INTERNATIONAL TEACHING ASSISTANTS' LIVED EXPERIENCES, PERCEPTIONS OF SUPPORT, AND CAREER GOALS: A PHENOMENOLOGICAL INQUIRY

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This is dedicated to my husband, Chris, and my daughter, Eleanor. With your love, support, and understanding, I was able to complete this doctoral journey. You are my everything.

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ABSTRACT

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by Caitlin A. Hamstra

International graduate teaching assistants (ITAs) and their domestic counterparts play integral roles at institutions of higher education because they are responsible for teaching and facilitating substantial numbers of undergraduate courses (Austin, 2002; Kaufman & Brownworth, 2006; Smith, Meyers, & Burkhalter, 1992). However, ITAs have different linguistic, cultural, and educational backgrounds from their domestic and native English-speaking peers, which results in additional challenges (Swan, Kramer, Gopal, Shi, & Roth, 2017). Because of these differences, non-native English-speaking ITAs need differentiated support and training that accounts for their past educational experiences, current teaching assignment, and future career plans in order to provide adequate support.

Grounded in hermeneutical phenomenology, this qualitative study examined the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study was to examine ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. The results of this study show that ITAs have a positive view of their experiences as ITAs. They are satisfied with the support they receive from the university; however, there is a need for added training in teaching, support in language differences, and assistance in adjusting to life in the US. Overall, the career goals of ITAs are positively influenced by their teaching experiences as ITAs but not directly influenced by the training and support they received from the university.

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CHAPTER I

INTRODUCTION

International graduate teaching assistants (ITAs) and their domestic counterparts play integral roles at institutions of higher education (IHE). According to Jia and Bergerson (2008), ITAs have educational, language, and cultural experiences that are outside of North America and other English-speaking countries. Non-native English speakers (NNES) are native speakers of one or more languages, which they acquired in childhood, other than English (Krashen, 1987). International graduate students with educational experiences outside of North America who are non-native speakers of English and have graduate teaching assistantships are considered ITAs (Jia & Bergerson, 2008). IHE seek international graduate students not only because of their knowledge, research skills, but also for the "international perspectives they bring to the teaching of undergraduate students" (Smith, Meyers, & Burkhalter, 1992, p. vii).

ITAs are an essential component of undergraduate education because they are responsible for teaching and facilitating substantial numbers of undergraduate courses (Austin, 2002; Kaufman & Brownworth, 2006; Smith et al., 1992). They have been utilized extensively in colleges and universities with graduate programs (Chiang, 2016). As the focus on research expands for faculty members at colleges and universities seeking higher Carnegie rankings, departments will continue to rely more heavily on ITAs for undergraduate teaching (LoCastro & Tapper, 2006), making ITAs even more vital to undergraduate education (Luft, Kurdziel, Roehrig, & Turner, 2004).

Despite their key role in academe, ITAs often have little to no teaching experience. They are graduate students, not professionals, yet they are given teaching and advising duties and are seen as experts by undergraduate students (Chiang, 2016). ITAs also have different native

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languages and cultural and educational backgrounds from their domestic peers, which results in their facing additional challenges than those of their US peers (Swan, Kramer, Gopal, Shi, & Roth, 2017). These differences result in the need for differentiated support and training specifically designed for ITAs. Appropriate training and support of ITAs is essential for several stakeholders, including the ITAs themselves, the undergraduate students in their classes, the campus at large, and their future employers (Dimitrov et al., 2013). Support and training policies should account for ITAs' past educational experiences, current teaching assignment, and future career plans in order to adequately support ITAs.

Grounded in hermeneutical phenomenology, this qualitative study examined the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study was to examine ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. This study built upon and adds to the work of Trebing (2015), who identified suggestions ITAs themselves had for improving ITA training programs. The current study extended this research by analyzing ITAs' career goals and how institutional training and support programs help prepare them to achieve those goals.

Background

The United States (US) is the leading higher education destination for students choosing to study outside of their home country (Institute for International Education [IIE] Project Atlas, 2017). Out of all students studying outside their home country, 24% study in the US, followed by 11% in the United Kingdom, and 10% in China (IIE Project Atlas, 2017). According to Bargerstock and McCarthy (2012), students who enter the US with the intent to study are

considered international students. International students may be degree seeking, non-degree seeking, or enrolled in post-degree optional practical training (OPT) programs (Bargerstock & McCarthy, 2012). However, the majority of international students in the US are degree-seeking. According to the IIE Open Doors Report (2018), over 90% of international students are degree seeking, with 35% studying in graduate programs (IIE Open Doors "Places of Origin," 2018).

Half of the students entering the US to study come from China and India (IIE Open Doors "Leading Places of Origin," 2018). Students from China make up 33.2% of the total international student population, and 36.6% of students from China are graduate students. Students from India make up 17.9% of the international student population in the US, and 87% of students from India are graduate students or are participating in post-graduation Optional Practical Training (OPT) (IIE Open Doors "Leading Places of Origin," 2018). Of the degree-seeking international graduate students studying in the US, 33% receive funding from a college or university, which includes teaching and research assistantships (IIE Open Doors "Primary Source of Funding," 2018). This funding includes tuition and small stipends. International graduate students who receive teaching assistantships are considered ITAs.

Degree-seeking international students are increasingly focusing on science, technology, engineering, and math (STEM) (IIE Open Doors "Fields of Study," 2018). In this study, social, physical, and life sciences are included in STEM. In the 2016/17 academic year, over 20% of international students selected to study engineering, which was an increase of over 6% from the preceding two years (IIE Open Doors "Fields of Study," 2018). Math and computer science fields of study, which are combined in the IIE survey, saw the large increases in enrollment from the 2015/16 to the 2017/18 academic years, making them the third most popular fields of study, with almost 17% of all international students (IIE Open Doors "Fields of Study," 2018). Social

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science and physical and life sciences were ranked the fifth and six most popular fields of study, with a combined total of almost 15% of international students majoring in these fields (IIE Open Doors "Fields of Study," 2018).

Because ITAs are current instructors in STEM and many are future faculty members (Bettinger et al. 2016), adequate training and support are vital for STEM ITAs in order for IHE to ensure quality undergraduate education (Austin et al., 2009). Colleges and universities in the US are increasingly relying on ITAs for undergraduate education, particularly in STEM fields. As STEM fields continue to gain popularity in the United States, more international graduate students will be seeking quality programs. To attract high quality graduate students, institutions must provide adequate training and support to ensure the success of the graduate students in their studies, teaching, and future careers. As institutions seek quality instruction for undergraduate courses, they must have adequate training and support systems in place for the ITAs that facilitate those classes and are future faculty members in those departments. For institutions to properly prepare ITAs for the classroom, researchers and practitioners need to understand their experiences and future career goals. If ITA program coordinators understand ITAs' experiences and future plans, they can design programs to improve outcomes for ITAs and the students in their classrooms.

This study occurred at a university located in the Midwest. Due to an increased focus on research and doctoral programs, the university recently moved up in the Carnegie rankings and is currently classified as a higher research activity doctoral university (The Carnegie Classification of Institutions of Higher Education, 2017). This increased focus on research at the university has resulted in departments relying on TAs—both domestic and international—to facilitate and teach courses in their programs, particularly in STEM departments. During the Fall 2017 semester,

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there were 71 ITAs at the university, and just under 75% of the ITAs were in STEM programs, including mathematics, physics, chemistry and biochemistry, biology, engineering, psychology, and computer science. The ITAs in STEM came from around the world, including Bangladesh, China, Germany, Ghana, India, Nepal, Saudi Arabia, and Sri Lanka.

ITAs at the university receive training in several ways. First, all TAs—both domestic and international—are directed to a TA training website, which includes 19 pages about teaching and working at the university. The site contains information that they need before they start working on campus, including using the university's email and intranet system, how they will get paid, tuition waivers, information technology, the library, student disability services, valuing diversity, academic integrity, and safety information. Second, ITAs are provided an optional week-long, 35-hour training prior to the start of the fall semester. All ITAs are invited to participate in the program; however, it is optional, and many are unable to participate because they have not yet arrived in the country. The program focuses on preparing students to teach in a US classroom, to understand US culture, and to effectively use the English language in the classroom. Finally, some ITAs also receive training through their departments, which ranges from a week-long seminar to a brief discussion with lab coordinators. The preparation of ITAs to teach at the university varies greatly, depending on how engaged the ITAs are and how much their department requires them to do.

Statement of the Problem

As non-native English-speakers, ITAs arrive to US campuses with English proficiency; however, as newcomers to the country, their academic English skills are still developing (Evans, Anderson, & Eggington, 2015). Furthermore, many ITAs are new teachers, have never taught in

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the US, or have never taught in English, which increases their linguistic burden and makes the adjustment to teaching more challenging. Instead of viewing ITAs' multilingualism as an advantage, colleges, universities, and their departments have historically viewed non-native English-speaking ITAs and their developing academic English skills as problems that needed solving (Bailey, 1984). IHE often require speaking tests that occur out of context and without assessment of interpersonal, communicative, and teaching skills, which perpetuate this language-deficit view (Kuo, 2011). Some ITA programs are implemented because of legal requirements by states and other programs occur as a result of policies of the institutions and departments in which the ITAs teach. These programs have expanded in recent years with the growth of ITAs teaching undergraduate students (Austin, 2002; Gorsuch, 2015; Kauffman & Brownworth, 2006; Ross & Dunphy, 2007).

The language deficit model of ITA programs is problematic for several reasons. First, when an IHE decides to host any NNES student, they must bear "some responsibility for these students' language development from the time they enter the university until they exit" (Evans et al., 2015, p. xi). Institutions that host ITAs must be prepared to support them in the ways that they need to be supported, including in language, culture, and teaching. The amount of support NNES get is directly related to their success as students, and colleges and universities have an obligation to support this development (Evans et al., 2015). Second, the language deficit model does not account for the strengths of NNES ITAs and the value they bring to campuses. ITAs have unique backgrounds and needs, and they bring rich linguistic, cultural, and academic diversity to colleges and universities; however, these advantages are not always considered in training and support programs for ITAs, which often focus on improving their English language skills.

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Teaching, learning, and language are the key elements to ITA training and have been well documented in the literature (Bresnahan & Cai, 2000; Civickly & Muchisky, 1991; Gorsuch, 2012; Hoekje & Williams, 1994; Ross & Dunphy, 2007; Smith et al. 1992). There are also studies about the variety of ITA training programs and support best practices, as well as handbooks for ITAs and their program facilitators (Gorsuch, Meyers, Pickering, & Griffee, 2013; Hoekje & Williams, 1994; Kaufman & Brownworth, 2006; Smith et al., 1992). While, TA and ITA development and training are becoming more represented in the literature, they are still underrepresented (Gorsuch, 2012; Gorsuch, 2016; Parker, Ashe, Boersma, Hicks, & Bennett, 2015). Although some studies inform the structural support ITAs receive at the organizational level (Brinkley-Etzkorn, McGaskey, & Olsen, 2015; Trebing, 2015), there is a dearth of research regarding ITAs' perceptions of their support systems and how their experiences can shape effective policies for ITA programming in order to prepare them for the current roles and future careers.

Purpose Statement

Grounded in hermeneutical phenomenology, this qualitative study examined the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study was to examine ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. This study built upon and adds to the work of Trebing (2015), who identified suggestions ITAs themselves had for improving ITA training programs. The current study extended this research by analyzing ITAs' career goals and how institutional training and support programs help prepare them to achieve those goals.

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According to Moustakas, (1994), "phenomenology is rooted in questions that give a direction and focus to meaning" (p. 59). Therefore, to understand non-native English-speaking ITAs' experiences and their perceptions of support, I investigated the following question:

- What are the lived experiences of non-native English-speaking International Teaching Assistants in STEM?

The following sub-questions also helped drive the study and answer the research question:

- How do university training and support influence these lived experiences?

- How do their experiences influence their perceived preparation towards their career?

Theoretical Framework

To analyze the experiences of ITAs, this study used Lave and Wenger's (1991) situated learning theory through legitimate peripheral participation. According to Lave and Wenger, situated learning theory is learning positioned within a specific activity and characterized by the process of learning through legitimate peripheral participation. Legitimate peripheral participation is the relationship between learners, the experts they are learning from, and the activities in which they engage (Lave & Wenger, 1991). As can be seen in Figure 1, the foci of situated learning theory are the person, the practice, and their social world; legitimate peripheral participation occurs where the social world, practice, and the individual person intersect (Lave & Wenger, 1991).
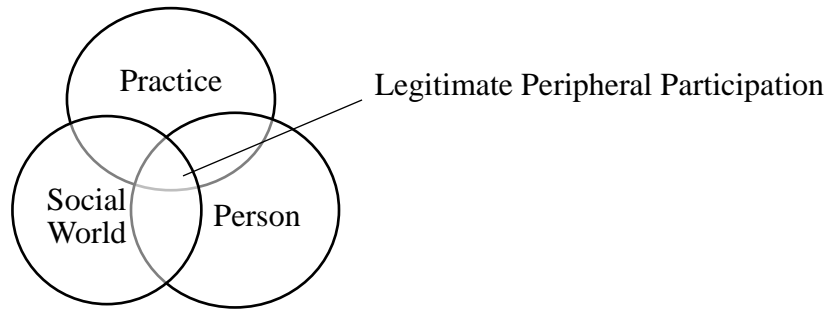
Figure 1. Situated Learning through Legitimate Peripheral Participation
This figure illustrates the crucial components of situated learning that together make legitimate peripheral participation.

According to Lave and Wenger (1991), the learning environment is the community in which a practice takes place, and the learning within that community of practice "concerns the whole person acting in the world" (p. 49). Because the world is socially constructed, learning, thinking, and knowing occur within the social structures and practices of the world (Lave & Wenger, 1991). Knowledge and practices are thus created, shared, and learned within that social world (Lave & Wenger, 1991). ITAs initially learn how to be teachers through training, but they also develop their skills and knowledge through increased participation in the classroom as learners and teachers.

Through legitimate peripheral participation, learners become experts by increased participation in their practice and gaining experience and increased responsibility in their communities of practice (Lave & Wenger, 1991). Increasing amounts of participation and experience help learners gain knowledge and expertise. ITAs develop expertise while they plan, teach, assess, and reflect on their experiences. They need a breadth of experience in the classroom, as observers, instructors, and learners in order to become experts and fully participating members of the learning community. As the learners gain knowledge and experience, their participation increases from peripheral to full (Arshavskaya, 2015; Lave &

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Wenger, 1991). As ITAs gain experience they move from peripheral, novice teachers to fully participating skilled teachers.

According to Arshavskaya (2015), situated learning theory is "grounded in social constructivist perspectives on learning" and is reflective of the process of becoming a teacher (pp. 57-58). For learners to become experts, they must participate in the community of practice at many levels and have a range of experiences with a variety of community members (Lave & Wenger, 1991). Novice ITAs learn socially from experts and other members of the learning community, gaining increasing amounts of teaching experience through practice and engagement with that community (Arshavskaya, 2015; Lave & Wenger, 1991). Because learning happens through sharing and interaction, ITAs learn from all members of the campus community with whom they interact. Through this process, the whole community becomes part of the learning environment, which aids in increasing learners' opportunities for engagement and developing expertise.

While ITAs learn from faculty members about their fields of study, research, and teaching (Arshavskaya, 2015), learners do not only learn from their primary mentor; they also learn from other apprentices and other master practitioners around them (Lave & Wenger, 1991). Learners need full access to a wide variety of activities, people, and resources (Lave & Wenger, 1991). This exposure to other participants and activities in the community of practice facilitates increased learning and aids learners in their development into experts. ITAs are not only learning from their faculty advisors and ITA and TA training program coordinators, they are learning from other ITAs and TAs, other graduate students, and their undergraduate students. They gain experience and knowledge through their experiences outside of the classroom in their offices,

labs, meetings, and study groups. Therefore, as ITAs engage on campus and with other members of their community of practice, they are learning.

As ITAs learn about teaching and gain experience, they develop the knowledge and skills necessary to become experts, not only in their field but also in teaching that field. This study will use situated learning theory to understand how ITAs gain teaching experience and learn from their professors, classmates, fellow TAs, and students through legitimate peripheral participation.

Theoretical Perspective

In order to understand the lived experiences of non-native English-speaking ITAs, this qualitative phenomenological study used social constructivism as the theoretical perspective. According to Creswell (2013), social constructivism is the act of individuals seeking understanding of their working world. Through this paradigm, individuals "develop subjective meanings of their experiences" (Creswell, 2013, p. 24). Using social constructivism, researchers seek multifarious views from participants and rely on their views of their own experiences to understand the world (Creswell, 2013). To achieve rich descriptions of participants' experiences, researchers rely on broad and general questions that allow participants to construct their own meanings of their varied experiences (Creswell, 2013). Using a social constructivist paradigm, this study used descriptions of ITAs' own experiences to develop a better understanding of the phenomenon of being a non-native English-speaking STEM ITA.

Significance of the Study

This study took ITA support beyond ITA training programs and English language support. It used ITAs' experiences to inform institutional policies to prepare and support ITAs in their teaching and future careers. With this information, institutions can create a bottom-up

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approach to policy and organizational structure. Rather than instituting policies based on language-deficit models for ITAs, institutions can implement policies which will provide appropriate training and support for ITAs based on their experiences and future goals. Policies that are informed by ITA experiences and are designed to properly train ITAs and future faculty will result in improved STEM undergraduate and graduate education.

Definition of Terms

1. Graduate teaching assistant (TA): A graduate student who teaches for the institution as part of a financial package; may be a US citizen or an international student

2. International student: Non-US citizen with temporary student visa

3. International teaching assistant (ITA): An international graduate student who teaches for the institution as a part of a financial package

4. Non-native English speaker (NNES): A person who has (an)other language(s) as their native language(s) and also speaks English; someone whose first language is not English and speaks English as an additional language

5. Other assistantship: A position which pays a student to do a job other than teaching on campus that also covers some or all the students' tuition

6. STEM: Science (including physical, life, and social sciences), Technology, Engineering, Math

7. Teaching assistantship: A position which pays a graduate student to teach a course or courses that also covers some or all of the students' tuition

Assumptions

Researchers bring preconceived notions or assumptions to their research (Creswell, 2013). It is important for researchers to understand their beliefs and assumptions and to reflect and write about them in order to understand how they impact research (Creswell, 2013). Prior to and during data collection, I was a teacher of English as a second language and English for academic purposes to international students preparing to matriculate into university classes. Additionally, I also acted as the ITA program director for the university where the study took place. I believe that language and culture are crucial components of international students' experiences. I also believe that ITAs attend graduate school in the US for a variety of reasons and that they have multiple educational and professional goals while they are ITAs. The aim of this study is to understand how the university prepares ITAs for their current teaching roles and future careers, given their differing educational and professional goals.

Methodological Approach

Through a hermeneutical phenomenological qualitative study, I sought to understand the lived experiences of non-native English-speaking ITAs. This study sought to understand what ITAs experienced, how they experienced it, and their perceptions about it (Moustakas, 1994). Using interviews, this research elicited the ITAs' perceptions of their experiences and support in order to understand how they perceive the support they received and how that support prepared them for their future careers. Using hermeneutical analysis, I found the deeper meaning of ITAs' words and experiences through interpretation in order to understand the phenomenon of ITAs teaching in the US.

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Overview of the Study

     This study consists of five chapters. Chapter I provides an introduction to international teaching assistants, a background of international students in the United States, the statement of the problem, and the purpose of the study. Chapter II provides a review of the literature and connects the topic of this study with previous studies. Chapter III details the methodological approach of the study, including research design, population, methods of collecting data, and methods of coding and analyzing data. Chapter IV provides the findings from the data collection. Chapter V provides an analysis of the findings, as well as the broader implications and recommendations for ITA training and support.

