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This multiple case study explored the professional identities of teachers at the intersection of mathematics and language learning. Situated within a neoliberal schooling context, teachers were required to adapt standardized instructional goals and practices to support the cultural, linguistic, and academic backgrounds of new-arrival refugee and immigrant youth while simultaneously contending with a range of accountability pressures (Block & Holborow, 2012). Of particular interest were the personal, professional, and political resources impacting teachers' professional identity development and, ultimately, their resilience to neoliberal pressures (Holland et al., 1998; Mockler, 2011). A job crafting perspective (Wrzesniewski & Dutton, 2001) illuminated the extent to which teachers were successful in adapting the normative boundaries of their prescribed teaching roles to better support students' academic backgrounds while building off their cultural and linguistic repertoires. Findings revealed that teachers' resilience to high-stakes testing, standardization of instructional goals and practices, and oversight was mediated by key differences in their personal and professional backgrounds. This resilience was paramount for teachers to be able to counter neoliberal measures and support their professional identity development by aligning their moral purpose for teaching with their instructional practice. Implications suggest the importance of teachers developing the necessary political knowledge to untangle the effects of neoliberal pressures on their instruction (Gutiérrez, 2013; Yeh, 2018) by exploring how a variety of cultural resources impact the alignment between their moral purpose and their teaching practice (Mockler, 2011).

MAKING NEW WORLDS AT THE INTERSECTION OF MATHEMATICS AND  
LANGUAGE LEARNING: TEACHER PROFESSIONAL IDENTITY  
IN THE NEOLIBERAL ERA

by

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## DEDICATION

*This dissertation is dedicated to my father, Dr. Gerhard Kroiss, whose dedication and intelligence have laid the foundation for the International Institute for Critical Thinking. I promise to carry on your legacy.*

APPROVAL PAGE

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*Happiness can be found even in the darkest of times if one only remembers to turn on the light. - Albus Dumbledore.*

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## CHAPTER I: INTRODUCTION

### **Introduction**

Future directions for research indicate a need to better understand how English language teachers negotiate the tensions associated with addressing neoliberal accountability goals while at the same time promoting the development of students' language acquisition within content area learning (Barkhuizen, 2016; Norton & De Costa, 2018). In the mathematics classroom, neoliberal policies, with their emphasis on short-term measurable targets and quick fixes, can quickly undermine teachers' ability to promote simultaneous language development and mathematical understanding, each of which requires considerably more time and flexibility for teachers to accomplish (Aguirre & del Rosario Zavala, 2013; Li & De Costa, 2017; Yeh, 2018). This challenge is increased in classrooms with new-arrival refugee and immigrant (NARI) youth, where multiple languages are represented; students sometimes have few, if any, experiences with formal schooling; and teachers are required to deal with these tensions within a limited time period (Amthor & Roxas, 2016; Echevarria et al., 2015). Before attempting to understand these challenges, it is important to grasp the macro-level origins of neoliberal manifestations and why their policies promote centralized measures for teacher monitoring and accountability in the form of scripted curricula, frequent high-stakes testing, and standardized instructional goals (Apple, 2004; Block & Holborow, 2012; Hargreaves, 2000).

### **Neoliberalism in Education**

Neoliberal ideologies originate from economic theory, first articulated in the 1970s, advocating a self-regulating market, privatization, and financial deregulation (Block & Holborow, 2012). By the 1990s, neoliberalism had become prominent in political and economic Discourses and practices, defining individual well-being through entrepreneurial freedoms,

supported by private-property rights, free markets, and globalization (Harvey, 2005). Ironically, neoliberal ideologies in favor of free markets, individualization, and choice have led to educational reforms marked by an emphasis on heightened standardization of assessment and curriculum with centralized government control (Apple, 2004; Block & Holborow, 2012). It is ironic because neoliberal principles, which guide the state to decentralize control over the market, lead to simultaneous centralization of educational control.

The control is deemed necessary because the state, operating on the principle that self-interest leads to better market outcomes, couples liberalism with surveillance to keep up performance and drive competition. Therefore, performance mechanisms are put in place to measure and subsequently reward individual merit and enterprise, resulting in a drive for constant comparative public assessment (Ball, 2003). In turn, schools are driven by a need to evidence rising performance indicators as students are expected to compete in order to make an enterprise of themselves (Apple, 2004). The hidden assumption is that the need for standardized practices and assessments, widely challenged in the educational research literature (Abiria et al., 2013), will reward individual merit, leading to the development of the student as an enterprise (Apple, 2004), by implementing a level playing field for all students.

This emphasis results in a technocratic professional model which, opposite to liberal ideals for the market, emphasizes a view of teachers as skilled technicians, held accountable through standardized instructional practices and the production of quantifiable measures for student achievement (Hargreaves, 2000). Neoliberal policies have manifested in both language and mathematics education, albeit in slightly different ways. In the following sections, we will explore how this is the case with the effort to consider the application to teachers at the intersection of mathematics and language learning.

## **Neoliberal Manifestations in Mathematics Education**

In mathematics education, neoliberal manifestations are amplified by the measures put into place by educational policies such as including No Child Left Behind (2001), Race To The Top (2009), or the Common Core State Standards. Such policies enforce centralized educational control and accountability measures through high stakes testing by connecting student test scores to school funding, school closure, and teacher and student success (Lipman, 2012). Research in mathematics education has explored the effects of such neoliberal policies geared towards raising students' mathematics test scores through standards-based curricula and test-based teaching practices (Llewellyn, 2016).

Not surprisingly, neoliberal pressures on teachers and students are increased in schools which are categorized as “low-performing” on high-stakes testing. Eisenhart and Allen (2016) documented how two such schools engaged in an effort to meet neoliberal agendas for mathematics education through attention to increasing content standards and achievement score gains, preparing more of their students to go to college and, as a result, contribute to the national economy through STEM related careers. They found that the schools in this study largely utilized didactic, teacher-centered practices where students simply followed a standards-based curriculum and worked through math problems on the computer which were subsequently reviewed in class. Moreover, Eisenhart and Allen showed that the mathematics-related identities for students were informed by a figured world which privileged students who quickly “got-it right,” were quiet and obedient, and succeeded at mathematics with no apparent struggle. As a result, students frequently disengaged from seeing themselves as mathematically successful when their identities performed differently from this narrow status quo. Thus, in these schools,

the figured worlds of mathematics education, influenced by neoliberal policies, did little to promote students to become deeply engaged, skilled, or passionate about mathematics.

Gutiérrez (2013) points out the need for mathematics teachers to become informed about neoliberal impact factors, particularly in urban schools. She has called for urban mathematics teachers to develop the necessary political knowledge to inform equitable practices by paying attention to the social nature of mathematics while advocating for their students in the face of standards-based curricula, high-stakes testing and teacher evaluation systems, which frequently disable teachers from exercising their professional judgment. Yeh (2018) echoes this call by noting that mathematics teacher candidates must understand how mathematics education is entangled within national and global discourses which create challenges for enacting culturally and linguistically responsive teaching practices. In an ethnographic study Yeh (2018) explored how 4 novice bilingual teachers were able to institute equity-oriented practices within neoliberally influenced schooling contexts. Findings revealed that the teachers' ability to provide culturally and linguistically responsive instruction was hampered by performance audits which controlled the substance of teachers' curricula and instruction. As a result, much of the mathematics instruction focused on test-driven skills rather than lessons which built off of students' mathematical and cultural knowledge and practices. In the next section, we will explore the concomitant effects of neoliberal policies in language education.

### **Neoliberal Manifestations in Language Education**

Neoliberal manifestations in language education are driven by the ideological dominance of English as a world language and its role in providing access to competition within globalized markets (Block et al., 2012). As a result, scholars have theorized that the command of English provides its speakers with the linguistic capital necessary to be seen as dominant players in the

neoliberal economy (Phillipson, 2003). Minority languages have acquired an inferior position in the Anglo-American neoliberal empire, and various countries are more frequently swapping their native language for English as the mode of instruction, often at a great cost to students and teachers (Piller & Cho, 2013). Thus, Teaching English to Speakers of Other Languages (TESOL) has been positioned as a new global market for English teaching with the goal of increasing capital gains for transnational corporations and ultimately reinforcing Anglo-American nations as dominant in the world's hierarchy (Flores, 2013).

Implications of these neoliberal principles are increasingly connected to issues of identity, policy, power, and control within our schools (Razfar, 2012). In other words, language ideologies can create hierarchies in the classroom as spill-over from larger sociopolitical structures (Razfar & Rumenapp, 2012). As a result, schools increasingly reflect hegemonic language practices which privilege speakers of English over those of other languages (Razfar et al., 2011). For example, English-only policies are held by various school systems across the nation and express language ideologies which influence a classroom's power and participation structures (Planas & Civil, 2013). ELs and their families often depend on teachers to articulate such injustices.

However, English language teachers, both globally and in US classrooms, have been able to counteract neoliberal impact factors in order to create authentic and equitable learning environments for English learners. One such example is offered by Li and De Costa (2018) who documented how one English teacher in China was able to utilize her agency through job crafting (Wrzesniewski & Dutton, 2001) in order to create more student-centered learning experiences for her students in a test-driven schooling context. Another important finding is offered by Varghese and Stritkus (2005) who demonstrated the impact of the local schooling



context in determining how teachers dealt with English-only policies in the classroom. The researchers found that teachers were able to leverage their professional identities in order to adapt and shape reductive language policies. A final example is offered by Abiria et al. (2013) who documented how teachers in Uganda enacted their agency through translanguaging, translating, providing drawings, games, songs, dramas, and role-plays to support students struggling with the implementation of English as the language of instruction and testing.

Summarily, neoliberally influenced school environments may be particularly problematic for teachers working with new-arrival students whose cultural and linguistic backgrounds are even less representative of the expected standardized norms. Scripted curricula, high-stakes testing, and external oversight encourage a one-size-fits-all approach which ignores the needs and resources of NARI youth. In the following section, we will take a closer look at the backgrounds and life experiences of NARI youth and how their life-trajectories present unique opportunities and challenges for teachers.

### **New-Arrival Refugee and Immigrant Youth**

Amthor and Roxas (2016) point to threats of homogenization by elaborating on the vast differences between English learners (ELs) in the US school system. While some ELs are born in the US but speak a language other than English in their home, others have just newly-arrived in the US. NARI youth make up a fairly underexplored section of EL student population, as a review of the literature reveals a lack of consensus regarding their experiences and characteristics (Oikonomidou et al., 2019). Sometimes referred to as newcomers, NARI youth are generally categorized as having spent anywhere from 0-3 years in the US school systems, and represent a vast range of life experiences.

Having arrived in the US as either voluntary or involuntary immigrants or refugees, NARI youth must contend with current political discourses that have created a more hostile climate for newcomers (Oikonomidoy et al., 2019). While voluntary immigrants typically have more time and resources to allocate to their move, involuntary immigrants tend to leave their country of origin suddenly, fleeing from war or violence, although they may not necessarily hold the protection of refugee status (McBrien, 2005; UNHCR, 1951). Surrounded by a politicized discourses of ‘illegal immigration,’ undocumented youth often feel demonized and battle fears that they or their parents may be deported or detained (Gonzalez, 2017). Conversely, refugees are frequently portrayed as helpless victims dependent on the humanitarian efforts of their host countries (Duran, 2017). Refugee youth often spend years in camps before a country is willing to resettle them and have no choice in terms of the host countries to which they move (Cho et al., 2019). Like immigrant youth, refugee stories are punctuated by tragedy, including experiences of PTSD, rape, violence, and inter-generational stress (Sullivan & Simonson, 2016). These background experiences increase students’ difficulties with adapting to neoliberally influenced schooling contexts. In the following sections, I will detail a range of factors that serve to hinder or support the success of NARI students in US classrooms.

### **Challenges for NARI Youth**

Factors which impede the transition of NARI youth into the US school system stem from both in- and out-of-school experiences. In a recent review, Oikonomidoy et al. (2019) summarized a range of family and community-based challenges, school structures, and psychological pressures hampering the integration of NARI youth. Challenges to the home and community lives of NARI youth include poverty leading to food-scarcity and hunger in their households (Bajaj et al., 2017). In order to compensate for these difficulties, NARI youth may

hold responsibilities such as taking care of younger siblings or having to work for extra income in order to support their families (Roy & Roxas, 2011). In addition, many NARI youth deal with a host of psychological stressors based on present and past trauma (Oikonomidou et al., 2019). Included in the present are the pressures of constant “otherness” perceived by NARI youth as a threat to their self-esteem (Patel, 2015). In addition, many undocumented youth live under the psychological terror of being deported themselves or returning home to find family missing (Jeffries, 2014). Moreover, NARI youth are presented with a variety of traumas inherent to their past life experiences. For example, Thomas et al. (2004) noted that 86% of refugee youth had witnessed or experienced violence, 32% had been raped, 13% had been imprisoned or detained, and 16% had lived in hiding. Of these refugee youth, 37% fled their home countries due to death or persecution of family members, 21% had been persecuted themselves, and 15% had been forced into sex slavery.

Further, NARI youth are frequently challenged by deficit perspectives from peers and teachers when transitioning into the US school system (Bal, 2014; Shapiro & MacDonald, 2017). Hegemonic language ideologies and English-only policies undermine the linguistic repertoires of NARI students (Razfar, 2012). Cho et al. (2019) revealed that teachers predominantly felt like refugee students had poor social-emotional behaviors due to the fact that they did not understand the extent of trauma in their pasts. Likewise, Roy and Roxas. (2011) demonstrated that teachers thought of refugee students as disruptive, unmotivated, and noncompliant. Fortunately, research has also begun to document several promising suggestions on the education of NARI youth. In the following section, I will explore sources of support for the successful integration of NARI youth into the US school system.

## **Support for NARI Youth**

Factors involved in supporting the academic success of NARI youth include family and community support, transnational ties, and culturally and linguistically responsive schooling practices. In the realm of home and community life, research has documented shared familial values for education (Roy & Roxas, 2011). For example, Roy and Roxas (2011) revealed that Bantu Somali refugee families spoke extensively of their children's academic goals and frequently reached out to teachers to inquire about student progress despite considerable language barriers (Roy & Roxas, 2011). Furthermore, a study by Davila (2017) showed that newcomer refugee students were motivated to engage in language and literacy practices in order to overcome marginalization and low expectations in the classroom. Accordingly, youth supported one another with linguistically complex content by drawing connections to their shared funds of knowledge. Moreover, NARI youth benefited from their positions as transnational agents and maintaining bonds with their homeland(s) while forming roots in new places (Duran, 2017). Youth were shown to accomplish these complex identities by leveraging their multilingual repertoires and adding to their accumulated literacies in order to fluidly transcend borders. Gilhooly et al. (2017) found that Karenni refugee youth enacted transnational practices and developed multilingual repertoires in order to advocate for other members of their diasporic community. Further, Ryu et al. (2019) demonstrated how Chin refugee students built off their transnational identities in order to carve out productive spaces in a STEM learning community through blending dominant science discourses with knowledge from their home culture.

Finally, several school-based factors contribute to the success of NARI youth. Bajaj et al. (2017) researched effective schooling practices for NARI youth and offer a framework of Socio-

Politically Relevant Pedagogy (SPRP). SPRP rests on three central tenets: First, within SPRP, teachers and school staff cultivate students' transnational critical consciousness through helping them explore the interconnections between their own lived experiences, local and global issues, human rights, and the diverse causes for immigration. Second, SPRP specifically focuses on providing both formal and informal opportunities for reciprocal learning between students' families, their home communities, and the educational setting. One important outcome of this is to help teachers recognize and appreciate the knowledge, resilience, and cultural wealth of their communities (Yosso, 2005). Third, SPRP establishes the importance of attending to the material conditions of students' lives. Schools help with the coordination of services and resources that support the learning process by making sure students' needs are met in and out of school. In addition to ensuring that these features are upheld, SPRP seeks to honor youths' transnational identities by recognizing the considerable academic hurdles they have to overcome and reaching beyond traditional indicators of academic success, such as high-stakes test scores.

Amthor and Roxas (2016) also recommend that teachers of NARI youth expand their understanding of the experiences of refugee and immigrant youth. To achieve this, the authors propose that teachers move away from focusing on cross-cultural competence and towards building cross-cultural relationships. Such relationships are marked by teachers' genuine care and interest in students' transnational and local experiences. In addition, teachers should take a more critical stance, and avoid viewing cultures and local cultural communities as static or tradition-based. In this process, teachers keep an open mindset which helps them to clarify cultural assumptions for themselves and other students in the classroom community. Further, the authors urge teachers to foster transnational agency in immigrant youth rather than focusing on cultural authenticity. They warn that a focus on cultural authenticity can be portrayed as asking

youth to embody their culture through artifacts which may disrupt immigrant youth's identity development as they are engaged in the process of developing a sense of belonging within their new contexts. In the following section, I will detail how my dissertation study fits into the landscape of the literature by exploring how mathematics teachers of NARI youth leverage their professional identities to support new-arrival students with the challenges posed by a neoliberally influenced schooling context.

### **Purpose and Research Questions**

Teachers practicing at the intersection of mathematics and language learning are caught in the cross-fire of neoliberal reforms relative to both fields. In mathematics education, researchers have explored how the “culture of performativity” results in teachers being less able to present instruction with students’ cultural and linguistic backgrounds in mind (Yeh, 2018). This neoliberal focus on testing, accountability, and achievement in mathematics education constrains the meaning of success in mathematics for students and teachers, resulting in narrow spaces for students to identify as mathematically proficient and causing them to develop a negative self-perspective as mathematics learners if they do not seem to fit these expectations (Eisenhart & Allen, 2016). Even for students who meet these narrow success criteria, they often don’t embody current notions of mathematical literacy (National Research Council, 2001). Simultaneously, researchers in applied linguistics have documented how one-size-fits-all interventions with quick-fix expectations, particularly as they related to the need for frequent testing in a yet to learn language, constrain teachers’ abilities to align instruction with students’ cultural and linguistic repertoires (Abiria et al., 2013; Varghese & Stritikus, 2005). Such practices are a result of the neoliberal push for a global economy, which has encouraged the use of English as a dominant world-language, with the concomitant effects of English-only language

policies across school systems and hegemonic language ideologies in the classroom (Li & De Costa, 2017; Razfar & Rumennapp, 2012).

In light of these constraints on teachers, researchers are calling for a better understanding of how teachers can implement culturally and linguistically responsive practices within neoliberal contexts (Barkhuizen, 2016; Norton & De Costa, 2018). Many would predict problematic outcomes for teachers working in professional spaces where normative expectations of neoliberal policies constrain instructional and assessment practices (Ingersoll, 2003). Ball (2003) phrases this conundrum as *values schizophrenia*, denoting the incongruity between a teacher's desired and authentic practice with the performance of a fabrication, a foil, geared towards placating an external and limited version of teacher effectiveness (p. 221). Ball contends that this dynamic can leave teachers feeling conflicted due to the constraints it places on their ability to practice in ways which align with their personal educational goals, or their moral purpose for teaching (Mockler, 2011). Teacher professional identity is one way for studying how teachers may leverage a variety of resources to overcome the tensions of neoliberal schooling contexts (Abiria et al., 2013; Haneda, & Sherman, 2016; Li & De Costa, 2017). Studies on this topic call for a closer view of the relationships between teacher professional identity and teacher agency as they are enacted within neoliberal schooling contexts (Buchanan, 2015).

In light of these notions, this study has set out to explore how mathematics teachers of NARI youth negotiate their professional identities within a neoliberally influenced schooling context. Special attention is given to how teachers enact their agency to best support their students while going outside of the normative expectations of their jobs. Of special interest are the range of structural constraints and affordances impacting teachers' professional identity

formation and opportunities for agentic action at the intersection of mathematics and language learning. The research question guiding this study are:

RQ1: What are key features of teachers' professional identities within the new world of mathematics and language learning for NARI youth?

RQ2: What is the relationship between teachers' professional identities and the cultural resources offered by the figured worlds of mathematics and language education?

RQ3: In what ways do teachers enact their agency to negotiate the constraints and affordances relative to aligning why and how they teach?

In the next chapter, I explain the theoretical framework for the study.



## CHAPTER II: THEORETICAL FRAMEWORK

### **Teacher Professional Identity**

Teacher professional identity (TPI) is a construct describing how teachers make sense of who they are as professionals across various contexts and time (Beijaard, Meijer, & Verloop, 2004). TPI can be thought of as the dynamic function of teacher's personal, professional, and political histories and the environments in which these interplay (Beauchamp & Thomas, 2009). Professional environments generally offer a variety of constraints and affordances for TPI, interacting with how teachers develop their identities across time and space (Edwards & Burns, 2016). In this process, teachers leverage their agency to decide how they respond to the contextual impact factors which shape and reshape their identities as professionals (Haneda & Sherman, 2016). In the following sections, I will discuss how TPI is theorized, how agency is related, and the various factors that have been found to influence TPI formation. Literature is sourced from general and subject-specific articles regarding teacher professional identity in the fields of mathematics and language education. Although there are some distinctions, for the most part, differing disciplines agree on the overarching ideas underlying the construct of TPI.

#### **What is Teacher Professional Identity?**

Research on the construct of TPI has been ongoing for the last two decades and is rooted in the fields of symbolic interactionism and psychology (Beijaard, Meijer, & Verloop, 2004). While there is some success in detailing various theoretical descriptors for understanding TPI, an overarching critique regards vagueness in defining and operationalizing it as a construct (Langer-Osuna & Esmonde, 2017). Nonetheless, socio-cultural perspectives consensually inform research on identity in education, treating it as being shaped and reshaped through participation across time and a variety of sociocultural contexts (Norton, 2017). Thus, rather than taking an

Ericksonian individualist perspective on identity, the education literature has followed Meade's conceptualization of identity as multiple, participatory, and transformative (Graven & Heyd-Metzuyanim, 2019). Varghese et al. (2016) note that identity development is a dynamic process, marked by teachers' diverse life histories and shaped by various contextual influences. Others add that identity is negotiated across a variety of activity systems, as teachers utilize their sense of agency to identify which identity features to apply and which to resist (Edwards & Burns, 2016; Gresalfi & Cobb, 2011). Based on these understandings, TPI can be viewed as a process and a product, evolving in response to teachers' participation across various activity systems and transformed across time. In the following sections, I will delve deeper into the theorization of the situated and temporal nature of identity.

Gee (2001) defines identity as being recognized as a certain kind of person in a given context. He notes that people have multiple identities which are a result of their performances in society. In the same vein, Lee (2012) utilizes an ecological stance to describe the diverse activity systems in which human beings participate and how the constraints and affordances of such systems impact their opportunities for identity formation. Literature regarding TPI thus pays attention to how teachers make sense of who they are as a result of social influences from a variety of contexts. Beijjaard et al. (2004) explain TPI to be the dynamic interplay between the self, differing social contexts, and teachers' professional communities, all of which provide simultaneous constraints and affordances. As teachers negotiate their professional contexts, they make sense of their identities by linking "why" they teach, their *moral purpose*, with "how" they teach, their daily practices (Mockler, 2011). This negotiation is not necessarily a smooth path, especially in contexts with multiple competing demands, any of which could undermine the attainment of the others. Thus, as teachers take action to successfully navigate their professional

spaces, they enact agency, their ‘socioculturally mediated capacity to act’ (Ahearn, 2001, p. 112), in accordance with how they see themselves as professionals.

In addition to being socially situated, the literature regarding TPI is clear that teachers’ professional identities do not remain static, but are formed through an ongoing negotiation between various contexts over time (Beauchamp & Thomas, 2009). Varghese et al. (2005) expand on this notion by noting that identity development is a dynamic process, marked by teachers’ diverse life histories and shaped by the changing expectations of teachers’ professional communities. As these changes occur, teachers employ their agency to negotiate the impact on their professional identities (Edwards & Burns, 2016). In this sense, reflection is a central component in shaping teachers’ professional identities in response to their experiences relative to a variety of social contexts (Beauchamp & Thomas, 2009). In particular, reflection as a vehicle for agency is considered to be temporal by encompassing not only past events, but also present engagements and desired future outcomes or anticipated imaginaries (Haneda & Sherman, 2016).

In mathematics education, TPI has been theorized in three distinct ways: Teachers’ participation in a variety of professional activities, the beliefs they hold about themselves, as well as the narratives they tell about themselves (Gresalfi & Cobb, 2011). However, prevailing sociocultural perspectives in mathematics education have generally framed identity as being linked to learning by treating learning as a process of becoming someone in relation to participation in a variety of mathematical contexts (Langer-Osuna & Esmonde, 2017). For example, Gresalfi & Cobb (2011) studied how teachers’ professional identities responded to simultaneous participation in their school contexts and a professional development. Each context defined high-quality mathematics teaching differently and findings revealed that teachers constructed differing identities through participation in the two conflicting settings. However, at

the end of the two-year study, teachers had reconciled their professional identities to uptake practices from the professional development and ultimately opted to transform their school contexts to be more reflective of their professional learning experiences. Likewise, Andersson (2011) studied how one teacher, Elin, was able to adopt practices for critical mathematics education through analyzing shifts in her professional identity as evidence of pedagogical learning across the course of one year. Andersson paid special attention to the structural factors and processes across time which supported or hindered Elin in developing a professional identity reflective of critical mathematics education. Findings revealed that temporal occurrences of constraints and affordances were difficult to predict and lead to an ebb and flow in Elin's professional identity development and learning.

In language education, TPI has also been discussed as ways in which teachers negotiate their inner subjectivity through participation across a variety of local, social, and historical contexts and time (De Costa & Norton, 2017). Language teacher identity is considered to transform as teachers enact their agency to navigate a variety of structural constraints and affordances. For example, Abiria and Kendrick (2013) looked at how primary school teachers in Uganda leveraged their professional identities as a way to resist hegemonic language policies that enforced English as the only language of instruction. Teachers pushed back by instituting a variety of plurilingual practices through translanguaging and sourcing local linguistic and multimodal cultural resources in the form of drawings, games, songs, demonstrations, dramas, and role-plays. Another example of how language teacher professional identity is contextually situated is offered by Haneda and Sherman (2016) who explore how a language teachers' professional identity interacts with features which provide differing opportunities for agency across a variety of micro-contexts in his school setting. Findings reveal that participation across

different micro-context with a school may provide diverse opportunities for teachers to choose actions which align with their sense of who they want to be as professionals.

Summarily, TPI is a construct which has surfaced in general education literature, as well as in language and mathematics education across the past two decades. It has been considered a useful link for understanding how teachers learn and practice in response to a variety of sociocultural factors relative to their professional contexts. In addition, research on TPI has looked at teacher identity as both a product, shaped by interactions across sociocultural contexts, and a process, ongoing and transformative both to the individual and the sociocultural spaces which they inhabit. I will follow this section with a brief discussion of agency before continuing on to discuss specific impact factors on TPI development.

### **What has Agency got to do with it?**

There is no question that agency is intertwined with identity, yet various theoretical perspectives propose different grain-size comparisons and relationships between the two constructs. For example, Holland et al. (1998) explain agency to be one of the sub-components of identity formation. From this perspective, individuals shape their identities within *figured worlds*, which provide a range of cultural resources for identity formation. Holland and colleagues note that agency arises as individuals engage in the dialogic process of answering and negotiating various resources and Discourses of the figured worlds which they inhabit. In a symbiotic manner, individual and collective agency then reshape sociocultural contexts, in turn giving rise to new resources for identity formation.

Others discuss agency as a co-construct of identity, treating it as a counterpart to identity, rather than an integration. For example, Buchanan (2015) makes note of the correlational nature of agency and identity relative to the sociocultural contexts in which teachers practice. Buchanan

notes that individuals enact their agency to perform actions which are informed by who they perceive themselves to be as professionals. More specifically, according to Buchanan, agency can be viewed as teachers' professional identities in action. Similarly to Holland and colleagues, Buchanan makes note of the fact that agency is relative to the structural constraints and affordances which moderate teachers' actions and perspectives. Summarily, teacher agency and professional identity exist in a reciprocal manner and evolve relative to a variety of impact factors within teachers' professional contexts (Mockler, 2011). These actions, and the effects they have on teachers' sociocultural environments, in turn shape their professional identities in an ongoing way.

