a research study. Mr. Kombe is a doctoral candidate in the Teaching and Learning Department at Clemson University. The purpose of this research is to gain a better understanding of how international secondary mathematics teachers experience the transition to teaching in American classrooms, and how the interactions they have with students in class influence the teaching and learning of mathematics.

Your child’s part in this study will be to complete an electronic, anonymous survey, in the fall of the school year. It will take your child about 15 - 20 minutes to complete the electronic survey.

In addition, your child’s class has been selected for a video study. Your child’s teacher will record a video of an instructional session. Only members of the research team will have access to audio and video records of the instructional session. The video-recorded session will be transcribed for analysis. Audio and video records will be securely stored on password-protected machines. Audio and video records will be securely stored for a period of five years, at which time they will be erased.

Risks and Discomforts

We do not know of any risks or discomforts to your child in this research study.

Possible Benefits

We do not know of any way your child would benefit directly from taking part in this study. However, this research may help us to understand the successes and challenges international mathematics teachers encounter, as they look work with students in American secondary mathematics classrooms.
Protection of Privacy and Confidentiality

Your child’s participation in the electronic survey is anonymous. We will do everything we can to protect your child’s privacy and confidentiality. We will not tell anybody outside of the research team that your child was in this study or what information we collected about your child in particular.

Choosing to Be in the Study

You do not have to let your child be in the study. You may tell us at any time that you do not want your child to be in the study anymore. Your child will not be punished in any way if you decide not to let your child be in the study or if you stop your child from continuing in the study. Your child’s grade will not be affected in any way if you, or they, choose not to participate in the study, or choose to stop at any time.

We will also ask your child if they want to take part in this study. Your child will be able to refuse to take part or to quit being in the study at any time.

Contact Information

If you have any questions or concerns about this study or if any problems arise, please contact Dennis Kombe at Clemson University at 843-817-8129 or dkombe@clemson.edu. If you have any questions or concerns about your child’s rights in this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-0636 or irb@clemson.edu. If you are outside of the Upstate South Carolina area, please use the ORC’s toll-free number, 866-297-3071.

Consent

I have read this form and have been allowed to ask any questions I might have.

☐ I give my permission for my child to be in this study.

☐ I do not wish (my child) to participate.

Parent’s signature: ___________________________ Date: ____________

Child’s Name: __________________________________________

A copy of this form will be given to you.
Appendix C

Teacher invitation participate in research study and Consent Form

Clemson University

An Examination of International Mathematics Teachers’ Pedagogical Adaptation and Teacher-Student Interpersonal Relationships in High School Mathematics Classes.

Dear Teacher,

My name is Dennis Kombe, a doctoral candidate in the Teaching and Learning Department at Clemson University’s Eugene T. Moore School of Education, working under the supervision of Dr. S.M. Che and I am inviting you to take part in my dissertation research study.

I am very interested in learning about your experiences as an international secondary mathematics teacher. I believe you bring a wealth of knowledge and experience to the schools and communities you teach at. However, given variation in education, backgrounds, and culture, it is likely that you approach mathematics instruction differently from your local counterparts, and it is this aspect that my dissertation considers. My research seeks to better understand how international secondary mathematics teachers experience the transition to teaching in American classrooms, the nature of interactions and relationships they have with students in their classes, and how their evolving teaching philosophies influence how they teach mathematics.

As a participant in the study,

- You and your students will be invited to complete a brief online survey on student-teacher interactions (15 – 20 minutes max).
- You will then participate in an interview (lasting between 45 minutes and an hour) to take place in a mutually agreed upon location and time. At the interview we will discuss your background, your perception of differences in teaching secondary mathematics in your home country and in the US, as well as a brief exploration of how these changes influence the way you currently teach. You may decline to answer any of the interview questions if you so wish.
- Finally, you will be asked to record a video of a lesson of your choice, which will be followed by a video stimulus recall interview.

With your permission, the interviews will be tape-recorded to facilitate collection of information, and later transcribed for analysis. Shortly after the interview has been
completed, I will send you a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or clarify any points that you wish. Audio and video records will be securely stored on password-protected machines. Audio and video records will be securely stored for a period of five years, at which time they will be erased.

There are no known or anticipated risks to you as a participant in this study. Your participation will be a valuable addition to research on international teachers and findings could lead to greater understanding of the successes and challenges international mathematics teachers encounter as they look for ways to effectively work with students in American secondary mathematics classrooms. Results should lead to ideas and recommendations on how to tailor ongoing professional development to meet the specific needs of international mathematics teachers. Data collection is expected to start in September of 2015 and go through to November of 2015.

All information you provide is considered completely confidential. Your responses will not be shared with anybody outside of the research team. As part of the nature of academic research, data will be used for research purposes, and may be presented in academic papers, publications, and at conferences. Your name, the name of any schools you mention, and any other identifiable information will never be disclosed, but if necessary, will be displayed as pseudonyms.