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CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The number of degree-seeking international graduate students in STEM fields is on the rise (IIE Open Doors "Fields of Study," 2018). These students are a crucial component of higher education in the US (LoCastro & Tapper, 2006; Luft et al., 2004) because they are responsible for teaching and facilitating substantial numbers of undergraduate courses (Austin, 2002; Kaufman & Brownworth, 2006; Smith et al., 1992). According to Jia and Bergerson (2008), TAs who have educational, linguistic, and cultural experiences that are outside of North America and other English-speaking countries are considered ITAs. Therefore, for the purposes of this study, non-native English-speaking (NNES) ITAs are graduate students whose native languages are not English, who have previous educational experiences outside of North America, and who have graduate teaching assistantships.

Colleges and universities seek international graduate students for their knowledge, research skills, and the "international perspectives they bring to the teaching of undergraduate students" (Smith et al., 1992, p. vii). For these reasons, utilizing ITAs has been an established practice at colleges and universities with graduate programs (Chiang, 2016). However, ITAs often have little or no teaching experience; they are graduate students, not professionals (Chiang, 2016). ITAs also have different language, cultural, and educational backgrounds from domestic teaching assistants, which result in different challenges (Swan et al., 2017). Because of these differences and resulting challenges, ITAs need differentiated support and training from their host institutions. Institutional support and training policies should account for ITAs' past

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educational experiences, current teaching assignment, and future career plans in order to adequately support ITAs. Appropriate training and support of ITAs are essential for several stakeholders, including the ITAs themselves, the undergraduate students in their classes, campuses at large, and TAs' future employers (Dimitrov et al., 2013).

Grounded in hermeneutical phenomenology, this qualitative study examined the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study was to examine ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. This study built upon and adds to the work of Trebing (2015), who identified suggestions ITAs themselves had for improving ITA training programs. The current study extended this research by analyzing ITAs' career goals and how institutional training and support programs help prepare them to achieve those goals.

This study used Lave and Wenger's (1991) situated learning theory through legitimate peripheral participation to understand the lived experiences of non-native English-speaking ITAs. Legitimate peripheral participation describes the relationship between learners (person), the activities in which they engage (practice), and the experts from which they are learning (social world) (Lave & Wenger, 1991). Therefore, in order to understand non-native English-speaking ITAs lived experiences, it is critical to understand who the ITAs are as learners, what they do in their roles as ITAs, and how they are supported. This support comes from the experts from whom they are directly learning and institution which hosts them. It is also critical to understand how they are prepared by their social world to achieve their career goals. Figure 2 depicts the relationship between person, practice, and social world for ITAs and how these elements influence their career goals.

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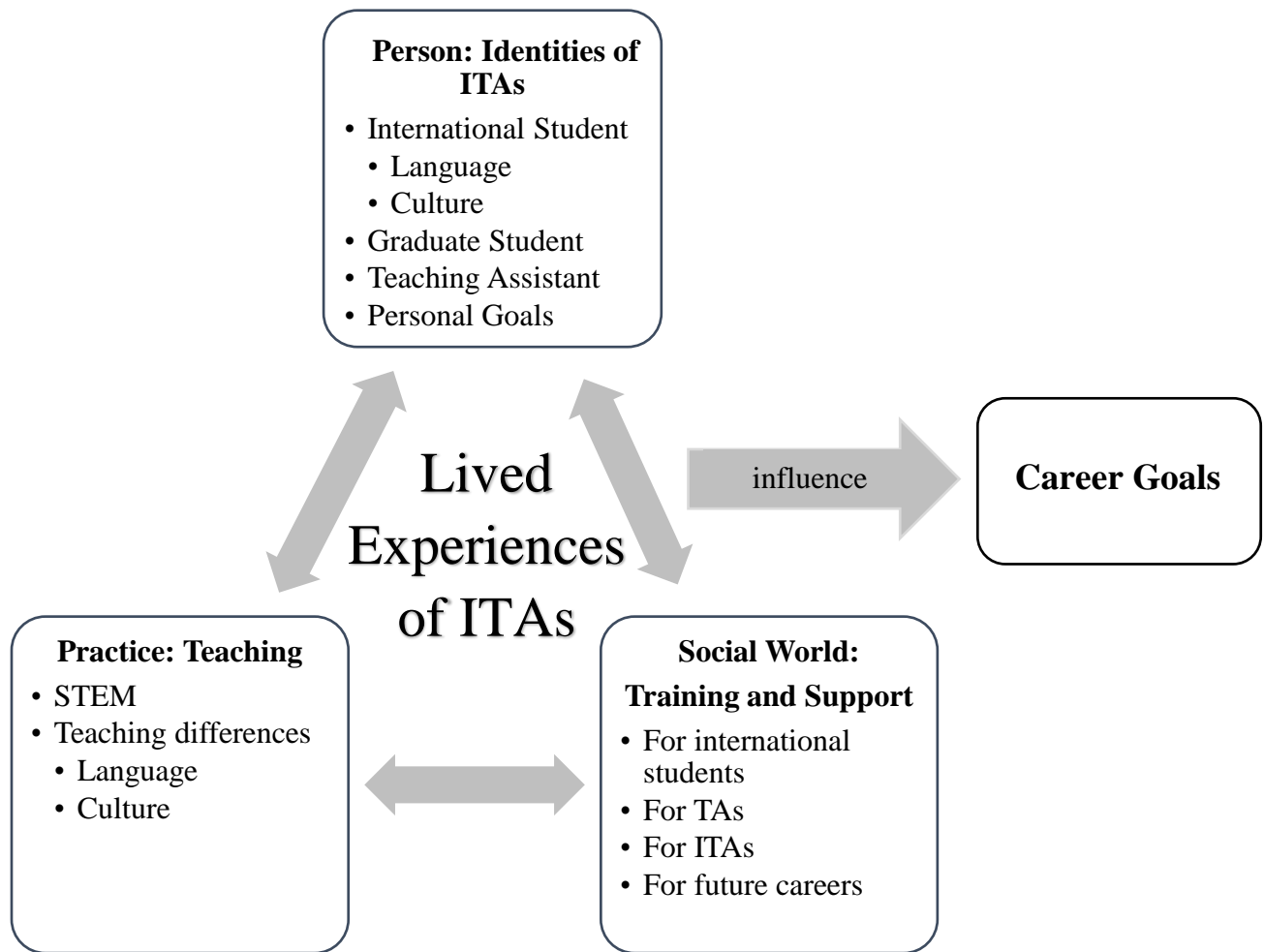
Figure 2. ITA's Identities, Practice, and Social Word Influence Career Goals
This figure depicts the how the lived experiences of ITAs are constructed by their identity, practice, and social world, which together influence ITAs' career goals.

The identity, practice, and social world of ITAs are all connected. First, their identities as international graduate teaching assistants affect how they engage in their social world and how they approach their practice as current and future STEM instructors. Second, their practice as STEM instructors affects how they are trained and supported, and their practice affects their identities as teaching assistants, graduate students, and future professors. Finally, their social world, including support and training, affects their identities as ITAs and their practices as current and future STEM instructors. The ITAs' identities, their practice, and their social world

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are all contributing factors to the goals they have for the future and whether or not they achieve them.

This chapter is organized according to Lave and Wenger's (1991) situated learning theory, and presents literature regarding (1) the identities of ITAs as learners, (2) their practice of teaching, (3) their social world, including training and support, and (4) their career goals. First, this chapter discusses the identities of ITAs, as international students, as non-native English speakers, as STEM graduate students, as graduate teaching assistants, and their personal career goals. Second, this chapter presents literature regarding ITAs' practice as teachers in STEM fields and as teachers in a different culture using a different language. Third, this chapter discusses how ITAs are trained and supported within their social world, the efficaciousness of that training and support, and how it prepares them for their future careers. Because identity, practice, and social world are deeply interconnected, when analyzed together, a full picture of how ITAs learn and become experts in their STEM fields emerges. Finally, this chapter considers TAs' and ITAs' career goals and how IHE support those goals.

<div align="center">Person: Identities of ITAs</div>

According to Lave and Wenger (1991), "learning involves the whole person" (p. 53). Therefore, in order to understand how people learn, connect to their social communities, and become full members (Lave & Wenger, 1991), it is incumbent to understand who NNES ITAs are. This section discusses the multiple components of ITAs' identities: (1) international students in the US; (2) non-native English speakers; (3) international graduate students; (4) graduate teaching assistants; (5) graduate teaching assistants in STEM; and (6) international graduate teaching assistants. These multiple components of identity contribute to NNES STEM ITAs'

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lived experiences and make their experiences unique from other international students and other graduate students.

International Students at US Institutions

As colleges and universities look to diversify and internationalize their campuses by bringing international students to the US, international students bring both educational and economic contributions. International students add cultural and academic value to the campuses and communities in which they study and reside with the linguistic and cultural diversity they bring (NAFSA "International Student Economic Value Tool," 2017). Both domestic and international students benefit from increased diversity on campus, which helps prepare them to work and participate in a global society (Cheng, Myles, & Curtis, 2004).

Colleges, universities, and their surrounding communities also reap great economic benefits from international students in the US. During the 2016/17 academic year, there were 1,078,822 international students that studied in the US, and they "contributed $39 billion and supported more than 455,000 jobs to the US economy" (NAFSA "International Student Economic Value Tool," 2018, para. 1). This contribution came from spending on "higher education, accommodation, dining, retail, transportation, telecommunications, and health insurance sectors" ("International Student Economic Value Tool," 2018, para. 1). Not only are international students and their families cultural and academic assets to the US (NAFSA "Welcoming International Students," 2017), they are also economic drivers of local and state economies.

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Factors for Studying in the United States

Students from around the world choose to study in the US for a variety of reasons. McMahon (1992) proposed two models for international students and their families as they make the decision to study abroad. The push, or outbound, model describes reasons students choose to leave their country (McMahon, 1992). Push factors include personal reasons, such as enhancing career prospects, future job prospects, future earnings prospects, higher status, living in a different culture, making international contacts, improving language skills, and recommendations from family, friends, and relatives (Cubillo, Sanchez, & Cerviño, 2006; Mazzarol & Sontar, 2002). Chao (2016) examined college decision-making of Chinese students and found that Chinese students who chose to attend college abroad seek to grow their understanding of the world. Other reasons students want to study abroad is to "take control" of their futures, to have diverse cultural experiences, and to improve their career possibilities, including earning potential (Chao, 2016, p. 34). There are several factors that international students consider when deciding whether to leave their country to study, and many of these factors include creating a better future for themselves.

The pull, or inbound, model describes reasons students choose a specific country as their destination. Some of the factors international students consider when choosing where to study abroad include a desire to gain a better understanding of the West, the cultural distance between the home and host cultures, knowledge of the host country, the social reputation of the country, the academic reputation of the country, cost of living, time to degree, immigration processes, and the fact that institutions overseas offer better courses than local institutions (Cubillo et al., 2006; Mazzarol & Sontar, 2002) When deciding which institution to attend, students consider the host institutions' prestige and reputation for quality, expertise of faculty, whether the institution

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recognize the student's qualifications, cost, and the number of international students on campus.

(Cubillo et al., 2006; Mazzarol & Sontar, 2002). Figure 3 depicts the push and pull factors for

international students studying in the United States.

Push Factors	Pull Factors
• enhancing career prospects	• desire to gain a better understanding of the West
• future earnings prospects	• the cultural distance between the home and host cultures
• higher status	• knowledge of the host country
• living in a different culture	• the social reputation of the country
• making international contacts	• the academic reputation of the country
• improving language skills and	• cost of living and tuition/fees
• grow understanding of the world	• time to degree
• recommendations from family, friends, and relatives	• immigration processes
• take control of their future	• better courses than local institutions
• see the world and broaden… experiences	• institutions' prestige and reputation for quality
	• expertise of faculty
	• whether the institution recognize the student's qualifications
	• number of international students on campus

Figure 3. Push and Pull Factors Model for International Students
This figure illustrates the factors that influence international students' decision to leave their
home countries and the factors that influence their choice of destination.

In addition to the factors that compel international student to leave their home countries,

international students consider both the host country and host institution when they determine

where they will study for higher education. Cost of living and tuition and fees are important pull

factors for international students because they can be much higher in the US than in other

countries (Mazzarol & Sontar, 2002). This results in graduate students seeking assistantships to

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pay for the high costs of tuition and cost of living (Golde & Dore, 2004). Receiving an assistantship can mean the difference between an international graduate student attending graduate school in the US and not attending at all. Another important pull factor for studying in the US is that the experience enhances career prospects and future earnings prospects. Like other international students, ITAs choose to travel to the US for graduate school to enhance their careers and future earnings. This study sought to understand how ITAs' lived experiences at the university prepared them to achieve their career goals.

International Student Challenges

International students face a variety of challenges on US campuses. These challenges fit into three different categories: academic, social, and cultural (Lee & Rice, 2007; Wu, Garza, & Guzman, 2015). Academic challenges include interactions with professors and campus administrators, isolation from classmates, language issues, and pressure of parents' expectations (Lee & Rice, 2007; Wu et al., 2015). Social challenges include campus social interactions, and feelings of social isolation and loneliness (Lee & Rice, 2007; Wu et al., 2015). While feelings of isolation and loneliness often occur throughout students' academic journey, they often have initial adjustment challenges, making the beginning of their time in the US more difficult (Ankawa, 2017). Cultural challenges include denial of funding or job opportunities, off-campus interactions such as housing and shopping, concepts of time and punctuality, and prejudice against international students (Lee & Rice, 2007; Wu et al., 2015).

While international students need and receive support when they first arrive on campus, it is also important for them to receive on-going support after the initial arrival to campus (Hung & Huyn, 2010). As students adjust to life on campus, they need consistent and on-going support by

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their host institutions as they learn about US culture, US academic culture and values, and sociocultural norms of the country (Hung & Huyn, 2010). The literature about international student support is presented in the Social World: Training and Support section of this chapter.

Non-Native English-Speaking International Students

International students may be native English-speakers or NNES. Native English-speakers identify English to be one of their native languages, and often they have educational experiences in English. Students who are NNES may fall into two categories: (1) those who attended school in another language and (2) those who attended school in English but at home spoke one or more other languages, which they consider to be their native languages. Those who fall into the first category must meet English language admissions requirements to start taking classes at colleges and universities in the US. They can do this through demonstrating English proficiency on the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) prior to arrival in the US, or they can gain proficiency by taking language classes in the US. Students in the second category—who have educational experience in English but spoke one or more other languages at home—may not have to prove English proficiency to US colleges and universities because English was the medium of instruction at their schools. Furthermore, they may or may not identify as NNES; some international students in the second category identify as native English speakers, and others identify as NNES. Whether students attended school in English or in their native languages, English proficiency is important for NNES international students because English language skills affect their social and academic adjustment to life as a student at US colleges and universities (Andrade, 2009).

While NNES international students are required to demonstrate English proficiency prior to starting college and university classes, they do not necessarily have the English language skills necessary to be successful students in English (Evans & Andrade, 2015). Therefore, many NNES students require additional language training and support from their college or university, beyond what they received prior to admission (Evans & Andrade, 2015). However, it is a mistake for IHE to assume that all NNES students will acquire the requisite language skills simply by being living in an English-speaking environment (Evans & Andrade, 2015). NNES' language skills may plateau or even backslide if host institutions do not have sufficient admissions procedures, adequate language testing, appropriate language support, and adequate tracking of student success (Andrade, Evans, & Hartshorn, 2014; Eggington, 2015; Evans & Andrade, 2015; Renata & Meckelborg, 2013).

International Graduate Students

While international graduate students may have similar experiences to undergraduate international students and domestic graduate students, their experiences are significantly different from their peers. Graduate students are often older than undergraduate students and may be married, which affects how and with whom they socialize, especially if they have a partner from their home country (Trice, 2004). Graduate students also have more educational experience and are emerging experts in their field, which separates them from their undergraduate counterparts. They also have different linguistic, educational, and cultural backgrounds from their domestic peers, which affects their ability to connect and socialize with peers in their department. These experiences give international graduate students different academic and social perspectives from their domestic and undergraduate counterparts

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International graduate students often must contend with racism and potential violence, especially those from Muslim-majority countries (Ariza, Motoyasu, Lustig, Palmer, & Stalvey, 2018). This violence, dangerous rhetoric, and White supremacy have been on the rise in the US since the election of Donald Trump as President of the US and after he signed Executive Orders 13769 and 13780 (Ariza et al., 2018). Executive Order 13769 suspended the entry into the U.S. of people from Iran, Iraq, Libya, Somalia, Sudan, Syria, and Yemen, called for tighter restrictions on the visa process, and limited the number of refugees that could enter the U.S. (Executive Order No. 13769, 2017). After the Executive Order 13769 was put on hold by the courts, President Trump signed Executive Order 13780, which eliminated Iraq from the list of countries with suspended immigration (Executive Order No. 13780, 2017). These Executive Orders restricted travel to and from multiple Muslim-majority countries. Therefore, students from these countries were no longer able to travel home to visit their families, and their families were no longer able to travel to the US to visit their students.

Ariza et al. (2018) investigated the lived experiences of international graduate students from Muslim majority countries after the election of President Trump and the signing of the immigration Executive Orders. The authors explained that students from Muslim-majority countries often feel unwelcome due to anti-Islamic graffiti, violence against Muslims on college campuses across the country, and political rhetoric that perpetuates violence. As a result, Ariza et al. (2018) found that the participants had feelings of fear and uncertainty due to the current political climate, even if they were not from one of the seven countries mentioned in the Executive Orders.

In addition to feelings of fear and being outsiders, NNES graduate students often face social and academic challenges. Trice (2004) found that where international graduate students

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come from also influences how much they socialize, especially with American students. The author found that students from East and Southeast Asia, as well as students from Western countries, were more likely to socialize with Americans than Middle Eastern and African students. One hypothesis for the reluctance of Middle Eastern and African students to integrate with people outside of their own culture was discrimination (Trice, 2004). However, the author noted that in this study the amount of time international graduate students spent with co-nationals did not have an effect on how much time they spent with Americans. In fact, those who developed relationships with Americans were able to do so, regardless of their relationships with those from their country.

Some of the challenges NNES graduate students face are a result of their English language skills. They face difficulty with listening comprehension and oral proficiency (Kuo, 2011). Listening comprehension is a challenge for the NNES graduate students especially in lectures (Kuo, 2011; Lin & Scherz, 2014), in discussions (Lin & Scherz, 2014), and when other speakers had accents that NNES were unfamiliar with, such as US Southern dialects (Kuo, 2011). Listening comprehension and oral proficiency also affect their ability to communicate as well as they would like (Kuo, 2011). Sometimes NNES graduate students feel powerless because they cannot communicate as they could in their home country due to their English language skills, which negatively affects their self-esteem and ability to make friends with Americans (Ankawa, 2017; Kuo, 2011).

NNES graduate students can also have a difficult time adjusting socially. Lin and Scherz (2014) found that NNES graduate students had few chances to socially interact with domestic students, and when they did have those opportunities, they did not always understand the group dynamics due to the blending of academic and social conversation in study groups. Even when

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NNES graduate students had the chance to engage with domestic students, Lin and Scherz (2014) reported that Asian international graduate students did not always feel comfortable developing meaningful relationships with peers from other cultures because their expectations of social interaction and friendship were based on those from their home cultures. Similarly, Ankawa (2017) found that some international graduate students preferred to socialize with other international students rather than Americans.