Some theorists also make note of the temporal nature of agency conceptualized to be informed by teachers' past experiences, including their professional training or personal histories (Haneda & Sherman, 2016; Li & De Costa, 2017). In addition, teachers are thought to be engaged in the present moment as well as their future desired events and goals. Using a temporal perspective of agency allows researchers to pay better attention to the relationship between teacher agency and professional identity and how the two are mutually shaped across time (Li & De Costa, 2017). In the following sections, I will discuss some of the key impact factors which have surfaced in the literature on TPI development.

### **Influences on Teacher Professional Identity Development**

TPI development is a dynamic process taking place across time and the various activity systems in which a teacher participates. Of particular interest to this study are the dual tasks for participants to develop their professional identities at the intersection of mathematics and language learning. Therefore, I will highlight findings regarding key influences on identity development for both language and mathematics teachers. Influences on TPI come from macro,

meso, and micro levels in the form of political, professional, and personal impact factors (De Costa & Norton, 2017; Mockler, 2011). However, it is important to understand that while these spheres are discussed separately, they interact and overlap with one another across time and space.

Political factors, which have been shown to impact teacher professional identity for both mathematics and language teachers, include an increased emphasis on neoliberal ideals in education, diverse political ideologies, and socially assigned markers of power. Mockler (2011) succinctly defines this realm of influence as the *external political environment* by stating:

The domain of the external political environment comprises the discourses, attitudes and understandings surrounding education that exist external to the profession, experienced by teachers largely through the media, but also through the development of government policy which relates to their work and the ways in which political ideology impacts upon their work as a result of government policy. (p. 521)

An example of such influences is offered through Norton and De Costa's (2018) review on language teacher professional identity, which highlights how capitalist ideologies and high-stakes testing influence teacher identity by redefining what counts as good language teaching. In addition, the authors note how issues such as language hierarchies ultimately influence identity development by positioning non-native speaking language teachers as less-valuable. An additional example is offered by Appleby (2016) who asserts that socially ascribed markers of power, such as race or gender, act as mediators in identity formation for language teachers. She provides data documenting how gender, race, and national English-speaking origin functioned to privilege white-men teaching English in Japan. For mathematics teachers, neoliberal principles such as performance audits and scripted curricula, have led to a "culture of performativity,"

ultimately hampering teachers' abilities to teach mathematics in critical and culturally responsive ways (Yeh, 2018). Gutiérrez (2013) comments that mathematics teachers, especially urban mathematics teachers, need the political knowledge to advocate for themselves and their students in order to follow their professional judgment in the face of high-stakes testing, teacher evaluation, and other measures of school reform.

Professional impact factors on TPI include opportunities for professional learning as well as constraints and affordances offered within teachers' professional environments. Researchers in mathematics education have explored how the expected values and norms of varying professional contexts can cause complications for mathematics teachers' professional identity development as they attempt to align their personal values with those of their professional contexts (Gresalfi & Cobb, 2011). Moreover, the impact of administration is influential in shaping TPI (Beauchamp & Thomas, 2009) Haneda and Sherman (2016) recount how a top-down administrative style, an over-focus on test scores, and lacking access to collaboration disabled one language teacher from meeting the needs of his students and hampered his identity development. In addition to professional context, the theories and curricula presented during teacher learning programs are professional impact factors. In his discussion on novice language teacher identity formation, Morgan (2016) contends that teacher educators should be critical in how theoretical perspectives may impact TPI development, pointing out that the field of applied linguistics can often position teachers as technicians rather than agentic practitioners. In mathematics education, Ma and Singer-Gabella (2011) explored how a university course provided access for teachers to develop new identities around the world of reform mathematics. By simulating positions as either students or teachers, the instructors supported pre-service teachers in approximating practices to move students from traditional mathematics to reform-



oriented mathematics teaching. In addition, Hobbs (2012) revealed that the extent to which “out-of-field” teachers were able to form new professional identities as mathematics teachers was strongly influenced by relative professional and pre-professional learning experiences leading to teachers’ ability to engage students, know the curriculum, and implement appropriate teaching strategies.

Finally, TPI is a result of personal impact factors such as teachers’ backgrounds, emotional experiences, social positions, interests, and previous schooling experiences (Beauchamp & Thomas, 2009). In language education, Shahri (2018) demonstrated how one teacher’s personal learning history supported an emotional attachment to critical pedagogy. De Costa and Norton (2017) point out that supportive personal relationships can help language teachers productively negotiate various constraints and challenges and support emotional burn-out management. In mathematics education, De Freitas (2008) revealed that pre-service teacher identities as advocates of teaching mathematics for social justice were strongly impacted by their personal learning histories. Similarly, Drake et al. (2001) studied subject-specific identities in 10 elementary teachers and found that their identities all incorporated disappointing or negative experiences in learning mathematics as students and that in order to implement more reform-oriented teaching practices teachers’ identities needed to have access to some positive mathematics-related learning experiences.

Summarily, I have set out to explain the consensus that TPI is both socially constructed and developed over time. This development is frequently influenced by factors at macro-, meso-, and micro-levels (De Costa & Norton, 2017). Political impact factors at the macro-level include a growing emphasis on neoliberal ideals and socially assigned markers of power. Professional or meso-level factors which influence TPI include the constraints and affordances offered through

professional contexts and learning. Finally, TPI is impacted at the personal micro-level through teachers' backgrounds and personal histories. In the following section I will highlight the key theories I utilize as my theoretical framework.

### **Theoretical Foundations**

In such unique circumstances, as exist in this study's context, the process of teacher identity formation is complex and subtle, subject to the range of sociocultural factors (Holland et al., 1998; Urietta, 2007). Holland et al.'s (1998) social-practice theory provides a theoretical framework for understanding how teachers' sense of identity and agency allow them to negotiate the multiple subtle challenges of teaching mathematics to NARI youth within a neoliberal context. Moreover, Mockler's (2011) framework delivers an appropriate lens for exploring the political, professional, and personal impact factors teachers might face. Finally, job-crafting (Wrzesniewski & Dutton, 2001) highlights the symbiotic and situated relationship between teacher professional agency and identity at the intersection of mathematics and language learning. In the following sections, I will detail how these three theories combine to form the framework I utilized for my dissertation study.

### **Making New Worlds at the Intersection of Mathematics and Language Learning**

Holland et al. (1998) provide a theoretical lens which offers the appropriate degree of nuance for understanding the complexity of teacher professional identity formation at the intersection of mathematics and language learning within a neoliberal schooling context. According to this theory, individual identity, or *identity in practice*, forms and reforms as individuals participate within socially and historically produced collectives or *figured worlds*. Figured worlds are considered historical phenomena which shape and are shaped by the actors which inhabit them. As individuals construct their identities within figured worlds, they must

contend with the subject positions afforded to them based on enduring divisions of gender, race, ethnicity, or class. Moreover, identities are shaped through the *space of authoring*, where individuals engage in the dialogic process of orchestrating socially available practices and discourses, thereby giving rise to individual agency. Holland et al.'s theoretical lens is made cyclical through the idea that collective activity can lead to *making new worlds*, as individuals draw on resources from old figured worlds to imagine and realize new activity systems. It is this final piece of Holland et al.'s theory that strongly connects to the identity construction of teachers at the intersection of mathematics and language learning within neoliberal contexts.

Teaching language and mathematics to NARI youth requires teachers to construct professional identities in a *new world* (Holland et al., 1998). Through the space of authoring, teachers orchestrate resources from the figured worlds of mathematics and language education, enacting their agency to select or resist various constraints and affordances, while simultaneously responding to expectations for performance and accountability. The extent to which teachers are able to align agentic moves with desired professional identities is moderated by the neoliberal constraints of their schooling contexts. As mentioned previously, the new world of teaching at the intersection of mathematics and language learning is subject to the cross-fire of neoliberal reforms relative to both fields. Therefore, teachers are dealing with the challenge of figuring out what it means to be a teacher at the intersection of mathematics and language learning for NARI youth while simultaneously contending with a range of performance pressures. Holland et al.'s (1998) theoretical lens captures the complexities and subtleties of teacher's professional identity formation across different professional contexts or figured worlds, providing a rich theoretical lens for understanding how teachers attempt to navigate the intersection for mathematics and

language learning within neoliberal schooling contexts. In the following section, I will explain how Mockler's (2011) framework supports this theoretical base.

### **Teacher Professional Identity in the Neoliberal Age**

Mockler's (2011) framework for teacher professional identity expands my understanding of Holland et al.'s (1998) notions of identity production by highlighting the personal, professional, and political resources within teachers' figured worlds. Mockler's framework for teacher identity serves to juxtapose technocratic models by focusing on the fluid and situated nature of identity production. This view of teacher professional identity provides a counterpoint to neoliberal notions of teachers living out static, performative roles geared towards ideals of "what works." Instead, Mockler points to the complexity of teacher professional identity formation being an ongoing and highly personal process.

Included in this process is the negotiation of teachers' *moral purpose*, or their personal philosophy about education. Mockler notes that teacher professional identity formation calls for teachers to theorize the link between their moral purpose for teaching and their teaching practices. She contends that when teachers make these connections, they are better able to hold on to the broad reasons for why they chose the profession. However, the ongoing process of teachers linking "why" they teach with "how" they teach is subject to a complex range of influences. By attending to the situated and temporal dimensions of teacher professional identity formation, Mockler notes how teacher professional identity is "formed and reformed constantly over the course of a career and mediated by a complex interplay of personal, professional and political dimensions" (p. 518). Thus, according to Mockler (2011), personal factors include teachers' backgrounds, social positions, interests, and previous schooling experiences. At the professional level, teachers' identities respond to their professional histories and learning

experiences, as well as their local contexts. At the political level, teachers must contend with current discourses surrounding education, which frequently include neoliberal ideologies represented in the form of high-stakes testing, increased accountability measures, scripted curricula, and teacher de-professionalization (Ingersoll, 2003).

I have selected to combine the theoretical approaches for teacher professional identity and agency by Mockler (2011) and Holland (1998) to better nuance the complexity of teacher professional identity formation at the intersection of mathematics and language learning. Holland and colleagues provide me with an epistemological perspective for capturing the complex nature of how teachers are subject to a myriad of cultural resources as they form their professional identities within and across figured worlds. Mockler's (2011) framework helps me understand how the cultural resources of respective figured worlds are produced from personal (micro); professional (meso); and political (macro) impact factors. As a part of this complex process, teachers enact their agency to select or resist this array of impact factors. The agentic moves teachers make, and the impact of these actions on their teaching environments, provide additional resources for teachers' professional identity development (Buchanan, 2015). In the following section, I will explain how job crafting (Wrzesniewski & Dutton, 2001) is a productive framework for understanding teacher agency.

### **Teacher Identity and Agency Through a Job Crafting Perspective**

Job crafting (Wrzesniewski & Dutton, 2001) highlights the reciprocal relationship between teacher professional agency and identity. This theory utilizes a situated perspective to analyze how individuals enact their agency in order to craft their professional roles to better align with their identities. Job crafting originates from organizational theory and is offered as a perspective for making sense of how employees go beyond their defined roles to construe their

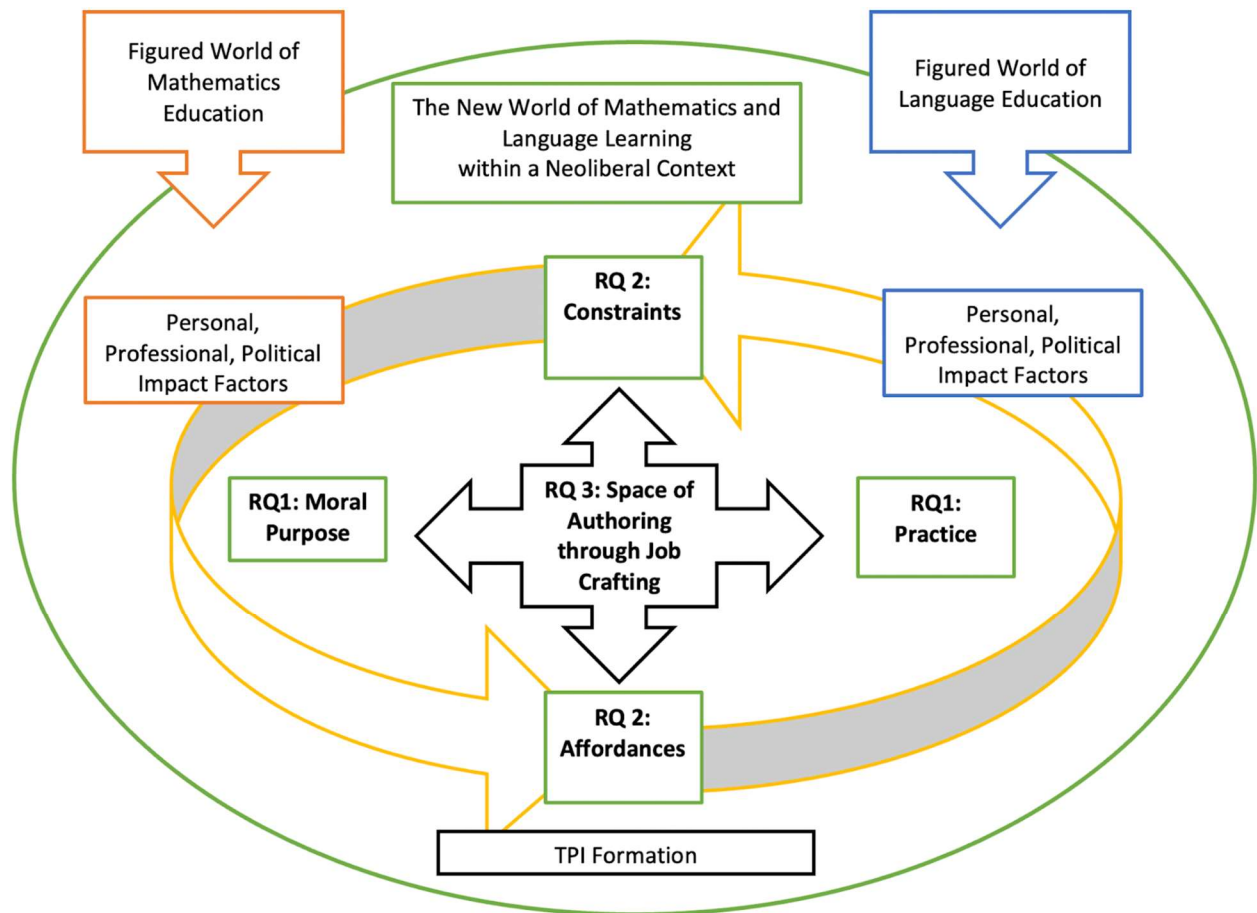
own purpose and meaning for their jobs by altering the cognitive-, relational-, and task-specific boundaries of their professional roles. While research has linked teachers' subject-specific teaching roles with their professional identities (Drake et al., 2001; Kasten et al., 2014; Spillane, 2000), it has yet to determine how teachers form their professional identities at the intersection of two professional roles. Thus, job crafting is a useful lens for understanding how teachers may enact their agency to negotiate between the dual professional obligations of mathematics and language teaching.

Applied to research on teacher identity and agency, job crafting is a way to understand how teachers enact their agency in relation to the structural features of neoliberally influenced schooling contexts (Haneda & Sherman, 2016; Li & De Costa, 2017). For example, a recent study (Haneda & Sherman, 2016) explored how one teacher negotiated the conflict between his moral purpose for teaching (Mockler, 2011) and the test-driven teaching practices his administration enforced. He was able to leverage various micro-contexts in his school, marked by differing levels of control, in order to change the task boundaries set forth by the school's administration. In another study (Li & De Costa, 2017), a Chinese EFL teacher negotiated a neoliberal work environment which was founded on the privatization of English language instruction and reduced her teaching role to testing preparation. A job crafting perspective helped to illuminate ways in which she was able to transform cognitive, relational, and task boundaries to support her desire to teach in more authentic ways. Summarily, job crafting can help to understand how teachers evaluate their local contexts and take action through negotiating their prescribed professional roles and making modifications in line with how they see themselves as teachers. In the final section, I will explain how I combine the aforementioned theories into a cohesive theoretical framework.

## Combined Theoretical Vision

In combination, the preceding theories provide a comprehensive perspective for capturing the nuances of teacher professional identity and agency at the intersection of mathematics and language learning within a neoliberal context. As seen in Figure 2.1, my research questions are integrated within this combined theoretical framework.

**Figure 2.1. Combined Theoretical Framework**



In an effort to construct a new world at the intersection of mathematics and language learning, teachers must draw on existing cultural resources from the respective figured world of mathematics and language learning (Holland et al., 1998). These cultural resources originate from personal, professional, or political impact factors and manifest themselves as either

constraints or affordances within teachers' local contexts (Buchanan, 2015; Mockler, 2011). In the space of authoring (Holland et al., 1998) teachers dialogically orchestrate these impact factors by making changes to the normative expectations of their jobs in an effort to align “why” they teach, their moral purpose, and “how” they teach, their practice (Mockler, 2011). Thus, through job crafting, teachers make specific choices for how, why, and what they want to change by leveraging the available cultural resources of their prescribed teaching roles (Wrzesniewski & Dutton, 2001). The combination of these three theories is helpful for understanding how teachers might successfully negotiate the intersection of mathematics and language learning within a neoliberal context while simultaneously identifying the obstacles which undermine such efforts. In the following chapter, I will detail the methodology I utilized for operationalizing this theoretical framework.



## CHAPTER III: METHODOLOGY

### **Multiple Case Study Design**

According to Yin (2017), a rigorous qualitative case study with multiple data sources allows for the opportunity to make sense of complex phenomena within a given context. Additional benefits of a multiple case study design include the researcher's ability to explore similarities and differences within and across cases. My dissertation study followed a multiple case study design, considering each of the participant teachers as separate cases, and subsequently drawing thematic comparisons across the three cases (Baxter & Jack, 2008; Yin, 2017). This methodological approach allowed for simultaneous in-depth exploration of each participant as an individual case, as well as the potential to surface themes across teachers. Moreover, teachers were treated as separate cases because although each teacher practices within the same school context, there were presumed differences between grade-level teaching assignments, professional backgrounds, teachers' personal histories, and their moral purpose for teaching. Therefore, individual teachers were bound as cases to contribute to a nuanced understanding of individual similarities and differences between teachers constructing their professional identities at the intersection of mathematics and language learning (Baxter & Jack, 2008). Cross-case analysis contributed to a deeper understanding of common experiences including cultural constraints and affordances as well as teachers' ability to exercise agency within the new world of mathematics and language learning. Analysis followed the research questions:

RQ1: What are key features of teachers' professional identities within the new world of mathematics and language learning for NARI youth?

RQ2: What is the relationship between teachers' professional identities and the cultural resources offered by the figured worlds of mathematics and language education?

RQ3: In what ways do teachers enact their agency to negotiate the constraints and affordances relative to aligning why and how they teach?

In the subsequent section I will describe the school context in which the teachers practice.

### **Context**

The Anne Hart Arrival (AHA) school, founded in 2007, serves NARI youth from as many as 30 different countries of origin. As a result of the growing number of refugee and immigrant students, the local school district founded AHA to support NARI students with their transition to the American school system. Teachers and staff at the AHA school aim to support students and their families as they transition into a new world. The school's mission statement reflects these ideals, stating efforts to, "Empower students and families through challenging academics and language learning to help them become independent, lifelong learners."

As an initial hub for newcomer students from around the world, teachers and staff at the AHA school are adept at pooling the efforts of a range of local support networks to ensure the emotional, physical, social, and academic needs of students and their families. For example, the school hosts a bi-annual parent day, where important community liaisons, such as immigration lawyers, engage with parents in social justice efforts as families navigate the complexities of American society. In addition, school social workers, counselors, and teachers connect with mental and physical health services in the community to support students and families overcoming past and current trauma. Physical needs of students and families are also kept in mind through food and other material donations.

Beyond offering support to families and students, the AHA school celebrates NARI youth's cultural capital. Teachers frequently utilize students' linguistic resources to serve as interpreters and liaisons for more recently arrived youth. During class, certain teachers can be observed building off students' cultural and linguistic backgrounds, while taking the opportunity to learn new bits of language or information from their pupils. In addition, the school hosts an annual international festival, where students gather in cultural groups to perform songs, poems, and dances from their countries of origin. Teachers and students spend months rehearsing, designing costumes, and creating informational displays. The festival has gained traction in the local community and is often so crowded that onlookers are forced to stand in the door of the auditorium to get a peek at this dynamic event.

However, in addition to offering an initial support network for newcomers, the school system founded AHA with the purpose of alleviating the struggle mainstream teachers reported in meeting the needs of these youth, as well as teachers' concerns about NARI youth negatively impacting their test scores. In line with these concerns, AHA has concentrated its efforts on grades 3-12, the "testing grades." AHA students remain at the school for two semesters, during which teachers are expected to prepare students to transition into their districted mainstream schools. As a part of this preparation, students are expected to complete a variety of standardized testing measures for both language and content area learning.

A number of factors influence the ability of AHA Teachers to meet neoliberal performance measures. One reason is that it is difficult for new-arrival youth to reflect their content-area learning on English-only testing measures (Cummins, 2007; Garcia & Sylvan, 2011). In addition, refugee and immigrant students at AHA are often categorized as students with interrupted formal education (SIFE). SIFE students are identified by the school system if they

entered the U.S. after 2nd grade, have missed more than two years of formal education, or have incomplete literacy in their native languages (DeCapua & Marshall, 2015). Thus, AHA teachers are tasked to bridge gaps in students' learning histories by integrating content from a range of grade levels. Unfortunately, the individual progress students make in their learning trajectories at AHA is poorly reflected on grade-level specific testing measures. A final challenge for teachers is that AHA enrolls new students every Tuesday throughout the school year. As a result, students arriving later in the school year miss foundational aspects of teachers' local curricula. Any of these factors, either singularly or in combination, cause neoliberal testing measures, normed for students in mainstream US schools, to be an inappropriate measure of student learning. It is within this context that teachers are tasked with navigating the intersection of mathematics and language learning. The three participating teachers are introduced in the subsequent section.

### **Participants**

Participants in this study include three mathematics teachers at the AHA school. In total, there are 6 mathematics teachers at AHA, all of which were invited to participate but only 3 consented to the study. All three teachers are female, two of them are European American, and one is African American. Two of the teachers practice in the elementary section for grades three through five. The elementary team is departmentalized, with half of all teachers teaching mathematics and science, while the others teach ELA and social studies. The third teacher is the only middle grades mathematics teacher at AHA.

Delilah was observed teaching third grade mathematics. Delilah is the only veteran teacher in the group. Prior to coming to AHA, she taught English learners for 20 years. This is her fourth-year teaching mathematics at the DH Newcomers school, and she has participated in a wide range of professional development for mathematics teaching. Penelope teaches fifth grade

mathematics and has recently graduated from a Master's program geared towards licensure in TESOL. Penelope is a self-proclaimed lover of mathematics and is in her second year of teaching mathematics at AHA. She is the only teacher of color in the study. Finally, Ruby was observed teaching sixth grade mathematics. Although she is in her fourth year of teaching, she is just beginning her first-year teaching at AHA. Prior to teaching at AHA, Ruby taught middle grades mathematics at a local charter school. Next, I will discuss the details of the curricula all three teachers were expected to implement by the county's school system.

### **Curriculum**

All math instruction at the AHA Newcomers school follows programmatic curricula. In the elementary section, the curriculum of choice is *Eureka Math*, a Pre-K-12 program. *Eureka Math* aims to teach math conceptually rather than through procedural memorization. The program provides teachers with a comprehensive curriculum, professional development, as well as books and other support materials. The elementary math coach, provided by the county, is specifically trained in the *Eureka Math* program and works with teachers only on the specific strategies laid out in the program. While this program aims at conceptualizing mathematical concepts, it does so by prescribing detailed solution strategies for the students rather than allowing students to come up with unique ways of problem solving. The middle school section uses *Open Up*, a middle-grades specific program. This program provides student and teacher materials, scope and sequence of the curriculum, and family resources. In addition, the program provides specific scaffolds for students who are learning English and separate ones for students with disabilities. While this program is also focused on conceptual understanding, it leaves more room for students' novel solution strategies. However, oversight from the county is geared towards implementation with fidelity to the program.

In addition to the county-wide curricula, mathematics teachers are expected to utilize a language-based program within the mathematics classroom. This program is known as the *3Ls* and is geared towards extending English learners' literacy development through the selection of complex text (Cuchierra, 2018). Rather than a scripted curriculum, the *3Ls* is a lesson flow designed to make literacy instruction for ELs more complex, engaging, and cognitively demanding. The *3Ls* framework was designed for literacy and language instruction, however, mathematics teachers at AHA are encouraged to apply it at least once a week to math or science lessons. In the subsequent section, I will explain my methods for data collection.

### **Researcher Positionality**

My role as a researcher was undergirded by the relationships which I had previously formed with two of the three participants. Delilah formerly served as a cooperating teacher for our university's TESOL program. Prior to the study, she had hosted two pre-service teachers for whom I served as a university supervisor. In addition, Penelope graduated from the same TESOL program. I had worked with her extensively during her teacher education experience. My relationship with Ruby was new. However, it was simplified by the fact that Ruby was a very open personality who really wanted to participate in the study. She was new to her position at AHA and looked forward to having someone to talk about her experiences with. Accordingly, Ruby did not impart less nuanced information in our interviews and discussions compared to the other two participants.

Furthermore, my relationship with the teachers was defined by my role as a listener. This study was not designed for me to offer ideas for professional learning. Hence, I was careful not to give feedback or suggestions influencing teachers' practice. Rather, my questions were geared

towards “digging deeper” and allowing teachers’ the space to express and reflect on their experiences at the intersection of mathematics and language learning.

### **Data Collection**

Data was collected in the form of interviews, teacher lesson reflections, and classroom observations during the final months of the 2020-2021 school year. Due to the COVID-19 pandemic, the initial portion of this school year required students to engage in distance-learning. However, at the point of data collection, students and teachers were back to in-person learning. Nonetheless, COVID protocol restricted visitors from entering the building and therefore all data were collected virtually. Table 3.1 outlines how each data source was developed to support the research questions and the underlying theoretical framework. All interview questions, observation protocol, and lesson reflection prompts are attached as appendices A-C.

The combination of data sources served to triangulate (Tracy, 2010) a better understanding of the structural constraints and affordances involved in teachers’ professional identity formation and agentic action in the new worlds of mathematics and language learning. Ball (2003) predicted that the constraints of neoliberally influenced schooling contexts can lead to a misalignment of teachers’ moral purpose for teaching and their practice. However, not all cultural resources within teachers’ professional contexts were expected to act as constraints. Interviews, classroom observations, and teacher lesson reflections helped illuminate the relationship between teachers’ professional identities and the cultural resources offered by the figured worlds of mathematics and language education (Holland et al., 1998). In addition, data sources showcased how teachers enacted their agency in an effort to create alignment between their moral purpose and practice, thus providing insight to why and how teachers elected to make

certain changes to their jobs in order to best support NARI youth in the mathematics classroom (Wrzesniewski & Dutton, 2001).