Participation in this study is voluntary. You may choose not to take part and you may choose to stop taking part at any time. You will not be penalized in any way if you decide not to be in the study or to stop taking part in the study. I understand how busy the life of a teacher can be and so I am very appreciative of you taking time to consider this. As a token of gratitude, teachers will be accorded a $50 gift certificate at the completion of the data collection process.

I hope you will volunteer to participate in my dissertation study. If you choose to volunteer, or need more information to assist you in reaching a decision about participation, or have any other questions, please feel free to contact me by phone at 843-817-8129 or e-mail at dkombe@clemson.edu.

Additionally, if you have any questions or concerns about your rights in this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-0636 or irb@clemson.edu. If you are outside of the Upstate South Carolina area, please use the ORC’s toll-free number, 866-297-3071.
I very much look forward to speaking with you and thank you in advance for your assistance in this project.

Sincerely,

Kombe, Dennis

Doctoral Candidate
Department of Teaching and Learning
Eugene T. Moore School of Education
Clemson University

CONSENT FORM

I have read this form and have been allowed to ask any questions I might have. I agree to take part in this study.

Participant’s name: ____________________________________________________________

Participant’s signature: ___________________________ Date: ____________________
Appendix D

Student survey

Student Version of Questionnaire on Teacher Interactions

QUESTIONNAIRE

This questionnaire asks you to describe your teacher’s behavior. Your cooperation can help your teacher improve his/her instruction. DO NOT TYPE IN YOUR NAME, the responses are confidential and anonymous. This is NOT a test. Your teacher will NOT read your answers and they will not affect your grade. Your teacher will only receive the average results of the whole survey, not individual surveys.

Student Background Information

The purpose of these questions is just to get a better idea of who you are.

What grade are you in?

7th 8th 9th 10th 11th 12th

Are you female or male?

Female Male

What is your ethnicity? Select all that apply.

American Indian or Alaskan Native Asian
Black or African-American Hispanic or Latina/o
Native Hawaiian or Pacific Islander White
Other ethnicity

What is the name of your school?

What is the name of your MATH class?

What is the name of your MATH teacher?
Survey Items

On the next few pages you’ll find 64 sentences on the questionnaire. Select options you think most applies to the teacher of this class.

For each question, you can chose a response that best represents how often the teacher demonstrates behavior indicated by the statement. That is: 1 - Never, 2 - Rarely, 3 - Sometimes, 4 - Often, 5 - Always.

For example:

My teacher expresses herself/himself clearly

If you think that your teacher always expresses himself/herself clearly, select or click on number 5 on your computer screen. If you think your teacher never expresses herself/himself clearly select or click on the number 1. You can also choose numbers 2, 3, or 4, which are in between. Thank you for your cooperation.