Graduate Teaching Assistants

Graduate assistantships make graduate school a possibility for many students, and they are also a way for colleges and universities to entice potential students with appealing financial aid incentives (Golde & Dore, 2004; LoCastro & Tapper, 2006). There are two common types of assistantships IHE: teaching and research. Research Assistants (RAs) are graduate students, domestic or international, who receive an assistantship to do research with faculty in their department. Graduate teaching assistants (TAs) are graduate students, domestic or international, who have teaching assistantship. TAs from the US are considered domestic TAs, and TAs from other countries are considered ITAs. ITAs often attend the same training sessions as domestic TAs because they are a part of the general TA populations.

All TAs are an important part of undergraduate education in the United States at institutions with graduate programs. While assistantships draw talented students to campus, teaching appointments are often created to meet the needs of the department rather than to ensure quality instruction by the TAs and for the undergraduates in the courses (Austin, 2002). Colleges and universities hire masters and doctoral students to facilitate or independently teach undergraduate courses, and at large universities, TAs are in charge of most of the instruction at

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the undergraduate-level (Austin, 2002; Kaufman & Brownworth, 2006; Smith et al., 1992). However, they often have little to no teaching experience (Shannon, Twale, & Moore, 1998). Departments often assign teaching responsibilities to TAs and ITAs, who have little to no prior pedagogical training or teaching experience, without regard to best pedagogical practices (LoCastro & Tapper, 2006; Shannon et al., 1998). Instead, as institutions seek higher Carnegie research ratings, the number of ITAs teaching introductory undergraduate courses is also increasing in order to give faculty time to devote to research (LoCastro & Tapper, 2006).

ITAs and their domestic counterparts need to be adequately trained and supported to be effective instructors for undergraduate students and to have their own successful experiences as graduate students (Austin et al., 2009; Twale, Shannon, & Moore, 1997). Bettinger, Long, and Taylor (2016) found that the more often graduate students teach, the more likely they are to graduate within six years and to gain employment by a college or university. Therefore, to improve both graduate and undergraduate education, it is essential to dedicate more attention to the training of TAs and ITAs because they are current instructors and future faculty (Austin et al., 2009; Twale et al.,1997).

International Graduate Teaching Assistants

NNES ITAs have different educational, linguistic, and cultural backgrounds from their domestic and native English-speaking peers, which results in the need to additional training and support (Jia & Bergerson, 2008; Kauffman & Brownworth, 2006). This section first considers the unique linguistic backgrounds and needs of NNES ITAs. Next, this section discusses the effect of culture on ITAs' identities and experiences.

Language

Most international students must demonstrate English proficiency by receiving a certain score on an English proficiency test, such as the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS), or by completing the institution's English language program. At some institutions, ITAs must demonstrate higher level of English proficiency than what is required for graduate study because they are responsible for instruction in classrooms, which requires different—and more difficult—linguistic skills. While many institutions have higher language requirements for ITAs, some institutions have the same minimum language requirements for teaching and studying.

English speaking requirements vary across institutions and states. At some institutions, the state legislature determined the minimum English requirement for ITAs. For example, in Pennsylvania, non-native English-speaking ITAs are required to pass an additional spoken exam before they can teach (Heidish, 2006). For states without legislated language requirements, colleges and universities develop their own policies. Some institutions do not allow ITAs to teach during their first year on campus, other institutions require ITAs to participate in pedagogical training before teaching, and others allow ITAs to teach during their first semester with or without training (Trebing, 2015; Williams, Barnes, Finger, & Ruffin, 1987; Wright, Purkiss, O'Neal, & Cook, 2008).

Some states and institutions require ITAs to take oral proficiency tests, such as the Speaking Proficiency English Assessment Kit (SPEAK) before entering the classroom (Kaufman & Brownworth, 2006). While ITAs with sufficient scores may not be required to participate in an ITA training course, ITAs with lower speaking scores may be required to have additional training (Kaufman & Brownworth, 2006; Monts de Oca, 2013). The deficit model of ITAs

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(Bailey, 1984) is perpetuated when states and institutions have speaking test requirements for ITAs to teach, without assessing interpersonal communicative and functional teaching skills (Kuo, 2011). Because in addition to speaking skills, interpersonal communicative and functional teaching skills are key factors in determining whether ITAs have sufficient English ability to be in the classroom (Kuo, 2011).

Language is a major focus of ITA training programs because ITAs need to be able to use language with fluency and reasonable accuracy (Hoekje & Williams, 1994). Accuracy and flexibility enable ITAs to effectively communicate with their students, peers, and faculty members; have better understanding of that communication; and to appropriately respond to the needs of their students (Hoekje & Williams, 1994). The ability to use English with flexibility and accuracy also helps ITAs integrate into the campus community and to meet new people (Kuo, 2011). Communication and language skills are crucial factors in helping ITAs adjust to a new context and role. One ITA explained that it is hard to talk to other students, which results in difficulty connecting with peers (Kuo, 2011).

It is important for ITAs to have meaningful English interactions because exposure to the language is not enough to develop adequate communication skills. Renata and Meckelborg (2013) found that international graduate students had varying levels of English exposure and opportunities for meaningful interactions in English. Some students had frequent and meaningful interactions in English, while others often spent their time conversing in their native language. The authors explained that studying in the US and being surrounded by English was not enough for international graduate students to have "high levels of interaction" in English (Renata & Meckelborg, 2013, p. 24). Because the students had low-levels of interactions in English, they had fewer chances to practice fluency and improve their vocabulary, and they had fewer

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opportunities to meet new people and create cross-cultural friendships (Renata & Meckelborg, 2013). These missed opportunities not only resulted in missed language practice but also missed opportunities for cultural learning (Renata & Meckelborg, 2013). Therefore, it cannot be assumed that international students are getting enough exposure to English just because they are studying in an English-medium college or university.

In addition to using the language socially, it is also important for ITAs to use and understand functional classroom language (Kuo, 2011). Functional classroom language includes the use of language in different contexts, such as office hours, in class, or in a lab (Gorsuch, 2015; Ross & Dunphy, 2007). Lave and Wenger (1991) explained that learners must learn how the community of practice uses language to become full members. However, because ITAs are non-native English speakers and often have difficulty with informal English, they may have trouble communicating effectively with their community of practice, including their supervisors, peers, and students. Additionally, their identities as professionals are "negotiated, and even negatively perceived and evaluated by US college students" (Chiang, 2016, p. 124). While ITAs are experts in their field, they have difficulty explaining concepts in the same way as native English-speaking instructors, which can negatively impact the way their students view them as teachers and as professionals in their field (Chiang, 2016). This juxtaposition of content expert and language novice affects how undergraduate students view ITAs (Chiang, 2016). Therefore, it is imperative that ITAs learn how to use appropriate discourse in order to be effective teachers.

Speaking and listening skills are not only concerns of undergraduate students, departments, and ITA programmers; they are also major concerns of ITAs themselves (Arshavskaya, 2015; Hebbani & Hendrix, 2014; Kim, 2016; Kuo, 2011; Swan et al., 2017; Ye, 2013). Arshavskaya (2015) found that ITAs are particularly concerned that their limited fluency

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and vocabulary limits their effectiveness in explaining discipline specific concepts. Similarly, Swan et al. (2017) found that over three-quarters of the ITAs occasionally or frequently face language barrier challenges. However, Ranata and Meckelborg (2013) reported that ITAs' confidence increases with the amount of exposure they have had, but colloquial English remains a barrier for ITAs, even if they regularly communicate in English.

Through linguistic support, ITA training and support programs must focus on developing and maintaining communicative and sociolinguistic competence because these skills are what help them communicate effectively with their students (Hoekje & Williams, 1994; Trebing, 2015). Trebing (2015) found ITAs struggle to learn and apply sociolinguistic and discourse rules because these skills are challenging and take time to develop. Therefore, institutions need to provide long-term support to help them improve their communicative and sociolinguistic competence. For ITAs to be successful, they need purposeful, planned, and quality interactions in English (Ranata & Meckelborg, 2013).

Culture

Culture is an important part of identity for all people, but it can be especially significant for those who live far away from home. Culture has an effect on many aspects of life, including language, communication, educational values, and understanding social and academic situations. Because culture is such an important part of lived experiences, the gap between US academic culture and ITAs' home cultures result in challenges that ITAs frequently face (Swan et al., 2017). Kuo (2011) explained that the gap between the home and host cultures was a major challenge for ITAs' communication. Cultural differences are often the cause of communication gaps between the ITAs and their students, which can result in misunderstandings and

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communication challenges between them (Civickly & Muchisky, 1991; Gorsuch, 2012; Kuo, 2011). However, undergraduate students are often unable to understand what causes misunderstandings, and they often misinterpret cultural misunderstandings to be caused by language (Civickly & Muchisky, 1991; Kuo, 2011).

Chen, Hung, Park, and Takahashi (2017) noted that for ITAs teaching in the US, textbooks and other teaching materials are based on US culture. ITAs are not always familiar with cultural references, but they recognize the importance of teaching within the cultural context and using cultural references that US undergraduate students understand (Chen et al., 2017). Cultural differences can be a hindrance to communication and limit ITAs' abilities to understand and to be understood. Therefore, cultural training and support is critical for ITAs to feel like they understand, belong, and for them to become effective instructors (Ross & Dunphy, 2007). Chen et al. (2017) also noted that conversations with domestic teaching assistants about cultural references help ITAs negotiate cultural differences and help domestic TAs become more aware of what students from other cultures may not recognize or understand. Cultural training is essential for ITAs to feel like they fit into their new context and for them to be effective teachers (Ross & Dunphy, 2007).

Practice: Teaching

Participating in social practice is fundamental to learning (Lave & Wenger, 1991). Therefore, it is important to understand ITAs' teaching practice and how that contributes to their learning. This section will discuss two components of ITAs' teaching practice. First, the relationship between language, culture, and teaching for ITAs is presented. Second, teaching in

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STEM fields in higher education is presented, including best practices for STEM TAs according to the National Science Foundation (NSF).

Language, Culture, and Teaching

Language, culture, and teaching are inextricable for ITAs. Language is an essential component to how ITAs teach and how they connect to their host culture. Culture is part of language; they cannot be separated. Furthermore, culture is an integral part of teaching because cultural norms impact how teachers and learners understand classroom interactions. Because language, culture, and teaching are three essential needs for ITAs, they are the focus of most ITA training and support programs (Bresnahan & Cai, 2000; Civickly & Muchisky, 1991; Gorsuch, 2012; Hoekje & Williams, 1994; Ross & Dunphy, 2007; Smith et al., 1992). While there is a consensus regarding the importance of language, culture, and teaching for ITAs, there is disagreement surrounding the implementation and emphasis of these areas in ITA programs (Gorsuch, 2012; Hoekje & Williams, 1994). For example, LoCastro and Tapper (2006) argued that ITA training programs should emphasize teaching identity, attitudes, and practices rather than viewing ITAs in these programs as language-deficit and needing more language training. While Gorsuch (2012) acknowledged that language cannot be the sole focus of ITA programs, the author argued that learning the nuance of language for effective classroom teaching is a slow process, and ITAs require additional support and training in procedural English. Despite the emphasis on these needs in training workshops, many ITAs have a difficult time adjusting "to teaching and learning in their new cultural context, where attitudes, priorities, and behaviors may differ from those they are accustomed to" (Gourlay, 2007, p. 98). In order to ease the transition to a new learning context, ITAs need on-going training and support in these three salient areas.

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ITAs have a variety of educational and teaching experiences. While some ITAs have taught in their home countries and some have experience in the US educational system, others have neither teaching nor educational experience in the US (Gorsuch, 2012; Hadré & Burris, 2012; Jia & Bergerson, 2008). The academic and cultural experiences ITAs have is important because it affects their teaching beliefs and styles (Gorsuch, 2012). Their teaching beliefs and styles may be different from what their undergraduate students are used to, and that difference may cause communication problems between ITAs and their students (Gorsuch, 2012). In fact, the idea of teaching pedagogy may be new for some ITAs, and they may not have ever thought about how teaching is culture-specific and can be different in different places (Ross & Dunphy, 2007).

As developing teachers, ITAs have both classroom management and instructional challenges (Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011). To overcome teaching challenges and become effective instructors, ITAs need to change classroom challenges into positive experiences for both them and their students (Bresnahan & Cai, 2000). In order to do that; however, they need to learn how. Arshavskaya (2015) reported that ITAs developed their own coping strategies; however, some of the decisions they made were questionable, such as easy grading due to their lack of experience and a lack of guidance. To be effective instructors, ITAs have to adjust to "a new pedagogical culture" while at the same time learning American academic English conventions (Ross & Dunphy, 2007, p. 117). Zhou (2009) found that ITA programs often did not provide enough teaching practice, nor did they provide sufficient guidance and assistance to ITAs. Additionally, Kuo (2011) reported that many of the language challenges ITAs faced occurred in the classroom. For ITAs to convert challenges to successes, they need training and long-term support (Arshavskaya, 2015; Bresnahan & Cai, 2000).

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However, ITAs often do not have enough opportunity to practice effective teaching strategies, so ITA programs need to provide more guidance and help for ITAs to effectively implement what they learned in training (Zhou, 2009). And while ITA programs emphasize language, culture, and teaching, the ITAs' new cultural context makes it difficult for them to adjust to their new roles and life in academia (Zhou, 2009). It is essential for ITA programs to both train and support ITAs in their adjustment to life in a new language and culture, as well as their development as teachers.

ITA programs are an important component for improved teaching effectiveness. Meadows, Olsen, Dimitrov, and Dawson (2015) found that ITAs who participated in an ITA program were more effective teachers than ITAs who only participated in a program designed for both domestic and international TAs. ITA programming is also an opportunity for ITAs to identify and reflect on their beliefs about good teaching and to learn about best teaching practices in an American context (Ross & Dunphy, 2007). Reflection on these beliefs is critical for ITAs' success in teaching by helping them identify the cultural aspects of their beliefs (Ross & Dunphy, 2007). Shannon et al. (1998) suggested that ITA programs purposefully design training to develop teaching skills and to provide the pedagogical skills needed for effective instruction. Additionally, when ITA programs focus on promoting teaching confidence, ITAs' self-efficacy also increases (Dawson, Dimitrov, Meadows, & Olsen, 2013; Salinas, Kozuh, & Seraphine, 1999; Young & Bippus, 2008).

Language, culture, and teaching are critical components of ITAs' experiences. They have diverse educational backgrounds, speak other languages, and are developing teachers. In order for ITAs to be successful in their instruction of undergraduate students, they require appropriate training from their IHE and the departments from which they teach. Another critical component

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of their teaching success is on-going support from their IHE and their departments. College and university training and support services need to assist ITAs in their adjustment to life in a new culture, teaching in a new culture and language, and preparing them for their roles as STEM instructors. ITA training and support, and how it is essential to the success of ITAs, is presented in the section entitled Social World: Training and Support.

Science, Technology, Engineering, and Math

STEM fields continue to grow in importance for colleges and universities. According to the National Science Foundation (NSF), almost 60% of doctoral degrees, 30% of bachelor degrees, and 20% of master degrees awarded in 2012 were in science and engineering fields (NSF "What percentage of degrees are in S&E fields," 2012). Recognizing the importance of teaching and learning to the future of science, the NSF created the Center for the Integration of Research, Teaching, and Learning (CIRTL). CIRTL's mission is to improve undergraduate education through the development of graduate students and faculty by advancing best teaching practices ("About Us," 2016). Its purpose is to improve graduate education as a way to train and improve the teaching of future faculty:

> CIRTL uses graduate education as the leverage point to develop a national STEM faculty committed to implementing and advancing effective teaching practices for diverse student audiences as part of successful professional careers. The goal of CIRTL is to improve the STEM learning of all students at every college and university, and thereby to increase the diversity in STEM fields and the STEM literacy of the nation. ("About Us," 2016, para. 1)

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CIRTL recognizes that quality instruction is a crucial component to STEM education because TAs are current and future STEM educators. When TAs are trained in appropriate teaching practices, they become more effective instructors for their current and future students. CIRTL aims to help TAs prepare to be effective faculty members after they graduate. As a result of more effective STEM instruction, there will be increased diversity and STEM literacy in the US.

CIRTL works to improve teaching and learning in the STEM fields through better pedagogical training of TAs. In promoting teaching and learning, CIRTL established three core ideas: Learning-through-Diversity, Teaching-as-Research, and Learning Communities. These core ideas are meant to guide institutions of higher education in their training and support of TAs:

- Learning-through-diversity capitalizes on the rich array of experiences, backgrounds, and skills among STEM undergraduates and graduates-through-faculty to enhance the learning of all. It recognizes that excellence and diversity are necessarily intertwined.

- Teaching-as-research is the deliberate, systematic, and reflective use of research methods by science, technology, engineering, and mathematics (STEM) instructors to develop and implement teaching practices that advance the learning experiences and outcomes of both students and teachers.

- Learning communities bring together groups of people for shared learning, discovery, and generation of knowledge. To achieve common learning goals, a learning community nurtures functional relationship among its members. (CIRTL "Core Ideas," 2016, para. 1-3)

These three components enhance STEM education through the recognition of the importance of diversity, emphasizing teaching-as-research to grow teaching and learning, and by bringing

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people together. ITAs are critical to the success of CIRTL's core ideas, especially learning-through-diversity. They bring unique experiences and ideas to their departments and their undergraduate students. Their diverse linguistic, educational, and cultural backgrounds enrich the learning of undergraduate students and improve the research community of their departments because excellence requires diversity (CIRTL "Core Ideas," 2016).

CIRTL proposed these ideas to improve undergraduate education through graduate student education, and there have been several institutions that have implemented these tenants. Austin et al. (2009) reported on two universities which implemented CIRTL programs: The University of Wisconsin-Madison (UW-M) and Michigan State University (MSU). UW-M adopted the three pillars of the CIRTL program for the Delta Program, which was developed for academics from graduate students to faculty (Austin et al., 2009). The program had project-based courses where participants identified a learning problem, explored the literature about it, and designed a solution to the problem (Austin et al., 2009). The program was designed to support TAs and postdoctoral researchers and to help them develop portfolios, letters of recommendation, and publications on teaching and learning in preparation for the job market (Austin et al., 2009). Overall, the participants were satisfied with the program, and the learning-through-diversity pillar was adopted on the UW-M campus. The researchers reported that the Delta Program enhanced teaching and learning at UW-M and that many faculty members began incorporating the three CIRTL pillars in their publication proposals (Austin et al., 2009).

The CIRTL program at MSU focused on four professional skills needed for STEM doctoral students: Planning, Resilience, Engagement, and Professionalism (PREP) (Austin et al., 2009). The PREP program was designed to foster growth in the four skills across different stages during the early (course work, dissertation prospectus, career planning), middle (research

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implementation, creating professional networks), and late (dissertation writing, job search) stages of the doctoral students' graduate programs (Austin et al., 2009). It was designed to provide doctoral students with a strong foundation and understanding of teaching and learning throughout their doctoral programs (Austin et al., 2009). Students in the PREP program reported a greater understanding of diversity, had a better understanding of how to approach professional development, and understood the importance of professional development activities (Austin et al., 2009). The focus on diversity, teaching-as-research, and learning communities improved STEM doctoral students' understanding of teaching and learning. These best practices can guide the development and implementation of appropriate training and support for all TAs—both domestic and international—in STEM fields.

There is a strong connection between the success of STEM doctoral and master-level TAs and the undergraduate students in their courses. According to Bettinger et al. (2016), doctoral students contribute to higher education in multiple ways. They receive degrees and contribute to undergraduate education through the teaching and facilitating of courses (Bettinger et al., 2016). Furthermore, Bettinger et al. (2016) pointed out that TAs are current instructors and future faculty; they help determine the future of undergraduate STEM education through their teaching during graduate school and later as faculty members. The teaching success of TAs is critical to the success of the undergraduate students in their current classes, to future STEM students, and to their own development as professionals in STEM.