**Table 3.1. Research Questions and Data**

Research Question	Clarification	Data
RQ1: What are key features of teachers' professional identities within the new world of mathematics and language learning for NARI youth?	Professional identities are reflective of: - <i>Why</i> (moral purpose) teachers teach in this context. - <i>How</i> (practice) teachers teach in this context.	<ul style="list-style-type: none"> <li>Teacher Interviews: Interview data will highlight key features of teachers' professional identities by eliciting an in-depth theorization between why and how they teach.</li> <li>Classroom Observations: Classroom observations will contribute to an understanding of how teachers enact their reasons for teaching through their practice.</li> <li>Teacher Lesson Reflections: Teacher lesson reflections will provide a formative perspective of how teachers link why and how they teach.</li> </ul>
RQ2: What is the relationship between teachers' professional identities and the cultural resources offered by the figured worlds of mathematics and language education?	-Some cultural resources act as <i>affordances</i> by aiding in the alignment between "why" and "how" teachers teach. -Some cultural resources act as <i>constraints</i> by contributing to a misalignment between "why" and "how" teachers teach.	<ul style="list-style-type: none"> <li>Teacher Interviews: Interview data will illuminate the personal, professional, and political resources from which teachers draw on to shape their professional identities. In addition, interview data will show how these resources act as either constraints or affordances in helping teachers align "why" and "how" they teach</li> <li>Teacher Lesson Reflections: Teacher lesson reflections will provide a formative perspective of how teachers' professional identities deal with the constraints and affordances of their professional environments.</li> </ul>
RQ3: In what ways do teachers enact their agency to negotiate the constraints and affordances relative to aligning why and how they teach?	Teachers attempt to align why and how they teach by making changes to the normative expectations of their jobs.	<ul style="list-style-type: none"> <li>Teacher Interviews: Interview data will provide in-depth reflections on how teachers make changes to the normative expectations of their jobs in order to align why and how they teach.</li> <li>Classroom Observations: Data from classroom observations will provide additional evidence relative to changes teachers make to their prescribed professional roles.</li> <li>Teacher Lesson Reflections: Teacher lesson reflections will provide insight to how teachers make formative changes to normative expectations in an effort to meet their teaching goals.</li> </ul>

## Interviews

Interviews were conducted via Zoom at the beginning, middle, and end of the project. Interview questions were semi-structured, allowing the flexibility to build on emerging themes from field notes while allowing teachers to construct their own narratives (Merriam & Tisdell, 2015). Although questions were general in nature, each question was based off my theoretical framework, and participants were guided to respond to a range of probes as needed. This



interview structure supported a better understanding of how teachers' professional identities are shaped within the new world of mathematics and language learning for NARI youth by eliciting an in-depth theorization between why and how teachers teach (Holland et al., 1998; Mockler, 2011). In addition, interview questions illuminated how teachers' professional identities are related to the personal, professional, and political resources offered by the figured worlds of mathematics and language education (Holland et al., 1998; Mockler, 2011). Finally, interview questions served to gain insight into how teachers enacted their agency to negotiate the constraints and affordances of their professional environments.

Interview 1 (see Appendix A) was given at the start of data collection. For this initial interview, all questions were the same for the three participants. Interview questions were semi-structured and designed to better understand the key features of teachers' professional identities shaped within the new world of mathematics and language learning for NARI youth (Holland et al., 1998). In addition, questions illuminated how teachers' professional identities were related to the cultural resources offered by the figured worlds of mathematics and language education (Holland et al., 1998; Mockler, 2011). Finally, interview questions served to gain insight into how teachers enact their agency to negotiate the constraints and affordances of their professional environments.

Interview 2 was given at the midpoint of data-collection. Although data analysis was ongoing, I engaged in an additional comprehensive round of analysis to specifically answer research questions for every participant. Based on this analysis, Interview 2 questions were written specifically for each participant in order to address emergent themes regarding the nature of their professional identity, relative constraints and affordances they had discussed, and ways

in which they enacted their agency to craft their jobs outside of the normative expectations (see Appendices B, C, and D).

Interview 3 (see Appendix E) was given at the end of data-collection, shortly after the finale of the school year. For this interview, the questions looped back to being the same for all participants, with personalized information to prompt interview conversation. At this point, I felt very familiar with teachers, having engaged them in informal reflections every Friday. I purposefully left the questions relatively open-ended, encouraging a “bird’s-eye” perspective, to allow participants to share additional key information. I ensured that final questions were written to put teachers in a position of being the experts on the intersection of mathematics and language learning by asking them to “speak to” state and county officials as well as future teachers in order to advocate for themselves and their students. In the next section, I will relay details regarding classroom observations.

### **Classroom Observations**

Classroom observations were conducted to explore the alignment between teachers’ moral purpose for teaching and their practice. In addition, classroom observations were used to observe how teachers enacted their agency to make changes to their prescribed professional roles through job crafting (Wrzesniewski & Dutton, 2001). Classroom observations were conducted virtually on a bi-weekly basis and lasted 90 minutes for elementary teachers and 60 minutes for the middle school teacher. Although I structured my position as a participant observer during the pilot study, COVID restrictions required all observations to be virtual, restricting me to a sole observer with limited capacity to interact (Merriam & Tisdell, 2015).

Like the interview protocol, the observational focus was semi-structured in order to allow themes to emerge (Merriam & Tisdell, 2015). Each observation protocol was written to

specifically address the key features of teachers' professional identities as evidenced in their initial interview (see Appendices F, G, and H). I looked for examples and counterexamples in which teachers' practice aligned with the narrations of their professional identities. In addition, the observer role allowed me to collect data in the form of a running record of the lesson which supplemented the observation protocol. I followed the running record up with the observation protocol as a tool for ongoing data analysis. In the next section, I will explain data collection regarding teachers' weekly lesson reflections.

### **Weekly Reflections**

In addition to formal interviews, teachers met with me every Friday via Zoom to debrief their week. Each week, teachers reflected on the constraints and affordances impacting their practice (Mockler, 2011). Thus, teachers' reflections provided a formative perspective of how teachers theorized the link between why and how they teach. In addition, lesson reflections offered information about how teachers attempted to preserve this link by making key changes to the normative expectations of their professional environments through job crafting (Wrzesniewski & Dutton, 2001).

Prompts for weekly lesson reflections followed the same structure each week but were very open-ended in order to allow teachers to share what they felt was most relevant. Questions were designed to encourage teachers to comment on successes and challenges regarding the week's experiences and to make connections to relevant structural constraints or affordances. Teachers were also encouraged to share any changes they made to the curriculum and comment on upcoming goals and expectations. In the following section, I will explain the steps I took to analyze the data.

## **Data Analysis**

All data was analyzed initially by drawing up individual profiles for each of the case study participants. Initial inductive analysis of individual teacher interviews, classroom observations, and lesson reflections focused on surfacing the key features of teachers' professional identities within the new world of mathematics and language learning (Holland et al., 1998). Analysis considered the reason "why" (moral purpose) teachers teach in this context as well as "how" (their practice) they teach (Mockler, 2011). In addition, special attention was given to identifying the personal, professional, and political resources which acted as constraints and affordances for individual teachers. Finally, data was examined to understand the ways in which teachers enacted their agency to negotiate the constraints and affordances of their jobs. Subsequent cross-case analysis used the constant comparative method (Lincoln & Guba, 1985; Strauss, 1987) to establish themes relevant to all three teachers. Cross-case analysis aided in understanding patterns regarding specific features of teachers' professional identities as well as common impact factors. In addition, cross-case analysis focused on key ways in which teachers crafted their jobs (Wrzesniewski & Dutton, 2001) to better account for the academic, cultural, and linguistic backgrounds of their students.

Moreover, data analysis was both formative and summative. Formative analysis was utilized to design an observation protocol as well as to establish emergent themes to aid weekly discussions and formal interviews. Summative analysis was conducted in several rounds in order to draw up in-depth profiles for each of the case study participants, as well as to illuminate generalizations which better explained the shared experience of the teachers working at the intersection of mathematics and language learning (Baxter & Jack, 2008; Yin, 2017). In the

following sections, I will detail the specific steps taken for data analysis along with my coding scheme.

### **Coding Frameworks**

Each research question addressed a portion of the overall theoretical framework and coding was both inductive and deductive, based on the underlying theories for each research question. RQ1 focused on all three data sources. Analysis was inductive, geared towards surfacing the unique features of teachers' professional identities by looking at how teachers understand and practice their identities within the new world of mathematics and language learning (Holland et al., 1998). Analysis considered both the reason "why" (moral purpose) teachers teach in this context as well as "how" (their practice) they teach (Mockler, 2011). This research question relied heavily on the constant comparative method (Lincoln & Guba, 1985; Strauss, 1987) to essentialize key features of teachers' professional identities.

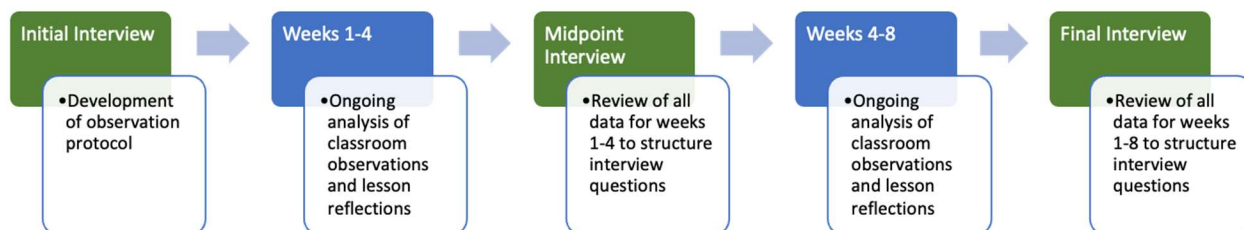
RQ2 was analyzed utilizing teachers' interviews and weekly lesson reflections and relied on Mockler's (2011) framework regarding the political, professional, and personal factors impacting teachers' professional identities. The coding framework looked for evidence in the realm of personal influences including personal learning history, personal identity markers, as well as personal interests and roles. Professional influences included professional learning opportunities, career histories, school features, and professional unions or networks. Finally, political impact factors were identified as high-stakes testing, professional observations and oversight, as well as standardization of instructional goals and curricula. In addition, analysis focused on surfacing key themes within and across cases relevant to each of the categories established within Mockler's (2011) framework.

RQ3 was structured around Wrzesniewski and Dutton's (2001) conceptual framework of job crafting. Analysis focused on ways in which teachers made changes to job task boundaries by altering the frequency, scope, or type of task. In addition, analysis considered ways in which teachers made changes to the relational boundaries of their jobs by revising the quality or amount of interaction they have with co-workers, administrators, parents, or students. Finally, changes to cognitive boundaries were analyzed as modifications to how teachers viewed their jobs. Inductive analysis identified consistent themes within and across teachers relative to their job-crafting in each of the three areas. In the following sections, I will detail how these coding frameworks were utilized for formative and summative within- and cross-case analysis. Formative analysis was conducted during data collection and focused on within-case analysis, geared towards informing subsequent data collection. Summative analysis was completed after data-collection ended with the intention of finalizing both within- and cross-case findings.

### **Formative Analysis**

Data was formatively analyzed using the constant comparative method (Lincoln & Guba, 1985; Strauss, 1987) in order to develop an understanding of the key features of teachers' professional identities, relevant structural constraints and affordances, and the extent to which teachers engaged in job crafting. Emergent themes supported subsequent data collection by informing classroom observations, interview questions, and weekly discussion prompts. Figure 3.1 displays the main portions of the continuous analysis taking place throughout the data collection period.

**Figure 3.1. Formative Analysis**



As shown in Figure 3.1, the initial interview served as a foundation for structuring the observation protocol specific to each teacher. Based on how teachers discussed why and how they teach at the intersection of mathematics and language learning, individual protocols were developed through inductive analysis, surfacing key features of teachers' professional identities. Observation protocols were structured to be used during classroom observations in order to look for enacted examples of how teachers narrated their professional identities in relation to *how* and *why* (Mockler, 2011) they teach at the intersection of mathematics and language learning. In addition, Interview 1 was formatively analyzed to summarize cultural constraints and affordances regarding teachers' professional identities (Holland et al., 1998). Immediate analysis of these impact factors was useful for informing discussions during our weekly lesson reflections. Using Mockler's (2011) framework, I looked for important factors from personal backgrounds, interests, and learning histories. I also analyzed interview transcripts to pull out key professional influences including their career histories, school and system features, professional learning opportunities, and professional networks. Finally, I looked for political impact factors such as high-stakes testing, standardization of instructional goals and curricula, as well as oversight from county officials or administrators. Each piece of evidence was coded as either a constraint or an affordance, depending on whether teachers spoke negatively or positively about these factors. At times, it wasn't clear if the impact was negative or positive, so I

made note to see if this would be revealed through subsequent discussions. Lastly, Interview 1 was analyzed to surface key ways in which teachers reported crafting their jobs beyond the normative expectations by making adaptations to cognitive-, relational-, and task- boundaries (Wrzesniewski & Dutton, 2001). This allowed for subsequent triangulation (Tracy, 2010) during classroom observations and weekly lesson reflections.

During each week of data collection, formative analysis focused on utilizing the observation protocol as an additional tool for analysis. All classroom observations were conducted online, therefore it was possible to keep a running record of the lessons. This allowed me to document additional features of teachers' professional identities which weren't narrated during the formal interviews and therefore not included in the observation protocol. In addition, I was able to observe ways in which teachers made practice-based changes to the normative expectations of their curricular requirements by enacting their agency through job crafting. Immediately after each lesson observation, I would utilize the observation protocol to formatively analyze the running record. This process also helped to inform the weekly lesson reflection discussions with teachers, as I was able to better understand and follow emerging themes from classroom practice. In addition, weekly lesson reflections were formatively analyzed to keep track of relative constraints and affordances experienced by teachers relative to their professional goals, as well as the ways in which they reported making changes to the normative expectations of their jobs.

Prior to the mid-point interview, all data were reviewed for each participant in order to crystallize emergent themes and write interview questions accordingly. Connections were drawn between how teachers narrated their professional identities in the initial interview and how they practiced their identities during classroom observations. In addition, interview questions built on



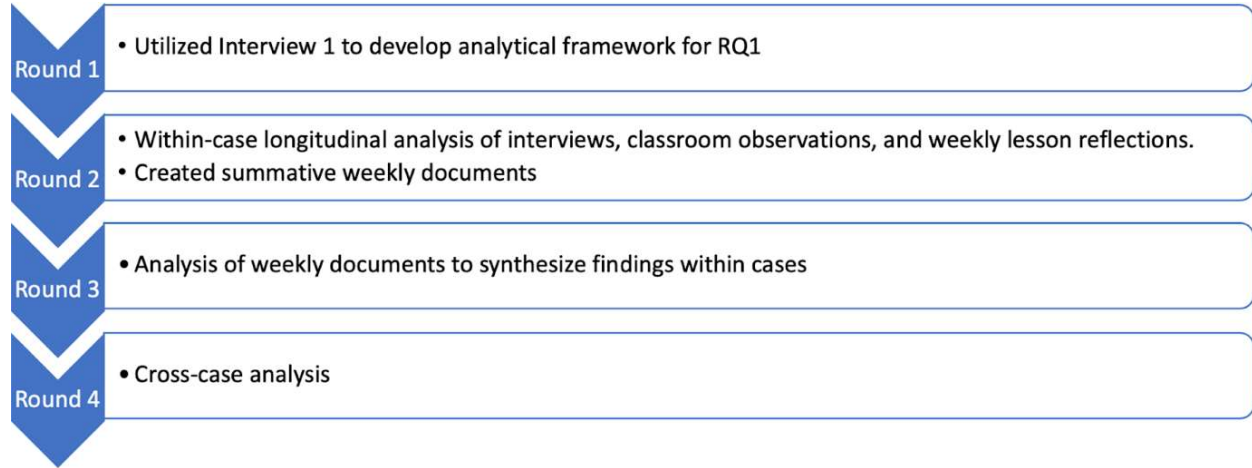
the emergent constraints and affordances that teachers had been referencing in their weekly reflections. Finally, analysis considered data from classroom observations and weekly lesson reflections regarding how teachers crafted their jobs beyond the normative expectations set forth. This facilitated writing interview questions specific to how teachers had been enacting their agency and the structural factors involved.

Prior to the final interview, all data was reviewed to serve as prompts for final interview questions. Unlike the mid-point interview, questions for the final interview cast a more peripheral net. Weekly lesson reflections had already served the purpose of continuing to discuss emergent themes regarding teachers' professional identities, their structural constraints and affordances, as well as ways in which they engaged in job crafting. Therefore, the analysis for the final interview was used to summarize individualized prompts for each teacher. The interview questions themselves were unanimous for all three teachers and geared towards casting a wide net to collect final perspectives not discussed previously. In the following section, I will describe how all data was analyzed again after data collection ended.

### **Summative Analysis**

Summative analysis began after data collection ended and was intended to corroborate initial findings from the formative analysis. Summative analysis was conducted in 4 main rounds as shown in Figure 3.2.

**Figure 3.2. Summative Analysis**



The first round of analysis was completed using Google Docs. During this round, Sam and I independently read through the interview transcripts and selected in-vivo examples relative to each research question. Research question 1 took the most time since the goal was to expand on the observation protocol and develop a detailed analytical framework which could be applied to all three teachers. First, we selected all examples which responded to the general essence of how teachers described why and how they teach at the intersection of mathematics and language learning. Next, we copied that text onto another document and used the constant comparative method (Lincoln & Guba, 1985; Strauss, 1987) to identify broader categories descriptive of teachers' professional identities. Once I arrived at approximately 8-10 descriptors, I began developing the analytical framework. I thought to take an outsider's perspective to come up with categories to utilize which would act as points of reference for all three teachers so I could begin drawing comparisons. The categories included how teachers responded to and built on students' identities, their approaches and beliefs regarding both mathematics and language learning, as well as how they structured their classroom environments. The analytical framework for each teacher included a variety of themes for how their professional identities were evidenced within

these categories. Subsequently, we also analyzed Interview 1 to identify relevant structural constraints and affordances using codes derived from Mockler's (2011) framework detailing personal, professional, and political factors. In addition, Interview 1 was analyzed to look for ways in which teachers reported altering task-, cognitive-, and relational- boundaries set forth in the normative expectations of their jobs (Wrzesniewski & Dutton, 2001).

Round 2 of data analysis began once analytical frameworks were established, and subsequently all data was analyzed in ATLAS.ti. Data analysis was longitudinal and I proceeded by looking at all classroom observations and the weekly reflection for each participant and moving across all three participants before moving on to the next week. This helped me keep a better sense of the context, since teachers were experiencing similar circumstances, such as preparing for the EOGs or visits from county officials. Coding was mostly deductive and based on the established analytical frameworks. At this point in data analysis, I was mostly sorting evidence relative to each of the research questions and their connected theoretical frameworks. Once coded in ATLAS.ti, I transferred weekly data into a chart in Google Docs which represented all data for each participant for that week. I also coded the mid-point interview, and final interviews in this fashion as they appeared on my analytical timeline at weeks 5 and 8.

After all data was analyzed longitudinally, I began the third round of analysis. I started a new project in ATLAS.ti to synthesize the weekly documents I had created. The goal was to surface emergent themes for each participant for each of the three research questions. For research question 1, I looked across all of the weekly data sources in order to surface emergent themes relative to how each teacher responded to and built on students' identities, their approaches to mathematics and language learning/teaching, as well as how they structured their classroom environments. For Research Question 2, I followed a similar process, looking for

examples across all data documents regarding the personal, professional, and political constraints and affordances for teachers. Next, I used the constant comparative method to come up with themes specific to each teacher across all data sources. Finally, I synthesized all weekly data and interview documents to surface the ways in which teachers made consistent changes to task-, relational-, and cognitive-boundaries. All synthesized data was transferred into google documents. I structured one such document for all participants relative to each research question.

The fourth and final round of analysis focused on cross-case analysis. For the first research question, I looked for themes which would serve as mutually exclusive descriptors for teachers' professional identities within the categories describing ways in which teachers responded to and built on students' identities, their approaches to mathematics and language teaching, as well as how they structured their classroom environments. I utilized the group manager coding function and looked across all three teachers within each of these categories in order to surface key themes descriptive of how teachers navigated their professional roles at the intersection of mathematics and language learning. Within these themes I looked for commonalities and differences regarding how teachers narrated and practiced their professional identities.

For the second research question, I utilized the data I had organized for each individual teacher according to Mockler's (2011) framework. I looked across the personal, professional, and political influences teachers had indicated as important and started coding to find smaller pieces of data describing key features of teachers' impact factors. Subsequently I used the group manager function to re-read selected text for each teacher and came up with themes using the constant comparative method (Lincoln & Guba, 1985; Strauss, 1987). These themes primarily

emerged as I looked at potential causal factors which were similar or different across the teachers and appeared to be connected to various features of their professional identities.

Finally, I used the constant comparative method (Lincoln & Guba, 1985; Strauss, 1987) within the group manager function to come up with themes for the third research question in each of the categories relative to job crafting (Wrzesniewski & Dutton, 2001). These categories included ways in which teachers adjusted the task-, cognitive-, and relational-boundaries of their jobs. Subsequently, I looked for similarities and differences regarding how teachers made changes to the normative expectations of their jobs in order to arrive at mutually exclusive themes. In the next chapter I will detail relevant findings by describing both the individual profiles of each teacher as well as relevant cross-case findings.

## CHAPTER IV: FINDINGS

### **Individual Profiles**

In the following section, I will discuss findings individually regarding the professional identities of each of the three teachers. Individual profiles are geared towards developing a more nuanced understanding of the nature of teachers' professional identities, key influences, and ways in which teachers were able to enact their agency to craft their jobs. Each profile will be discussed by initially exploring how teachers responded to student identities, addressed language learning, approached mathematics teaching, and formed a classroom environment. Subsequently, constraints and affordances relative to each teacher's professional identity development will be explored in the personal, professional, and political realms. Finally, individual profiles will detail how teachers negotiated these structural factors in order to craft their jobs at the intersection of mathematics and language learning. The findings are structured following the research questions:

RQ1: What are key features of teachers' professional identities within the new world of mathematics and language learning for NARI youth?

RQ2: What is the relationship between teachers' professional identities and the cultural resources offered by the figured worlds of mathematics and language education?

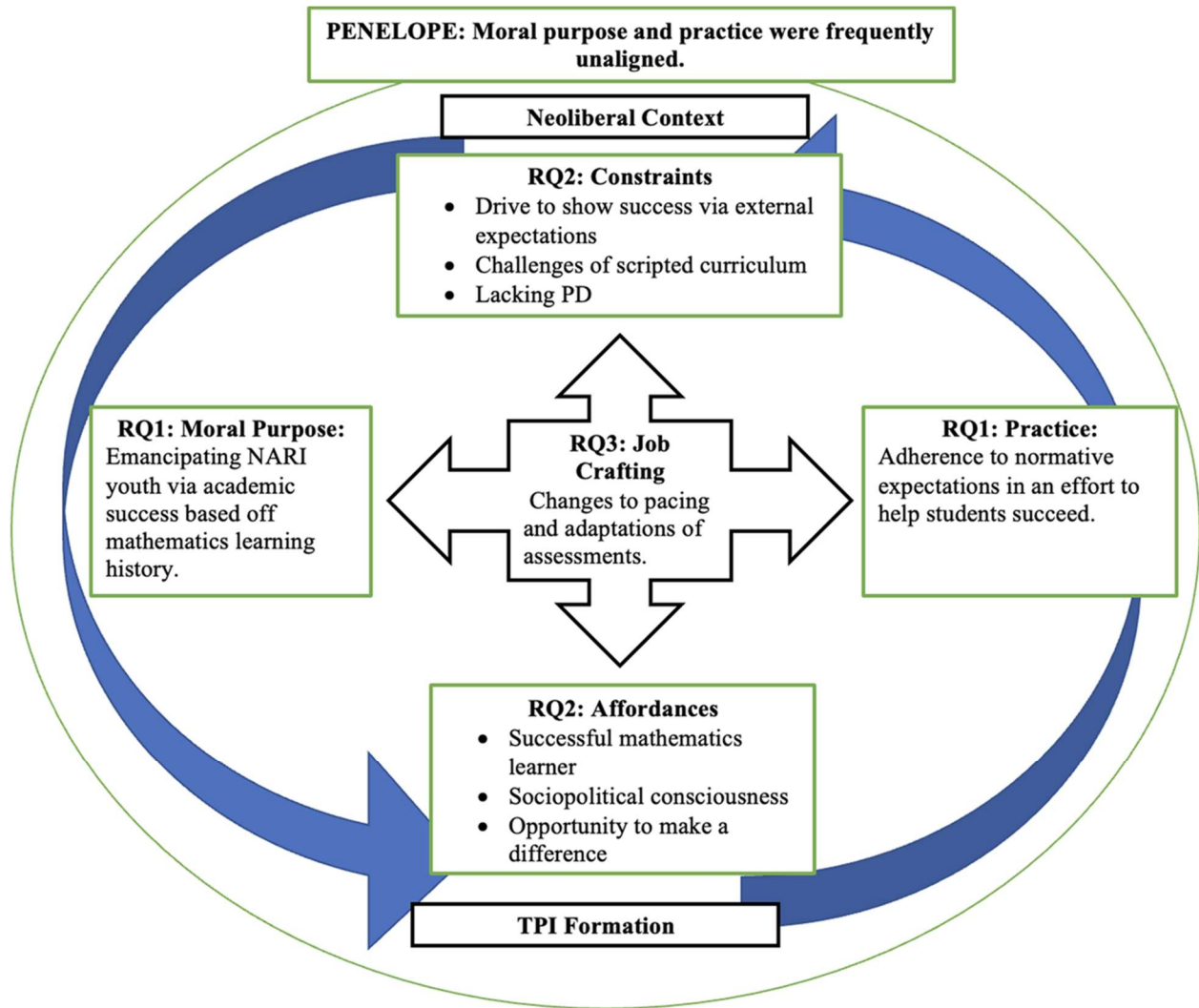
RQ3: In what ways do teachers enact their agency to negotiate the constraints and affordances relative to aligning why and how they teach?

#### **Penelope's Professional Identity**

Penelope is a young black woman with a powerful personality. Her presence demands attention and respect. She is a recent graduate from the university's TESOL MAT program and the only teacher of color in the study. A self-proclaimed mathematics lover, she is in her second year of teaching 5th grade mathematics at the AHA school. Since the elementary school is

departmentalized, she also teaches science. Figure 4.1 provides an overview of the discussion to follow, outlining the relationship between Penelope’s professional identity and relevant constraints and affordances, along with how she leveraged her agency to respond to normative expectations of her job.

**Figure 4.1. Penelope’s Profile**



***Shaping Student Identities***

Penelope’s moral purpose for working with the youth at AHA was driven by her own experiences of marginalization as a black female in the mathematics classroom. She addressed

student identities based on her strong sociopolitical drive which translated into her wanting to emancipate youth through academic success. In her interviews, she talked a lot about wanting to make a difference in students' lives and that she felt the impact might be greatest at AHA, believing that students would benefit from the example that their first math teacher in the US is a black woman. In addition, she felt strongly about empowering females of color to succeed at mathematics. Penelope told me about a girl in her class that never felt comfortable saying the answer although she knew it, "She does not need to minimize herself and make other people feel better. If they want to feel better about their math skills they should practice their math skills."

In addition, Penelope sympathized with structural power dynamics that NARI students and families must contend with. She talked of parents and students facing a stigma based on their immigration status and language barrier and expressed sympathy for how stressful that must be.

She mentioned:

I don't have to deal with that on a regular basis, whereas people who come into this country have all these different situations come up where they have to interact with people in English, and it is very high stress, and like, you don't know what's going on and it's probably people who you know are in a different kind of position you know, like, if it's someone who's from the government or some kind of institution that you have to talk to...is hard.

Based on this awareness, she discussed ways in which she wanted to teach students to advocate for themselves in their new schools. For example, she told students to ask for pictures to aid comprehension and instructed them regarding different roles of teachers and other employees in public schools.