PLEASE BEGIN

1. My math teacher is strict. 1 2 3 4 5
2. We have to be silent in our math class. 1 2 3 4 5
3. My math teacher talks enthusiastically about math. 1 2 3 4 5
4. My math teacher trusts us. 1 2 3 4 5
5. My math teacher is concerned when we do not understand something. 1 2 3 4 5
6. If we don’t agree with our math teacher we can talk to our teacher about it. 1 2 3 4 5
7. My math teacher threatens to punish us. 1 2 3 4 5
8. We can decide some things in class in our math class. 1 2 3 4 5
9. My math teacher is demanding. 1 2 3 4 5
10. My math teacher thinks we cheat. 1 2 3 4 5
11. My math teacher will explain things again. 1 2 3 4 5
12. My math teacher thinks we don’t know anything. 1 2 3 4 5
13. If we want something my math teacher is willing to cooperate. 1 2 3 4 5
14. Our math tests are hard. 1 2 3 4 5
15. My math teacher helps us with our work. 1 2 3 4 5
16. My math teacher gets angry unexpectedly. 1 2 3 4 5
17. If we have something to say my math teacher will listen. 1 2 3 4 5
18. My math teacher sympathizes with us. 1 2 3 4 5
19. My math teacher tries to make us look foolish. 1 2 3 4 5
20. My math teacher’s standards are very high. 1 2 3 4 5
21. We can influence our math teacher. 1 2 3 4 5
22. We need our math teacher’s permission before we can speak. 1 2 3 4 5
23. My math teacher seems uncertain. 1 2 3 4 5
24. My math teacher looks down on us. 1 2 3 4 5
25. We have the opportunity to choose assignments, which are most interesting to us. 1 2 3 4 5
26. My math teacher is unhappy. 1 2 3 4 5
27. My math teacher lets us fool around in class. 1 2 3 4 5
28. My math teacher puts us down. 1 2 3 4 5
29. My math teacher takes a personal interest in us. 1 2 3 4 5
30. My math teacher thinks we can’t do things well. 1 2 3 4 5
31. My math teacher explains things clearly. 1 2 3 4 5
32. My math teacher realizes when we do not understand. 1 2 3 4 5
33. My math teacher lets us get away with a lot in class. 1 2 3 4 5
34. My math teacher is hesitant. 1 2 3 4 5
35. My math teacher is friendly. 1 2 3 4 5
36. We learn a lot from my math teacher. 1 2 3 4 5
37. My math teacher is someone we can depend on. 1 2 3 4 5
38. My math teacher gets angry quickly. 1 2 3 4 5
39. My math teacher acts as if he/she does not know what to do. 1 2 3 4 5
40. My math teacher holds our attention. 1 2 3 4 5
41. My math teacher is too quick to correct us when we make a mistake. 1 2 3 4 5
42. My math teacher lets us boss her/him around. 1 2 3 4 5
43. My math teacher is impatient. 1 2 3 4 5
44. My math teacher is not sure what to do when we fool around. 1 2 3 4 5
45. My math teacher knows everything that goes on in the classroom. 1 2 3 4 5
46. It is easy to make a fool of my math teacher. 1 2 3 4 5
47. My math teacher has a sense of humor. 1 2 3 4 5
48. My math teacher allows us a lot of choice in what we study. 1 2 3 4 5
49. My math teacher gives us a lot of free time in class. 1 2 3 4 5
50. My math teacher can take a joke. 1 2 3 4 5
51. My math teacher has a bad temper. 1 2 3 4 5
52. My math teacher is a good leader. 1 2 3 4 5
53. If we don’t finish our homework we’re scared to go to math class. 1 2 3 4 5
54. My math teacher seems dissatisfied. 1 2 3 4 5
55. My math teacher is timid. 1 2 3 4 5
56. My math teacher is patient. 1 2 3 4 5
57. My math teacher is severe when grading papers. 1 2 3 4 5
58. My math teacher is suspicious. 1 2 3 4 5
59. It is easy to get in to an argument with my math teacher. 1 2 3 4 5
60. My math teacher’s class is pleasant. 1 2 3 4 5
61. We are afraid of our math teacher. 1 2 3 4 5
62. My math teacher acts confidently. 1 2 3 4 5
63. My math teacher is sarcastic. 1 2 3 4 5
64. My math teacher is lenient. 1 2 3 4 5

THANK YOU!
Appendix E

Teacher survey

Demographic Information

Name ________________________________________________________

Would you prefer a pseudonym be used in this research study?  Yes      No

If yes, please indicate a preferred name you would like to use __________

Gender:  Male   Female


What are your educational credentials? ___________________

What is your native country? ___________________

How many total years of full-time teaching experience do you have? __________

For how many years did you teach in your country before coming to the U.S.? ________

Have you taught in other countries besides your native country?  Yes  No

If so, where and for how long? ________, __; ________, __; ________, __.

How many years have you been teaching in the US (please include current the year) ___?

What grade(s) do you currently teach? ___________________

What subject areas do you teach? _____________________

Total number of students in your class (es) ______________

Student demographic racial and ethnic make-up in the school/ your classroom? ________

(Estimated percentages are okay)

School Information

School Name

School District
QUESTIONNAIRE

This questionnaire asks you to describe your perception of your classroom behavior. On the next few pages you’ll find 64 sentences on the questionnaire. For each statement, chose a response that best represents how often you demonstrate the behavior indicated by the statement. That is: 1 - Never, 2 - Rarely, 3 - Sometimes, 4 - Often, 5 - Always.

For example:
I express myself clearly 1 2 3 4 5

If you think that you always expresses yourself clearly, then select or click on the number 5 on your computer screen. If you think you never expresses yourself clearly, then chose the number 1. You can also choose numbers 2, 3, or 4, which are in between. Thank you for your cooperation.