TAs are important to their departments and IHE because they can influence retention in STEM undergraduate education while they are teaching introductory classes; however, results are mixed as to whether this effect is positive or negative (Bettinger et al., 2016; O'Neal, Wright, Cook, Perorazio, & Purkiss, 2007). It is essential for current faculty to work with TAs to improve

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their teaching skills to improve outcomes for STEM undergraduate education (Austin et al., 2009). However, TAs often work autonomously, without adequate support (Luft et al., 2004); therefore, faculty who supervise TAs do not contribute to TAs' development and help them become better instructors (Sohoni, Cho, & French, 2013). When TAs work independently, without guidance from senior mentors, their teaching skills do not necessarily improve. Furthermore, when TAs do not have adequate teaching support, they cannot get help with areas of weakness, including language and cultural differences. Because STEM TAs are responsible for much undergraduate education, IHE need to help TAs improve their areas of weakness and their teaching skills. The success of TAs directly results in the success of undergraduate students and the future of STEM in the US.

Social World: Training and Support

The social world is critical for the development of ITAs as they become experts in their discipline and in teaching (Lave & Wenger, 1991). ITAs learn about teaching from their entire social world, including faculty and staff, peers, friends, and family (Wulff, Austin, Nyquist, & Sprague, 2004). This section will discuss ITAs' social world: (1) support of international students; (2) training of TAs; (3) institutional support of TAs; (4) socialization of TAs; and (5) intuitional training and support, including the impact of ITA training programs, ITAs' perceptions of ITA programs, assessing the effectiveness of ITA programs, and implementing effective policies for ITAs.

Support of International Students

It is crucial for institutions to understand the needs of international students before they arrive on campus (Andrade, 2006; Eggington, 2015). "Institutions cannot simply admit foreign

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students and expect them to adjust to life in a new country and educational system without appropriate support and programming" (Andrade, 2006, p. 133). Colleges and universities have a responsibility to support international students as they adjust to academic life in the US, learn about and adapt to US culture, and adjust to using US English (Andrade et al., 2014; Cheng et al., 2004; Eggington, 2015; Evans & Andrade, 2015). It is not enough to bring students to campus and to expect them to adjust to the language and culture; they need purposeful and planned exposures to both language and culture to ensure successful academic and social adjustment (Andrade, 2006; Renata & Meckelborg, 2013). Rienties, Beausaert, Grohnert, Niemantsverdriet, and Kommers (2012) found that academic performance is positively correlated with academic adjustment, personal-emotional adjustment, and attachment. Providing academic and social support for international students helps to ensure they are academically successful.

However, most offices at IHE that work with international students focus on immigration, financial, and employment requirements rather than providing cultural, academic, and linguistic support (Özturgut & Murphy, 2009). In fact, faculty and staff are not always aware of the issues that are the most important to international students, and they often overestimated the importance of nonimportant issues (Galloway & Jenkins, 2005). Making international students "feel like they are a significant part of the US cultural mosaic is not a priority, nor is making their educational experiences worthwhile considered" (Özturgut & Murphy, 2009, p. 380). As a result, a gap exists between what international students need and what they receive because faculty and staff at IHE are not required to communicate and create meaningful relationships with international students, which "make their experiences culturally, socially, and educationally worthwhile" (Özturgut & Murphy, 2009, p. 380). However, colleges and universities are

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required to attend to immigration, financial, and employment issues, so those issues become the priority for international offices. Furthermore, many educational systems do not recognize their weaknesses and challenges in supporting international students (Özturgut & Murphy, 2009).

Faculty and staff of colleges and universities are critical factors in international students feeling connected. International graduate students reported that faculty and staff had an impact on whether they felt a sense of belonging to their college or university (Ariza et al., 2018). One way that faculty and staff can help international students feel more connected is to be involved in activities at which international students are present to better get to know students and understand their needs (Galloway & Jenkins, 2005). If faculty and staff become more aware of international student needs, reflect on what they do to support those needs, and give more support to students as they adjust to academic life in the US, the students will be more academically and socially successful (Andrade et al., 2014; Cheng et al., 2004; Eggington, 2015; Evans & Andrade, 2015; Rienties et al., 2012).

Training of TAs

Training and preparation of TAs—both domestic and international—is critical for all colleges and universities. However, there is a lack of consistency in training and professional development opportunities for TAs and ITAs. Institutions and departments have their own policies for TA and ITA preparation and development. Most institutions offer a centralized model of training before TAs start teaching (Ferzli et al., 2012; Parker et al., 2015; Shannon et al., 1998), but there is wide variation in training practices within and across institutions. Some TAs and ITAs participate in multiple training sessions provided by multiple units on campus, some only participate in training by their departments, while others receive no training at all

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(Brinkley-Etzkorn et al., 2015; Luft et al., 2004; Shannon et al., 1998). Training may be optional or required. Length of training can range from a few hours to several semesters, with doctoral students often receiving more continuing training than master-level students (Young & Bippus, 2008). In a survey of doctoral students in the US and Canada, Fagen and Suedkam Wells (2004) found that despite satisfaction with graduate programs overall, almost half of the TA respondents reported a lack of training and supervision in teaching.

Because TAs often have little teaching experience, adequate and appropriate training is essential. TA training is important for the success of several stakeholders, including the TAs themselves, the undergraduate students in their classes, the campus at large, and TAs' future employers (Dimitrov et al., 2013). TA training programs increase TAs' self-efficacy, self-confidence, and teaching effectiveness (Boman, 2013; Dimitrov et al., 2013; Young & Bippus, 2008), and they also benefit the TAs by developing self-confidence in their communicative and organizational skills while helping them complete their degrees (Dimitrov et al., 2013). TA programs not only help the TAs, they also enhance undergraduate learning because of their attention to teaching strategies and focus on student-learning (Dimitrov et al., 2013). Additionally, these programs help create connections for a variety of departments across campus, and they prepare TAs to be future faculty, which is a benefit to both the TA and the colleges and universities where they are earning their graduate degrees and to those at which they will work after graduating (Austin, 2002; Dimitrov et al., 2013).

Purposefully planned TA training programs aid in the improvement of teaching and learning for both ITAs and their undergraduate students. Ferzli et al. (2012) analyzed the effects of TA workshops and concluded that training should focus on pedagogy, teaching development, and monitoring growth and progress, and they should also devote time to reflection on their own

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teaching. Parker et al. (2015) also examined an institution-wide TA training program at the University of North Carolina Wilmington. The purpose of the four-hour, voluntary program was to aid in the university's goal of improving undergraduate student learning. The results showed that the program helped to enrich and expand TAs' understanding of applied learning experiences (Parker et al., 2015).

TA and ITA programs need to prepare participants to plan, assess, manage a classroom, and facilitate student-centered learning techniques (Meadows et al., 2015). To be successful in the classroom, TAs needed training in classroom management, challenging student situations, facilitating discussions, and improving self-efficacy (Young & Bippus, 2008). Luft et al. (2004) also found that in addition to improving TAs' abilities to teach effectively and develop curricula and assessments, TA training programs need to be designed to develop their knowledge of best educational practices in their field, as well. It is also important for TA programs to incorporate TA concerns during the development of the program in order for the program and its TAs to be successful (Sohoni et al., 2013). Therefore, TA programs and professional development opportunities need to be responsive and flexible to TA needs. When TAs perceived that their training was of quality design, they were more likely to plan to attend professional development activities (Hadré & Burris, 2010).

TAs also need mentoring and support in their teaching (Austin, 2002). However, TAs do not always feel as though they are getting the guidance and support in teaching that they need. Faculty are often uninvolved in the labs of STEM TAs and do not provide the support TAs need to be more effective teachers (Sohoni at al., 2013). Luft et al. (2004) explained that TAs believe the faculty and staff working with them tend to ignore discussion of teaching skills, and the authors argued that faculty and staff need incentives to be more involved with undergraduate

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education. Additionally, Twale et al. (1997) concluded that there are a limited number of faculty who have pedagogical training and are willing to assist STEM ITAs. Without adequate pedagogical support, ITAs have difficulty increasing their teaching competency.

To ensure that TA training is successful, it is essential for institutions to assess programs that support TAs. Young and Bippus (2008) suggested that TA training be grounded in the literature, get feedback from current and former TAs for teaching suggestions, and help promote TAs' confidence (Young & Bippus, 2008). Dimitrov et al. (2013) recommended that institutions determine their goals when deciding whether to implement short-term or long-term training programs because they both have positive impacts on TAs but serve different purposes. Short-term programs can include more TAs and introduce teaching development whereas long-term programs build a sense of community among TAs and help them prepare for careers in academia (Dimitrov et al, 2013). Another important way to assess program effectiveness is through feedback from TAs, which can be conducted through program evaluation surveys by TAs who had completed a training program (Gorsuch, Stevens, & Brouillette, 2003; Parker et al., 2015) and used the results to analyze the effectiveness of the program and to adjust the design of the program and plan for future seminars.

Institutional Support of TAs

TA training, support, and professional development opportunities are inconsistent across institutions and departments (Ferzli et al., 2012). After initial training, some institutions have centralized support available to all TAs while others offer decentralized support organized by departments (Shannon et al.,1998). In an analysis of multidisciplinary graduate-level pedagogy courses, O'Loughlin, Kearns, Sherwood-Laughlin, and Robinson (2017) found that departments

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on campus recognized the need for and their responsibility of offering pedagogy courses to prepare graduate students to teach. However, the authors concluded that graduate-level pedagogy courses for graduate students that have been developed at colleges and universities across the country have "arisen largely without systematic training of faculty in teaching or in the teaching of teachers" (O'Loughlin et al., 2017, p. 180). In addition to systematicity, consistency is important for graduate student support. Ferzli et al. (2012) concluded that institutions need to provide TAs consistent and long-term training, support, supervision, and mentoring if TAs are going to continue teaching foundational courses.

Each discipline is unique, with different values, methods, understanding of teaching and research, and interactions among scholars; therefore, graduate students need support in learning about and adjusting to this new culture (Austin, 2002). Graduate students are often still learning about the culture of their discipline and learning how to be members. Therefore, in addition to institution-wide support, TAs also need support in adjusting to the culture of their disciplines, their institution, as well as the culture of their departments (Austin, 2002). As instructors of lower level undergraduate courses, TAs are often undergraduate students' first exposure to the discipline's ideas and culture; therefore, TAs need support in guidance as they navigate their own experiences becoming experts and introducing undergraduates to the field (Austin, 2002).

TAs can also receive support through the purposeful creation of teaching communities. In a case study of STEM TAs and Assistant Instructors, Milner-Bolotin (2001) reported how TAs and undergraduate assistant instructors of a physical science course established weekly meetings to share pedagogical knowledge and experiences. The group was not required; however, there were a core group of TAs and assistant instructors who attended. The author concluded that the weekly meetings helped establish a teaching community and helped bridge the gap between

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graduate students from two different departments who taught the course (Milner-Bolotin, 2001). Swan et al. (2017) also found that ITAs perceived learning community meetings as one of the most valuable aspects to their ITA training and support program. Learning communities and TA meetings can effectively support TAs if they are purposeful, structured, and regularly scheduled.

Another essential component of TA and ITA support is through mentoring (Austin, 2002; Ferzli et al., 2012; Lechuga, 2011; Parker et al., 2015; Swan et al., 2017). Mentors can be other graduate students who are further along in their program or faculty members. Lechuga (2011) found that faculty mentors often view their role as mentor as both supervisory and developmental; faculty often expect graduate students to be independent learners in order to become experts themselves in the field (Lechuga, 2011). Faculty also believe it is their responsibility to help graduate students to become socialized into the profession by encouraging them to write conference papers and give presentations (Lechuga, 2011), which helps graduate students develop professionally as academics in their field. Teaching assistants benefit most when they meet regularly with mentors, as they become aware of which aspects of their teaching they need to improve and receive advice on how to strengthen their teaching abilities (Austin, 2002).

In addition to mentoring, video recording lessons is also a beneficial practice for teaching feedback, as well as an opportunity for self-reflection (Calahan, 2013; Calonge, Mark, Chiu, Thandani, & Pun, 2013). Recording allows TAs to observe their teaching, particularly the non-verbal aspects of teaching, and to self-reflect on areas of improvement (Calahan, 2013). Video recording and watching the video together is also an opportunity of mentors and TAs to discuss teaching practices and improve instruction and encourages a cycle of feedback and reflection

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(Calahan, 2013; Calonge et al., 2013). Regular recording, discussion, and self-reflection are important aspects to improving instruction.

Socialization of TAs

Socialization theory explains the process of an individual becoming part of a group (Austin, 2002). Socialization is one of the dominant theories in graduate teaching (Austin, 2002; Austin et al., 2009) and international teaching assistant literature (Bresnahan & Cai; Jia & Bergerson, 2008; Trebing, 2015). This theory helps explain how graduate student learn about the discipline, research, and teaching from their faculty mentors to become independent academics and teachers themselves (Austin, 2002).

For graduate school, socialization "refers to the process through which individuals gain the knowledge, skills, and values necessary for successful entry into a professional career requiring… specialized knowledge and skills" (Weidman, Twale, & Stein, 2001, p. iii). Graduate school is viewed as a place of socialization for graduate students within their disciplines and future academic careers, specifically future faculty positions (Austin, 2002). Socialization includes the individual learning about the group's values, attitudes, expectations, and culture (Austin, 2002). According to Weidman (2006), socialization occurs across the organization and includes multiple people and processes. Students' backgrounds, predispositions, and preparation for higher education are the inputs of the socialization process (Weidman, 2006). The environment which affect students include their peers, their major, their co-curricular activities, their family, their friends, and their employers (Weidman, 2006). Additionally, the socialization processes, such as their interactions, integration into the community, and their learning also have an impact on their socialization in that context (Weidman, 2006).

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Mena, Diefes-Dux, and Capobianco (2013) applied situated learning theory in the analysis of socialization experiences of engineering TAs. The authors found that TAs' socialization experiences fall into five categories: "TA responsibilities, TA training, interactions with different groups of individuals, use and development of certain skills, and balancing teaching and research" (p. 195). In order for TAs to become members of the learning community, they must have interactions with multiple groups, developing and using new skills, and learning how to balance their teaching, learning, and research (Mena et al., 2013). The TAs have two types of training, both prior to the semester and during the semester (Mena et al., 2013). These training experiences are important for the TAs' socialization and help TAs learn from other TAs and faculty members, particularly about what was expected of them (Mena et al., 2013). Without these training experiences, their expectations would be unclear, and the TAs would have a more difficult time becoming members of the community and experts in their fields.

Socializing and preparing graduate students for future faculty careers is crucially important for graduate programs (Austin, 2002; Austin et al., 2009). Austin (2002) found that there are discrepancies between the preparation graduate students received in graduate school and the reality of academic work. Because of these discrepancies, participants in the study recommended that graduate schools: (1) provide more mentoring and feedback, (2) provide more purposefully planned opportunities for peer meetings, (3) encourage diversity in teaching experiences, (4) provide graduate students with realistic ideas about faculty responsibilities, and (5) provide more opportunities for guided reflection (Austin, 2002). The author recommended graduate schools provide systematic opportunities for students to learn about faculty life, faculty members provide regular feedback to their graduate students, graduate schools should utilize

peer relationships to foster academic and institutional socialization, and graduate schools should provide regular opportunities for self-reflection (Austin, 2002). Austin (2002) explained that these recommendations would help prepare doctoral students for future faculty positions.

Socialization is also important for ITAs, who are new to the cultural context of US universities. When ITAs assimilate to a new culture—allowing themselves to be socialized— they become more integrated into their new context, rather than isolated or marginalized (Trebing, 2015). Jia and Bergerson (2008) analyzed the socialization of ITAs and found that when ITAs are purposefully socialized, they experienced lower levels of ambiguity and uncertainty. Supportive social networks are important because they can help lessen some of the cultural, social, and psychological challenges ITAs face (Jia & Bergerson, 2008). Similarly, Bresnahan and Cai (2000) reported that ITAs were more successful when they had somebody with whom they could share their concerns and ask questions. That person did not necessarily have to be a mentor, rather it could be a peer, another TA, another student in their program, a program director, a faculty member, or one of their students (Bresnahan & Cai, 2000; Trebing, 2015). Bresnahan and Cai (2000) also found that purposeful institutional support of ITAs was more important for the successful adaptation of ITAs than the level of their English language skills.).

Faculty are a crucial part of TA training and socialization in higher education because they help TAs learn how to be experts in their fields (Lave & Wenger, 1991; Mena et al., 2013). ITAs who feel supported and welcomed by their department have increased feelings of success (Trebing, 2015), and TAs that feel accepted by faculty describe their relationships as "colleagueships and working relationships" (Mena et al., 2013, p. 205). The TAs explained that interaction with their peers are a valuable component of their experiences because valuable

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learning opportunities often come from other apprentices—in this case other TAs—not just from mentors (Lave & Wenger, 1991; Mena et al., 2013).

Mena et al. (2013) recommended that faculty view teaching assistantships as apprenticeships, where TAs learn from faculty. The authors recommended that faculty meet with TAs more often to provide more frequent feedback and advice (Mena et al., 2013). The authors also recommended explicit peer mentoring models, such as TAs sharing offices and having designated peer mentors (Mena et al., 2013). This is important because ITAs who engage in socialization and assimilation strategies are more likely to develop context-appropriate teaching strategies, to be considered competent teachers by their students, and to be more effective in their roles as ITAs (Trebing, 2015). Through purposeful teaching opportunities, peer mentors, and faculty contact and feedback, TAs have the opportunity to become members of the learning community and experts through socialization and legitimate peripheral participation.

Institutional Training and Support of ITAs

ITA Training Programs

ITAs have different backgrounds, needs, and challenges from their domestic peers (Jia & Bergerson, 2008; Kauffman & Brownworth, 2006). Swan et al. (2017) found that over 90% of ITAs reported that they faced specific challenges that domestic teaching assistants did not. Because of their different backgrounds and unique challenges, in addition to formal institutional and departmental support they receive with domestic TAs, ITAs are also trained and supported through ITA training programs, (Brinkley-Etzkorn et al., 2015; Shannon et al., 1998). However, ITA programs did not begin as a means to meet the needs of diverse graduate student populations. Instead, they developed in the 1980's because of the dissatisfaction of

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undergraduate students, their parents, and administrators with ITAs and their English language skills (Kaufman & Brownworth, 2006; Wright et al., 2008). Bailey (1984) reported this negative perception of ITAs as the "foreign TA problem" (p.3).

ITA programs have continued to expand with the rise in the number of untrained graduate students teaching increasing numbers of undergraduate courses (Austin, 2002; Gorsuch, 2015; Kauffman & Brownworth, 2006; Ross & Dunphy, 2007). Recently, ITA programs have been using asset-based models to develop ITAs' linguistic, cultural, and pedagogical knowledge. These models capitalize on the strengths of ITAs and the value they bring to campuses. ITAs bring content-area skills and knowledge, as well as international perspectives to their teaching of undergraduate students (Smith et al., 1992).

Assisting with the transition to the US is an essential component to ITA training. ITAs need cultural training and support, including adjusting to US culture, academic and discipline culture, the culture of the college or university, and the culture of their department. Because ITAs come from a variety of cultural contexts, they need training and support in important US cultural and academic aspects, such as informal social interactions, communicating with professors and students, working in groups, the importance of time, and academic integrity (Arshavskaya, 2015).