Penelope's sociopolitical drive translated into her having high academic expectations for her students. She aimed to emancipate her students through academic success and mentioned that she is trying to make sure that, "students get to a better place." She also talked a lot about students developing and meeting certain measures of growth, saying, "there is no level that can't level up." However, her goals of academic success were subject to existing standardized instructional goals and assessments. Since these external requirements were not normed for NARI youth, they created unjust expectations and pressure on Penelope's teaching practice, ultimately leaving limited room for integrating students' cultural, linguistic, or academic backgrounds into the curriculum. Penelope ultimately expressed frustration about the conflict of attempting to have students meet external measures that were so difficult to attain, stating: "They did not know how to do well on the test ... I felt at a huge huge loss, because I have 27 kids, I feel like maybe six or seven got it." In the following section, I will discuss ways in which Penelope's professional identity responded to students' language learning needs.

### ***Addressing Language Learning***

In terms of language learning, Penelope felt strongly about preparing students with the language competence to be successful in their future mainstream schools. She really worried about this transition, because she considered not being able to speak English as a major disadvantage. She said that a part of the reason she is at AHA is because she likes watching students' "transformation into someone who speaks English." In reflection of her goals for students' language learning she says:

I'm kind of trying to show them that there's a contrast between AHA and other schools, because this is an environment where we will all make mistakes in our language, and then

we will all grow from them. But in another environment, it could be more stressful to try to participate.

As a result of feeling so urgent about preparing students for life beyond her classroom, Penelope had high expectations for her students' language performance. For example, she did not read word problems aloud to her students but expected students to read them independently. She typically scaffolded comprehension of word problems by discussing them with the class after students had read through them. During this time, she would informally focus on vocabulary, paying mostly attention to key academic terms although she sometimes also focused on more context related vocabulary. Penelope also utilized other forms of language scaffolding including the use of pictures or diagrams regarding the mathematical concepts presented. She also supported students' language production by occasionally providing written or oral sentence frames. However, it seems Penelope's approach to language learning was mediated by the pressures of high-stakes testing. For example, after the EOG test was over, she explored language learning in greater detail, developing her own lessons where students explored different vocabulary terms related to the four operations and then focused on collaborating to solve word problems with these terms. In the next section, we will take a look at how Penelope approached mathematics instruction.

### *Approach to Mathematics*

One of Penelope's main goals was to get students ready for life beyond AHA. In terms of mathematics learning that meant she felt that she needed to cover the curriculum mandated by the county. Therefore, she tried to teach the prescribed curriculum with fidelity, although not without issues. She stated, "I'm implementing EUREKA, how it's supposed to be done. Right, but then I find out after weeks that's not working." Penelope typically differentiated for her

students as a whole group by changing the pacing of the curriculum to give students more time to process. She also offered scaffolds such as multiplication charts or conversion tables to give students access to missing content knowledge. In addition, Penelope utilized her tutor to work with small groups of students on basic skills.

Nonetheless, there was a obvious disconnect between the external expectations and students' cultural, linguistic, and academic learning needs. In order to compensate, Penelope worked harder on modeling and transferring knowledge to her students. She had a strong background in mathematics which made her explanations thorough and exact. She relied strongly on teacher modeling in the hopes that if she showed students the exact strategies to use they would ultimately master the content. Nonetheless, Penelope frequently felt frustrated with the expectations set forth by the curriculum, since students often were not able to arrive at the correct answer. She encouraged students to follow along, often saying things like, "I'm coming to see if you know how to multiply  $\frac{3}{4}$  times 4. Write what I have on the board!"

Thus, Penelope's desire to emancipate students via success at external standards created pressure on her teaching which ultimately left little room for her to focus on students' thinking or solution strategies. Classroom observations demonstrated a focus on collective solution strategies geared towards getting the correct answer. When students were asked to collaborate, she would prompt their discussion by saying things like, "Did you get the right answer, did your neighbor get the right answer?" This was in line with her perspective of how mathematics provides a clear reference for success via the answer. During her initial interview, she talked about how she liked mathematics as a student because, "You get it either right or wrong." Penelope mentioned feeling like this could be good for AHA youth because, "Math offers quick gratification when students can get the answer right." Similarly, whole group discussions were usually structured around

initiate-response- evaluate type questions with limited attention to students' thinking, "Raise your hand if you have an answer. Jason? (Says 15) Yes! Thank you." An exception to this pattern in Penelope's practice was evident in the two observations after EOGs had ended. Students were found collaboratively working in groups to explore patterns of parallel lines and discussing their thinking regarding key vocabulary in word problems. In the final section, I will explain key ways in which Penelope structured her classroom environment.

### ***Forming a Classroom Environment***

Penelope's classroom environment communicated high expectations along with a sense of academic rigor and accountability in the classroom. She was positioned as the leader and set high expectations to hold kids accountable for their learning. She positioned students as scholars, pushing them to focus on their individual success. It seemed most important to Penelope to enable each student to achieve their personal best rather than creating a classroom environment with ample social interaction. In reflection of her own mathematics learning experiences, she shared that she did not go to class to socialize, saying:

I didn't go to class to sit with my friends, I just went to class to take the class, do the work, and leave so, um, I didn't really give other people an opportunity to voice their opinions about how they felt about me.

This level of isolation was impacted through structural racism which frequently left Penelope feeling marginalized in her higher-level mathematics classes. She lamented being the only female of color, but covered that experience with the tough armor of individualized academic success.

Penelope pushed her students to also bring a general decorum to the learning environment. Expectations for students included homework completion, asking questions in class,

paying close attention, and showing one's work. She supported her expectations by holding students accountable with an air of tough love. After several students did not complete their homework, she addressed the class saying, "If you didn't do it, go home and do your homework, so that you don't come to class and sit there and blink." Penelope expected all of her students to be able to meet these expectations for their one benefit. She mostly wanted them to simply feel accomplished. She said:

Just any kind of way that I can congratulate them on working hard ... push them to work harder and show them that they have accomplished something. Even if it wasn't what we did whole-group, even if it wasn't getting the homework right, even if it was just turning in the homework.

In the next section, we will take a look at the key personal, professional, and political impact factors on Penelope's professional identity development.

### **Key Influences on Penelope's Professional Identity Formation**

Key influences on Penelope's professional identity development included personal, professional, and political impact factors. Relevant personal factors included her personal background and learning history. At the professional level, she was impacted by her career history, school features, professional associations, and opportunities for professional learning. Finally, Penelope's professional identity responded strongly to political impact factors including high-stakes testing, the standardization of instructional goals and practices, and oversight from external officials.

#### ***Personal***

Penelope's personal background experiences and mathematics learning history served as simultaneous affordances and constraints to her work at the intersection of mathematics and

language learning. Penelope's learning history included experiences of marginalization as a black woman in higher level mathematics classes. Frequently she felt underrepresented or disrespected as a person of color in her mathematics courses. She mentioned that once:

This one guy sitting next me, a white male, um you know we were answering the question and ... I saw that he really, like, didn't know what his answer was so I said, "Hey you know I can explain" he said, you know, "oh no, no, I'm fine."

These experiences ultimately led Penelope to viewing mathematics as an individual endeavor. She was a top student at a prestigious public university; however, she says she never went to class to socialize or be friends with people, just to get the work done. Her individual success with learning mathematics was reflected in the strong content knowledge she integrated into her teaching practice. In addition, experiences of marginalization inspired Penelope to empower youth from linguistically and culturally diverse backgrounds. She hoped that NARI youth could follow in her footsteps and achieve academic success. She said:

I think I do feel motivated to empower AHA students, you know, who could easily be marginalized in those areas. By seeing that, you know, their first math teacher is a black woman. So don't let anybody think that black people can't do math or you can't do math, whatever race you are.

Unfortunately, her students' access to academic achievement was complicated by the fact that success was defined by standardized instructional goals, practices, and assessments. Since these standards were not normed to the learning profiles of NARI youth, they caused Penelope to feel frustrated with herself and her students, ultimately leading towards more teacher-centered instruction. Once the pressure of the EOG was over, she created her own lessons, which were much more student-centered by integrating students' academic and linguistic backgrounds.

Penelope's learning history also offered powerful influences regarding language learning. Positive learning experiences regarding language and culture include a partnership between her and a Spanish-speaking peer in college where the pair engaged in tandem language learning. The two developed a friendship and shared in one another's cultural and linguistic worlds. This was her first language teaching experience and she felt very happy with the process. However, the same partnership also offered constraints in the form of Penelope's fear regarding language learning. She recounted a story from a birthday party where people were speaking to her in Spanish. One man repeatedly asked her the same question and she did not grasp the meaning, this embarrassed her so badly that she went home and cried. Thus, while Penelope's fear of "language failure" has made her more empathetic towards the experiences of NARI students and families, she also placed a lot of pressure on her students to learn English more quickly. In the subsequent section, we will look at key professional influences on Penelope's professional practice.

### ***Professional***

Affordances to Penelope's professional identity from the professional realm included her career history, school features, and her engagement with this research study. She mentioned the positive impact she has had from her career history having been set exclusively at the AHA School. After completing her internship and student teaching at the school, she was hired and now has spent two years as the elementary mathematics teacher for 5th grade. Having engaged in a setting with NARI youth for the past three years has given her the opportunity to feel like an "expert." In addition, Penelope completed her Master's degree in TESOL at one of the local universities which she said provided her with a lot of knowledge regarding her work with English learners. Additional affordances were offered by her school setting. She stated that her

administration was consistently supportive of adjusting expectations for her students and encouraged her not to worry about standardized testing. The school also offered her a tutor to help with students' varied learning needs which was a tremendous benefit for her. Finally, she felt that her professional association with this research study was supportive of her practice. Penelope shared that our weekly conversations served as an opportunity for her to push herself to reflect:

Oh definitely you know this was like my PLC. I could bring my problems here, and then we could, like, talk out some solution... Reflection is like a major part of improving your practice as a teacher and I'm not saying that I wasn't asked to reflect from my admin because I was. But, um, it's so easy to not reflect where you're just like going, going, going... So meeting with you and thinking over what went well, what didn't go well each week was really nice.

Constraints from Penelope's professional realm came in the form of opportunities for professional learning and development as well as specific school features. She lamented the fact that she felt like there were not enough learning resources for her to improve as a professional at the intersection of mathematics and language learning. She said that the school's professional learning committee meetings really did not help her with teaching mathematics because they were mostly geared towards literacy and language learning. Penelope felt like she was the only expert on teaching math to NARI youth, and said, "From my perspective, we have PLC, we have a math coach, we have a department head, we have a principal, we have a curriculum facilitator and none of those things have helped me."

Furthermore, Penelope struggled with appropriately differentiating for the wide range of her students' needs while simultaneously living up to the pressure of teaching the curriculum.



She said there is very little awareness in the school system concerning these challenges and wished for the appropriate support for her position. Penelope said it would be perfect to have one teacher per classroom that was able to work towards differentiation and another to focus on the county mandated curriculum. In the next section I will explore political impact factors on her professional identity development.

### ***Political***

Affordances to Penelope's professional identity from political influences came in the form of certain instructional goals and practices required by the county's school system. She said that the prescribed curriculum provided her with certain resources such as activities and assessments. While Penelope did not consider these resources to really fit her students' learning profiles, she mentioned appreciating the structure they provided. When considering the absence of such a structure she said, "You know it's kind of like when your teacher says, you can write a paper about anything. And you're like oh awesome and then it's like, oh my gosh I have no idea ..."

Nonetheless, influences from the political sphere posed more constraints than affordances for Penelope. She frequently complained about the pressures of high-stakes testing, the inappropriate standardization of instructional goals and practices, as well as the impacts of county-based oversight. In regards to high-stakes testing, she struggled with how these expectations defined her success as a teacher. Although during our first interview she boldly commented that she was not concerned about the EOG, her confidence wavered as the exam drew nearer. When I spoke with her the afternoon after she administered the test, she was tearful and defeated, feeling like a failure because none of her kids passed and that this meant she did

not do her job. Penelope felt conflicted about whether or not it was her role to prepare her students to pass the exam:

You know it's kind of like if you're running with a baby and there's this giant garage door that's about to close. And you're, like, I'm not going to be able to get out, I'm not going to make it through, but then, well, maybe I can ... So you run and then you, like, throw the baby and you fall at the same time. I did everything I could have done, and then the garage door just mashes on the baby

In addition to feeling stressed by high-stakes testing, Penelope struggled with the standardization of instructional goals and practices. She found herself 3 months behind in the prescribed curriculum and felt very disparaged about not having been able to cover the content required by the script. In addition, she complained that the curriculum did not account for language learning. She said she felt like it is a “teeter totter” between relying on the curriculum and realizing that it did not actually help her meet her students’ needs. Penelope struggled with the curricular requirements being too difficult, “I can’t even get the higher-level students to work together and help each other, because they’re not there yet.” When asked what she would do differently, she said she would want a curriculum that offers an outline without requiring such strict pacing.

Finally, Penelope mentioned feeling a lot of pressure from the county officials’ oversight. In particular, she felt guilty about being behind on her pacing. The county’s mathematics coach compiled a list of topics for her which were expected to be covered by the EOG. Penelope felt stressed and expressed her frustration by stating, “I understand they’re wanting to have some level of accountability for what we do here, some kind of standard for what we do, of course,

that should be in any institution, but no one knows what that should be ...” In the next section, I explore how Penelope enacted her agency by crafting her job beyond the prescribed boundaries.

### **How Penelope Crafts her Job**

A brief review of the job crafting framework (Wrzesniewski & Dutton, 2001) surmises that changing task boundaries can appear as making changes to the number of tasks one performs, the scope of the tasks, or the type of tasks. Further, relational boundaries can be altered through the amount of quality of interactions an individual engages in within the professional setting. Finally, changing cognitive boundaries involves changing the view of one’s job.

Penelope made attempts to adapt the normative expectations of her job by altering the boundaries of her professional tasks as well as the cognitive boundaries set in place (Wrzesniewski & Dutton, 2001). She altered the task boundaries of her job by making changes to the expected curriculum via pacing, built-in assessments, and, to a more minimal degree, the materials and activities of the curriculum. More specifically, she changed the pacing of the curriculum by combining lessons, extending more important lessons, or dropping lessons which she found to be least important. In addition, Penelope made adaptations to the scripted assessments by providing certain scaffolds such as multiplication charts or conversion factor charts between standard and metric units. Finally, she occasionally adapted the curriculum’s activities and materials. For example, she added visuals to the county’s pre-made PowerPoints to support language learning or she made changes to the word problems in the script if the context was too difficult.

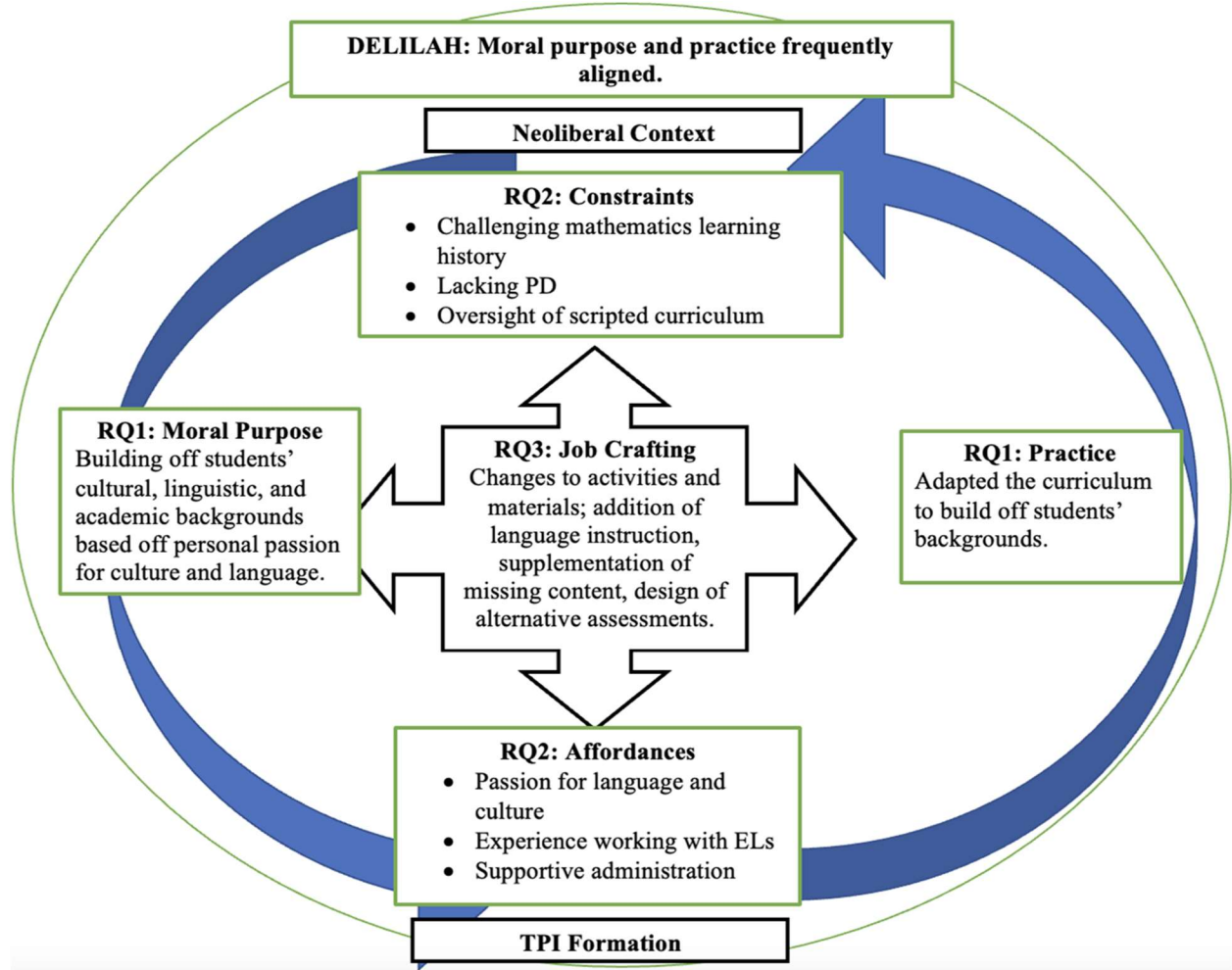
In addition, Penelope engaged in an ongoing struggle to redefine existing cognitive boundaries concerning her success as a teacher at the intersection of mathematics and language learning. She was conflicted between working relentlessly towards her goal of emancipating

NARI youth via academic success and the unfair expectations set forth by standardized measures for student achievement. In the absence of alternative measures for learning, Penelope experienced strong feelings of failure when her students did not pass the EOG. In addition, her students did not show substantial success on the assessments provided by the curriculum. In an effort to redefine the cognitive boundaries for success, Penelope engaged in job crafting by making minor changes to the assessments provided by the county's curriculum. However, the scaffolds and alterations she put into place were not sufficient to give her a more appropriate definition of her success as a teacher at the intersection of mathematics and language learning. In the next section, I will share information regarding Delilah's professional identity, relevant cultural resources, and her ability to job craft.

### **Delilah's Professional Identity**

Delilah is a veteran teacher who dedicated her career to working with English learners. Passionate about linguistic and cultural diversity, she shared about her ambition to become a teacher, "I was always fascinated by people from other places, and, to be honest, being an American kid and seeing American kids, I had no desire to work with American kids." Accordingly, she worked for over 20 years to improve the experiences of English learners. This is her fourth-year teaching mathematics at the AHA school, stating, "I would never want to switch schools, because AHA is just the best compared to any other school, in my opinion. The fact that it's all, you know, Newcomer kids, yeah, that's what I love." Figure 4.2 summarizes how Delilah job crafted to support her professional identity as well as how constraints and affordances of her context contributed to this process.

Figure 4.2. Delilah’s Profile



### *Shaping Student Identities*

Delilah responded to student identities by building instruction off students’ cultural, linguistic, and academic backgrounds. She took a strength-based approach (Yosso, 2005) towards working with students culturally and linguistically diverse backgrounds and was critical of how current schooling structures received NARI youth. During our first interview she said:

I know that teachers that I’ve worked with in the past ... they thought it was too much of a challenge, so, then they resented it. You know, like “Why do I have to deal with this kid who doesn’t speak English” or, “why do I have to accommodate their celebrations, they

are here.” Not that people try to be disrespectful but I know teachers have so much pressure on them that I’ve seen teachers just react the wrong way because it adds to their pressure.

Delilah was very appreciative and passionate about cultural and linguistic diversity. She frequently asked students to express their thoughts in their home language and welcomed the use of all languages in her classroom. Delilah said she hopes her mindset will allow students to adapt to their new school:

The fact that I respect and appreciate that they’re coming from other cultures, you know I’m willing to think about how I can teach them the best way. I’m not just like, well, they need to learn this way because that’s what I said, or because that’s what we do, so I think it makes me more flexible.

In addition, Delilah incorporated students’ personal background experiences and interests. She said that she was able to do so by previewing the curriculum and making changes based on what she thought kids would connect with. She frequently wrote her own mathematical word problems to capitalize off of students’ prior experiences or topics they were interested in. For example, Delilah encouraged students to pick a topic (they selected travel) and she created all the week’s word problems around that topic using students as characters in them. During class, students were observed talking to each other about the word problems and their background knowledge regarding the contexts. In addition, students had opportunities to act out various scenarios in the word problems whenever they were involved as “characters.” Moreover, she incorporated fun and student-friendly activities on a daily basis. She always started class with a music video to review basic facts. All students would get up to dance and sing along. In the next section, I will detail how Delilah approached language learning.

### *Addressing Language Learning*

One of the most strongly developed aspects of Delilah's professional identity was her approach to language learning. Some of the ways in which she attended to language learning was by encouraging multiple forms of contributions, making room for targeted language practice, and utilizing a broad range of scaffolding techniques. Delilah encouraged multiple forms of student contributions by providing opportunities for nonverbal communication or providing responses in students' home language. In addition, she validated all responses regardless of grammatical structure or vocabulary use. Instead of correcting students, she commended student contributions and directed other students to build on them. For example, when discussing the attributes of shapes, one student said, "It's like this" while acting out parallel lines with two pencils. Delilah responded, "Good! Someone tell me more, what does she mean by that?"

In addition, Delilah provided many opportunities for targeted language practice. She started each lesson with a vocabulary practice session, regularly integrating a range of activities such as acting out vocabulary terms, reading vocabulary in silly voices, discussing students' background knowledge of terms, modeling concepts with realia, utilizing real-world scenarios, or playing videos and songs integrating the target vocabulary. In addition, she often integrated turn-and-talks with supports such as sentence frames. Tasks for partner- or small-group discussions included students sharing background knowledge regarding a mathematical concept or a solution strategy they used. Other times, she would aim for students to speak in front of the class using sentence frames to share information relevant to a mathematical task they were working on, such as, "I live \_\_\_\_ miles from the school."

Delilah also used a wide range of scaffolding strategies to support language comprehension in the form of listening or reading. For example, she was intent on making both

content- and context-related vocabulary comprehensible through visuals, physical actions, or explanations. She supported students' listening comprehension by speaking very slowly, using physical gestures, providing wait-time, and repeating her instructions. Delilah also scaffolded student comprehension of peer contributions by writing peer contributions on the board and revoicing them in order for the whole class to understand. When possible, she also utilized students' home language to offer translations. For written tasks, Delilah either read aloud to students or pre-recorded a read-aloud on presentations. In addition, she used many visuals and realia to support comprehension of various constructs contained in word problems. To further support student comprehension of the complex language behind word problems, she often asked students to act out the scenario or draw a picture of it.

Delilah also supported language output, such as speaking or writing, in purposeful ways. For example, she was always sure to provide ample wait-time when students were speaking to ensure that no one would begin feeling anxious. She also supplied students with sentence frames to scaffold written or spoken student contributions. All student contributions, regardless of structure, were always celebrated which really supported students with taking the risk to speak. Overall, she found language as the key to learning. She said:

Teachers need to slow down to explain things and not just assume that, because the child nods his head when you say, "Do you understand?" that they do understand. I want teachers to realize that they have really good capabilities, but the teacher has to figure out how to get it out of them.

In the subsequent section, I will outline Delilah's approach to teaching mathematics.



### *Approach to Mathematics*

Delilah's approach to teaching mathematics was most strongly informed by her own difficulties with learning mathematics as a student. Having experienced the intimidation mathematics can present to learners, made her want to make mathematics "approachable" for her students. Overall, her approach to mathematics to NARI youth could be described as building on authentic assessments, differentiating instruction accordingly, and creating collaborative learning experiences around students' thinking while supporting a growth mindset.

Delilah frequently created assessments to inform her instruction. Rather than figuring out if students were achieving the curriculum standards, she was mostly interested in finding out what kids actually knew by also accounting for language demands of the content. In addition to formal assessments, she created informal assessments throughout classroom practice. She frequently utilized whiteboards and would call out, "1-2-3 show me" at which point all students would hold up their answers. Based on evidence from formal and informal assessments, Delilah adapted and differentiated her instructional practice. She said, "I want to make sure they all can go to their next year, being able to do certain things." To differentiate the curriculum for her class, she went "off script" for an entire week because she realized that many kids could not fluently add or subtract. Thus, Delilah differentiated the curriculum for the class as a whole by creating her own materials and adding in language, context, and content supports. For individual differentiation, she utilized small groups and conducted guided math lessons. In addition, she differentiated for individual students by addressing individual learning needs such as teaching numbers 0-10.

Delilah centered collaborative learning opportunities around students' thinking. During class, she created ample opportunities for student collaboration through partner- or small-group

practice. Discussions were always based on open-ended opportunities for students to explore their thinking. She utilized prompts such as “Turn to your neighbor, tell them something about a triangle.” or “What strategy did you use to solve this problem?” During whole group discussions, Delilah supported students by directing them towards one another’s contributions and making use appropriate linguistic scaffolds such as sentence frames or students’ home language. Throughout these discussions, she reinforced a growth mindset by focusing on solution strategies rather than the answer. For example, she said, “How did you get your answer? Thumbs up if you think that’s ok. Did anyone add another way?” In addition, she did not discount incorrect answers but used them as opportunities for learning. For example, when students were arguing about an answer she said, “I like that you are disagreeing, let’s see, this is another tricky one. What sides are parallel?” Finally, Delilah also supported a growth mindset by positioning students to help one another. For example, when students were working on a multi-step word problem she said:

It’s not a competition, it is about learning from one another. It is ok to talk to anyone near you about your strategy. It is ok to show your boards to each other. We will see which team will help each other the best. You don’t have to solve it the same way, you just have to make sure your friends have all gotten it solved.

In the final section about Delilah’s professional identity, I will share how she structured her classroom environment.

### ***Forming a Classroom Environment***

Delilah’s classroom environment felt nurturing and safe. She treated each student as an individual, kept things positive, and provided students with the autonomy to be active members in the classroom community. She treated students as individuals by demonstrating awareness

about their unique abilities, backgrounds, challenges, personalities, and problem-solving patterns. She also focused on supporting students who needed individual support by checking in with them during independent practice, translating to L1, or using other methods to ensure comprehension and task readiness. For example, several students had trouble with technology, so Delilah always made sure to be patient and offer support. In addition, Delilah ensured that her classroom felt safe and positive. She provided ample wait-time during whole group discussions or as students got ready to prepare for activities. Students were expected to treat one another with kindness and Delilah taught respect and positive responses between the students. For example, she said, “Thank you for doing such a great job. Give your partner a thumbs up if they did a great job.”

Finally, Delilah incorporated student autonomy into her classroom environment. She did so by creating opportunities for students to have rotating leadership positions, such as leading the class in reading vocabulary. In addition, she positioned students to evaluate one another’s answers, for example, if a student answered a question, she typically asked the rest of the class to give thumbs up or down to indicate if they agreed or disagreed with the student. Finally, she encouraged students to take responsibility for their learning by helping them set goals and finding ways to reach them. After a successful computation practice, she said, “Good! We are getting better at this. How can we get even better?” In the next section, I explain some of the key personal, professional, and political impact factors on Delilah’s professional identity.