PLEASE BEGIN

1. I am strict. 1 2 3 4 5
2. Students have to be silent in my math class. 1 2 3 4 5
3. I talk enthusiastically about math. 1 2 3 4 5
4. I trust my students. 1 2 3 4 5
5. I am concerned when students do not understand something. 1 2 3 4 5
6. If students don’t agree with me, they can talk to me about it. 1 2 3 4 5
7. I threaten to punish students. 1 2 3 4 5
8. Students can decide some things in my class. 1 2 3 4 5
9. I am demanding. 1 2 3 4 5
10. I think students cheat. 1 2 3 4 5
11. I will explain things again. 1 2 3 4 5
12. I think my students don’t know anything. 1 2 3 4 5
13. If students want something I am willing to cooperate. 1 2 3 4 5
14. My math tests are hard. 1 2 3 4 5
15. I help students with their work. 1 2 3 4 5
16. I get angry unexpectedly. 1 2 3 4 5
17. If students have something to say I will listen. 1 2 3 4 5
18. I sympathize with students. 1 2 3 4 5
19. I try to make students look foolish. 1 2 3 4 5
20. My standards are very high. 1 2 3 4 5
21. Students can influence me. 1 2 3 4 5
22. Students need my permission before they can speak. 1 2 3 4 5
23. I seem uncertain. 1 2 3 4 5
24. I look down on students. 1 2 3 4 5
25. Students have the opportunity to choose assignments which are most interesting to them. 1 2 3 4 5
26. I am unhappy. 1 2 3 4 5
27. I let students fool around in class. 1 2 3 4 5
28. I put students down. 1 2 3 4 5
29. I take a personal interest in students. 1 2 3 4 5
30. I think students can’t do things well. 1 2 3 4 5
31. I explains things clearly. 1 2 3 4 5
32. I realize when students do not understand. 1 2 3 4 5
33. I let students get away with a lot in class. 1 2 3 4 5
34. I am hesitant. 1 2 3 4 5
35. I am friendly. 1 2 3 4 5
36. Students learn a lot from me. 1 2 3 4 5
37. I am someone students can depend on. 1 2 3 4 5
38. I get angry quickly. 1 2 3 4 5
39. I act as if I do not know what to do. 1 2 3 4 5
40. I hold students’ attention. 1 2 3 4 5
41. I am too quick to correct students when they make a mistake. 1 2 3 4 5
42. I let students boss me around. 1 2 3 4 5
43. I am impatient. 1 2 3 4 5
44. I am not sure what to do when students fool around. 1 2 3 4 5
45. I know everything that goes on in the classroom. 1 2 3 4 5
46. It is easy to make a fool out of me. 1 2 3 4 5
47. I have a sense of humor. 1 2 3 4 5
48. I allow students a lot of choice in what they study. 1 2 3 4 5
49. I give students a lot of free time in class. 1 2 3 4 5
50. I can take a joke. 1 2 3 4 5
51. I have a bad temper. 1 2 3 4 5
52. I am a good leader. 1 2 3 4 5
53. If students don’t finish their homework they will be scared to come to my class. 1 2 3 4 5
54. I seem dissatisfied. 1 2 3 4 5
55. I am timid. 1 2 3 4 5
56. I am patient. 1 2 3 4 5
57. I am strict when grading papers. 1 2 3 4 5
58. I am suspicious. 1 2 3 4 5
59. It is easy to get in to an argument with me. 1 2 3 4 5
60. My class is pleasant. 1 2 3 4 5
61. Students are afraid of me. 1 2 3 4 5
62. I act confidently. 1 2 3 4 5
63. I am sarcastic. 1 2 3 4 5
64. I am lenient. 1 2 3 4 5

THANK YOU!
Appendix F

Semi-Structured Interview Questions

Cover three aspects of teacher instructional practices: Transition, Pedagogy, and Interpersonal relationships.

1. How did you become interested in teaching in the U.S.?

2. Looking back to your initial experiences as a newly arrived international teacher, what stood out for you?

3. What are some of the immediate differences you noted between the educational systems of your country and that of the US?

4. What challenges did you face as a new international educator and how did you overcome these difficulties? How would these scenarios play out in your home school or classroom context?

5. What support structures were availed by the administration to help bridge the gap in transition from your home culture to the American culture and school norms?

6. How do you describe your role as a teacher in your current school? In what ways is it similar / different from the role you played as a teacher back home?


8. How would you describe your philosophy on mathematics teaching? How has this philosophy informed your choices implementing lessons or assessing students, or in helping students make sense of the mathematics they are learning?

9. In what ways are your current teaching approaches different from the ones you used to practice at home?
   a. Are there any differences in how decisions are made about what and how to teach mathematics and what to omit from your lessons?
   b. How do you maximize student learning in your classroom? How do you know when your students understand? How do you decide when it is time to move on to a new topic in your classroom?
   c. How do your students learn mathematics best? How do you know when learning is occurring in your classroom?
d. How do you facilitate or encourage students to make connections between concepts learned? (Luft & Roehrig, 2007).

10. Could you describe some of the challenges you faced in your teaching while making this transition? How did you overcome these challenges?

11. Looking back as an international teacher, what, in your opinion, are some strengths or advantages you bring to the American secondary mathematics class? What are some shortcomings you have in class that could be attributed to your background?

12. How would you describe the relationship you have with students in your mathematics classes?

13. How do you think your students would describe you as a teacher?

14. How well do you understand the students in terms of their backgrounds, their culture, prior academic achievement, or based on activities outside of class? How does this knowledge inform the nature of relationships you have with students in class, if at all?

15. Would you consider yourself to be authoritative, supportive, lenient or strict? What are examples of things you do that would support this description?
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