The design and implementation of ITA programs are unique to the institutions in which they are located. ITA programs and trainings range from brief orientations to structured and supervised teaching seminars (Brinkley-Etzkorn et al., 2015; Shannon et al., 1998). Kaufman and Brownworth (2006) recommended a centralized facility, which facilitates collaboration and demonstrates the institution's commitment to ITA teaching preparation and development. According to Brinkley-Etzkorn et al. (2015), most institutions have adopted a centralized model

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of ITA training by implementing a week-long training program prior to the start of the semester, the remainder of the institutional support is decentralized. However, Ernst (2008) also found that ITA training was a departmental-level task, which happened at the graduate school-level, and Gorsuch (2012) found that this decentralized training was important for ITAs' development as emergent experts in their discipline and department. According to Kaufman and Brownworth (2006), the best approach to ITA preparation is through systematic programming, with a centralized center which coordinates with academic departments on mentoring, supervision, and assessment. In order to ensure alignment and quality, it is essential that departments and programs define and align their goals for ITA programming

ITA programs are important because they support ITAs as they become teachers in a new cultural context. However, pedagogical and academic growth do not happen without proper planning and long-term support. To be effective programs, ITA training must be purposefully designed for ITAs (Shannon et al., 1998). ITAs who participate in purposefully designed ITA programs have a better understanding of classroom expectations and norms and had higher scores of teaching effectiveness than ITAs who only participated in a training program designed for all TAs (Dawson et al.; Meadows et al., 2015).

ITA programs also provide opportunities for ITAs to reflect on and identify their ideas about good teaching and to learn about and practice teaching strategies appropriate for the American context (Ross & Dunphy, 2007). This reflection is important for ITAs to continue to learn and grow as teachers. ITA programs can also play an important role in boosting ITAs' teaching confidence because when confidence is emphasized in training, ITAs' self-efficacy improves (Dawson et al., 2013; Salinas et al., 1999; Young & Bippus, 2008).

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In addition to training and support in teaching, ITA programs also help ITAs adjust linguistically. Kim (2016) found that ITAs in engineering labs had trouble addressing communication gaps and initiating negotiation during labs. The undergraduate students in these labs perceived these communication problems but often chose to delay negotiation with the ITA rather than address the problem (Kim, 2016). Therefore, in addition to the support TAs need in best teaching practices, ITAs need added linguistic and cultural support to communicate more fluently and effectively with undergraduate students.

ITA Perceptions of ITA Programs

ITAs have varying opinions about and experiences with training programs (Jia & Bergerson, 2000; Trebing, 2015). Jia and Bergerson (2008) reported that ITAs with experience on US campuses have different perceptions of ITA programs than those who are new to the US with educational experiences that have occurred outside of the US ITA programs need to both address' ITAs challenges and meet the needs of the departments in which ITAs are teaching (Jia & Bergerson, 2008).

Trebing (2015) asked ITAs about their experiences in ITA training programs and what suggestions they had for improving teaching outcomes. The ITAs reported that the pre-semester programs were "somewhat useful;" however, many of the ITAs were unsure of the objective of the workshops and why they had to attend (Trebing, 2015, p. 216). The ITAs also explained that they learned how to manage classroom challenges and employ effective classroom management and teaching strategies, but they wanted more of those types of sessions (Trebing, 2015). The ITAs perceived themselves as too busy for the workshops and did not understand how the workshops connected to them (Trebing, 2015). Two ITAs suggested that a course occurring

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during their first semester of teaching would be more beneficial than a workshop prior to the start of the semester (Trebing, 2015). The author suggested that some ITAs may not be prepared to understand the importance of the information in the programs before they begin teaching (Trebing, 2015). Therefore, providing long-term training and continuing support during the first semester of teaching may help ITAs better learn and apply the concepts presented in the program.

Mentoring is one key aspect for ITAs to perceive the ITA program as effective. ITAs who are paired with experienced peer mentors in an ITA program report ITA programs to be effective (Swan et al., 2017). ITAs who participate in a mentoring program believe that it has a positive effect on their teaching, strengthened their teaching confidence, and strengthened their teaching skills (Swan et al., 2017). Therefore, peers can serve as mentors to ITAs during their first teaching experiences.

Assessing Effectiveness of ITA Programs

As was previously established, there are multiple components to effective ITA training: language, culture, teaching, mentoring, and reflection (Bresnahan & Cai, 2000; Civickly & Muchisky, 1991; Ferzli et al., 2012; Gorsuch, 2012; Hoekje & Williams, 1994; Ross & Dunphy, 2007; Smith et al., 1992). Young and Bippus (2008) explained that the key to effective TA training is clarifying their needs, designing and implementing programs to meet those needs, and to measure how well the training met the TAs' needs. For training to be effective, programs need to evaluate and review how well they are helping ITAs (Ferzli et al., 2012). Because ITAs are often trained and receive support from different units across campus, all support services and programs need to evaluate needs, implement programs, and measure success through program

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evaluation. Because there are few published studies regarding comprehensive evaluation of ITA programs, this chapter includes discussion of TA training and support programs, as well.

ITAs are often supported through centralized facilities or programs before they start teaching, in addition to the more on-going support they receive from their departments (Brinkley-Etzkorn et al., 2015). Departments are often left to decide what kind and how much training and support their ITAs receive (Ernst, 2008). Gorsuch (2012) explained that this type of department-level training is important for ITAs because they are developing in their areas of study, and the department is an appropriate place for ITAs to become experts in their field. However, Kaufman and Brownworth (2006) explained centralized training opportunities for all ITAs is best practices for ITA training, and the authors recommended that the ITA program coordinate with departments around campus to help train, mentor, supervise, and evaluate ITAs.

One of the primary ways to evaluate the organizational support of ITAs is through the evaluation of the effectiveness of teacher training (Dawson et al., 2013). Teaching training programs can be evaluated on the effectiveness of their teaching training through the observation of ITAs' teaching (Dawson et al., 2013). This observation should be done multiple times using a rubric to measure growth according to specific learning outcomes. Another way to assess program effectiveness is to survey ITAs about their perceived self-efficacy because perception of self-efficacy is an important factor in teaching efficacy (Boman, 2013; Dawson et al., 2013; Salinas et al., 1999; Young & Bippus, 2008). To assess on-going support programs, self-efficacy surveys would need to occur frequently and at various stages in the ITAs' program to monitor efficaciousness of programs and support.

One of the most important ways to evaluate ITA training and support is by asking ITAs for feedback (Dawson et al., 2013; Trebing, 2015; Young & Bippus, 2008). Soliciting ITAs'

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opinions can be done via survey (Dawson et al., 2013; Young & Bippus, 2008) or interview (Trebing, 2015). This feedback can provide meaningful ideas regarding the content of training programs and allows facilitators to tailor programs to the needs of the ITAs. ITA training is typically top-down, with little input from ITAs themselves (Zhou, 2009). However, to effectively design, implement, and evaluate the training program, ITAs' voices need to be heard.

Implementing Effective Policies for ITAs

To adequately prepare ITAs for success in the classroom, they need orientations, English language training and support, on-going workshops, seminars in their academic departments, mentoring, continuing supervision, as well as evaluation (Kaufman & Brownworth, 2006; Swan et al., 2017). In a comprehensive benchmark study, Brinkley-Etzkorn et al. (2015) analyzed the administrative and organizational structures of 20 ITA support programs at 20 institutions with RI Carnegie classification. The study found that of the 20 institutions surveyed, there were both formal and informal support services provided for ITAs. There were 17 formal courses and seminars designed to support ITAs, 10 orientation trainings, and nine workshops (Brinkley-Etzkorn et al., 2015). The informal support services included conversation circles or groups, mentoring, and buddy programs (Brinkley-Etzkorn et al., 2015). However, mentoring programs, which were a crucial component to ITA success, only occurred in two of the 20 institutions (Brinkley-Etzkorn et al., 2015). ITAs believe mentoring is one of the most valuable parts of their ITA training and support experiences (Swan et al., 2017); however, they are missing in many programs (Brinkley-Etzkorn et al., 2015).

The 20 institutions surveyed had decentralized organizational structure, which resulted in a lack of collaboration and coordination across units (Brinkley-Etzkorn et al., 2015). Participants

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expressed a desire to collaborate on ITA issues with other departments and divisions; however, they reported an inability to do so due to a lack of time (Brinkley-Etzkorn et al., 2015). As a result, ITAs did not receive enough support and training in communication, teaching pedagogy, and culture to be successful classroom instructors (Brinkley-Etzkorn et al., 2015). Therefore, in order for ITAs to be successful in the classroom, it is important for IHE to be aware of their organizational structure, its impact on how ITAs are trained and supported, and make policies that ensure ITAs receive sufficient support and training in communication, teaching, and culture.

Career Goals

This section will discuss TAs' career goals and how colleges and universities help support these goals. As previously established, the training and support of TAs is often designed to meet the needs of the institution and the departments hosting the graduate students, rather than the needs of the TAs and the undergraduate students in their classes (Austin, 2002). TA programs are not designed to support the current needs of TAs, nor are they designed to assist TAs in achieving their personal career goals, whether their goal is to work in academia or outside of higher education. Whatever their career goals may be, graduate students need guidance about academic careers, focused feedback and mentoring, teaching opportunities, and opportunities for reflection (Austin, 2002).

TAs planning to pursue faculty positions need support to encourage growth in teaching; however, they are often left without adequate assistance (Fagen & Suedkamp Wells, 2004; Luft et al., 2004). This is problematic because graduating doctoral students are those who are filling faculty ranks (Austin, 2002) While not all TAs seek to become faculty, many TAs plan to remain in academia, Bettinger et al. (2016) found that there was a positive correlation between graduate

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student teaching and future employment by colleges or universities. Horta (2018) also found that the career intentions of doctoral candidates matters: If PhD students arrive in their program planning to remain in academia, they are more likely to do that.

Because there is a correlation between being a TA and becoming a faculty member, the question of how graduate programs prepare graduate students and TAs for their future roles, including as faculty, arises (Austin, 2002). While graduate students are socialized in their roles as graduate students, in academic life, in their profession, and in their discipline, this ancillary exposure to becoming a professional in academia is not enough to ensure they are prepared for academic life as faculty members (Austin, 2002). Designing programs that prepare and support TAs in their current roles as instructors and future roles as faculty are essential for ensuring quality undergraduate education (Austin et al., 2009; O'Neal et al., 2007).

Preparing TAs for faculty roles is important; however, not all TAs plan to remain in academia. Golde and Dore (2004) reported that levels of interest in entering faculty ranks varied by discipline. For example, students in philosophy and English are more likely to desire to stay in academia than those with disciplines connected to industry, such as chemistry (Golde & Dore, 2004). For TAs planning to leave academia and enter industry, guidance is also absent. Fagen and Suedkamp Wells (2004) reported that 62% of doctoral students reported a lack in guidance in preparation for nonacademic careers. As a result, doctoral students planning to enter industry are graduating with feelings of unpreparedness.

While some of the literature addresses the career goals of TAs, there is a gap regarding what ITAs' career goals are and how colleges and universities help them to achieve their goals. Because of the missing research around ITAs' career goals, this study asked the research sub-

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question: How do the experiences of NNES ITAs in STEM influence their perceived preparation towards their career?

Conclusion

ITAs bring both content knowledge, research skills, and international perspectives to colleges and universities in the US (Smith et al., 1992). The use of ITAs in undergraduate education is a long-standing tradition in IHE, and their presence in undergraduate courses continues to grow (Chiang, 2016; LoCastro & Tapper, 2006; IIE Open Doors "Primary Source of Funding," 2018). In order to support the growing number of ITAs, colleges and universities are designing, implementing, and expanding ITA programs, which are specifically designed to improve ITAs' teaching (Austin, 2002; Gorsuch, 2015; Kauffman & Brownworth, 2006; Ross & Dunphy, 2007). ITAs who participate in programs specifically designed for ITAs have better understanding of US classroom norms and higher teaching effectiveness scores, which facilitate improved classroom effectiveness (Dawson et al., 2013; Meadows et al., 2015). When ITAs are more effective classroom instructors, their students directly benefit through increased learning.

While TA and ITA development and training are becoming more represented in the literature, they are still underrepresented (Gorsuch, 2012; Gorsuch, 2016; Parker et al., 2015). Although some studies have been published on the structural support ITAs receive at the organizational level (Brinkley-Etzkorn et al., 2015; Trebing, 2015), there is a dearth of research regarding ITAs' perceptions of their support systems and how their experiences can shape effective policies for ITA programming in order to prepare them for the current roles and future careers.

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One of the most important ways to understand how ITAs are being trained and supported is by asking them for feedback (Dawson et al., 2013; Trebing, 2015; Young & Bippus, 2008). Because ITA training is typically top-down (Zhou, 2009), feedback directly from the ITAs themselves can provide meaningful ideas regarding what the ITAs are receiving and what they need. In order to effectively support ITAs through appropriately designed programs, ITAs' perspectives need to be heard. ITA programs need to both address' ITAs challenges and meet the needs of the departments in which ITAs are teaching (Jia & Bergerson, 2008). This study sought to understand ITAs' perceptions of how they are being supported and of how that support prepares them for their future careers. In addition to ITAs' experiences and career plans, this study also examined ITAs' perceptions of the training and support they receive across the university in order to understand whether they believe the training and support they receive is sufficient.

The results of this study are meant to inform institutional policies that are based on students' own experiences. Rather than the typical top-down approach to ITA policy (Zhou, 2009), this study sought to give voice to ITAs and provide a framework for a bottom-up approach, taking into consideration what ITAs say that they need regarding training and support. On a broader scale, the results of this study can guide ITA programs and graduate programs so that they adequately prepare ITAs for teaching during graduate school and for their future careers by providing an analysis of ITAs' perceptions of institutional support that they receive utilizing a qualitative methodology.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this chapter is to explain the methodological approach of the study. This chapter presents the following: the purpose of the study, the research question and sub-questions, theoretical framework, ethical considerations, qualitative research design, theoretical perspective, sample, data collection, methods of coding and treating data, data analysis, the role of the researcher, goodness criteria, and trustworthiness.

Purpose of the Study

Grounded in hermeneutical phenomenology, this qualitative study examined the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study was to examine ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. This study built upon and adds to the work of Trebing (2015), who identified suggestions ITAs themselves had for improving ITA training programs. The current study extended this research by analyzing ITAs' career goals and how institutional training and support programs help prepare them to achieve those goals.

Research Question

To understand non-native English-speaking ITAs' experiences and their perceptions of support, I investigated the following question:

- What are the lived experiences of non-native English-speaking International Teaching Assistants in STEM?

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The following sub-questions also helped drive the study and answer the research question:

- How does university training and support influence these lived experiences?
- How do their experiences influence their perceived preparation towards their career?

Theoretical Framework

Lave and Wenger's (1991) situated learning theory was used to frame this study. This framework was appropriate because this study examined the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest, and situated learning theory describes the process of learning within a community of practice (Lave & Wenger, 1991). First, this study examined how ITAs learn and how they are supported as novice teachers throughout the learning process. In situated learning theory, learners move from peripheral participants to full participants through increased engagement with their practice and the community (Lave & Wenger, 1991). This study analyzed ITAs' reports of their experiences as novice teachers who are in the process of becoming experts in their disciplines and in the teaching of those disciplines. Second, this study examined how ITAs perceive they are supported by faculty, staff, and their peers as their engagement increases within the community of practice on campus. Finally, this study considered ITAs' future goals and how those goals are connected to the support ITAs receive as they are becoming experts in their discipline and teaching of that discipline.

The choice of situated learning theory for this study was reinforced by its use in Arshavskaya (2015), which analyzed ITAs' experiences in US classrooms. This study used situated learning theory to understand how ITAs perceive how they are being supported and how

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that support prepares them for their future careers. The purpose of this study was to examine ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. Situated learning theory framed the analysis of how ITAs describe their experiences, support, and career plans.

Theoretical Perspective

This study used social constructivism as its theoretical perspective to understand the lived experiences of non-native English-speaking STEM ITAs. Social constructivism is concerned with how individuals understand and make meaning in their worlds (Creswell, 2013). People experiencing a phenomenon have their own subjective ideas about their experiences, and bringing in multiple points of view and experiences helps construct the essence of that phenomenon (Creswell, 2013). Therefore, this study used the experiences of individuals and analyzes them in aggregate to construct the true essence of being a NNES STEM ITA (Moustakas, 1994).

Ethical Considerations

According to Moustakas (1994) human research must be guided by ethical principles. Because ethical standards are essential to the integrity of qualitative inquiry, I sought to maintain the highest ethical standards. First, I obtained IRB approval before beginning the study. Each participant received detailed information about the study prior to participation; they signed informed consent forms, which are found in Appendix C; and they were allowed to withdraw at any time (Moustakas, 1994). Additionally, the identities and gender identities of the participants, as well as the location of their university, is kept anonymous in order to protect their identities.

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According to Jones, Torres, and Arminio (2014), qualitative researchers have "the ethical imperative to do *good*" (p. 175). This study sought to understand the lived experiences of NNES ITAs in order to inform and improve policies regarding NNES ITAs. Not only did I seek to adhere to the highest ethical standards of the field, I sought to do good by improving understanding of ITAs' experiences and future goals to create informed policies which will provide appropriate training and support and will improve STEM undergraduate and graduate education.

Qualitative Research Design

A hermeneutical phenomenological qualitative design informed this study. A phenomenological study seeks to understand the essence of an experience or phenomenon by collecting data from people who have experience with the phenomenon (Creswell, 2013). According to van Manen (1990), phenomenological studies ask, "What is this or that experience like?" (p.9). Phenomenological studies return to experience "to obtain comprehensive descriptions that provide the basis for a reflective structural analysis that portrays the essences of the experience" (Moustakas, 1994, p. 13). These types of studies use descriptions of experiences to develop essences or structures of the phenomenon (Moustakas, 1994). They seek to understand what participants experienced, how they experienced it, and their perceptions about it (Moustakas, 1994). The goal is to "determine what an experience means for the persons who have had the experience and are able to provide a comprehensive description of it" (Moustakas, 1994, p. 13). This study sought to examine the phenomenon of being an NNES ITA in a STEM field and to understand what it means to be an ITA through the descriptions provided by the participants who have experienced being one.

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Reflective processes are a critical component of phenomenological studies, and these processes allow for logical and systematic analysis and synthesis (Moustakas, 1994). Through reflection, researchers must construct textural descriptions, which include "thoughts, feelings, examples, ideas, situations that portray what comprises an experience" (Moustakas, 1994, p. 47). Repeated reflection on these thoughts and experiences and seeing them repeatedly throughout the phenomenon gives the researcher confirmation of what is experienced. It is also important for researchers to reflect on their own thinking, intuition, and judgements, as they are part of the scientific investigation (Moustakas, 1994). Therefore, as a part of the inquiry process, I systematically reviewed, analyzed, synthesized, and reflected on the participants' descriptions. I also documented this reflection and review in a research journal.

According to Moustakas (1994), "perception is regarded as the primary source of knowledge, the source that cannot be doubted" in phenomenology (p. 52). Perceptions occur from different angles, and every perception counts (Moustakas, 1994). The research question in this study asked about the perceptions of graduate ITAs in STEM about the specific training and TA support programs at the university. To answer that question, I analyzed ITAs' perceptions of their training and support programs, how they were interconnected, and how they gave meaning to the phenomenon of being an ITA.

In addition to the perceptions of the participants, the perceptions of researchers are also crucial components of phenomenology. According to Moustakas (1994), the participants, the researcher, and the phenomenon are all integrated: "What I see is interwoven with how I see it, with whom I see it, and with whom I am. My perception, the thing I perceive, and the experience or act interrelate" (p. 59). Therefore, in this study I regularly reflected on my perceptions and how they relate to the descriptions and perceptions of the participants in a research journal.