### **Key Influences on Delilah’s Professional Identity Formation**

Key influences on Delilah’s professional identity development will be considered in the personal, professional, and political realms. Relevant personal factors included her personal learning history and interests. At the professional level, she was impacted by her career history,

school features, professional associations, and opportunities for professional learning. Finally, Delilah was impacted by the political features of high-stakes testing, the standardization of instructional goals and practices, and oversight from external officials.

### ***Personal***

Personal impact factors which served as affordances for Delilah's professional identity development included her personal learning history and interests. Her learning history with mathematics functioned as an affordance towards the creation of a safe learning environment for her students. During her first interview, she recounted:

Well, to be honest, I was always horrible at math. I hope that the one benefit that benefits the kids is that I really try to break it down for them. Whereas, like, my dad used to help me with my homework and because he's a genius he had so much trouble helping me because he couldn't break it down for me. Right, um, so I hope that I make it approachable because I don't see it as something that comes easily to everybody.

In addition, her personal interest for culture served as an affordance for Delilah's work with NARI youth. During high school, she developed her personal passion for language and culture. She took Spanish and had the opportunity to travel to Spain on a study abroad trip. Delilah shared her memories of the experience:

And you know we didn't have Internet back then, and I would go to Boston to buy magazines in Spanish, so I could practice and I listened to, like, a really crackly radio station and I don't think it was even Spanish it was so crackly that it was Portuguese. I really couldn't tell. When I would listen to it just to try and learn, you know I just did whatever I could. I was obsessed with Spain, but I was interested in, you know, any other culture.

The main constraint came from Delilah's poor experiences as a mathematics learner. Although this also had positive outcomes, she displayed a lack of confidence in her content knowledge. When asked to take the Praxis to qualify her as a mathematics teacher, she put off taking the test for quite some time. Delilah shared about practicing for the Mathematics Praxis test and said, "I would read the problem, and I would start doing it, and then I would realize, oh no, I didn't read it carefully. Yeah, I have all kinds of emotions now because it's not easy for me." In the next section, we will explore professional influences on Delilah's professional identity.

### ***Professional***

Professional impact factors came as affordances in the form of Delilah's career history, school features, and professional associations with our research study. Her career history consisted of 20 years working with English learners. She utilized that experience to pay special attention to the linguistic demands involved in her students' mathematics learning. In reflection of teaching mathematics to NARI youth she said, "Adapting the language stuff to math wasn't as hard for me as just learning the math." Moreover, Delilah has now had a few years of experience teaching mathematics to NARI youth which has afforded her some great learning opportunities in regards to teaching the content. She mentioned feeling more confident and said:

Yeah, and then I just fell into math and now I kind of like it. I mean, partly I like it just because learning math for me has been a big thing, and now that I have all this knowledge in my head, I want to use it.

In addition to her career history, Delilah found the features of the AHA school to be a tremendous advantage to her position. She loved that the school shared her values and goals concerning NARI students' needs, stating, "I was aware of the different things that AHA did ...

you knew that they weren't just focused on EOGs." She also felt like the administrators at her school shielded her from external oversight and pressure. She talked about the administrators pushing back against testing pressures and encouraging teachers to develop alternative assessments to evidence student learning. For example, her assistant principal supported her consistently with changing the curriculum to integrate missing content knowledge. A final professional affordance for Delilah was her participation in the research study. The weekly discussions really helped her reflect on her practice. She jokingly said, "Well it's given me more time to be reflective or let's say it's forced me to be more reflective."

Constraints in the professional realm included opportunities for professional development as well as certain school features. Delilah shared that she wanted to keep learning about mathematics instruction but all professional development focused on the EUREKA curriculum:

Once the county officially adopted Eureka, everything was focused around Eureka.

Before we started Eureka, they would have general PD ... Maybe they would do something about fractions or they would just pick some best practices to talk about. But yeah, now it's all Eureka.

She also mentioned that there did not seem to be clear support in regards to implementing both the 3Ls and EUREKA curricula together, stating there was not enough time to teach both and that no one had taught her how to effectively combine the two models.

In terms of constraints at the school level, Delilah was challenged by the ever-changing needs of her students. She shared, "What worked for the whole class last week might be very different the next week because a new student joined who may need a more differentiated approach." For example, she received four new students at the beginning of May. This changed her entire instructional approach since before her class was sort of on the same level but now she

felt like she should only do small group instruction. In general, she mentioned that her students had a lot of additional learning needs which were taken for granted such as technological literacy. In the next section, we will explore impact factors on Delilah's professional identity at the political level.

### ***Political***

Political impact factors offered mostly constraints to Delilah. Specifically, she struggled with issues regarding high-stakes testing, the standardization of instructional goals and practices, and oversight from external officials. Constraints regarding high-stakes testing were exemplified by the EOG. Delilah shared that she was confused regarding the goals for testing. On one hand, she mentioned that the school attempted to mitigate the stress teachers feel about the EOG yet county officials put pressure on her to prepare students for the test. She shared:

The last time that the EUREKA coach came she asked me kind of at the end of our meeting how I felt about EOGs coming up and I kind of told her like that's the least of my concerns which, of course, she didn't want to hear. Well, she met with us again this week and the whole 45 Minutes that she was with me she was working on word problems, so that we'd be ready for EOGs.

As the EOG drew closer, Delilah began to question her position, feeling like maybe she should have prepared her students more. In addition, she shared how painful the EOG was for her students. It lasted 4 hours and she said her students all felt really stressed about their performance.

In addition, Delilah felt constrained by the standardization of her instructional goals and practices from the school system. She said that there was a lack of awareness of students' learning needs and backgrounds. Delilah was frustrated that the county expected her to follow

their pacing guide without any awareness regarding her student population. She criticized that the mandated curriculum did not account for students' language learning needs or gaps in content knowledge. Therefore, Delilah always had to look for a lot of additional resources and make large-scale changes to the curriculum.

Despite her efforts to make appropriate adaptations for her students, Delilah experienced constraints from the oversight of county officials. She shared that she was held responsible to the county by having to submit her assessments after each unit, stating, "So we had to turn in a copy of the assessment, so that if anyone wanted to go back and look they could look at it." In addition, visits from the county's mathematics coach resulted in Delilah being criticized for adding in language instruction and not following the script. In regards to an upcoming observation from the mathematics coach Delilah told me:

But I will say that on Monday, I have to do the EUREKA lesson to the T because Miss H. has to videotape me again for the EUREKA person to watch. She wants to see my video again, which means she really didn't like the last.

In the next section, I will explain how Delilah crafts her job.

### **How Delilah Crafts her Job**

Delilah was highly engaged in job crafting to better support NARI youth at the intersection of mathematics and language learning. Out of the three teachers, she made the most changes to existent task boundaries by either teaching her own content or adapting provided materials from the curriculum. When teaching content from the curriculum, she mostly focused on the big ideas and came up with her own lessons and materials in order to build on students' academic, cultural, and linguistic backgrounds. For example, she discovered that many of her students were not able to fluently add or subtract so she created her own pre-assessment and then



taught place-value, addition, and subtraction. As a part of this “off-script” curriculum, Delilah taught addition and subtraction in the context of word problems. Students selected word problems to be written about travel and had an opportunity to share experiences of their own travels with the class. She began the lesson with the following word problem:

Ahmed wants to climb the Eiffel Tower because he wants to have a great view of Paris. The cost of one ticket is \$42. If Ahmed brings Babak with him, how much money does Ahmed spend on the two tickets?

Prior to presenting the word problem, Delilah introduced key vocabulary, including context related terms and had students practice discussing and acting the vocabulary out with a partner. Next, students took turns reading the word problem with support. Delilah further increased comprehension through utilizing physical gestures, visuals, and students’ home language. Students were then asked to formulate the question of the word problem in their own words before continuing to solve the problem with a strategy of their choosing. Subsequently, students discussed their solution strategies with the support of sentence frames, as Delilah revoiced their contributions to support collaborative comprehension and discussion. She utilized a focusing pattern for questions to prompt students to share their thinking with the class and utilized students’ contributions to represent the mathematical concepts using models, equations, and verbal contributions (NCTM, 2014). Table 4.1 demonstrates a snap-shot regarding how Delilah’s efforts for job crafting in this lesson supported students’ cultural, linguistic, and academic learning needs.

**Table 4.1. A Job Crafting Example**

<b>NARI Youth (Aguirre &amp; Zavalla, 2013; Bajaj et al., 2017; Amthor &amp; Roxas, 2016)</b>	<b>Language (Lucas &amp; Villegas, 2008; TESOL International Association, 2019)</b>	<b>Mathematics (NCTM, 2014; NRC, 2001)</b>
Funds of Knowledge/ Fostering Transnational Identities <ul style="list-style-type: none"> <li>• Students share background experiences of their travels</li> <li>• Writes word problems about travel</li> <li>• Checks students' background knowledge regarding contextual information in the word problems</li> </ul>	Comprehensible Input <ul style="list-style-type: none"> <li>• Pre-teaching vocabulary</li> <li>• Use of visuals and TPR</li> <li>• Comprehensible mathematics content</li> </ul> Social Interaction <ul style="list-style-type: none"> <li>• Students act out and discuss vocabulary with a partner</li> <li>• Students take turns reading the word problem for one another</li> <li>• Prompts student to dis-/agree with one another</li> </ul>	Goals support conceptual understanding <ul style="list-style-type: none"> <li>• Instruction based off students' prior content knowledge</li> </ul> Strategic Competence <ul style="list-style-type: none"> <li>• Students summarize question</li> <li>• Comprehension of word problem</li> <li>• Students can use an equation or draw a model to express the mathematics</li> </ul>
Reaching beyond traditional indicators of success <ul style="list-style-type: none"> <li>• Instruction based of alternative assessment</li> </ul>	Affective Filter <ul style="list-style-type: none"> <li>• Slow speech and pacing</li> <li>• Supportive classroom environment</li> </ul> Scaffolding Language Demands <ul style="list-style-type: none"> <li>• Students take turns reading the word problem with support</li> <li>• Use of L1</li> <li>• Individual student support</li> <li>• Sentence frames to scaffold answers</li> </ul>	Purposeful Questions to explore student thinking: <ul style="list-style-type: none"> <li>• Focusing pattern to explore students' solution strategies</li> </ul> Mathematical Representations <ul style="list-style-type: none"> <li>• Use of models, equations, and verbal expressions</li> </ul> Student Thinking: <ul style="list-style-type: none"> <li>• Students select solution strategies</li> </ul> Discussion <ul style="list-style-type: none"> <li>• Students are prompted to respond to one another's' solution strategies by drawing comparisons to their own</li> </ul>

Further, Delilah was the only teacher to job craft through making changes to relational boundaries. She selectively leveraged her relationships with administrators to better meet the needs of her students. Although she mentioned being someone who likes to follow the rules, she found some freedom in choosing whose rules to follow. For example, she saw eye-to-eye with the school administrators and pointed out that they really supported her in making instructional changes based on the students' needs. However, the county's mathematics coach did not seem to understand the needs of AHA students. Delilah accordingly utilized her rapport with school administration to push back on unfavorable regulations with county officials.

Finally, Delilah changed the cognitive boundaries of her position by redefining success for herself. She did not put much stock into standardized assessments or the assessments of the curriculum, stating:

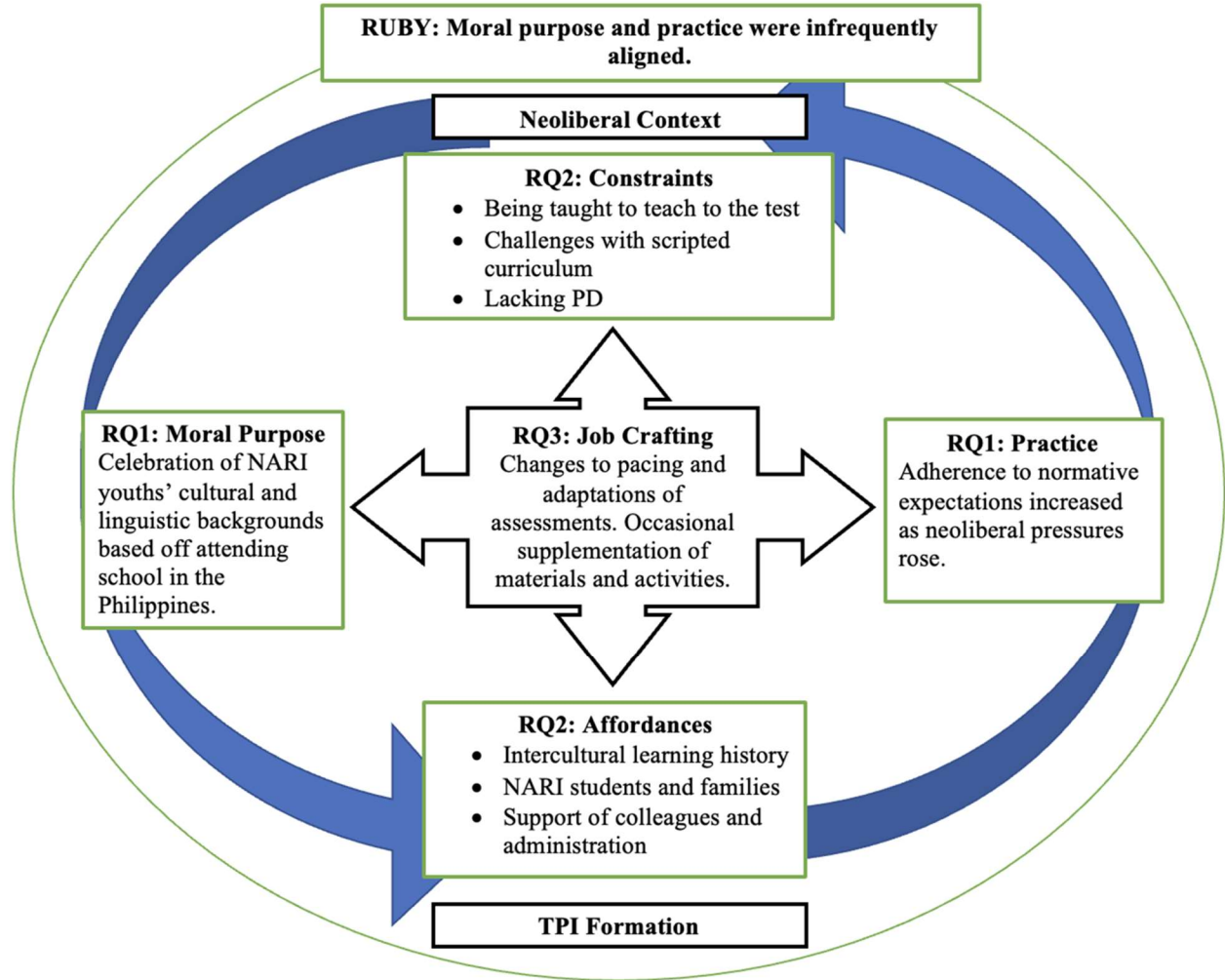
Right, because on the end of module tests, they might get everything wrong and then you feel like, well, they haven't learned anything but they have learned something. So, I feel like you need to have a way to show them, and yourself, and admin that they have learned something.

By creating her own assessments for both language and mathematics learning, she redefined success for herself. Delilah's definitions of success also included formative observations such as seeing her students using strategies, progressing on a daily basis, explaining their thinking, and showing growth on teacher-made assessments. She mentioned a highlight being, "And then, of course, when they can actually start explaining." In the final individual profile, we explore Ruby's professional identity, the major impact factors, and how she managed to job craft.

### **Ruby's Professional Identity**

Ruby is a young woman with a buoyant and friendly personality. Her students enjoyed her sense of humor which created a relaxed yet focused classroom atmosphere. She taught middle grades mathematics and was observed teaching sixth grade at the AHA school. Ruby was in her fourth year of teaching and it was her first-year teaching at AHA. Prior to teaching at AHA, she taught middle grades mathematics at a local charter school. In Figure 4.3, we can see a synopsis of Ruby's professional identity, the relevant constraints and affordances of her professional context, along with how Ruby job crafted in an attempt to strike a balance between NARI students' mathematics learning needs and the normative expectations of her job.

**Figure 4.3. Ruby’s Profile**



***Shaping Student Identities***

Ruby responded to her students’ identities by building on students’ linguistic, academic, and cultural knowledge and attending to issues of equity. She was frequently observed making connections to students’ background experiences, for example, she connected students’ experiences of traveling to the US by comparing the volume of a rectangular prism to what fits inside a suitcase. In addition, Ruby focused on building the background needed to understand scenarios posed in word problems. She said she frequently looks ahead in the lessons and makes changes according to both mathematical constructs and real-world scenarios. Ruby also built on

students' cultural and linguistic knowledge bases. For example, she created an end-of-year project that allowed students to plan trips to their home countries. In addition, she strongly supported the use of students' home languages in the classroom while also positioning herself as a language learner. She frequently asked students to teach her phrases in their language and talked about how she is still learning too. Kids were strategically grouped by languages and observed using a variety of linguistic repertoires to communicate. Ruby commented on her grouping strategy:

I did mix up the language groups as much as I could. I had the two Arabic speakers working with a Spanish speaker, and I had my one French speaker working with Spanish speakers. And then, I have a ton of Spanish speakers in that class too, so I mixed them up as best I could and let them work together ...

Finally, Ruby approached student identities with a focus on equity by keeping broader sociopolitical structures in mind. During her first interview she stated, "Americans are typically very bad about wanting everyone to conform to what they are. Everybody who comes here has to speak English." Ruby considered language as a point of access. She commented on how inequitable standardized tests are from a language perspective:

And to then be taking a whole test in a language that I'm not speaking and to, then, have somebody wanting me to think again in the language I don't speak, and do a whole lesson... I think that's just too much, you know.

As a part of this awareness, Ruby advocated for equitable learning experiences and expectations for NARI youth. She shared that she wants for their future teachers to be, "... understanding and to take the time and explain ... these kids are smart and they want to learn, don't let them fall to

the wayside.” In the next section, we will explore how Ruby’s nascent professional identity as a language teacher responded to students’ language learning needs.

### *Addressing Language Learning*

Ruby was relatively new to working with English learners in the mathematics classroom. However, her professional identity exemplified consistent attention to vocabulary as well as a range of scaffolding techniques. She was observed developing an inclination to pause and check for student comprehension of vocabulary. Ruby typically attended to vocabulary with the help of oral explanations while also integrating visuals and physical gestures or objects to make vocabulary comprehensible. During her interviews, she frequently mentioned that she was proud when kids demonstrated vocabulary mastery on assignments or assessments, sharing, “They weren’t just saying the easy words like flip and turn. They were using words like translate, and rotate, and reflection.”

In addition to focusing on vocabulary, Ruby developed a range of scaffolding strategies to support language learning. To aid linguistic input, such as reading and listening, Ruby frequently encouraged her students to utilize google translate or made attempts to translate into students’ native languages herself. She also utilized visuals, such as pictures or visual mathematical representations to support both context and concept development. In addition, Ruby built background knowledge and rephrased word problems to aid comprehension. When supporting students with language output, such as speaking and writing, Ruby utilized a great deal of wait time. In addition, she adjusted assessments to account for language by adding sentence frames. However, Ruby shared that it was difficult for her to find enough ways to support all students with speaking and writing about mathematics and said that she wanted to

provide more opportunities for practice the following year. In the subsequent section, I will share about how her professional identity approached mathematics teaching.

### *Approach to Mathematics Teaching*

Ruby's professional identity was marked by a conflict between following external expectations for mathematics instruction and doing what she thought was best for her students. On one hand, she struggled to move away from standardized assessments and teaching standards, working hard to meet expectations set forth by local and federal guidelines. Conversely, Ruby's approach to mathematics teaching was very student-centered, focusing on opportunities to build off student understanding and utilizing a range of mathematical representations.

Ruby made a continuous effort to differentiate and build mathematical concepts off of what students already knew. She asked open-ended questions to probe students' prior knowledge and then built off of their contributions. During interviews, she often talked about wanting students to construct their own mathematical understanding. For example, she shared that she wanted students to, "work through a few different things to where they come up with their own understanding of the Pythagorean theorem." Ruby also differentiated for students by making connections between the curriculum and students' prior content knowledge. For example, when learning about how to find volume with fractional side lengths, she first introduced the basic concepts of area, perimeter, and volume. She also offered individualized scaffolds such as calculators or multiplication charts in addition to utilizing a tutor for individual support. Ruby also exemplified a focus on multiple representations of mathematical concepts. During interviews, she reflected on how important it was to make math accessible through various perspectives such as drawing connections to real world scenarios. For example, she organized a class "shopping spree" to introduce decimals with money. Ruby also frequently utilized real

world objects. For example, she cut balls in half to show students how to mark the radius with a toothpick. Finally, she continuously utilized visual representations such as virtual representations of fractions.

Simultaneously, Ruby was also committed to following the prescribed curriculum. Although she realized that standardized expectations were not necessarily appropriate for her students, she worried about getting in trouble if she did not stick to the script. Initially, Ruby was more frequently observed adapting her lessons to build off students' thinking, however, she engaged in more teacher-directed instruction as the EOG approached. During the later portion of data collection, a typical lesson was representative of teacher modeling, independent student practice, and review of the answers. In the next section, I will explain how Ruby formed her classroom environment.

### ***Forming a Classroom Environment***

Ruby's classroom environment was marked by a growth mindset, humor, and relationships. She was always very focused on making sure that students felt comfortable being vulnerable enough to make mistakes and ask questions. During interviews, she shared that this was the result of her personal frustrations learning math, stating she wanted to create a "safe zone" where kids felt comfortable making mistakes and learning from them. Ruby encouraged students to discuss and reflect on their learning processes by telling them, "Some people didn't understand but that is ok. Looks like we have some people that understand them all and we have some people that only understand a couple and that's ok." Her focus was not on students getting the correct answer but rather on doing their personal best, which extended to the EOG when she commented:



I just want to make sure that they understand that it is a test, it is a big deal and at other schools it's going to be a big deal to everybody. But the only thing that you can have control over is doing your best, and so do your best and the rest will work itself out.

In addition to embodying a growth mindset, Ruby's classroom environment was marked by humor. She would jokingly sing songs and substitute in new words, such as, "I got the power! I can make you do any lesson I want." However, she also utilized humor for classroom management. For example, she shared how two girls were making hand motions across the room to each other instead of paying attention. In turn, Ruby started making hand motions too and proceeded to do the chicken dance. The whole class started laughing and the girls got back on track.

In addition, Ruby focused on forming relationships between herself and the students. She made sure to be available to her students outside of school. For example, she gave students her personal phone number and shared how some of her students called her while feeling stressed about the EOG and she was able to calm them down. Ruby also talked about how building relationships and making herself available to the students really helped during distance learning when she told students, "I'll help you out. You can message me on Canvas, you can text me, call me, video call me ...". In addition, Ruby built relationships by taking time for personal topics even when she felt pressured to get through the curriculum. In one event, the students asked her if she was going to play soccer during field day. As a response, she delved into a discussion about different sports the students enjoyed and shared her personal favorites. In the next section, I will explain the key personal, professional, and political influences on Ruby's professional identity.

## **Key Influences on Ruby's Professional Identity Formation**

### ***Personal***

Personal impact factors which served as affordances for Ruby included her personal learning history and interests. During interviews, Ruby shared that she spent a lot of time comparing herself to her twin sister who always got the answer faster in mathematics courses. She said she spent a lot of time, “feeling like an idiot.” However, this experience encouraged her to create a “safe zone” for students to learn mathematics without judgment. In addition, Ruby spent two years attending an international school in the Philippines. This provided impactful experiences such as being a language minority and allowing her to form lasting relationships with peers from various backgrounds. She said, “You know my whole life has been a mesh of cultures and people, so that’s something that’s always been near and dear to my heart.” In a later discussion, Ruby likened the AHA School to “coming home.”

The only personal feature which served as a constraint to Ruby was her tendency to worry about getting in trouble for not following the rules set forth by standardized instructional goals and practices. She shared how this created a conflict between what she felt was best for her students and what the county was asking her to teach. She worried a lot about getting in trouble about adjusting the script for her students, stating:

So as a teacher, as a person, my personality is I like to make sure that what I’m doing is accurate. And if I was coming up with my own things I feel like I would constantly be going to somebody else asking if this is right, is this good, is this okay?

In the subsequent section, we will explore impact factors from Ruby’s professional realm.

## *Professional*

Affordances in the realm of professional influences included Ruby's career history, school features, and professional association with my study. Prior to her current position, she taught middle school math at a local charter school which provided her with experience for working with the prescribed mathematics curriculum. In addition, her current school features provided supportive working relationships. For example, she reported that her curriculum facilitator (CF) was very supportive and she really appreciated her colleagues. She stated:

I love my coworkers, we work really well together, we're a great team. We all have different strengths and weaknesses. I bring, like, kind of the wild fun to the party or whatever, but they bring some of the wisdom of the years of teaching, and I can learn from them. I can use them as a sounding board for different things, and we all help each other out.

In addition, Ruby considered students and families to be a tremendous asset to the school. She said, "My worst days at AHA are better than my best days at my previous job..." Finally, she felt like participating in the study also served as a professional affordance because it gave her new ways of thinking about her teaching. She shared, "I've rethought how I've done something or I've implemented an idea that was thought up or mentioned in one of our conversations."

Professional constraints for Ruby included a lack of professional learning opportunities, her career history, and certain features of her school. Similarly to the other teachers, she noticed a lack of appropriate professional development available for helping her navigate the intersection of mathematics and language learning. Ruby said there was no guidance on how to apply the 3Ls lesson framework to the mathematics classroom. In reflection of the challenges of integrating language learning for NARI students, she stated, "I thought I knew what teaching ELs was like

... but I didn't." In addition, Ruby's career history provided constraints through testing pressure and the reinforcement of standardization of instructional goals and practices. She shared that her previous school put a lot of pressure on the EOG exam and used it as a singular definition of teachers' success. Finally, certain school features acted as challenges for Ruby. For example, she reported having some difficulty adjusting to students with interrupted educational backgrounds while dealing with the county's pacing pressures. She shared that many of her students had no knowledge of basic computation facts and were not prepared to work with technology. Despite these constraints, she was required to keep on pace with the 6th grade curriculum prescribed by the county. She stated:

Really it would be nice if we were given the resources and they said, "I want you to use this curriculum but you're free to change it to how you need to be able to reach all your kids, and hey here's 17 more teachers to help out. We can make the class sizes smaller and allow some more small group interaction." But we all know that's not going to happen.

In the next section, I will detail related political impact factors for Ruby's professional identity.

### ***Political***

Constraints were presented in the form of high stakes testing, standardization of instructional goals and practices, and oversight. Ruby felt very anxious about the EOG test. She said, "When it comes to content being tested and such a high level of accountability, I want to make sure that I'm teaching what they're supposed to know." Ruby felt pressured to cover all content prior to the exam and shared that she was constantly struggling to meet the needs of her students and while dealing with pressures of the curriculum:

The standardized curriculum expects too much. I think there's always going to be a conflict between pacing and language, just because you're essentially teaching two things in one lesson. In a perfect world that would double the amount of time you have on it, but you're having to try and scrape, and squeeze, and push together to have them both there together, so there's definitely going to be some time issues.

Standardization pressures were exacerbated by county-based oversight. Ruby mentioned that the mathematics coach lacked experience helping NARI students and held her to the same standards as other teachers across the county. She worried that making the types of changes she deemed necessary for her students would ultimately get her in trouble with the coach:

I think I could get in trouble if they find out. I think they don't understand it's imperative that I do change this for my kids. But I also can get in trouble. Then I'm going to stick with the curriculum more because, outside of my school, the support and understanding of how I have to teach to help these kids isn't necessarily there.

In the final section of Ruby's profile, we will explore how she was able to craft her job beyond normative expectations.

### **How Ruby Crafts her Job**

Ruby showed motivation to craft her job beyond external normative expectations. However, the political constraints of accountability and oversight caused Ruby to constantly fear that she may get in trouble for doing so. Some of the ways in which she was successful at altering the task boundaries of her job included making adaptations to pacing, assessments, and materials. Ruby shared that she was able to adapt the curriculum to her students' needs by skipping certain lessons, making changes to prescribed activities, or combining lessons to focus on essential information. She also made adaptations to the assessments provided by the

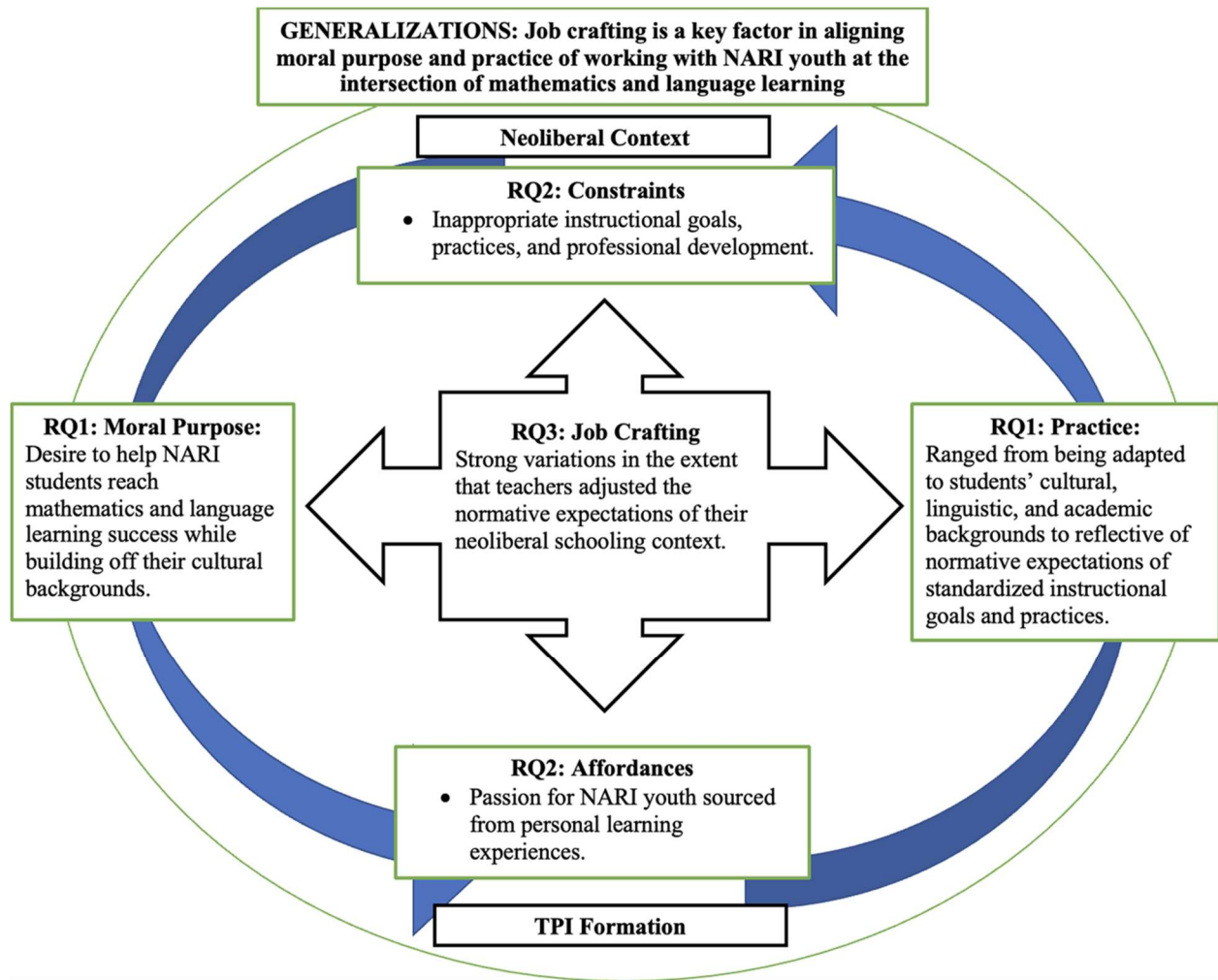
curriculum. For example, she added hints, changed point values, simplified questions, or added a few questions on vocabulary to reflect students' language learning. In addition, Ruby shared that she often added to the county's curriculum by highlighting vocabulary or accounting for missing content knowledge. For example, she taught kids fraction basics or created games to account for computation skills.

Ruby also pushed on the cognitive boundaries of her job. She drew on conversations with co-workers or administrators to make a shift in the importance she placed on the EOG exam. Initially, coming from a test-driven schooling environment, Ruby defined her success as a teacher through her ability to prepare students for the EOG. However, in her final interview, Ruby criticized the EOG for relying too much on language and exemplified success as students who are usually quiet participating in class or seeing her students applying academic vocabulary. In the next portion, I will relay results from the cross-case analysis between teachers.

### **Patterns Between Teachers**

In the following sections, I will highlight patterns across the three teachers relative to each of the three research questions. First, I will detail themes related to the nature of the teachers' professional identities. Next, I will explain key influences relevant across teachers' professional identity formation. Finally, I will compare ways in which teachers crafted their jobs to better meet the needs of NARI youth at the intersection of mathematics and language learning. Key findings are outlined in Figure 4.4.

**Figure 4.4. Patterns Between Teachers**



**Similarities and Differences Between Teachers' Professional Identities**

Themes across teachers' professional identities will be discussed following the categories of how teachers shaped student identities, addressed language learning, approached mathematics instruction, and formed their classroom environments. The most nuanced patterns of teachers' approach to student identities emerged regarding their attention to sociopolitical features and the ways in which teachers prepared students for the US school system. All three teachers brought a sociopolitical stance to their work by connecting student identities with an awareness of language policies, prejudice against immigrants, and unjust testing requirements. Penelope was

at the forefront of this, driven by the desire to empower her students via academic success. She sympathized with the difficulties immigrant families experienced based on language barriers. Similarly, Ruby critiqued equity issues regarding the expectation for students to complete standardized assessments in a language they are still learning. Finally, Delilah expressed criticism about how many teachers in the US expect English learners to conform without any sensitivity towards their unique circumstances.

Despite these similarities, there were marked differences in the ways the three teachers prepared students for the US school system. Delilah critiqued conformist expectations placed on NARI youth and adapted her practice to sustain students' linguistic, academic, and cultural backgrounds. While Penelope recognized some of the same issues, she focused more on the assimilation of expected norms and practices in order to ensure that students reached success via the academic expectations of the US school system. Ruby, who initially reflected some of Delilah's approaches, utilized fewer opportunities to make adaptations based on students' backgrounds as the EOG drew near.

In addition, marked differences appeared between how teachers addressed language learning in the mathematics classroom. While all three teachers commented on the importance of language instruction, Delilah was the only one to make changes to the curriculum to consistently integrate purposeful language learning. She adapted each lesson to include vocabulary practice. In addition, she supported students' listening skills through repetition, slow speech, and the revoicing of peer contributions. Delilah also supported the comprehension of word problems by having students act them out or drawing pictures to summarize the scenarios. When students worked independently on online assignments, Delilah prerecorded a read-aloud of instructions



and activities. Finally, she scaffolded student language output through sentence frames and supporting student-to-student conversations during small-group and partner activities.

Some of the main differences among how teachers approached their mathematics instruction emerged in the areas of teachers adhering to the prescribed curriculum and their definitions for student success. Both Penelope and Ruby expressed concern with meeting the expectations of standardized instructional goals and methods for mathematics instruction. Stress regarding pacing requirements ultimately resulted in teacher-directed instruction and adherence to the scripted curriculum for both teachers. Conversely, Delilah expressed feeling less pressure to meet external expectations. This seemed to support her ability to veer away from the curriculum by creating her own assessments, building instruction off students' backgrounds, and integrating student collaboration through interactive classroom discussions or small-group talks.

In addition, the teachers differed in their definition of success in mathematics. Delilah usually posed open-ended questions in order to observe student thinking. She also probed for multiple answers, veering away from isolating the correct answers and instead focusing on students sharing their solution strategies. Ruby engaged in similar activities by directing students to evaluate one another's answers and then utilizing mistakes as learning opportunities. Conversely, mathematical success for Penelope meant getting the correct answer. Therefore, she focused the class on arriving at the desired answer through collective solution strategies as taught in the curriculum.

Finally, teachers' classroom environments differed in the ways that they structured student and teacher positions in the classroom. Penelope positioned herself as a motivational leader, keeping her students on their toes with rigorous expectations and a strong focus on academic success. She aimed to draw out excellence from each student by positioning them as

scholars. Conversely, Delilah positioned herself as a type of mother figure, making sure to attend to all her students' needs on an individual basis. She ensured that students created a supportive environment by prompting them to help or complement each other. Finally, Ruby positioned herself more as a friend and equal to her students. She focused on supporting vulnerability and a mutual understanding of one another's learning abilities and habits. In the next section, I will explore patterns regarding impact factors on teachers' professional identities.

### **Key Impact Factors on Teachers' Professional Identities**

Significant personal impact factors were contained in teachers' learning histories and included experiences of marginalization, mathematics learning, and intercultural opportunities. Penelope was the only teacher of color amongst the three teachers. During high-school and college, she excelled at mathematics but suffered from often being the only black woman in higher-level courses. She felt out-of-place and not welcomed by her white peers. She recalled going to class, just to "get the work done," not to socialize. In this manner, Penelope was robbed of the experience of seeing mathematics as a social endeavor. Instead of making herself vulnerable to racist interactions by attempting to socialize, she focused on her personal achievement. She was proud of her success in mathematics, and her academic achievement ultimately shaped her drive to be a role model for her students to follow in her footsteps. Unfortunately, academic success was defined by meeting external standards which were not normed for NARI youth and this ultimately left Penelope feeling stressed and frustrated.

Relatedly, personal success in their mathematics learning history was a second key factor for teachers. Drake et al. (2001) found that disappointing or negative experiences learning mathematics as students required teachers to have access to new and positive mathematics-related learning experiences in order to implement reform-oriented teaching practices.

Interestingly, Ruby and Delilah were able to build off their difficulties learning mathematics by embracing mistakes and encouraging a growth mindset amongst their students. However, in line with Drake et al.'s (2001) findings, both teachers lacked confidence in their content knowledge, which likely impacted their confidence in the implementation of new practices. Conversely, Penelope was very successful as a mathematics student which was evidenced by the content knowledge she integrated into her mathematical explanations. However, arguably success as a learner does not constitute a positive learning experience. For Penelope, experiences of marginalization in her mathematics courses narrowed her definition of success and ultimately undermined a growth-mindset.

An additional powerful influence included language and cultural learning opportunities in teachers' learning histories. All three teachers had experience learning another language and interacting with people from diverse cultural backgrounds. These learning experiences surfaced strongly in their work with NARI youth. For example, Ruby went to an international school where she learned along with other children from a wide range of cultural backgrounds. For her, AHA felt "like coming home." Delilah was also very passionate about learning Spanish in high school and had the chance to travel to Spain on a study-abroad trip. For her, working at AHA was a privilege which supported her passion for language and culture. Finally, Penelope experienced a mutual learning experience with a Spanish-speaker in college. Penelope applied her experiences of being in the language-minority to the empathy she held for NARI youth and their families.

Key impact factors at the professional level included teachers' career histories, professional learning, and school features. Teachers' professional career histories provided both experience and knowledge regarding the unique needs of NARI youth in the mathematics

classroom. In particular, the extent to which teachers had experience working with English language learners impacted how successful they were in terms of adjusting both content and language learning to their students. Thus, Delilah, who had over 20 years of experience working with this student population, was best able to prioritize her instruction to focus on cultural and linguistic learning opportunities.

Moreover, all three teachers felt constrained by the fact that they saw themselves as the sole experts at the intersection of mathematics and language learning. They complained that no professional learning sources provided the appropriate information on how to best combine language and mathematics instruction, stating that other “experts” in the county either did not understand the NARI aspect or the mathematics aspect. In addition, the professional development offered within their school typically only focused on language learning without attention to mathematics instruction. For example, the school asked teachers to merge the EUREKA curriculum with the 3Ls curriculum with no clear guidance on how to do so.

School features presented simultaneous constraints and affordances for all three teachers in the form of students and families. All three teachers specifically stated they would not want to teach anywhere else. Penelope shared how she felt like she could make the biggest impact at AHA, Delilah said she only wanted to teach at this school because of the unique population, and Ruby truly felt at home with the students and families. In addition, all three teachers shared an additional affordance of the school being that administration supported their choice to make adaptations to the curriculum and attempted to shield them from testing pressures. At the same time, all three teachers struggled with differentiating their instruction to support such a wide range of student learning profiles. New students enrolling every Tuesday posed the additional challenge of their classrooms staying in constant flux. In addition, their students all had varied

learning histories which frequently included interruptions to formal education. Teachers struggled with the task of teaching a standardized curriculum while adapting to such a wide range of academic backgrounds.

Common political impact factors included high-stakes testing, standardization of instructional goals and practices, and oversight. For all three teachers, high-stakes testing provided constraints. First off, teachers struggled with mixed messaging regarding the importance of the EOG. Although they asserted that the EOG was not an appropriate measure for their students, they became more concerned about it the closer the test drew. This was likely a result of teachers beginning to receive additional pacing pressures from both the school administration and county officials as the test approached. Finally, teachers struggled with self-doubt and feelings of failure after the EOG. For example, Penelope broke down in tears because she felt that she didn't prepare her students adequately and Delilah began to question herself, thinking she should have taken more time to prepare for the EOG. In addition, all teachers reported that their students struggled with confusion, anxiety, and feelings of failure. Delilah shared that the test taking experience was quite painful for her kids and Ruby mentioned how students got stressed prior because they did not understand the consequences of failing the test.

In addition, teachers felt constrained by the standardization of instructional goals and practice. Although all three teachers appreciated having some structure offered by the curriculum, they shared that the instructional goals and resources did not support the academic, cultural, and linguistic backgrounds of NARI youth. Teachers attributed this mismatch between external academic requirements and students' learning profiles to a lacking awareness of NARI youth in the school system. In other words, they felt that the county's expectations for

curriculum, pacing, and assessments did not take into account the realities at the intersection of mathematics and language learning.

Final constraints for all three teachers at the political level included the oversight they received from county officials. All teachers felt that there was no support from the county for veering off script or making adaptations to better meet the needs of NARI youth. Most likely, they conjectured, this was due to a lack of understanding on the officials' behalf concerning the needs of their students. Teachers felt pressured to submit unit assessments to the county, fearing that students' performance on standardized assessments would reflect poorly on their instructional practices. In addition, teachers received complaints from the county's math coaches if they were "off script" or behind on the pacing of the curriculum. In the final section, we explore ways in which teachers craft their jobs to go beyond normative expectations at the intersection of mathematics and language learning.

### **Opportunities for Job Crafting**

The following section will discuss patterns across teachers' abilities to job craft by making changes to the task, relational, and cognitive boundaries of their jobs. All three teachers showed awareness of needing to make changes to task boundaries in order to account for language learning, interruptions in formal education, and student backgrounds. However, the extent to which they adapted their practice to accommodate these three key areas varied. For example, while all teachers realized that the assessments provided by the curriculum did not accommodate language learning or interruptions in formal education, they did not all succeed in creating their own assessment. Ruby and Penelope attempted to utilize assessment provided by the curriculum by changing the order of the questions, adding hints, changing the point value of the questions, simplifying questions, or adding in questions to account for vocabulary.

Conversely, Delilah created her own assessments to better account for both language and content knowledge. Moreover, while Ruby and Penelope made small changes to task boundaries such as attending to vocabulary and providing language scaffolds for the curriculum, Delilah made more large-scale changes to her lesson format. For example, she began each lesson with dedicated vocabulary practice, carved out opportunities for students to practice speaking to one another throughout the lesson, or created all her instructional materials to offer language support through visuals, voice recordings, and connections to students' background knowledge.

The teachers also showed awareness to alter task boundaries in order to account for variations in students' learning histories. Penelope and Ruby utilized their tutors to teach basic skills and occasionally created short activities for the whole group to focus on missing content knowledge. For example, Ruby often took out time from prescribed tasks to play games which supported multiplication or division skills. They both also altered pacing in order to give students more time adjusting to the content which was often too advanced for their previous learning history. However, out of the three teachers, Delilah made the most explicit changes to support interruptions in formal education. For example, she left the third-grade teaching standards behind in order to teach basic addition and subtraction skills to her whole class.

Finally, while all teachers showed attention to student backgrounds, not all of them were successful in altering task boundaries to incorporate them. Penelope showed great awareness regarding the socio-politically influenced realities of her students, however, she had trouble making changes to the prescribed curriculum in order to reflect her students' identities. Before Ruby felt increased pacing pressures, Ruby catered to students' interests by playing games or linking students' prior experiences to classroom content. However, Delilah was the only one to consistently take time from the scripted lessons to play music videos which helped students

review basic facts. She also incorporated students' interests and experiences into the word problems she created as an alternative to the ones provided by the script.

The second form of job crafting, making alterations to the relational boundaries of one's profession, was only demonstrated by Delilah. All three teachers shared that the county's oversight regarding instructional goals and practices hampered their ability to make appropriate instructional decisions for their students. Simultaneously, they also all mentioned that the school administration supported their choice to make changes to the prescribed curriculum in order to meet their students' needs. Summarily, teachers were caught between conflicting messages from administrators and county officials. Delilah was the only one to actively leverage the shield provided by school administrators against the criticisms she received from the county. This was a strong factor in enabling her to adapt her instruction beyond the expectations of standardized instructional goals and practices. For example, she continued integrating language instruction even when the county's mathematics coach criticized her for being "off script" during an observation.

Finally, all three teachers engaged in job crafting in order to redefine how the cognitive boundaries of their jobs defined success. First, they attempted to alter cognitive boundaries regarding the EOG. However, although teachers knew it was an unfair verdict of their professional practice, they all struggled with completely disregarding the exam. For example, during her first interview Penelope jokingly threatened, "Let someone come to my face asking about the EOG." Yet this nonchalance dissipated as the external pressures rose. Ultimately, Penelope broke down, feeling like a failure because her students did not pass the EOG. Ruby started the year being very worried about it but conversations with her coworkers and administrators left her more relaxed. Nonetheless, she attended to pacing pressures put forth by



the county, and ultimately school administrators, to cover the curriculum prior to the exam.

Finally, Delilah was generally not worried about the EOG, but struggled once the EOG was over, blaming herself for not preparing students further.

Finally, and as a result of their struggles with standardized assessments, all three teachers searched for alternative measures of their success. Penelope said she felt successful when her students were actually providing answers during class. Ruby reported feeling proud when students learned new mathematical language, which she attempted to incorporate on the curricular assessments. Finally, Delilah defined success in a number of ways. She said that she looked for evidence of students applying strategies, making small progress from day to day, and explaining their thinking. She also designed her own assessments to show student progress to herself and her administrators. In the next chapter, I will provide discussion regarding the differences between teachers as well as their shared experiences of navigating the intersection of mathematics and language learning.

## CHAPTER V: DISCUSSION

### **Introduction**

In this study, I explored how three mathematics teachers of new-arrival refugee and immigrant (NARI) youth shaped their professional identities at the intersection of mathematics and language learning within a neoliberally influenced schooling context (Apple, 2004). Of particular interest were the personal, professional, and political impact factors informing teachers' professional identities and how those factors either constrained or supported teachers' abilities to align their moral purpose for teaching with their practice (Mockler, 2011). As evidence, I looked for ways in which teachers job crafted in order to make changes to the neoliberal expectations of their jobs in order to better support NARI students in the dual efforts of mathematics and language learning (Haneda & Sherman, 2016; Wrzesniewski & Dutton, 2001).

Through individual- and cross- case analysis of in-depth interviews, weekly teaching reflections, and lesson observations, I was able to construct a nuanced understanding of the unique process of professional identity construction for mathematics teachers of NARI youth. Individual differences in teachers' professional identities were observed in how they crafted their jobs and the cultural resources they were impacted by (Holland et al., 1998). In addition, my findings point to a number of common impact factors experienced by all three teachers. Both individual differences and generalities offer valuable insights for policy, practice, and future research. In the following sections, I will expand on implications regarding nuanced differences between teachers as well as their shared experiences of navigating the intersection of mathematics and language learning.

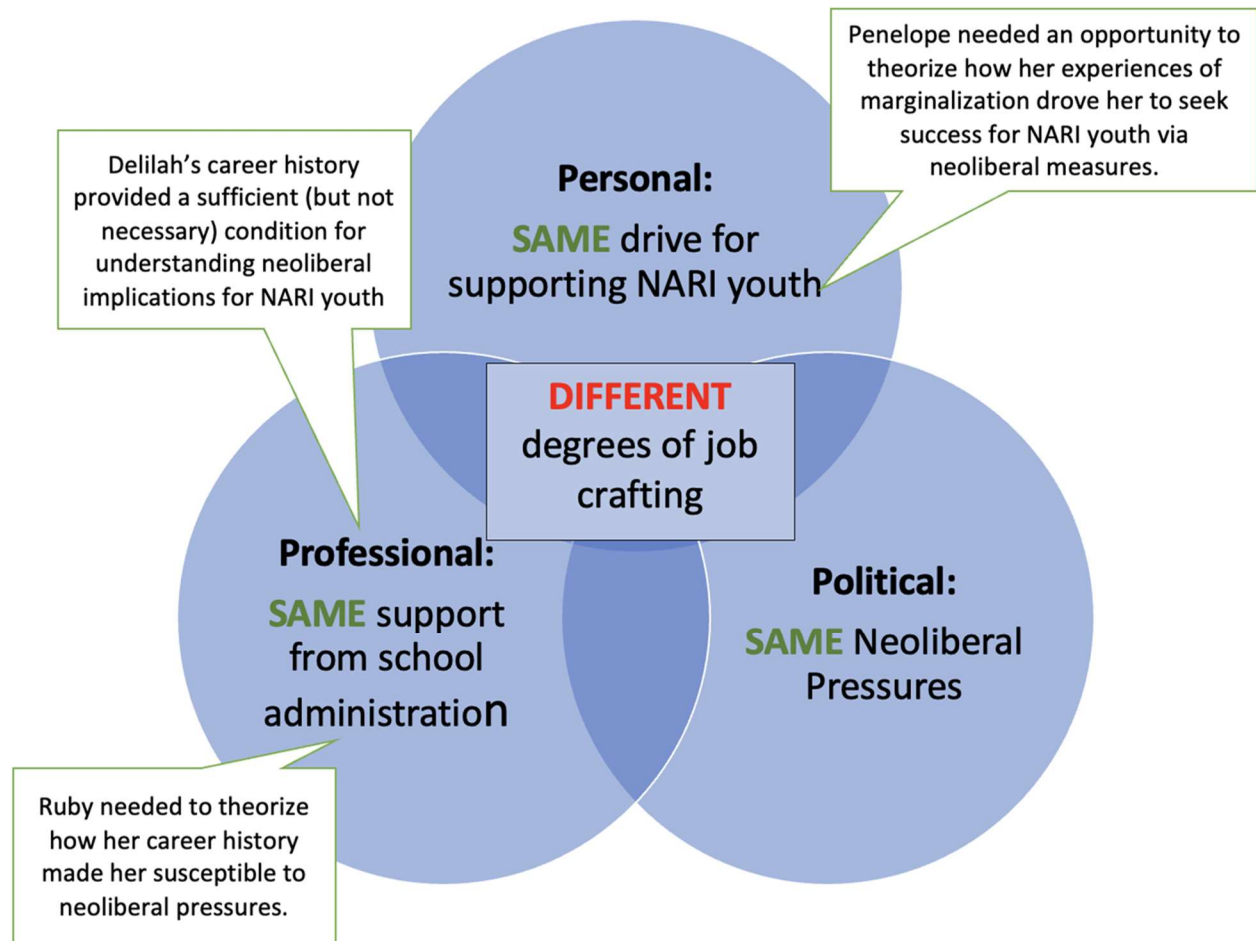
## Individual Differences

In the following sections, I will detail the key implications of individual differences amongst teachers. As seen in Figure 5.1, all three teachers were exposed to the same political impact factors stemming from the neoliberal context of the school system. These included the standardization of instructional goals and practices, oversight from county officials, and high-stakes testing pressures. In addition, all three teachers indicated a moral purpose for making adaptations to such political influences in order to account for NARI youths' cultural, linguistic, and academic backgrounds which were generally supported by the school administration. Summarily, while teachers had the same drive to support NARI youth, received the same support from school administration, and were under the same neoliberal pressures, they engaged in different levels of job crafting.

Research has declared that neoliberal expectations can be problematic for teachers' professional identities as they may lead to an incongruity between a teacher's practice and their personal educational goals, or their moral purpose for teaching (Ball, 2003; Mockler, 2011). Thus, in order to align their practice with their moral purpose for teaching, teachers may be required to job craft by making specific choices for changing the task, relational, and cognitive boundaries of their prescribed teaching roles (Haneda & Sherman, 2016; Wrzesniewski & Dutton, 2001). In this study, teachers' abilities to job craft ultimately related to their ability to adjust neoliberal schooling contexts to build off the cultural, linguistic, and academic backgrounds of NARI youth. Notably, individual differences in teachers' abilities to job craft, and resist unfavorable political impact factors, were mediated by personal and professional factors (Mockler, 2011). For example, Delilah's extensive career history provided the sufficient condition to help her understand the problem which neoliberal expectations posed for NARI

youth. However, while career history was sufficient, it is not necessary to provide an opportunity for this theorization. Thus, Penelope and Ruby needed access to opportunities to theorize neoliberalism and how their personal or professional experiences impacted their ability to job craft. In the following sections, I discuss individual differences in job crafting and the related personal and professional factors along with relevant implications.

**Figure 5.1. Individual Differences in Job Crafting**



**Task Boundaries**

Teachers showed attention to altering task boundaries by making changes to curricular materials to account for language learning, interruptions in formal education, and student backgrounds. However, as a result of personal and professional impact factors, the three teachers

showed variations to the extent they were able to adapt assessments and materials accordingly. Ultimately, the mediation between impact factors influenced the extent to which teachers were successful crafting their jobs within a neoliberally influenced context, thereby aligning their moral purpose with their teaching practice.

For Delilah, her personal learning history, personal interests, professional career history, and school features positively mediated political impact factors such as oversight, high-stakes testing, or the standardization of instructional goals and practices. Her personal mathematics learning history was marked by feelings of failure and lack of comprehension. According to Drake et al. (2001) disappointing or negative experiences in learning mathematics prevent teachers from implementing reform-oriented teaching practices. However, Delilah's mathematics learning history encouraged her to make "math approachable," by teaching content that was in line with students' learning histories. Accordingly, she made large-scale changes to the existing curriculum in order to account for gaps in content knowledge. Simultaneously, her passion for language and culture underscored her efforts to teach outside the mandated curriculum by integrating language learning and building off students' personal and cultural backgrounds. She was able to do so successfully, in part, due to the support of her school administration, who encouraged her to make adaptations to the tasks set forth by the county curriculum. Moreover, although Delilah lamented the absence of appropriate professional learning opportunities, her career history provided a lot of background to knowledgeably intersect mathematics and language learning. The combination of these affordances impacted how Delilah was able to respond to negative political pressures of her neoliberally influenced context. She made changes to standardized instructional goals and curricula, did not worry about high-stakes testing, and ignored oversight from county officials by seeking shelter with her school administration.