This study employed hermeneutical analysis of the data. According to Jones et al. (2014), "hermeneutics refers to the interpretation of an object for the purpose of understanding" (p 88). This study sought to understand ITAs' lived experiences, and hermeneutics guided how the data collected from the participants were analyzed to understand the essence of their experiences. Hermeneutical analysis "involves the art of reading a text so that the intention and meaning behind appearances are fully understood" (Moustakas, 1994, p. 9). "Meaning is multi-dimensional and multi-layered" (van Manen, 1990, p. 78), and hermeneutical phenomenological studies seek to uncover those layers and dimensions in order to understand what the experience is for those who have experienced it. According to Moustakas (1994) "hermeneutic analysis is required in order to derive a correct understanding of a text" (p. 9). Without analyzing all of the facets of the experience, it is not possible to derive a correct interpretation of a text or experience. Through hermeneutic analysis, the researcher interprets and "unmasks what is hidden behind the objective phenomena" (Moustakas, 1994, p. 10). In the interpretation of data, I did not just report the obvious themes; rather, I constantly analyzed and re-analyzed the statements of the participants, questioned pre-judgements, and elucidated connections that explicate the meaning of the lived experience (Moustakas, 1994). I continued to return to the statements of the participants to identify and analyze themes in order to understand the "structures of experience" (van Manen, 1990, p. 80).

To identify thematic statements made by participants, I took a wholistic approach, by reading all of the transcripts and statements made by the participants and then asking, "What sententious phrase may capture the fundamental meaning or main significance of the text as a whole?" (van Manen, 1990, p. 93). Then I wrote statements that express the participants' meanings in a way that reflects the significance of their accounts. Furthermore, I also looked at

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individual statements and identified those which "are essential or revealing about the phenomenon or experience being described" (van Manen, 1990, p. 93). These statements are the key quotations which exemplify the experiences of the participants.

Through this qualitative hermeneutical phenomenology, I attempted to find the deeper meaning of ITAs' words and experiences through interpretation in order to understand the phenomenon. This study elicited ITAs' perceptions of their experiences, ITA programs, and institutional support in order to inform institutional ITA policies and practices. On a broader scale, the results of this study are meant to inform ITA programs and graduate programs so that they can adequately prepare ITAs for teaching during graduate school and for their future careers by providing an analysis of ITAs' perceptions of institutional support that they receive utilizing a qualitative methodology. A hermeneutical phenomenology was useful because understanding what ITAs are experiencing will aid in better understanding how to develop more appropriate training and support services using their voices, ideas, and experiences.

<div align="center">Sample</div>

According to Creswell (2013), all participants in a phenomenological study must "have experience of the phenomenon being studied" (p. 155). This study sought to understand the lived experiences of non-native English-speaking international teaching assistants in STEM fields; therefore, in order to qualify to participate in this study, ITAs had to identify as non-native English speakers, be master- or doctoral-level graduate students with teaching assistantships in STEM fields, and have completed at least one semester of teaching.

Purposeful sampling was used to select seven participants. Sampling in qualitative inquiry "is characterized as *purposeful*" and requires choosing participants that have the "greatest

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potential for generating insight about the phenomenon of interest" (Jones et al. 2014, p. 107). Because the purpose of this study was to understand the lived experiences of non-native English-speaking STEM ITAs, it was important to have participants that reflect the ITA population at the Midwestern university. I recruited participants who came from different countries, who spoke different native languages, and who were concentrating in different fields within STEM. This purposeful sampling ensured diverse voices and experiences represented to understand what it means to be a non-native English-speaking STEM ITA at the Midwestern University.

Participants

During the Fall 2017 semester, there were 75 ITAs at the university. Just under 75% of the ITAs were in STEM programs, including mathematics, physics, chemistry and biochemistry, biology, engineering, psychology, and computer science. The ITAs in STEM came from around the world, including Bangladesh, China, Ghana, India, Nepal, Saudi Arabia, and Sri Lanka. There were 14 potential participants that responded to my email inquiry. Of those who responded, 13 were interested in participating in the study; however, two potential participants had completed their programs and had already returned to their home country, and two other potential participants were unable to participate because they were not on campus during the time of the interviews. Two different potential participants signed up to participate but had to withdraw because they had to leave campus earlier than expected. Another potential participant declined to participate due to schedule conflicts and due to a concern that the interview could have had a negative effect on immigration status and potential employment opportunities. This resulted in a total of seven NNES STEM ITAs who were interested and available to participate in the study. The seven participants were from three different countries, and they were studying

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math, chemistry, or physics either at the masters or doctoral level. A table of the participants and their information can be found in Appendix E.

Location

This study occurred at a mid-sized university located in the Midwest. There are just over 20,000 students, including bachelor, master, and doctoral students. The university offers over 70 graduate programs, including masters, specialist, and doctoral. Due to an increased focus on research and doctoral programs, the university recently moved up in the Carnegie rankings and is currently classified as a higher research activity doctoral university (The Carnegie Classification of Institutions of Higher Education, 2017). This increased focus on research at the university has resulted in departments relying on TAs—both domestic and international—to facilitate and teach courses in their programs, particularly in STEM departments

As stated in Chapter I, ITAs at the university receive training in several ways. First, all TAs—both domestic and international—are directed to a TA training website, which provides them with basic information about the University and its policies. Second, ITAs are provided an optional week-long, 35-hour training prior to the start of the fall semester. All ITAs are invited to participate in the program; however, it is optional, and many are unable to participate because they have not yet arrived in the country. The program focuses on preparing students to teach in a US classroom, understanding US culture, and how to effectively use the English language in the classroom. Finally, some ITAs also receive training through their departments, which ranges from a week-long seminar to a brief discussion with lab coordinators. The preparation of ITAs to teach at the university varies greatly, depending on how engaged the ITAs is and how much their department requires them to do.

Data Collection

After obtaining IRB approval to conduct the study, I sent an email invitation to all ITAs from the previous academic year. Because I was the director of the International Teaching Assistant program, I had the contact information of all ITAs at the university. I sent an email to all ITAs who had teaching assistantships during the previous academic school year, which was a total of 75 ITAs. All of them were invited to participate in the study. A letter of introduction, description of the study, and invitation to participate were sent to all potential participants. The letter of introduction is located in Appendix A. The letter of introduction instructed ITAs to reply to the email if they wished to participate and were eligible: They identified as a non-native English-speakers and were ITAs in a STEM field. After I received responses by the established date, I contacted all potential participants who replied via email and invited them to participate in three separate interviews. Everybody who responded was invited to take part in interviews.

Face-to-face interviews were conducted with the seven participants to understand their experiences as ITAs, to elicit their perceptions of institutional support, and to understand their career goals. The interviews were audio recorded and transcribed to ensure accuracy (Creswell, 2013). The recordings and transcriptions were encrypted and stored on a password-protected personal drive on a password-protected computer. All written notes were kept in a locked cabinet in the researcher's locked office space. No identifying information was stored with the data, and all participants were given pseudonyms. The data was also input into Dedoose, which is a password-protected, full qualitative and mixed-methods web-based support program for data storage and analysis (Dedoose, 2017).

Interview Protocol

I conducted three semi-structured, face-to-face interviews with each participant. I met with each participant at a mutually agreed upon location on the campus of the university. At the beginning of each interview, I obtained consent from the participants. This form can be found in Appendix B. The participants were notified that they could withdraw at any time and that each interview was recorded. The purpose of the first interview was to build rapport with participants and to ask about their English proficiency, confidence, and use, as well as their cultural adaptation to the United States. The second interview focused on their teaching experiences, and I asked them to share and reflect on artifacts from their teaching, including lesson plans, syllabi, rubrics, assignment sheets, emails they have sent to students or anything else from their teaching experiences at the university that they would like to share and discuss. The third interview focused on organizational support and their career goals. The interviews were long, in-depth, dialogue-based interviews designed to be interactive using open-ended questions, which could change depending on the answers to other questions (Moustakas, 1994). The questions elicited "a comprehensive account of the person's experience of the phenomenon" (Moustakas, 1994, p. 114). Long, exploratory interviews helped provide a rich, thick description of ITAs' experiences. To accurately describe participants' responses to questions, I took notes during and after interviews, noting emotional effects and inaudible responses that may provide valuable information about participants' feelings and experiences (Creswell, 2013; Moustakas, 1994).

The interview questions used were adapted from Trebing (2007) or were written by me and can be found in Appendix C. Trebing's (2007) questions were also utilized in Arshavskaya (2015) and Trebing (2015), both of which examined different aspects of ITAs' educational experiences. All of the questions were designed to answer the research question and sub-

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questions, and they are all grounded in the literature. An interview question crosswalk detailing each question and its foundation in the literature can be found in Appendix D.

Treating and Coding Data

Immediately following the interviews, I made notes in my research journal about what I was feeling and how I perceived the interview. Doing this helped me bracket my feelings during analysis so that I could accurately portray the participants' experiences and minimize any of my potential bias. I then had them transcribed by a professional transcription company, Rev (Rev.com, n.d.). When I received the transcripts, I listened to the interviews to ensure accuracy; I also fixed any mistakes or portions of the text that the transcriptionist could not understand that I could. As I listened, I took notes based on what I heard from the recording.

To store the transcribed interviews, communication with ITAs, and artifacts that they shared during the interviews, I used Dedoose, a web-based program that allows for coding of multi-media (Dedoose.com, 2018). I treated the data through the use of Dedoose, which allowed me to organize, view, and analyze the data by themes and codes. I tracked codes and themes using the codebook in Dedoose.

Data Analysis

The statements made by the participants and the themes uncovered were analyzed using situated learning theory through a social constructivist lens. I analyzed what the participants said about their experiences as non-native English-speaking ITAs in STEM as they related to the support they received as ITAs; the training and support they received from faculty, staff, and peers; and how that support and those experiences prepared them for their future careers.

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To analyze the data, I used a hermeneutical approach. Using this approach, I looked for emergent themes, patterns, and direct interpretation as is necessary in qualitative hermeneutical phenomenological studies (Jones et al., 2014; Moustakas, 1994; van Manen, 1990). I used the constant comparative method to continually analyze the data, compare it, and categorize it into meaningful themes (Creswell, 2013). There are two main phases of coding in the constant comparative method: initial coding and focused coding (Jones et al., 2014).

First, I closely listened to the interviews and read all the transcripts looking for general themes and identifying important ideas (Jones, et al., 2014). I took all the information from each participant, thoroughly analyzed, reflected on, and synthesized each participants' statements into "clustered themes and meanings… to develop the textural descriptions of the experience" (Moustakas, 1992, p. 118). These themes were coded, and the first set of codes showed action and were comprised of a variety of topics found in the interviews (Jones et al., 2014, p. 80). After clustering and labeling the experiences based on themes, I checked the experiences against everything else the participants said (Moustakas, 1994). I considered each statement equally with respect to the phenomenon, which is called horizontalization (Moustakas, 1994). Then I recorded all of the relevant statements made by each participant and identified "nonrepetitive, nonoverlapping" statements and clustered them into themes (Moustakas, 1994). During focused coding, I identified the relationships between the themes and codes that I had previously identified (Jones et al., 2014). This step made the codes more focused, "more integrative and theoretically rich" (Jones et al., 2014, p. 80). It also helped illuminate the essence of the experience, rather than merely reporting what the participants said (Jones et al., 2014).

During analysis, I also identified key quotations to exemplify their experiences in order to ensure participants' voices are being heard. Then I synthesized the information into a

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"description of the textures of the experience" including the words of the participants (Moustakas, 1994, p. 122). Using the individual descriptions of the participants, I took all of the clustered themes and meanings from each participant and created "a composite textural-structural description of the meanings and essences of the experience, integrating all individual textural-structural descriptions into a universal description" to represent the whole group and the experience of being a non-native English-speaking ITA (Moustakas, 1994, p. 122). My goal was to tell the participants' stories in a meaningful way—using their own words—so that their experiences can be heard and understood.

Data Presentation

The results of this study are presented in Chapter IV based on the themes uncovered in the three long, in-depth interviews with each participant. I also included meaningful quotations that exemplify the meaningful themes found and presented (Moustakas, 1994; van Manen, 1990).

Researcher Positionality

It is important for me as a researcher to be aware of my identity and role within the community. I am not an international student, and I grew up in the United States. I am a native English-speaker who has experience learning several other languages. I was the director of the ITA training program for two years, including for some of the participants in this study. I was the facilitator of the ITA training for some of the eligible participants in this study but not all. I was the ITA program director and facilitator for the ITA training program for three of the participants in this study, which may have affected their comfort in expressing dissatisfaction about organizational structure and support.

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There was no longer any power differential between the ITAs and me while I solicited participants nor during the interviews. The ITA program has never been required, neither for credit nor for a grade, for any of the ITAs. It was an optional program provided to them by the university. After the ITA training program, I also volunteered for the program by providing on-going workshops for all ITAs; however, these were also optional, and only three participants from this study attended any of the workshops. Because I have been a participant in the ITAs' experiences at the institution, I was reflective in my role and how that affected my understanding of their responses and experiences.

In order to focus on the experiences and stories of the participants, I attempted to bracket myself from the study (Creswell, 2013). Bracketing is when the researcher suspends personal experience, beliefs, and assumptions in order to focus on the phenomenon (Creswell, 2013; Jones et al., 2014). I regularly questioned my assumptions and biases through reflection and journaling, before the interviews, after the interviews, and during data analysis. I wanted to ensure that the views and experiences of the ITAs are the focus and that my experiences and beliefs did not color my interpretation.

One area about which I often reflected and wrote about in my research journal were my perspectives as a native English speaker and as an English teacher. I reflected on my perspectives of NNES' experiences and how that could have affected the interviews and my interpretation of the data. During the interviews, I never asked about native English speakers or comparison of different versions of English. However, I am a native English speaker and an English teacher. Some of the participants knew that I was an English language teacher and that I was the ITA program facilitator, and some did not. My being a native English-speaker, a US citizen, and an English teacher could have resulted in the participants comparing themselves to native English-

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speakers and highlighting their language differences. However, it is not necessarily the case. I asked explicit questions about speaking English and their feelings about their proficiency and use. Therefore, their comparisons could have also been a natural part of using a different variety of English in a new country.

In phenomenological studies, the researcher refrains from "making suppositions, focuses on a specific topic freshly and naively…and derives findings that will provide the basis for further research and reflection" (Moustakas, 1994, p. 47). The researcher remains objective and open to the essences of the experience (Moustakas, 1994). In this study, I made no hypotheses and remained open to the descriptions provided by the participants. My goal was to listen and report what I heard the participants say, not my own ideas. Finally, and most importantly, I sought to empower ITAs through this process; the goal was for their experiences to be heard and used to create effective policies.

Goodness Criteria and Trustworthiness

To maintain goodness criteria, this study used a theoretical framework and perspective which are aligned with the methodology of the study. Situated learning theory framed this study, and social constructivism was used as participants described and gave meaning to their experiences. These were appropriate for this phenomenological qualitative inquiry which sought to understand the lived experiences of ITAs. I also ensured that the interview questions were firmly rooted within the literature, that each question posted was designed to answer the research question and sub-questions, and that all fit within the social constructivist framework.

To further ensure goodness criteria, I frequently reflected on my positionality as a native English-speaker and as the director of the ITA program. It is imperative that I understand my

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position, power, and point of view before I can accurately present the results of the study (Jones et al., 2014). I must understand how my position of authority as the ITA director may have affected how the participants responded to my questions and how that may affect my interpretation of their responses (Glesne, 2011). I must understand my position and power so that I can pay attention to and then suspend my biases and preconceived notions (Jones et al., 2014).

I implemented several strategies to ensure trustworthiness in the results. To be considered of high quality, qualitative studies must be credible, transferable, dependable and confirmable (Jones et al., 2014). There were multiple participants in the study, and I used constant comparison of the data in order to understand the themes and perspectives of the phenomenon. I also provided comprehensive description of the participants and their setting to determine transferability of the results (Creswell, 2013). To ensure credibility and confirmability of results, I also utilized artifacts that the participants shared in the interviews. Another way to ensure trustworthiness is member checking, which is when the researcher elicits feedback from participants based on findings and interpretations to ensure accurate portrayal of their experiences and opinions (Creswell, 2013). I provided the participants with the findings and asked for feedback multiple times as a way to confirm accurate descriptions of the ITAs' experiences.

<center>Participant Descriptions</center>

This section provides information about the NNES ITAs who participated in this study. First there is an aggregate description of where the participants are from and their educational experiences. Then there are brief individual profiles of each participant, including the number of

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languages they speak, their teaching and work experience, and for how long they were in the US. A table of the participants and their information can be found in Appendix E.

The seven participants in this study were Jamie, Morgan, Sam, Taylor, Eagle, Avery, and Alex. Pseudonyms have been used to protect participant privacy. The gender identity of the participants has also been hidden to protect the privacy of the participants. The reason for hiding the gender identity of the participants is because there was only one female identifying participant. This participant requested that her gender identity not be disclosed because there were not many females in her department from her country of origin. Therefore, I do not disclose which participant is the female to ensure her privacy. To do this, the gender neutral, singular *they* is used for all participants, which is a method the Associated Press has adapted when people have been asked not to be identified by their gender (AP Blog, 2017).

The seven participants were from three different countries, and they were studying math, chemistry, or physics either at the masters or doctoral level. Jamie, Taylor, Eagle, and Alex were all from the same West African country which has English as its official language. The schools in that country use English as the medium of instruction, which means all their education has been in English, from primary school through university. They all received their bachelor's degrees from universities in their home country. Avery was from a South Asian country which has English as one of its official language. Avery attended English-medium schools in their home country from pre-primary school through university. Morgan and Sam were from a South Asian country which does not have English as an official language. Both Morgan and Sam attended schools in their home country with their native language as the medium of instruction from primary school through high school. They began learning English in kindergarten and continued with English classes until they graduated from high school. Morgan and Sam both

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attended university in their home country; the books and exams were in English, but the lectures were in their native language. Morgan received both a BS and an MS in their home country. Sam received a BS from their home country.

Alex

Alex was a master's student in chemistry. Alex had one native language and spoke two other languages, including English. At the time of the interview, they had been living and teaching in the US for one year, and they had one year of teaching experience at home prior to arriving in the US. Alex facilitated lab sections for the chemistry department.

Avery

Avery was a master's student in math. They had one native language and speak four other languages, including English. At the time of the interview, Avery had been living and teaching in the US for two years and did not have any prior teaching experience before. At the time of the interview Avery had completed all coursework, was completing a final project, and was graduating soon. After graduation, Avery returned home to find a job in data analysis. Avery taught math courses for the math department and was the teacher of record for all of those classes.

Eagle

Eagle was a PhD student in math who also has a master's degree in math from a US institution. Eagle had two native languages and spoke two other languages, including English. At the time of the interview, they had been living in the US for 10 years and had eight years of teaching experience, including one year at home. In addition to teaching, Eagle worked in the

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banking industry before starting graduate school in the US. Eagle taught math courses for the math department and was the teacher of record for all of those classes.

Jamie

Jamie was a PhD student in chemistry and received an MS in chemistry in the US. They had two native languages and spoke English. At the time of the interview, Jamie had three and a half years of teaching experience, including one year of teaching experience at home and had been living in the US for three years. In addition to teaching experience, Jamie also had experience working as a chemist in industry. Jamie facilitated lab sections for the chemistry department.