Penelope also showed a moral purpose for adapting instruction to build off students' cultural and linguistic repertoires in addition to their learning histories. However, beyond altering the pacing of the curriculum and making some changes to the assessments, she was ultimately unable to make substantial changes to the task boundaries of her job. Constraining factors included her personal learning history and the absence of professional learning opportunities. It appeared that Penelope's ability to change the task boundaries of her job were strongly influenced by her personal learning history. Her mathematics learning history provided experiences of marginalization which made mathematics an isolating endeavor for Penelope who ultimately gained satisfaction through her high-achievement of external measures for success. Penelope wanted to enable the same success for her students. Thus, while Penelope's personal learning history ultimately created a drive for emancipating NARI youth via academic success, this success was defined through measures standardized for mainstream students which NARI youth had a difficult time with. She frequently blamed herself that students were failing standardized assessments or that she was not on pace with the rest of the county in teaching the scripted curriculum. In addition, Penelope said she lacked any professional learning opportunities to help her navigate these issues. In combination, these factors inhibited her ability to job craft by making changes to the task boundaries in place.

Finally, Ruby's ability to job craft via adaptations to task boundaries was in flux. Likely due to the fact that it was her first year at the AHA School, she seemed to be in transition when choosing which boundaries to alter and which to keep in place. While at times, she was able to move away from the scripted curriculum to account for gaps in content knowledge while building on students' cultural and linguistic backgrounds, she also became concerned with keeping on pace with the remainder of the county in order to cover the required curriculum prior

to the EOG. Ruby's personal learning history and school setting served as positive mediators while her career history and absence of professional learning opportunities undermined her ability to job craft to meet NARI students' needs. Ruby's desire to reinforce NARI youths' cultural and linguistic repertoires in the mathematics classroom was reinforced by her personal learning history of having attended school in the Philippines. This experience not only taught Ruby to love and appreciate cultural and linguistic diversity, but also enhanced her criticality in terms of marginalization of NARI youth. This awareness supported her drive to make appropriate adaptations to existent task boundaries. However, Ruby's career history undermined this effort since her previous school expected her to teach the scripted curriculum and prepare students for the EOG. In addition, she lacked the appropriate professional learning opportunities to teach her more about how to make adaptations to the curriculum to account for students' language and content learning needs. Positive mediation was supplied through the school setting which provided a new perspective towards high-stakes testing and pacing pressures. Summarily, while Ruby made some changes to the task boundaries of her job, she did so inconsistently and less frequently because she felt pressure to cover the content prior to the EOG. In the next section, I will elaborate on the ways in which teachers crafted their jobs to expand existent relational boundaries.

### **Relational Boundaries**

Wrzesniewski and Dutton (2001) outline the alteration of relational boundaries to consist of changes to the types of relational interactions employees choose as well as the selection of who they choose to interact with. In this case, the key to resisting neoliberal impact factors seemed for teachers to leverage the relationships they had with school administrators against relationships they had with county officials. The only teacher to job craft through the dismissal

of county officials' relationships was Delilah. In the following sections I will explore the personal and professional factors which were involved in job crafting through altering relational boundaries.

Delilah was the only teacher to actively leverage relationships against one another. She made an active choice to seek a shield behind her relationships with school administrators who supported her in making the types of instructional changes she thought were best for her students. As a result, she was able to dismiss unfavorable evaluations and oversight from the county's mathematics coaches. By choosing which leadership to follow, Delilah was able to make more radical changes to her instructional practice and, in turn, support her moral purpose for meeting the needs of NARI youth. She even went so far as to tell the mathematics coach that she simply did not care about the EOG. Impact factors which likely supported Delilah in pushing back against neoliberally influenced relationships included her personal interests, professional career history, and the professional school setting. The school setting provided administrative leadership which she utilized as a counterbalance to county officials' influence. Moreover, Delilah's personal passion for language and culture underscored her conviction to go against county mandates. Finally, her professional career history of working with English learners for 20 years gave her the skills and experience necessary for making the types of adaptations she thought supported students' cultural and linguistic backgrounds as well as their content learning needs.

Conversely, Ruby and Penelope did not show the same ability to defy neoliberal pressures by leveraging the leadership offered by the school against that from the county. They felt accountable to both sources of leadership, which ultimately undermined their ability to push back against neoliberal influences. For example, both teachers referenced feeling pressured to



keep accountability with the county's pacing guide and talked about how the county's mathematics coaches worked with them to cover the curriculum prior to the EOG. Impeding factors were likely a result of teachers' career histories. Both Ruby and Penelope were early in their careers and may have lacked the confidence to defy leadership from the county. In addition, Ruby spent the initial years of her career working in a charter school where she was taught to be accountable to county oversight, testing pressures, and standardization of instructional goals and practices. Furthermore, while Penelope had spent the entirety of her career at the AHA School, she was seeking academic success for her students. Without additional references for success provided by the school administration, she was bound to follow the county's guide. In the following section, I will discuss teachers' efforts to redefine the cognitive boundaries of their jobs.

### **Cognitive Boundaries**

Changes to cognitive boundaries can be made through alterations to one's beliefs in order to deal with difficulties provided by the job (Wrzesniewski & Dutton, 2001). Accordingly, it was imperative to all three teachers to redefine existing cognitive boundaries for success. Standardized assessments did not provide usable feedback regarding the success of their practice. Students typically did not pass the assessments provided by the curriculum or any of the high-stakes tests. As a result, teachers struggled with feelings of failure and attempted to find alternative ways to define the success of their students. The extent to which they were successful depended on key personal and professional impact factors.

Delilah was able to create the most expansive redefinition of her success as a result of her personal learning history, personal interests, and career history. As discussed previously, Delilah also made the most extensive changes to her teaching practice by altering task boundaries

according to language learning needs, adapting content to account for missing content knowledge, and building off of students' backgrounds. As a result, she was able to build her own formative and summative assessments which provided alternative measures for success. Delilah's success in redefining cognitive boundaries was likely related to her personal learning history which caused her to want to create "more approachable" mathematics learning experiences. As a result, she created diagnostic assessments to inform her instruction based on students' personal learning histories, rather than pushing them towards high-pressure learning targets. In addition, her personal passion for language and culture coupled with her career history of working with English learners for 20 years positively mediated her redefinition of existent neoliberal measures for success.

Conversely, Ruby and Penelope lacked such definitive measures as supported Delilah's understanding of success. While both teachers expressed frustrations with the current measures, noting that their students infrequently showed achievement, they were not as active in creating alternative measures for success. Ruby and Penelope made minor changes to the assessments provided by the county's curriculum but did not create separate assessments. Mediating factors for both teachers included their career histories. Neither Ruby nor Penelope had such extensive experience working with English learners as Delilah and likely lacked the professional background to entirely redefine existent cognitive boundaries for success. In addition, Ruby's career history was very specific in outlining success as defined by students passing high-stakes testing. Further, Penelope's personal learning history fueled her call to emancipate her students via academic achievement and the standards available through the county provided the only reference she could use. In the final section, I will discuss relevant implications of individual

differences between teachers before moving on to discuss generalizable findings and implications.

### **Implications**

Notably, personal and professional factors can mediate teachers' ability to job craft in order to contend with the influences of a neoliberal environment. While all three teachers were exposed to the same political factors, the extent to which they job crafted differed. In turn they had difficulty supporting their moral purpose of responding to NARI youths' cultural, linguistic, and academic backgrounds. My findings indicate that teacher professional identity (TPI) is not always directly formed as a result of personal, professional, and political impact factors, but rather also the indirect product of the mediation between factors. In her explanation of TPI, Mockler (2011) does indicate an overlap between impact factors but she does not discuss the extent to which factors mediate one another. My findings showcase that although the teachers were all exposed to the same political impact factors, personal and professional factors mediated the extent to which they responded to neoliberal influences. Ultimately, this influenced teachers' professional identities by impacting their abilities to align their moral purpose for teaching with their practice.

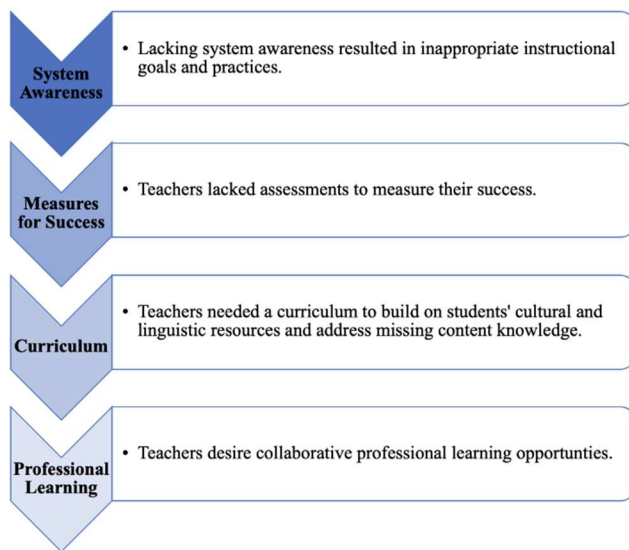
It would be useful to conduct analysis regarding how a self-study of teachers reflecting on the factors involved in the formation of their professional identities may impact their abilities to resist neoliberal pressures and support their efforts for job crafting. Through critical self-reflection, including an understanding of how other macro-level influences have impacted their own learning trajectories, teachers may better understand how their background experiences manifest in their practice. This suggestion is in line with Mockler's (2011) thoughts that "Teachers with a strong sense of their professional identity and the connection between their

purpose and their practice are more likely to be proactive in the enactment of their ‘moral purpose’ both within and beyond the school” (p. 525). Moreover, research underscores the importance of teachers developing the necessary political knowledge to untangle the effects of neoliberal pressures on their mathematics instruction, ultimately making them more capable at enacting equitable teaching practices (Gutiérrez 2013; Yeh, 2018). Thus, the theorization of teachers’ professional identity formation can support not only the alignment between their moral purpose and their teaching practice, but also the ability to enact their agency to counter neoliberal impacts on their professional lives. In the following section, I will detail how cross-case analysis revealed generalizable findings calling for implications at the intersection of mathematics and language learning.

### **Commonalities**

My findings revealed several key commonalities impacting teachers at the intersection of mathematics and language learning. As seen in Figure 5.2, findings showcased that all three teachers complained of lacking awareness regarding their professional responsibilities from system officials. In addition, the teachers struggled with an absence of appropriate and common assessments to measure their success. They also complained that the expected curriculum did not build on students’ cultural or linguistic resources and failed to address gaps in content knowledge. Finally, all three teachers hoped for a more appropriate and dedicated space for professional learning. In the following sections, I will discuss recommendations regarding the commonalities between teachers at the intersection of mathematics and language learning.

**Figure 5.2. Generalized Findings and Suggestions**



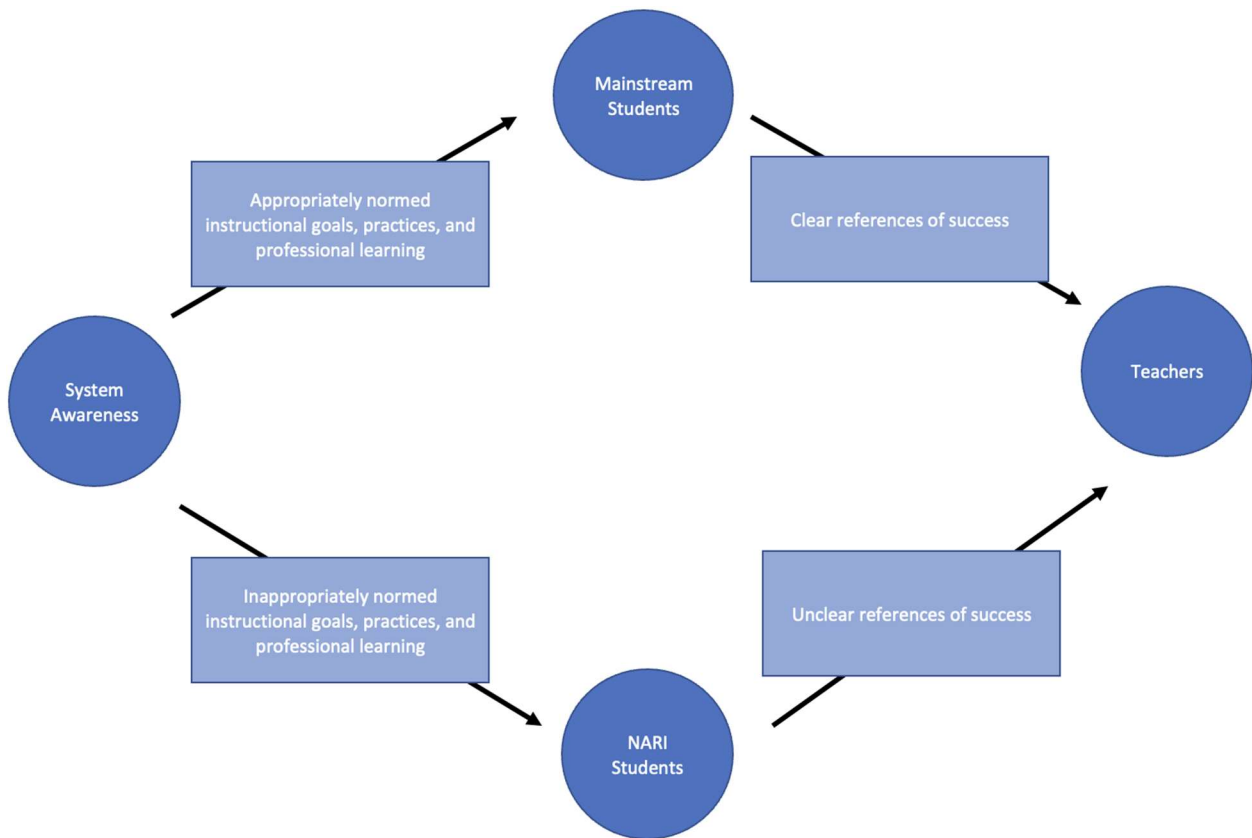
### **System Awareness**

Teachers felt as if system officials lacked appropriate awareness for the intersection of mathematics and language learning. For example, they struggled with being asked to stay on pace with the scripted curriculum that was normed for mainstream mathematics students. These expectations were enforced through oversight from county officials whom teachers believed to be unaware of the unique circumstances of their learning environments. Such pacing and accountability pressures ultimately interfered with two of the three teachers' abilities to job craft, leading them to adopt a teacher-directed instructional approach focused on the direct transference of the curriculum. Despite this change in instructional practice, teachers were unable to show student learning via standardized assessments. All three teachers regretted such accountability pressures and lamented that system officials applied minimal awareness of what the intersection of mathematics and language learning was like for the teachers and students.

As showcased in Figure 5.3, it was clear that the local school system selected curricula and professional development based on their awareness of student profiles in mainstream

classrooms. Simultaneously, the school system’s limited awareness of NARI students was reflected through their application of the same curricula and professional learning opportunities which were declared as inappropriate by teachers at the intersection of mathematics and language learning. As a result, teachers in this study frequently felt confused about their own success and the success of their students.

**Figure 5.3. Impacts of System Awareness**



In addition, all three teachers struggled with the accountability measures put in place by the school system to monitor teachers’ implementation of the required curriculum. Oversight from county officials was enforced via classroom observations, pacing requirements, and assessments. County officials urged teachers to prepare for the EOG despite the fact that the exam was not included in the accountability model for ELs in their first year in the US school

system (NCDPI, 2020). These types of pressures made it difficult for teachers to attend to the language and content learning needs of NARI youth as they struggled to keep on pace with the mainstream curricular requirements. Teachers attempted to keep pace by eliminating opportunities for language learning, differentiated content practice, or opportunities to build on students' cultural backgrounds. Nonetheless, teachers expressed that their students were unable to demonstrate growth on the assessments provided by the curriculum or the EOG.

Based on these issues, suggestions for policy include adjusting the expected mathematics curriculum in order to reflect the learning profiles of NARI youth. The school system should develop greater awareness regarding the realities faced by teachers at the intersection of mathematics and language learning. These include that students are arriving in classrooms on a weekly basis and frequently from a variety of difficult life trajectories. Students often have a variety of traumatic experiences as a result of fleeing from war-torn countries, poverty, or spending time in refugee camps. Therefore, NARI students tend to have interruptions in schooling leading to significant gaps in their content knowledge. Summarily, the school system should develop greater awareness of how curricular goals and resources available to mathematics teachers of NARI youth account for language learning, gaps in content knowledge, as well as the unique life trajectories of NARI youth. In the next section, I will discuss commonalities regarding teachers' struggle with existent measures for success.

### **Instructional Goals and Assessments**

As a result of lacking awareness at the system level, teachers were confronted with unclear measures for their success. All three teachers were initially told by their school administrators to “not worry” about the EOG or other standardized assessments, however, they received conflicting messages from both school administrators and county officials as the year

went on. Some of these messages came in the form of pacing pressures and guidelines regarding the curriculum prior to the EOG. Furthermore, teachers did not feel that the assessments provided by the scripted curriculum adequately measured student performance. At the mercy of standardized assessments, which their students invariably failed, teachers questioned their own efficacy. Without a clear definition for success in teaching at the intersection of mathematics and language learning, teachers fell prey to conflicting and complicated goals for their instructional practice.

As a result, all three teachers engaged in job crafting to alter cognitive boundaries for success. However, the ways in which they did so varied and did not reflect any common goals for NARI youth in the mathematics classroom. For example, Delilah decided to redefine her role away from external measures for success while Penelope saw it as paramount to prepare her students to succeed at standardized measures for mainstream schools. Differences in teachers' personal redefinitions for success most likely correlated with their personal learning histories and professional backgrounds. For example, Penelope had experiences of being isolated as the only black woman in her higher-level mathematics courses. As a result, she focused on individual achievement of external standards which ultimately became her model for success. This was the model she felt driven to apply in order to emancipate NARI youth through academic achievement. However, Penelope frequently felt defeated since she worked towards external expectations that were not appropriately normed for her student population. Thus, appropriate, common measures are needed for teachers to get a correct reflection of their success.

In addition, assessments did not provide teachers with any diagnostic tools to reflect students' prior knowledge, their mastery of instructional materials, or progress in language learning. Teachers frequently did not know much about students' prior content knowledge since



they lacked the diagnostic tools to realize where previous instruction may have ended.

Furthermore, teachers longed for assessments of grade level curriculum which also accounted for language learning. Thus, additional suggestions include developing instructional assessments to account for language learning and gaps in content knowledge. Assessments should reflect not only student mastery of grade-level mathematics curriculum but provide a diagnostic starting point regarding students' individual learning histories. In addition, language goals should be integrated and assessed throughout the curriculum. A possible solution would include entrance and exit exams to measure student growth specific to their time spent at the AHA school.

Future research regarding connections between teachers' professional identities and assessment might provide information about the impacts of common, appropriate instructional measures for the intersection of mathematics and language learning. For example, research could explore how teachers' professional identities impact and are impacted by the formation of such measures for success. The formation of instructional assessments used to reflect NARI youths' prior mathematical content knowledge, their mastery of grade level curricula, and their progress in language learning must be shaped by more specific instructional goals within each of these domains. As teachers engage in the formation of such goals, their unique professional identities, including their moral purpose for teaching mathematics to NARI youth, will likely impact the types of instructional goals they set. Therefore, it will be important to document how teachers collaborate with one another, drawing on a variety of cultural resources, in order to arrive at common goals. Of particular interest would be how the personal, professional, and political impact factors on teachers' professional identities correlate with the types of goals they set. In the following section I will discuss suggestions for instructional practices at the intersection of mathematics and language learning.

## **Curriculum and Instructional Practices**

While teachers appreciated the framework a curriculum provided, they were frustrated with the fact that the lessons, pacing, and resources were not useful for their purposes of teaching NARI youth. Teachers expressed needing to make adjustments in order to adapt the curriculum to their students' needs. However, even with adjustments, the curriculum did not seem to function smoothly. Key problems included absence of language instruction, as well as lacking differentiation for students with interrupted formal education. Although all three teachers showed attention to these three key areas, differing personal, professional, and political impact factors lead to various approaches in the ways in which teachers implemented their instructional practice. Therefore, it would be helpful to offer teachers the guidance of a shared curriculum which supports their students' learning needs, offers them usable tools and resources, and supports common measures for learning.

More specifically, such a curriculum should focus not only on teaching grade level standards but also serve to teach foundational mathematical content knowledge which students may be missing. All three teachers shared that they would like to allocate instructional time to work in a small group setting to support or extend students' prior content knowledge. Thus, a more nuanced curriculum would focus on dividing instructional time between preparing students for mainstream schools by focusing on the wider school system's required curriculum as well as small group instruction in the form of guided mathematics groups. Strategically integrating missing mathematical content knowledge for students with interrupted formal education can be achieved through the application of a guided math curriculum which would support teachers with diagnostic assessments and application of small group resources.

Teachers also mentioned that the mainstream mathematics curriculum should be purposefully adapted to the cultural and linguistic needs of new-arrival refugee and immigrant students. Thus, rather than teaching the required lessons, it is recommended that teachers isolate key grade-level goals and teach them while accounting for language learning and cultural backgrounds. In addition, prior research would suggest the power of making the mathematics content more culturally responsive to NARI youth (Aguirre & Zavala, 2013). In addition, research on the academic success of NARI youth (Bajaj et al., 2017) would encourage a curriculum that helps students explore interconnections between their own lives and transnational issues, as well as building off the knowledge, resilience, and cultural wealth of student communities (Yosso, 2005). Critical inquiry of student backgrounds could be integrated to make content more consequential and applicable for culturally and linguistically diverse youth (Amthor & Roxas, 2016).

Future research regarding the connection between TPI and curricular expectations should explore how teachers' professional identities change as a result of engaging in the development of a curriculum that adapts standardized instructional goals and practices to build on students' cultural and linguistic backgrounds. Changes in a curriculum to account for NARI youths' linguistic, academic, and cultural backgrounds would aid in supporting teachers' professional identity development by allowing them to better align their moral purpose with their teaching practice (Mockler, 2011). In particular, attention should be given to the cyclical relationship between teachers' professional identities and the creation of more linguistically and culturally responsive content. For example, all three teachers in the study paid attention to how students' cultural backgrounds merged with the contexts of word problems provided by the curriculum. However, the extent to which they were able to utilize student backgrounds as resources for new

world problems differed. Thus, it would be interesting to see how teachers' professional identities could shape and be shaped by the effort of creating culturally and linguistically consequential content. In the final section, I will detail how suggestions for professional learning can support more novel instructional goals and practices for NARI youth.

### **Professional Learning**

General findings showcased that mathematics teachers of NARI youth often felt as if they were the only “experts” at the intersection of mathematics and language learning. Teachers expressed a desire to have access to a dedicated professional learning space in order to more successfully integrate their dual responsibilities for mathematics and language teaching. While all teachers commented on the support they received from colleagues and administrators, they also noted that there were limited opportunities to collaborate with other experts in the school. Thus, professional development should be structured around a collaborative learning community, provide the opportunity for teachers to theorize links between their own professional identities and the neoliberal contexts in which they teach, and finally supply resources for practices which support students' cultural, linguistic, and academic learning needs.

First, participation in a strong professional learning community has been shown to provide teacher learning and improvements to instructional practice (Borko, 2004). Such learning communities must be facilitated to establish mutual trust, the formation and maintenance of communication norms, and a simultaneous respect for individual perspectives and collaborative growth (Little, 2002). Teachers in this study would benefit from participation in such a community since they expressed feeling as if sources for professional development were either specific to mathematics or language education but not to the combined task. If indeed, teachers are the sole experts in their roles, professional development should provide

opportunities for teachers to learn from one another. At present, teachers complained that they had limited opportunities for collaboration. However, evidence revealed that teachers' unique career histories provided valuable resources to inform their practice. For example, Delilah had ample experience supporting both language input and output. She masterfully scaffolded student opportunities to express their mathematical reasoning in small- and whole-group discussions. Conversely, Penelope and Ruby seemed to struggle finding ways to get "kids talking." Thus, collaboration could provide valuable opportunities for teachers build on one another's practice.

Second, professional development should provide the opportunity for teachers to theorize links between their own professional identities and the neoliberal contexts in which they teach. Findings in this study revealed that job crafting can serve as a political tool to help mathematics teachers of NARI youth align their moral purpose with their practice in a neoliberal context (Gutiérrez, 2013; Mockler, 2011). As teachers increased their ability to job craft, they were better able to adapt instruction to students' cultural, linguistic, and academic backgrounds. However, teachers needed the opportunity to understand the problem that neoliberalism poses for education, particularly for NARI youth at the intersection of mathematics and language learning (Apple, 2004; Bajaj et al., 2017; Block et al., 2012; Yeh, 2018). Professional development should support teachers in untangling how neoliberal ideologies in favor of free markets, individualization, and choice have led to educational reforms marked by an emphasis on heightened standardization of assessment and curriculum with centralized government control (Apple, 2004; Block & Holborow, 2012). Teachers would benefit from the political knowledge underscoring the effects of such performance measures on mathematics and language learning (Block et al., 2012; Eisenhart & Allen, 2016). Moreover, findings revealed that teachers' abilities to job craft were impacted by personal and professional factors. Thus, professional development

should support teachers in articulating and reflecting on impactful personal and professional experiences and how those serve to influence their job crafting efforts at the intersection of mathematics and language learning.

Finally, professional development should supply an opportunity for teachers to synthesize relevant resources for their practice at the intersection of mathematics and language learning. First, teachers could benefit from exploring how culturally responsive mathematics teaching (CRMT; Aguirre & Zavalla, 2013) might provide a framework through which to analyze how their practice provides access to high level mathematics learning (NCTM, 2014; NRC, 2001) while building off students' cultural and linguistic resources (Lucas & Villegas, 2008). In particular, teachers need opportunities to learn how to integrate consequential mathematics learning experiences through building of NARI youths' funds of knowledge and life trajectories (Bajaj et al., 2017; Yosso, 2005). One avenue could be for teachers to interview students and families to learn more about their knowledge and experiences and construct instructional units to reflect communities' strengths and interests (Civil & Khan, 2001). In addition, teachers would benefit from more explicit access to learning about high-quality mathematics teaching practices (Jacobs & Spangler, 2017), and how to institute cognitively demanding tasks in order to engender rich mathematical discussions (Jackson et al., 2013; Smith & Stein, 1998; Stein et al., 2008).

Future research regarding the link between TPI and professional learning might document how teachers mutually impact one another's professional identity development through the transference of cultural resources. Of particular interest may be how teachers' career histories can be leveraged as mutual knowledge. Moreover, teachers' mutual exploration of personal, professional, and political impact factors may be shared to make new meaning and impact

agency at the intersection of mathematics and language learning. In the next section, I will detail limitations to my study.

### **Limitations**

Limitations to this study include the time allotted to data collection, differences in professional backgrounds, and regulations regarding COVID-19. My study commenced at the end of the school year, leaving me with only 8 weeks of data collection. While I had the added bonus of having spent nearly 2 years in the teachers' classrooms for pilot observations, that data was not officially included. In addition, the end of the school year provided heightened pressures regarding the EOG which ultimately affected both Ruby and Penelope. While this served to highlight the implications of neoliberal testing pressures, it may have also limited the types of teaching practice I was able to observe from both teachers.

Furthermore, it is possible that differences in teachers' professional backgrounds provided a limitation for the study. For example, Delilah's career history was an affordance which provided 20 years of experience while the other two teachers were in the beginning years of their professions. In addition, Penelope had the benefit of having attended a master's program for teaching English learners but lacked any formal training in teaching mathematics. Conversely, Ruby had a degree in teaching general education but lacked professional preparation for working with students learning English.

Finally, while the COVID-19 pandemic had reached a point of allowing teachers and students to return to the classroom for in-person learning, several regulations may have impacted the results of my study. Protocols set in place likely influenced teachers' abilities to enact unencumbered collaborative learning experiences. Moreover, it is possible that teachers' practice was affected by the initial period of online instruction at the start of the school year. For

example, Penelope commented on how many students had trouble signing on to their online learning formats. This interruption in learning may have ultimately impacted teachers' success when returning to the classroom. In the following section, I offer concluding remarks to my exploration at the intersection of mathematics and language learning.

### **Summary**

In conclusion, my dissertation study has served to diagram the realities faced by mathematics teachers of NARI youth. Their professional identities provided a detailed illustration of their motivations and practices. Teachers' professional identities existed in a mutual relationship with the cultural resources relative to the figured worlds of mathematics and language learning which, in turn, constrained or enabled their agency to craft their jobs beyond the normative expectations. By categorizing these resources into personal, professional, and political impact factors, I was better able to identify some of the problems with which teachers were dealing.

Individual differences between teachers revealed the mediating capacity impact factors have on one another. For example, affordances from teachers' professional backgrounds can support teachers' resiliency in dealing with neoliberal pressures. Simultaneously, difficulties from teachers' personal histories likely undermined the same efforts. Job crafting (Wrzesniewski & Dutton, 2001) was a useful measure for understanding the extent to which teachers were able to push back against neoliberal implications in order to support their moral purpose for teaching. Ultimately, the extent to which teachers were able to craft indicated their success with aligning their moral purpose for building off students' academic, cultural, and linguistic backgrounds with their teaching practice.



Common findings revealed that teachers struggled with neoliberal implications (Apple, 2004) such as being asked to implement instructional goals and practices which did not differentiate between mainstream students and NARI youth. Furthermore, teachers felt conflicted by a lacking understanding of their success based on the absence of appropriate and common measures of student learning. Without alternative assessments, teachers were left subject to unfair measures of success and experienced feelings of defeat. They also lacked measures to diagnose students' learning histories, ultimately leaving them in the dark about where to begin their instructional practice. Finally, teachers needed more appropriate curricular resources and professional learning opportunities to address students' prior learning histories while also being able to build on their cultural and linguistic resources. Teachers yearned for a professional learning environment where they could collaborate on the unique task of teaching at the intersection of mathematics and language learning.

It is my hope to facilitate such a professional learning space for the teachers at the AHA School. All three teachers expressed how much it helped them to be a part of my research study since our weekly discussions gave them the opportunity to be more reflective about their practice and consider new solutions to the challenges they faced. Thus, it is my goal to facilitate teacher collaboration in order to develop solutions to some of the problems that were revealed in my study. It is my belief that future research at the intersection of mathematics and language learning will surface more generalizable guidelines for mathematics teachers of NARI youth.

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## APPENDIX A: INTERVIEW 1

Theoretical Base	Interview Question
Moral Purpose and Practice (Mockler, 2011)	Tell me about why you came to the AHA school to teach?  How do these reasons reflect in your daily practice?
Personal Impact Factors (Mockler, 2011) <ul style="list-style-type: none"> <li>• Class; Race; Gender</li> <li>• Personal schooling experiences</li> <li>• Personal Interests and roles</li> </ul>	You are a teacher of mathematics and language. What are your background experiences relative to both fields? (constraints and affordances) <ul style="list-style-type: none"> <li>• Personal experiences with mathematics learning</li> <li>• Personal experiences with language and culture</li> </ul>
Professional Impact Factors (Mockler, 2011) <ul style="list-style-type: none"> <li>• Career Histories</li> <li>• Professional Learning</li> <li>• Features of School/system context</li> <li>• Teacher education</li> </ul>	Did you feel prepared to teach math and language? <ul style="list-style-type: none"> <li>• Teacher education</li> <li>• Career history</li> <li>• Professional learning</li> <li>• School system context</li> </ul>
Political Impact Factors (Mockler, 2011) <ul style="list-style-type: none"> <li>• discourses attitudes and understandings surrounding education that exist external to the profession.</li> <li>• media and government policy</li> <li>• Political ideology</li> </ul>	In thinking about teaching at the intersection of mathematics and language learning, what types of things have helped you and what are some obstacles you might face? <ul style="list-style-type: none"> <li>• State/ federal policies</li> <li>• School features</li> <li>• Student characteristics</li> <li>• Accountability policies</li> </ul>
Job Crafting (Wrześniewski & Dutton, 2001)	Tell me about some of your teaching goals? <ul style="list-style-type: none"> <li>• Self</li> <li>• Students</li> </ul>
Job Crafting (Wrześniewski & Dutton, 2001)	If you were in charge, what changes would you make? <ul style="list-style-type: none"> <li>• Testing/accountability</li> <li>• Curriculum</li> <li>• Other</li> </ul>
Job Crafting (Wrześniewski & Dutton, 2001)	In the coming week, what are some things I should look for during your instruction?

## APPENDIX B: DELILAH INTERVIEW 2

Topics	Interview 2 Questions
<p>Culturally Responsive</p> <ul style="list-style-type: none"> <li>● Celebrating students' language and backgrounds</li> <li>● Being flexible and not forcing expectations</li> </ul>	<p>1. During our first interview, you talked about appreciating students' cultural and language backgrounds and not just expecting them to adjust to the expectations of American school. Can you tell me about how you feel this perspective impacts your teaching at this point?</p> <ul style="list-style-type: none"> <li>● Cultural responsiveness- examples from classroom practice?</li> </ul>
<p>Language Teaching</p> <ul style="list-style-type: none"> <li>● Vocabulary</li> <li>● Sentence Frames</li> <li>● Building background knowledge</li> <li>● Students talking and answering questions</li> <li>● Kids practicing vocabulary</li> <li>● Sentence Frames</li> <li>● Adapting word problem</li> </ul>	<p>2. In your first interview, you talked a lot about your explicit focus on teaching language, tell me about how this goal is going at this time?</p> <ul style="list-style-type: none"> <li>● How do you think this relates to your instruction of mathematics?</li> </ul>
<p>Student centered instruction</p> <ul style="list-style-type: none"> <li>● small groups</li> <li>● students taking responsibility for their learning</li> <li>● student leaders</li> </ul>	<p>3. Another thing you mentioned in your last interview was helping kids to take responsibility for their learning, how would you say that goal is going?</p> <ul style="list-style-type: none"> <li>● Thinking about their assessments etc.</li> <li>● Student leaders</li> </ul>
<p>Constraints</p> <ul style="list-style-type: none"> <li>● Push back from Eureka coach for going off script</li> <li>● Challenge to differentiate for all students.</li> <li>● Have to take standardized tests</li> <li>● Have to take Eureka county assessment</li> </ul>	<p>4. What are some current constraints and supports that impact your teaching at the intersection of mathematics and language learning?</p> <ul style="list-style-type: none"> <li>● EOG/ Pacing Guides</li> <li>● Constraints: Pushback from Eureka, differentiation</li> <li>● Supports: Admin support, 3ls making room for language; no EOG pressure compared to old school</li> </ul>
<p>Affordances</p> <ul style="list-style-type: none"> <li>● Loves culture</li> <li>● Empathy for mathematics struggle</li> <li>● Math PD from Guilford county</li> <li>● Admin support to change curriculum</li> <li>● Use of 3Ls supported her doing more language</li> <li>● Compared to her old school, she feels a lot less pressure</li> </ul>	

Topics	Interview 2 Questions
<p>Differentiating</p> <ul style="list-style-type: none"> <li>● technology</li> <li>● small groups</li> <li>● tutors</li> </ul> <p>Adapting the curriculum</p> <ul style="list-style-type: none"> <li>● Format (Spends more time on fluency)</li> <li>● Content</li> <li>● Adding language</li> <li>● Pacing</li> </ul>	<p>5. You have talked a lot about various challenges of teaching the expected curriculum and also differentiating for the broad range of student abilities in your classroom. . How is that going at this point?</p> <ul style="list-style-type: none"> <li>● Differentiation and scaffolding</li> <li>● Supports and constraints?</li> <li>● Key adaptations to curriculum</li> </ul>
<p>Mathematics Teaching</p> <ul style="list-style-type: none"> <li>● Growth Mindset</li> <li>● Wants to make math approachable</li> <li>● Wants to learn to be a better math teacher</li> <li>● Mentions being flexible and learning</li> </ul> <p>Creating a Safe Space</p> <ul style="list-style-type: none"> <li>● Making math more approachable</li> <li>● Breaking down the information</li> </ul> <p>Scaffolding Math</p> <ul style="list-style-type: none"> <li>● Integrating missing content knowledge</li> <li>● Bridging k-2 skills</li> <li>● Creating more responsive assessments</li> </ul>	<p>6. In your first interview, you shared a little about how you sometimes felt frustrated learning math as a student. How would you say that experience informs your teaching at this point?</p> <ul style="list-style-type: none"> <li>● Making math safe and approachable</li> <li>● Breaking down the information</li> <li>● Teaching for understanding</li> </ul> <p>7. Thinking about your experience of learning mathematics, how do you currently define success for students in mathematics?</p>
<p>Job Crafting</p> <ul style="list-style-type: none"> <li>● Wants to recreate Newcomers beginning assessment</li> <li>● Makes numerous and ongoing changes to adapt curriculum</li> </ul>	<p>8. Imagine you were coaching a new teacher in your position, how would you tell them to utilize/ adapt content to fit your students' needs?</p> <ul style="list-style-type: none"> <li>● How would this teacher know if they were successful as a teacher at the intersection of mathematics and language learning?</li> </ul>

## APPENDIX C: RUBY INTERVIEW 2

Topics	Interview 2 Questions
<p>Supportive Environment</p> <ol style="list-style-type: none"> <li>1. Modeling mistakes</li> <li>2. Builds off different students' strengths</li> <li>3. Growth mindset</li> <li>4. "Safe zone"</li> </ol>	<ol style="list-style-type: none"> <li>1. During our first interview, you talked about how you want to create a "safe zone" for students, tell me about how this goal is going at this time?               <ul style="list-style-type: none"> <li>• Growth Mindset</li> <li>• Influenced by personal learning history in mathematics</li> </ul> </li> </ol>
<p>Student Centered</p> <ul style="list-style-type: none"> <li>• Integrating student voice</li> <li>• Integrating student interests (Kahoot)</li> <li>• Follows student interests</li> </ul> <p>Having Fun but Meaning Business</p> <ul style="list-style-type: none"> <li>• Joking with students and letting loose</li> <li>• Wants to be herself</li> <li>• Easygoing but staying on track</li> <li>• Connecting student interests</li> <li>• Allowing for diversions</li> <li>• Can be herself at newcomers</li> </ul>	<ol style="list-style-type: none"> <li>2. During our first interview, you talked about how important it is for you to integrate student interests and have fun in class, tell me about how this goal is going at this time?               <ul style="list-style-type: none"> <li>• Balance between having fun and meeting pressures of teaching</li> <li>• Ability to build off student interest/contributions</li> </ul> </li> </ol>
<p>Coming Home</p> <ul style="list-style-type: none"> <li>• Newcomers is" like coming home"</li> <li>• Is interested in learning about students' cultural and linguistic backgrounds</li> <li>• Discusses context and checks/ builds background knowledge</li> <li>• Is sensitive towards differences in students' academic backgrounds based on their home country</li> <li>• Thinks about what is appropriate for other cultures</li> <li>• Wants to learn other languages</li> <li>• Against assimilation for CLD youth</li> </ul> <p>Language Awareness</p> <ul style="list-style-type: none"> <li>• Integrates vocabulary</li> <li>• Uses students' L1</li> <li>• Wants to make the math more visible to account for language</li> <li>• Builds background for word problems</li> <li>• Focus on vocabulary</li> </ul>	<ol style="list-style-type: none"> <li>3. During our first interview, you talked about your personal experiences leading you to appreciate your students' cultural and language backgrounds, and that Newcomers felt like coming home. Can you tell me about how you feel this perspective impacts your teaching at this point?               <ul style="list-style-type: none"> <li>• Language awareness- new teaching strategies?</li> <li>• Cultural responsiveness- examples from classroom practice?</li> </ul> </li> </ol>

Topics	Interview 2 Questions
<p>Constraints</p> <ul style="list-style-type: none"> <li>● Difficulty deciding if she should move on from a topic or stay</li> <li>● Challenge to translate everything</li> <li>● Feels like she failed when she is creating tests.</li> <li>● Feels pressured to cover content</li> <li>● Feels pressured by EOG</li> </ul> <p>Affordances</p> <ul style="list-style-type: none"> <li>● Has utilized her difficulty with math as a tool for empathy</li> <li>● Multicultural upbringing and traveled a lot</li> <li>● Collaboration with coworkers is key for her</li> <li>● Amy Cox is very helpful for her</li> <li>● Math coach is helpful</li> </ul>	<p>4. What are some current constraints and supports that impact your teaching at the intersection of mathematics and language learning?</p> <ul style="list-style-type: none"> <li>● EOG/ Pacing Guides</li> <li>● Constraints: EOG pressure; pacing; assessments don't show</li> <li>● Supports: Co-workers and PLC</li> </ul>
<p>Scaffolding</p> <ul style="list-style-type: none"> <li>● Supplements structure, content, and pacing of curriculum</li> <li>● Adjusts assessments to account for language and gaps in content <ul style="list-style-type: none"> <li>● Checks background knowledge of word problem context</li> </ul> </li> </ul> <p>Adapting the Curriculum</p> <ul style="list-style-type: none"> <li>● Integrates games</li> <li>● Adapts assessments</li> <li>● Thoughtful about pacing</li> <li>● Speaks up to math coach about adjusting lessons</li> </ul>	<p>5. You have talked a lot about various challenges of teaching the expected curriculum and also differentiating for the broad range of student abilities in your classroom. . How is that going at this point?</p> <ul style="list-style-type: none"> <li>● Differentiation and scaffolding</li> <li>● Supports and constraints?</li> <li>● Key adaptations to curriculum</li> <li>● Assessments?</li> </ul>

Topics	Interview 2 Questions
<p>Teaching Math</p> <ul style="list-style-type: none"> <li>• Makes connections to the real world</li> <li>• Invites student participation by building off their understanding</li> <li>• Wants to teach difficult concepts from multiple angles</li> <li>• Has Empathy for people with difficulty in mathematics.</li> <li>• Frustration as a student makes her a better teacher</li> </ul> <p>Practicing Math</p> <ul style="list-style-type: none"> <li>• Teaching students to try even if they make mistakes</li> <li>• Making multiple ways students can participate without feeling nervous</li> <li>• Uses nearpod for student responses with privacy</li> <li>• Using kahoot to let students participate and they love it</li> </ul>	<p>6. In your first interview, you shared a little about how you sometimes felt frustrated learning math as a student. How would you say that experience informs your teaching at this point?</p> <ul style="list-style-type: none"> <li>• Explaining mathematics from multiple perspectives</li> <li>• Empathy for people struggling with mathematics</li> <li>• Student participation: making room for participation without pressure</li> </ul> <p>7. Thinking about your experience of learning mathematics, how do you currently define success for students in mathematics?</p>
<p>Job Crafting</p> <ul style="list-style-type: none"> <li>• Adapts assessments for students to better be able to show what they know</li> </ul>	<p>8. Imagine you were coaching a new teacher in your position, how would you tell them to utilize/ adapt content to fit your students' needs?</p> <ul style="list-style-type: none"> <li>• How would this teacher know if they were successful as a teacher at the intersection of mathematics and language learning?</li> </ul>



## APPENDIX D: PENELOPE INTERVIEW 2

Topics	Interview 2 Questions
<p>Sociopolitical and Linguistic Focus</p> <ul style="list-style-type: none"> <li>● Addressing/teaching language hierarchies</li> <li>● Interrupting language bias within immigrant communities</li> <li>● Use of language partners</li> <li>● Awareness and advocacy for how ELs are positioned in society</li> <li>● Sensitivity to mathematics practices varying by culture</li> </ul>	<ol style="list-style-type: none"> <li>1. During our first interview, you talked about how immigrants have many injustices to deal with as a result of their cultural backgrounds and language barrier, how is this awareness impacting your teaching practice at this point?</li> <li>2. In relation to this awareness, you talked about wanting to get students ready for life beyond newcomers. Tell me more about what that means to you at this point in the school year?</li> </ol>
<p>Pushing and Preparing</p> <ul style="list-style-type: none"> <li>● Homework</li> <li>● Volunteering Answers</li> <li>● Showing work</li> <li>● All students should take language and content risks</li> <li>● Pushing students to participate</li> <li>● Wants students to become familiar with correct academic norms</li> <li>● Focus on life beyond Newcomers</li> <li>● Creating a space where no one will laugh at others</li> <li>● Pushing higher students to take responsibility</li> <li>● “Leveling up”</li> <li>● Pushes to have kids do their homework</li> </ul>	
<p>Student Practice</p> <ul style="list-style-type: none"> <li>● Small groups</li> <li>● Turn and talk</li> <li>● Student discussions</li> <li>● Applaud participation</li> <li>● Accountability for each other during partner work</li> </ul>	<ol style="list-style-type: none"> <li>3. During our first interview, you commented on how important it is for students to take accountability for one another through discussions during small group and partner practice. Tell me about how this goal is going at this time?</li> </ol>
<p>Mathematics Teaching</p> <ul style="list-style-type: none"> <li>● Teaching with fidelity</li> <li>● High expectations</li> <li>● Wants to teach math because she loves it</li> <li>● Experiences of being marginalized in math class and doesn’t want that for her students</li> <li>● Wants students to get the right answer for success</li> <li>● Informally discusses and jokes with students about her love for teaching math</li> <li>● Making math problems fun</li> </ul>	<ol style="list-style-type: none"> <li>4. In your first interview, you shared a little about how you were the only black female in your higher tracked math courses. How would you say that experience informs your teaching at this point?               <ul style="list-style-type: none"> <li>● High expectations/ Focus on getting it right/ Speed and efficiency</li> <li>● Teaching with fidelity to the curriculum</li> </ul> </li> <li>5. Thinking about your experience of learning mathematics, how do you currently define success for students in mathematics?</li> </ol>

Topics	Interview 2 Questions
<ul style="list-style-type: none"> <li>• Analyses problems with assessment</li> <li>• Emphasis on speed</li> </ul>	
<p>Constraints</p> <ul style="list-style-type: none"> <li>• Difficulty accommodating broad range of student ability levels</li> <li>• Lacking support: PLCs don't help; county math coach doesn't understand</li> <li>• Frustrated with students being disengaged</li> <li>• Pressure to cover the curriculum</li> </ul> <p>Affordances</p> <ul style="list-style-type: none"> <li>• Technology: Zearn; IXL</li> <li>• Tutor since mid-April</li> <li>• Eureka provides her with a lot of guidance and resources</li> </ul>	<p>6. What are some current constraints and supports that impact your teaching at the intersection of mathematics and language learning?</p> <ul style="list-style-type: none"> <li>• EOG/ Pacing Guides</li> <li>• Constraints: Differentiation; No support from PLC or coach; student disengagement; curricular pressures</li> <li>• Supports: Tutor; zearn; Eureka</li> </ul>
<p>Differentiation</p> <ul style="list-style-type: none"> <li>• Analyzes where gaps in comprehension are for different students</li> <li>• Changes assessments to be more appropriate to students' levels</li> <li>• Differentiates with small groups and stations</li> <li>• Uses technology to differentiate</li> <li>• Suggests having tracked math classes</li> </ul> <p>Scaffolding</p> <ul style="list-style-type: none"> <li>• Use of partner support based on content and language partners</li> <li>• Attempts to anticipate where content disconnect may happen</li> <li>• adapts assessments</li> <li>• Playing games for foundations skills</li> <li>• Models her work as optional support</li> </ul>	<p>7. You have talked a lot about various challenges of teaching the expected curriculum and also differentiating for the broad range of student abilities in your classroom. How is that going at this point?</p> <ul style="list-style-type: none"> <li>• Differentiation and scaffolding</li> <li>• Supports and constraints?</li> <li>• Key adaptations to curriculum</li> </ul>
<p>Job Crafting</p> <ul style="list-style-type: none"> <li>• Has mentioned wanting to do differentiated math classes</li> <li>• Changes pacing and assessments of the Eureka curriculum</li> </ul>	<p>8. Imagine you were coaching a new teacher in your position, how would you tell them to utilize/ adapt content to fit your students' needs?</p> <ul style="list-style-type: none"> <li>• How would this teacher know if they were successful as a teacher at the intersection of mathematics and language learning?</li> </ul>

## APPENDIX E: INTERVIEW 3

Theoretical Base	Interview Question
Job Crafting (Wrześniewski & Dutton, 2001)	<p>You have been sharing about the key changes you make to your teaching practice. Tell me about how these changes relate to your goals for teaching?</p> <ul style="list-style-type: none"> <li>• your goals for yourself as a teacher?</li> <li>• To your goals for your students?</li> </ul>
Impact factors on TPI (Mockler, 2011)	<p>During our discussions we have talked about things that help your teaching and obstacles you might face. How are those factors impacting you now?</p>
Impact factors on TPI (Mockler, 2011)	<p>Since we last talked, has else happened that has impacted your teaching at the intersection of mathematics and language learning?</p> <ul style="list-style-type: none"> <li>• Personal (Student relationships/ Interests)</li> <li>• Professional (Professional learning or school-level changes)</li> <li>• Political (Accountability/ Testing/ Policy)</li> </ul>
New World of Mathematics and Language Learning (Holland et al., 1998)	<p>Many of your students are transitioning into mainstream schools, what would you like to share with their future mathematics teachers?</p>
<p>Impact factors on TPI (Mockler, 2011)</p> <p>New World of Mathematics and Language Learning (Holland et al., 1998)</p>	<p>In reflection of your work at the intersection of mathematics and language learning, what could county/state/ federal officials change to support:</p> <ul style="list-style-type: none"> <li>• Your students?</li> <li>• Your teaching?</li> </ul>
Impact factors on TPI (Mockler, 2011)	<p>How has your participation in this study impacted you?</p>

## APPENDIX F: DELILAH OBSERVATION PROTOCOL

Interview Topics	Classroom Observations
Culturally Responsive <ul style="list-style-type: none"><li>• Celebrating students' language and backgrounds</li><li>• Being flexible and not forcing expectations</li></ul>	
Language Teaching <ul style="list-style-type: none"><li>• Vocabulary</li><li>• Sentence Frames</li><li>• Building background knowledge</li><li>• Students talking and answering questions</li><li>• Kids practicing vocabulary</li></ul>	
Mathematics Teaching <ul style="list-style-type: none"><li>• Growth Mindset</li><li>• Wants to make math approachable</li><li>• Wants to learn to be a better math teacher</li><li>• Mentions being flexible and learning</li><li>• Small group</li><li>• Fluency practice</li><li>• Technology practice</li></ul>	
Differentiating <ul style="list-style-type: none"><li>• technology</li><li>• small groups</li><li>• tutors</li></ul>	
Scaffolding Math <ul style="list-style-type: none"><li>• Integrating missing content knowledge</li><li>• Bridging k-2 skills</li><li>• Creating more responsive assessments</li></ul>	
Scaffolding Language <ul style="list-style-type: none"><li>• Sentence Frames</li><li>• Adapting word problem</li></ul>	
Adapting the curriculum <ul style="list-style-type: none"><li>• Format (Spends more time on fluency)</li><li>• Content</li><li>• Adding language</li><li>• Pacing</li></ul>	
Student centered instruction <ul style="list-style-type: none"><li>• small groups</li><li>• students taking responsibility for their learning</li></ul>	
Creating a Safe Space <ul style="list-style-type: none"><li>• Making math more approachable</li><li>• Breaking down the information student leaders</li></ul>	

## APPENDIX G: RUBY OBSERVATION PROTOCOL

Interview Topics	Classroom Observations
Supportive Environment	<ul style="list-style-type: none"><li>• Modeling mistakes</li><li>• Builds off different students' strengths</li><li>• Growth mindset</li><li>• "Safe zone"</li></ul>
Having Fun but Meaning Business	<ul style="list-style-type: none"><li>• Joking with students and letting loose</li><li>• Wants to be herself</li><li>• Easygoing but staying on track</li><li>• Connecting student interests</li><li>• Allowing for diversions</li><li>• Can be herself at newcomers</li></ul>
Culturally Responsive	<ul style="list-style-type: none"><li>• Newcomers is "like coming home"</li><li>• Is interested in learning about students' cultural and linguistic backgrounds</li><li>• Discusses context and checks/ builds background knowledge</li><li>• Is sensitive towards differences in students' academic backgrounds based on their home country</li><li>• Thinks about what is appropriate for other cultures</li><li>• Wants to learn other languages</li><li>• Against assimilation for CLD youth</li></ul>
Scaffolding	<ul style="list-style-type: none"><li>• Supplements structure, content, and pacing of curriculum</li><li>• Adjusts assessments to account for language and gaps in content</li><li>• Checks background knowledge of word problem context</li></ul>
Language Awareness	<ul style="list-style-type: none"><li>• Integrates vocabulary</li><li>• Uses students' L1</li><li>• Wants to make the math more visible to account for language</li><li>• Builds background for word problems</li><li>• Focus on vocabulary</li></ul>
Teaching Math	<ul style="list-style-type: none"><li>• Makes connections to the real world</li><li>• Invites student participation by building off their understanding</li><li>• Wants to teach difficult concepts from multiple angles</li><li>• Has Empathy for people with difficulty in mathematics.</li><li>• Frustration as a student makes her a better teacher</li><li>• Teaching students to try even if they make mistakes</li><li>• Making multiple ways students can participate without feeling nervous</li><li>• Uses nearpod for student responses with privacy</li><li>• Using kahoot to let students participate and they love it</li></ul>

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**Interview Topics****Classroom Observations**

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## Student Centered

- Integrating student voice
- Integrating student interests (Kahoot)
- Follows student interests

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Adapting the Curriculum

- Integrates games
  - Adapts assessments
  - Thoughtful about pacing
  - Speaks up to math coach about adjusting lessons
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## APPENDIX H: PENELOPE OBSERVATION PROTOCOL

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### Interview Topics

### Classroom Observations

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#### Sociopolitical and Linguistic Focus

- Addressing/teaching language hierarchies
- Interrupting language bias within immigrant communities
- Use of language partners
- Awareness and advocacy for how ELs are positioned in society
- Sensitivity to mathematics practices varying by culture

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#### Student Practice

- Small groups
- Turn and talk
- Student discussions
- Applaud participation
- Accountability for each other during partner work

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#### Mathematics Teaching

- Teaching with fidelity
- High expectations
- Wants to teach math because she loves it
- Experiences of being marginalized in math class and doesn't want that for her students
- Wants students to get the right answer for success
- Informally discusses and jokes with students about her love for teaching math
- Making math problems fun
- Analyses problems with assessment
- Emphasis on speed

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#### Pushing and Preparing

- Homework
- Volunteering Answers
- Showing work
- All students should take language and content risks
- Pushing students to participate
- Wants students to become familiar with correct academic norms
- Focus on life beyond Newcomers
- Creating a space where no one will laugh at others
- Pushing higher students to take responsibility
- "Leveling up"
- Pushes to have kids do their homework

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#### Differentiation

- Analyzes where gaps in comprehension are for different students
- Changes assessments to be more appropriate to students' levels

- 
- Differentiates with small groups and stations
  - Checks students' progress formatively
  - Uses technology to differentiate
  - Suggests having tracked math classes
- 

#### Scaffolding

- Use of partner support based on content and language partners
  - Attempts to anticipate where content disconnect may happen
  - adapts assessments
  - Playing games for foundations skills
  - Models her work as optional support
- 

#### Language Teaching

- Talks about empowering kids for basic communication
  - Mathematics provides a clear framework for language practice and success
  - Doesn't like making mistakes in language learning
  - Consideration of how vocabulary plays into content
-