Morgan

Morgan was a PhD student in physics. They had an MS in physics from their home country and an MS in physics from a US institution. Morgan had one native language and spoke four other languages, including English. At the time of the interview, they had been living in the US for four years and have five years teaching experience, three of which was in their home country. Morgan facilitated lab sections for the physics department.

Sam

Sam was a master's student in Chemistry. Sam had one native language and spoke two other languages, including English. At the time of the interview, they had been living and teaching in the US for one year. The one year of teaching in the US was Sam's only teaching experience. Sam facilitated lab sections for the chemistry department.

Taylor

Taylor was a master's student in chemistry. Taylor had one native language and spoke two other languages, including English. At the time of the interview, Taylor had been living and teaching in the US for one year and had three years of teaching experience at home. In addition to teaching experience, they also had experience running a business. Taylor facilitated lab sections for the chemistry department.

CHAPTER IV

FINDINGS

This chapter starts with the purpose statement and the research question that guided the study. Second is an explanation of the theoretical framework and how it applies to this study. Following the theoretical framework is a description of how the data were collected. Next, there is a description of the seven NNES ITAs who were participants in this study. After the participant descriptions, there are individual descriptions of each of the participants. The identities and experiences of the participants are an important part of the study because their cultural, linguistic, educational, and employment backgrounds have an impact on how they experience life as NNES ITAs. Following the participant description is a thorough presentation of the research findings from the interviews.

Purpose Statement

Grounded in hermeneutical phenomenology, this qualitative study examined the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study was to examine ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. This study built upon and adds to the work of Trebing (2015), who identified suggestions ITAs themselves had for improving ITA training programs. The current study extended this research by analyzing ITAs' career goals and how institutional training and support programs help prepare them to achieve those goals.

In order to understand NNES ITAs' experiences and their perceptions of support, I investigated the following question:

- What are the lived experiences of NNES International Teaching Assistants in STEM? The following sub-questions also helped drive the study and answer the research question:

- How does university training and support influence these lived experiences?

- How do their experiences influence their perceived preparation towards their career?

Theoretical Framework

To understand NNES ITAs' lived experiences, this study was grounded in Lave and Wenger's (1991) situated learning theory. In situated learning theory, learning occurs socially through the process of legitimate peripheral participation (Lave & Wenger, 1991). Through the process of legitimate peripheral participation, ITAs slowly increase their participation in their practice as STEM educators, which increases their knowledge and experiences in their field (Lave & Wenger, 1991). This process helps them develop into experts as they learn from their experiences and the people around them in their community of practice, including faculty members, peers, and their students (Lave & Wenger, 1991). Because Lave and Wenger's (1991) situated learning theory is concerned not only with how people learn but also with how those learners become experts, this study also uses this theory to examine how ITAs' perceive their lived experiences and whether they believe those experiences prepare them for their careers as STEM professionals.

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Social constructivism is the interpretive framework used in this study. Using the participants' ideas, experiences, perceptions, and descriptions of their own experiences, I sought to understand their lived experiences. Using the ITAs' own words and descriptions, I constructed a rich description of the phenomenon of being a NNES STEM ITA.

Data Collection

To invite potential participants to participate in the study, I e-mailed 75 non-native English-speaking ITAs from the previous academic year. There were 14 potential participants that responded to my email inquiry. Of those who responded, 13 were interested in participating in the study; however, two potential participants had completed their programs and had already returned to their home country, and two other potential participants were unable to because they were not on campus during the time of the interviews. Two different potential participants signed up to participate but had to withdraw because they had to leave campus earlier than expected. One potential participant declined to participate due to schedule conflicts and a concern the interview could have had a negative effect on immigration status and potential employment opportunities. This fear may be a result of the current political climate in the US and the rhetoric surrounding international and refugee populations coming from the current presidential administration as portrayed by the media. The current political climate in the US and its effects on international students is discussed more thoroughly in Chapter V. As a result, there were a total of seven NNES ITAs who were interested and available to participate in the study.

To answer the research question, I conducted three open-ended, in-depth interviews with each of the seven participants in the study. All of the interviews were recorded and transcribed. Interview questions are found in Appendix C and an interview crosswalk, which details how the

interview questions are grounded in the literature, is found in Appendix D. The purpose of the first interview was to build rapport with the participants; to ask about their English proficiency, confidence, and use; and to understand their cultural adaptation to the US. The second interview focused on teaching experiences both in their home countries and the US, and the participants shared artifacts from their teaching. The third and final interview focused on organizational support from the university, as well as their career goals.

Emerging Themes

The purpose of this study was to examine ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. In order to understand those lived experiences and how they prepare NNES ITAs for their careers, I conducted three in-depth, open-ended interviews with the participants. The interview questions were about their identities and experiences as NNES ITAs. The interviews included questions about language, culture, and teaching background and experiences, training and support from the university, and career goals. All of the questions helped contribute to the understanding of the NNES ITAs' lived experiences and how those lived experiences help prepare them for their career goals.

Themes

There is much overlap in the questions, responses, and resulting themes surrounding language, culture, and teaching. Culture is a thread that is woven throughout all experiences. Culture is a vital aspect of language, and it can be difficult—or impossible—to determine whether an experience is linguistic or cultural. The two are often inextricably tied and must often be analyzed in tandem. Similarly, culture is an important part of teaching experiences. Teaching

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within a certain context is a cultural experience. ITAs are teaching students who are natives of their host culture, as well. Therefore, culture is a central aspect of their teaching experiences. All three of these aspects are important elements to NNES ITAs' experiences and are found across multiple themes that emerged in the interviews and data analysis.

The emergent themes in this study are organized by the main research question and two sub-questions: (1) what are the lived experiences of NNES ITAs in STEM (2) how do university training and support influence these lived experiences, and (3) how do their experiences influence their perceived preparation towards their career?

Research Question: What are the Lived Experiences of NNES ITAs in STEM?

Four major themes emerged around the question of what NNES ITAs' lived experiences are: (1) the initial adjustment period, with sub-themes of the spoken English adjustment period, teaching adjustment, and social adjustment; (2) experiences using English, with sub-themes of adjusting to a different variety of English and language adaptation strategies; (3) cultural differences and adaptation with sub-themes of feelings of being a cultural outsider and adaptation strategy: ask and listen; and (4) teaching experiences, with sub-themes of teaching in a different cultural context, undergraduate students' lack of preparation and fear of math, and ITAs' focus on student learning.

Initial Adjustment Period

One of the major themes that emerged is the initial adjustment period that all the participants experienced. They all discussed challenges they faced upon their arrival in the US. They explained how things were difficult at the beginning, but most of them described how

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things eventually got easier. Three minor themes emerged within initial adjustment period:
spoken English adjustment period, teaching adjustment, and social adjustment.

Spoken English Adjustment

For many of the participants, adjusting to using English on a daily basis, socially and academically, took time and was a very difficult challenge. Part of that linguistic challenge came from the diverse cultural backgrounds of the participants. Indeed, most of the participants described a lack of confidence in and challenging experiences using spoken English at some point during their assistantship. For some, there was an initial lack of confidence, but they gained confidence as they gained experience in the US. For others, the lack of confidence in spoken English lingered even years after arriving in the US.

The beginning of their time in the US proved very difficult for some in their use of spoken English. Sam and Jamie mentioned in the first semester they noticed a communication gap. When asked about communicating in English, Sam explained that during the first semester, teaching in English was a challenge:

> In my first semester, it was really tough. Tough means, in my head I know how to say it, but I'm not used to talking fluent English. It's not like I don't know the word. I know the word, but in my head, I have to first set up. Now I am kind of fluent, but previously it was kind of hard.

While Sam had read books, taken exams, and written papers using English during their undergraduate program, they had not had enough experience using spoken English to have the fluency needed for teaching in the US. They had the knowledge of the language but lacked the

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fluency needed to recall words quickly to answer students' questions or assist them in their lab work. With time and practice, they were able to gain the fluency skills needed.

When asked how they improved their fluency, Sam explained that being immersed in an English-speaking place helped: "Every time I'm…going to Walmart or anywhere, I know I'm speaking English. Otherwise I'm stuck." Sam also mentioned that their support-network of English speakers has helped improve their fluency: "I have friends here and I'm talking with them in English…with professors, advisors, you always have to communicate with them in English." Despite gaining more fluency and feeling more confident, Sam admitted there are still some challenges with using spoken English, "When it comes to speaking, sometimes there is some struggling, I can see that." However, using English daily has helped Sam improve fluency and gain confidence in their speaking skills.

Jamie and Taylor both also had challenges adjusting to using English in the US, despite having grown up speaking English in school. Jamie explained:

Because of my accent, especially when I came here first ... it was very hard for people to understand me… Maybe it was new to them, or maybe it was because I spoke too fast or… my voice was so low.

Even though Jamie had grown up using English, the varieties used in the US is very different from the one variety in their West African home country. Jamie was accustomed to using English fluently with people who spoke the same dialect, but it was a challenge for people in the US to understand what they were saying.

Like Jamie, Taylor also had a challenging experience adjusting to using US English, which is different from the variety they use in their home country:

When I came here first, things were not that great, because in [home country] we speak

English a lot, but I normally speak slowly. But when I came here the language is quite faster, so I was having some challenges trying to understand certain things. But with time, I think it's now, I get to understanding anything.

Taylor also struggled with the differences in how English is used in the US and their home country. It took time to adjust to the speed of the language and the use of different vocabulary. Like Sam, Taylor is much more comfortable using English today than when they first arrived.

Avery did not label the transition to using US English as difficult; however, they mentioned that it took a few weeks during the first semester to adjust to the communication differences using English in the US. Initially, Avery was more comfortable communicating with other international students—particularly African and other Asian students—than with Americans because international students are also working on developing their language skills. Avery also mentioned that international students seem to be more willing to put more effort into communication. They also perceived that Americans are not necessarily willing to do a little bit more in order to communicate with NNES. Avery was conscientious of their fluency; they were aware that it took them more time to process what their students were saying than it would if they were communicating in Avery's native language. They likened their own adjustment in listening to US English to the adjustment their students must make when listening to them: "Similar to how students face a challenge understanding my accent, I used to have an issue understanding what they're communicating." Avery made it clear that the gap in communication, especially in listening, was comparable for both the native English speakers and the NNES.

Some of the ITAs continue to have language challenges, despite having been in the US for years. While Jamie said that things have gotten better, they also explained that they have lingering linguistic challenges because of dialectal differences: "But I think I'm comfortable with

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the English. It's just a problem with the accent and how people understand me." Jamie is still aware of the linguistic differences of their variety of English and how those differences can affect communication with others. Morgan also described on-going challenges using spoken English. Regarding conversational English, Morgan explained, "I have a hard time actually. I'm getting used to it, this being my fourth year in US, but comparatively speaking, I find that a bit difficult in terms of communication." While writing and using academic English is something Morgan has always felt comfortable with, speaking conversationally in English has remained a challenge for the four years that they have been on campus. Similarly, Taylor also indicated a desire to improve their spoken language by speaking faster. Both Morgan and Taylor believed this would help improve their communicative abilities.

Teaching Adjustment

In their first semester of teaching, many of the participants faced challenges in understanding their roles as instructors. Some of the new chemistry ITAs did not know how much they should participate in and help with the labs that they were facilitating. They did not know how much to actively seek out students who needed help and how much they should observe and allow students to come to them.

Sam, who had never taught before arriving in the US, facilitated upper-level chemistry labs. Because the students were in higher-level chemistry classes, Sam was unsure about how to support students' learning in their first semester, but the second semester was smoother because they had experience with the lab: [In the first semester] "I didn't know what kind of questions they are supposed to ask from that lab… but the second time I was doing the same experiment, I was developing the sense, like what kind of questions they might ask." Gaining experience with

students in the lab gave Sam the confidence and teaching sense to be able to predict students'

needs and questions prior to the start of class. In order to prepare for classes during the first

semester, Sam reviewed the experiments, read textbooks, and reached out to peers: "I was

preparing myself. Discussing with other TAs about the answers and everything." Preparation and

peer support helped Sam cope during the first semester, and experience gave Sam confidence

during the second semester.

In order to understand how the participants adjusted to teaching, it is also important to

understand how their confidence in spoken English affected their experiences in the classroom.

This is because language and teaching are inextricably linked for international teaching

assistants; language skills and confidence affect how ITAs teach and their confidence in their

own teaching abilities. Sam detailed how language was a critical part of the challenge in their

adjustment to teaching and feeling comfortable in teaching, "[In the first semester] I was lacking

in words and everything. I was speaking less [to students]." Sam also described how the students

thought Sam was afraid of them and was unsocial, which Sam explained was not true. Sam self-

identified as social and personable; however, they did not feel comfortable enough to approach

students during labs. In their second semester, after making some teaching adjustment, Sam

explained that their students realized that Sam is friendly, approachable, and trying to help

students do their best.

Taylor and Alex, both of whom had teaching experience before arriving in the US, were

also initially unsure about their role in the chemistry lab. For the first semester, Taylor explained,

"Sometimes I would stand somewhere in the class and talk to the students." Initially, Taylor did

not actively engage with students and seek ways to help them with their learning. However, in

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realizing that students will not learn that way, Taylor changed their approach in the second semester:

> But some of the students, if you talk in that way, they don't actually get it… For the second [semester] I just, I walked around. They are doing the experiment, then I'll go to each student one by one [asking] "How is it going?" … Some of the students…are shy. Even if the person has a real problem, they never ask you. You have to ask.

After the first semester, Taylor realized that their students are not going to seek help and that it was their responsibility as the TA to ask the students how they are doing. Alex, who was also initially unsure how to interact with the undergraduates in their lab, explained that once they started approaching students regularly, the students would approach them more often. They explained, "I realized that there were some of these students that initially were not coming to me but as time went on, they were more eager to come to me with problems." Once Alex realized that it was their responsibility to approach students and to be accessible, they noticed that students felt comfortable approaching them. Alex also noticed that students' performance improved once they felt comfortable approaching Alex: "And I think from that time their grades increased." Alex was able to make a connection between their own approachability and students' grades, which helped Alex better understand their students and how they learned.

Avery, who was also a new teacher when they arrived in the US, explained that during the first semester they needed a lot of time to prepare to teach their classes. As a math ITA, Avery was the teacher of record and responsible for preparing all the lessons for their classes. This responsibility was a great burden, especially in their first semester in the US. When asked whether they thought they had enough time to prepare for their teaching, Avery responded, "In my first semester, definitely no." As a result, their academic performance dipped because they

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had a difficult time finding the balance of being a student and a teacher. They felt like they had to decide whether to focus on their own classes or the classes that they taught:

> I had to take a call on whether I do something for 60 people whom I teach or do I become selfish and do it for myself… I'll feel bad when I see [my students] not performing to the expectations I have. If I don't do well, my teachers won't be happy with me, and I'm setting a bad image to start with.

Avery did not feel able to balance the responsibilities of simultaneously being a teacher, a student, and having a social life in their new country. They believed that they had to make a choice between being a successful teacher and being a successful student, and they did not want to let anybody down or underperform in any way. Avery explained that initially they did not have a plan for managing their time, but creating a strategy to cope with all of their teaching and learning responsibilities later helped them balance the roles of student and teacher.

Similarly, Alex also had a difficult time managing teaching, learning, and research responsibilities. In their home country, they did not have experience working and taking classes, rather students focused on studying. Alex was a teacher after they graduated with their bachelor's degree; however, they had never worked, researched, and taken classes at the same time. Therefore, having multiple responsibilities as a TA in the US was a challenge for Alex: "So, just combining being a TA, being a student at the same time, researching together, right from the onset, it was really hard for me. And I think that was one key thing." Finding the balance of teaching, learning, and research was a challenge for Alex, but it was an important element in their adjustment to life as an ITA in the US.

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Social Adjustment

ITAs also have to adjust to living in a new social and cultural context. The cultures from their home countries are different from the US, so it took time to adjust to social life in the US. One way many of the participants adjusted to life was through participation in social activities on and off campus. While some participants engaged in social activities, many mentioned that they did not have much time to participate in extracurricular activities.

Similar to their experiences with using English and teaching, socially adjusting to life in the US was initially difficult for some. Taylor explained that they had a difficult time finding ways to make friends and communicate with people in their lab: "For the first semester things were not all that good, but for the second semester everything was perfect. But with time, since we're talking to each other, we became friends. Everything started going well." As it was Taylor's first time studying abroad, away from their home country, it took time for them to feel comfortable communicating with other TAs. When I asked about the cause of the communication problems, Taylor said they had a difficult time understanding some of their peers from Asian countries because they had different accents. However, Taylor reported that as they adjusted to each other, communication became much easier for all: "But with time, we all got used to the language, and now we're all friends." Taylor believed that after they adjusted to each other's versions of English, the TAs in their department were able to become friendly and communicate effectively. This friendliness and effective communication with peers is important because the development of social life for ITAs is deeply intertwined with the gradual acclimatization of language and culture.

The social adjustment process is slow, and the master's-level participants indicated struggles with finding ways to socialize. Sam said that when they first arrived, there were events

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on campus in which they participated, such as picnics and activities hosted by different offices on campus. However, as the semester progressed, it became more difficult to engage in extracurricular activities. One such activity was a trip to a major US city several hours away, which was arranged by the international office. Sam had tickets for the trip; however, they could not participate due to an exam and had to sell their tickets. Alex and Taylor also mentioned that they did not have a lot of time to seek out social activities and wished they could participate more. They both said that they wished they had more time to play soccer and that more people knew how to play. Playing soccer, they said, was something that they really enjoy doing, but it was something they did not do very often.

Avery, on the other hand, initially spent their whole first semester integrating themselves into US culture by participating in many events on campus, both academic and social. They participated in the teaching and learning center's workshops, went to football games, and attended cultural events on campus. While Avery felt integrated in the community, they chose to cut back on the social events during their subsequent semesters because their academic work suffered during their first semester. Avery decided to focus on teaching and learning and tried to be a "systematic instructor," which resulted in a better balance of teaching, learning, and social life.

The doctoral students presented a different view of social life. Jamie, Morgan, and Eagle, all of whom earned master's degrees in the US and had been in the country for three or more years, were less concerned with social interactions. At the beginning of their interviews, Jamie and Morgan both acknowledged that they did not feel the need to seek out social engagements outside of their departments. However, over the course of the interviews, they both described how they actively volunteered in the community, one as a coach of a youth sports team and the

other as a leader of their religious center. Similarly, Eagle also described volunteer experience, attending weekly religious meetings, and attending social events with their religious group, as time permitted. The doctoral-level participants, who had spent significantly more time in the US than the master's-level participants, presented a more balanced view of social and academic life.

Experiences using English

One of the major emergent themes was the participants' experience using English. All the participants identify as non-native English speakers, and they all described some challenges with using English and how they managed those challenges. The two sub-themes that emerged were: adjusting to a different variety of English and language adaptation strategies.

Adjusting to a Different Variety of English

Upon arriving in the US, using English became something that all the participants had no choice but to consider. All the participants were proficient English speakers; however, the variety of English that they had learned was different from the variety, or dialect, used in the US. There are differences in their varieties of spoken and the versions spoken in the US, and the ITAs had to acclimate to that. Sam, who just completed their first year in the US, described using English like this: "speaking English has kind of become a full-time job." Once living in a different country, language was no longer something they could take for granted.

Not a Native Speaker

Some of the ITAs also juxtaposed themselves and their abilities to use the language with native English-speakers. Alex, Morgan, and Jamie all mentioned that their English was not as good as a native speaker; however, they had varying degrees of how they viewed their language

experiences and skills. Alex, who has had their whole education in English, expressed an awareness of the difference between being a native English-speaker and not being one, but they did not consider it a problem. Alex said, "I cannot be as good as a native speaker, I know that, but I have really had a lot, right from kindergarten." Despite comparing themselves to native English-speakers, Alex clearly had confidence in their ability to use English to communicate. Jamie, who was also educated in English, said that their written English abilities were strong, but their spoken skills were not. Native English speakers, Jamie explained, are better speakers than they are. However, they also framed the perceived gap between their own English and native English-speakers in a positive way: "There's a huge gap to improve. Even though I have actually studied in English all this while, I know a lot of words, but how to flow for people to clearly understand…This is a gap which I need to improve." Jamie viewed the gap as an opportunity for self-improvement, rather than as a language deficit.

Morgan mentioned that they understood that they were not a native English-speaker, but they thought that NNES understood the expectations of native English-speakers and that native English-speakers understood the situation of NNES. They explained, "we [NNES] understand their [native English-speakers'] expectations. Or they understand how much we are supposed to communicate. Other than that, I don't think there is any sort of awkwardness." It seems as though the people within Morgan's social context, both native and non-native English speakers both accept responsibility for communication, which allows all people to understand and be understood without discomfort or awkwardness.

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Accent

One of the major challenges mentioned by most of the participants was the difference in their variety of spoken English, or their accent. All the participants explained that they used some variety of British English in their home countries, so the differences between the spoken varieties of the language were challenging for them.

One of the challenges of having a different accent is the communication with students. When asked about how they feel about communicating in English, Alex said: "I think the issue has just been maybe the accents because how we pronounce things are kind of different. Even when I get it correct it might be because our English…in [home country] is British English." Because the participants' students are not necessarily used to hearing a variety of English different from their own, it can strain communication between ITAs and their students. In order to ease this tension, several ITAs explicitly address their language differences with their students.

Eagle, Avery, and Jamie all described how they addressed their different varieties of English with their classes. Eagle and Avery, both math ITAs, are the instructors of record for their courses, so they have the most contact with their students—three hours of independent instruction per week for each course. Because they are the primary contact for students, it is important for them to be upfront with students about how their variety of English differs from the variety used by most of the students.

Eagle viewed having a different variety of English as a cultural challenge rather than a linguistic one. They explained that they have a different version of English and that there will be differences in the way they, a NNES, use English than their students, the majority of whom are native English speakers. In order to help the students, understand the differences between their

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varieties of English, Eagle tried to help the students understand how there are many dialects of English, even across the US, by asking students to think about the difference between English in Georgia, Minnesota, New York, and California. When addressing their own variety of English, at the beginning of each semester Eagle said to students, "You would not expect me to speak the same way you speak. And you need to create room to accommodate me in that regard." Therefore, Eagle asked their students to understand and accept that their teacher has linguistic differences from them. When Eagle described the need to address their accent to the class, Eagle said, "I think that's one way of looking at the cultural misunderstanding." Eagle viewed these differences in dialect as cultural, rather than linguistic challenges, and Eagle compelled their students to take some of the responsibility in accepting and embracing those differences.

Avery also addressed their accent with their students by giving some background on language in their home country and asked students to point out any differences or misunderstandings. To students in their class, Avery explained:

> We follow predominantly British English, so probably my vocabulary would have a lot more of that. Some of it, I would not know whether it is British English or American English. While growing up I saw similar TV shows as you did, but I used to watch both British as well as American, so sometimes if you don't follow what the term is, please indicate it to me. I would love to learn!... You guys need to guide me through it. Any time, if you ask, I would be the most happiest person.

Avery was eager to help students understand that the differences between the language used in the US and their home country were not something that should get in the way of communication. Furthermore, Avery gave students agency in rectifying communication gaps. Rather than placing

the burden squarely on the instructor, Avery asked students to actively engage in communicative acts to ensure they understand and learn.

Jamie, a chemistry ITA who facilitated labs and was not the instructor of record, said that they were concerned with making communication better with students. In order to do that, they made it clear to the class that they have an accent, and they said to students, "I'm going to try and speak slow or try and shout or make it clear to you, but if you have any questions, you ask." Jamie was clear that they wanted to be up front and open with students so that they did not feel uncomfortable addressing any communication problems.

While many of the challenges with accent are similar, the participants had varying opinions of their own accents. Some did not make any judgement about the way they talked, and others did. Jamie described their accent as "horrible," but Avery was confident and appreciated their accent. While Jamie described their accent negatively, they did not mention a desire to change it or mention strategies they used to curtail it. Avery was very clear that the accent was not going to go away: "I was fairly confident that I'm not changing my accent. Accent is something which I'm blessed with." Avery's accent was a part of who they were, and they were not going to change that. However, in order to better improve communication with others, Avery explained that they made certain "adaptations which I see as paying dividends, so essentially when I teach in class, I see the expression on students' face, by that I understand how better it has got, or how worse it has gone." Therefore, Avery used their own experience and intuition to decide which language to use and what to adjust in order to effectively communicate with their students while maintaining their accent and identity.

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Adaptation Strategies

None of the ITAs mentioned a desire to change the way they spoke or to reduce their accent. Instead, they all sought to ensure their students understood what they were saying. Therefore, to cope with linguistic challenges, many of the ITAs developed and implemented strategies to improve communication and minimize misunderstandings. As mentioned previously, Jamie, Eagle, and Avery all addressed their accents with their classes in order to make sure students understand that there are linguistic differences and that it was acceptable to talk about the differences.

To scaffold instruction and ensure students were following what they say, Jamie, Eagle, and Morgan wrote notes for the students. Depending on the situation, the ITAs wrote notes on the board before class or during class as they talked so that their students could make the visual connection with the words the ITAs were saying. Sometimes students may not understand a word or two that the ITA is saying, so if they see the written word, they will make the connection between what the word is and how the ITA is pronouncing it. Jamie explained that writing on the board helped undergraduate students in multiple ways:

I used to write a lot on the board to help students get exactly what I'm trying to put across, especially the most things they are supposed to know. Even now, I still do that. When I go to class, it's very important procedure, I write them on the board to help them. Because even though all the students, most of them are Americans, you also have students who came from somewhere [else]. And you never know if you are communicating well with a person. So, I just write those things on the board for them. That is helping them a lot.

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Jamie wrote notes on the board because it helped all students—both native and non-native English speaking—understand the important parts of the lab, help clarify lab procedure, and help ease communication. This is important because there are students from all around the world in classes at the university who need scaffolding of both written and spoken instruction.

Sometimes the participants also brought typed notes to class to hand out to students. These served the same function as the notes on the board, but they saved time in class so that the ITA did not have to write while they talk. Jamie explained that they brought typed notes so that even if students did not understand the lesson very well, they had something that they could take home with them to look at and use to learn.

Another strategy most of the participants used was asking for clarification or repetition. They explained that they asked their students to repeat—sometimes two or three times—when they did not understand a question or answer to a question. While this seemed to be a successful strategy, the undergraduate students were not always accepting of the ITAs' accents. When Avery had a difficult time understanding students and asked them to repeat what they said, "A few students, I could see they were like, 'Don't you understand this English?'" Avery could sense the students' annoyance at having to repeat themselves. Most of the undergraduate students probably had very little experience with NNES and having to repeat themselves in conversation. While the ITAs addressed the differences and used strategies to mitigate problems, they still faced resistance to the fact that they have a different variety of English from US English.

Cultural Differences and Adaptation

As stated earlier, culture is a thread that is woven into the fabric of the participants' lived experiences. While culture is a critical element to ITAs' language and teaching experiences, it is

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also an element of its own. Cultural adaptation is a major emergent theme of ITAs' lived experiences, with sub-themes of feelings of being a cultural outsider and adaptation strategy: ask and listen.

Feelings of Being a Cultural Outsider

Many of the participants specifically mentioned how they felt like they were outsiders and that they did not necessarily feel as though they fit into their new cultural context. Sometimes these feelings were connected to individual situations, and other times they were feelings that persisted as part of their continued lived experiences. Many of these experiences and situations overlapped with language challenges, as described in the above section, but these feelings of being an outsider also occurred in social and teaching settings. It was not easy for the participants to identify and describe their feelings related to cultural misunderstandings. When asked about situations of cultural misunderstandings, the participants had a difficult time describing specific situations. However, they were able to describe cultural misunderstandings at other points in the interview.

Jamie had feelings of being a cultural outsider on their first day of ITA training. When Jamie was a newcomer to the US, they felt like a cultural outsider when several Americans kept smiling at them. In the US, smiling at strangers is very common; it is meant to make people feel comfortable and to indicate that the smiler is friendly. However, in Jamie's home culture, smiling is not something people do to strangers, unless something is wrong. Jamie described their initial discomfort when they walked into the training classroom:

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The instructor gave the biggest smile I've ever seen in my entire life. She just smiled so wide. So, I was like, "Well, let me just go back because there's something wrong with my shirt. I need to go and change."

Jamie felt so uncomfortable by the instructor's smiling that they literally felt like they needed to leave and change their appearance. Once the training began, the instructor explained how smiling is a cultural norm in the US, and this explanation made Jamie feel much more comfortable about their initial interaction with the instructor. Jamie was even able to comfortably laugh about the interaction during their description of the situation because they now know that smiling is a very polite thing for teachers to do in the US, especially at the beginning of a session.

Conversely, Sam and Avery had more persistent feelings of being outsiders. Sam initially felt out of place as the instructor of their lab. They felt shy with their students and did not know how to approach them during their lab sessions. Sam explained that because they are in a new place, they do not have the same social confidence that they have in their home country:

Sam: I am in a foreign country. I didn't know how to approach anyone.

Caitlin: Students?

Sam: Students, friends, anyone.

Sam had a strong feeling of being an outsider. They did not feel as though they knew how to connect and talk to anybody in their new cultural context. They were very explicit about feeling like they did not belong, describing how they were "in a foreign country." Sam did not feel like an insider in the US; they felt like they were in a strange and different place. Additionally, they were very nervous about making a good impression with all people in the US. Sam wanted to be perceived positively by students, faculty, and members of the community.

Avery also felt like an outsider when confronted with social and cultural issues in the classroom. They described a tenuous situation between two students who had conflict due to racial tension. Avery was not comfortable addressing the students' conflict, nor did they feel comfortable contacting their supervisor about the issue. Avery explained that they did not address the issue because they did not know the appropriate way to approach and help solve the situation. Avery was worried that their addressing the problem would offend the student rather than help them learn from the conflict:

> I was not confident of what is a friendly suggestion, what could seem personal on them… Since I observed it at least three or four different scenarios, I know for a fact it was race-related things. And I think individually, you have no issues with each other. I know for a fact. But I [thought], Okay, [the student will] have to learn as an individual. Someday [they] will learn it the hard way.

Avery did not have the confidence that they had the cultural knowledge to help the students overcome their divide. They felt like they were outside of the culture just enough that they did not know how to address the issue. They thought the students might take it personally, which would prohibit them from learning and growing. Therefore, they decided not to do anything.

Avery clarified that the reason they did not address the racial issue between the students was because they felt like a cultural outsider, not because they did not have the interpersonal skills to do so. They explained that if they were in their home country, they would have talked to the students to help them reconcile and understand the problematic, racial issue:

> If this was [home country], I would've called the person… to talk over what that person should be doing… I would have given them example. I would've given them a demo. [The US] is not my comfort zone. Here I feel a lot of people think if you say a little one

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thing… they take it too personally if you're trying to tell them something…Could I land up into potential trouble?

Because Avery lacked the cultural background—and perhaps capital—to address sensitive issues, such as racial conflict, they thought the students may complain about Avery and get them into trouble. Avery had concrete ideas about how they would address problems with people from the same cultural background, but they did not feel as though those strategies would work in the US. They expounded further, underscoring that they are not from the US: "Again, since I'm not a person from here, I don't know where I'm crossing the boundary." They did not have the confidence in their understanding of intricate and sensitive cultural issues because they grew up in another place.

At times, a small undercurrent of fear would appear with Avery as they discussed issues they had teaching because they are not from the US. The fears that Avery described connect to how Avery relates to their students and people in their department. Despite having a mostly positive view of teaching and interacting with peers, Avery indicated there was always tension because of their immigrant status, "I'm a legal alien who has come here, still I can never feel that this is my country." As a result, Avery sometimes overlooked behavioral issues—even serious ones—by not discussing them with students and not reporting problems with their department because they did not feel as though they had the cultural understanding and capital to address them appropriately.

Although many of the participants had feelings of being an outsider, many of them also developed feelings of being cultural insiders, as well. Eventually, they felt comfortable enough in US culture to feel that it was their own. Morgan explained there are always challenges for international students: "Being an international student, there are certain difficulties that you

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face." However, they found that over time, they were able to be part of the culture and understand it better. They also indicated that the familiarity with US culture allowed them to evaluate their own culture and US culture more accurately. "But once you are here, being part of the culture itself and getting to see the whole thing first hand... you can see the pros and cons of that way of dealing." Morgan found that with more experience in the US, they could better understand both US culture and their home culture. Rather than feeling like an outsider who must interact within US culture using their own cultural knowledge, Morgan felt as though they could evaluate US cultural norms and decide whether they are appropriate for any given situation. This indicates that Morgan felt bicultural, navigating multiple cultural identities, evaluating them, and determining which worked for them at any given time.

Avery also underpinned the notion that it was possible to feel like a cultural insider in some ways, even when with cultural tensions in the classroom. They explained that eventually they felt like the US was home, especially after meeting new people and making friends: "In my first few months here, probably I felt more like this is my home. So then, probably, the [cultural] distinction started getting lesser because I think I had more people whom I knew." Having friends from whom they could learn and to whom they could ask questions helped Avery feel like a cultural insider and made the US feel more like home.

One aspect that helped the participants feel like cultural insiders and gave them feelings of belonging on campus was the fact that their labs and departments were very multicultural. Most of the participants mentioned diversity within their departments and labs. Of the chemistry department, Jamie said, "our faculty members here, most of them are from different countries." Sam explained that the students in the chemistry department were also from around the world: "My lab, it's a multicultural lab. Everybody is from different country." Alex echoed Jamie's and

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Sam's ideas of the chemistry department being very diverse, and Alex explained that they were excited about working with people from other cultures,

Eagle described the math department as very diverse: "there is diversity among us as faculty [and] definitely there is diversity among students." The physics department is also diverse. Morgan said, "Most of my colleagues, especially my classmates or the other TAs, are from international backgrounds…also the faculty. We have lots of faculty from different backgrounds." Morgan explained that this diversity made communicating with peers and faculty easier and eliminated awkwardness because they were all in similar situations, being international people in the US. They felt more comfortable communicating in these diverse departments. Morgan felt more comfortable communicating within their department because of the diversity. The multicultural characteristics of STEM departments are an important part of the participants' lived experiences and feeling like cultural insiders in the US.

Adaptation Strategy: Ask and Listen

In order to adjust, several of the participants emphasized the need to listen, be open and brave, and utilize peers. Several of the participants underscored the importance of listening to other people they encounter because, they explained, listening helps them adapt to life in the US. Sam elucidated, "People love to talk about anything. You have to listen." While initially Sam was unsure about how to connect with people, they discovered that listening was an effective strategy for communication and connection. Sam's experience taught them that that listening not only helps the international students learn, it also helps Americans learn about international students. When international students learn about Americans first, Americans end up learning about international students, as well. Similarly, Avery also developed a strategy of listening to

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others in order to communicate more effectively. During conversations, they tried to make the other person feel comfortable, which was a strategy they found successful in helping adapt to life in the US.

In addition to listening, Alex also found that it was important to be the one who initiated conversation. In Alex's experience, Americans are friendly, but they are not necessarily going to initiate the conversation. Therefore, it is important to have the confidence to start talking first. Alex explained: "I think one thing I have realized, people were more friendly than I thought, but the key thing is you just have to be the first to talk." While Alex was less nervous about communicating with others, they also found that initiating conversation and then listening was the best way to have successful communication with Americans. While this is not an easy feat, Alex found it was important to be open and have the courage to start a conversation.

Utilizing peers is another important way the participants adjusted to cultural differences. Sam, Avery, Alex, and Eagle all described how they relied on American peers to adjust. Many of the participants regularly observed how their peers interact with students, professors, and each other for cues about how to interact appropriately in different situations. Alex was able to better understand student-professor relationships through observing their peers: "I have looked at the way of my American counterparts interact with their professors. I have also realized [the American students] are more forthcoming to go to [the professors]." Alex realized that students often go to see professors in order to get help and that students are able to be more honest, particularly about problems, with their professors in the US than they are in Alex's home country.

Sam, Avery, and Alex not only observed how their peers interact with others, they also directly asked their peers about cultural differences. The participants found that asking peers and

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friends for help aided in their cultural adjustment. Alex described how they have one friend who is particularly helpful in helping understand cultural differences:

> There are things that I ask him especially when I don't seem to understand. When I try to understand why it is so, and if I don't seem to come up with an answer, then I ask him, "Is this a normal situation here? How does things happen? How to deal? How do you do things?" He's been helping me a lot.

Alex found a peer to whom they felt comfortable asking questions and from whom they could get advice. This one person was crucial in Alex's adjustment to life in the US.

One adaptation strategy that none of the participants acknowledged using was the free counseling services offered by the university. The university offered individual counseling to students, a weekly support group for international students, and a support group for graduate students. However, none of the participants said that they used these services even though most were aware that some of them existed. In fact, some of the participants mentioned that they did not feel comfortable going to see a counselor or going to a support group. For some, they did not seek help because they did not feel as if their problems were serious enough to seek help. In their descriptions, it was clear that they knew it was culturally acceptable in the US to seek counseling; however, most still had their own cultural views of counseling, which resulted in their feeling uncomfortable using the service personally.

Avery explained that there are several reasons why they did not go to a counselor. First, they said "Though university offers, probably I'm not open enough to just go out there because they might give me too many follow up [appointments] to go to. I feel I'm not in a bad position." Avery did not seek help because they did not know what to expect from counseling. They thought perhaps that counseling would require extra time from Avery that they did not believe

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they had. Additionally, Avery believed what they were going through was not bad enough to seek professional help. While aware of the counseling services provided by the university, Avery was unclear about what the counselors do, who they help, and how they help. However, Avery suggested that they would have been more comfortable talking about their problems with somebody in their department: "If I knew there are someone in the department or somewhere that doesn't see me as mentally traumatized, probably I would have visited them few times in my initial days." Despite knowing that in the US many people visit the counseling center, Avery maintained the negative stereotype that only those with severe mental problems ask for psychological help and support, which prevented them from seeking help. However, Avery felt comfortable with their department and wanted to seek help there, rather than go to an unknown place with unknown people.

Teaching Experiences

All the participants are STEM ITAs, and there are many similarities in the lived teaching experiences of the ITAs across disciplines. The third emergent theme is the teaching experiences of the participants. There are three sub-themes of teaching experiences, which are teaching in a different cultural context, undergraduate students' lack of preparation and fear of math, and ITAs' focus on student learning

Teaching in a Different Cultural Context

For many of the participants, one of the biggest challenges of teaching was adjusting their style to a different cultural context. Morgan described teaching in the US like this: "it's a different culture, a different setting all together." Much of the way teaching and assessment is done in their home countries is different from the US. All the participants, except two, had

teaching experience prior to their arrival in the US. Therefore, they had to adjust their teaching approach to help their students, both international and domestic, to fit into norms of a US college campus.

One of the major teaching differences the participants described was how the classes were taught and assessed. Eagle explained: "back in my home country it was completely lecture-based. The professor comes to deliver, maybe teach. There was no form of discussion. [In the US] we have a combination of both lecturing and discussion." Similarly, Avery iterated that there is much more discussion in the US than in their home country. They described how in their home country there are a lot more students in the classes, so there is more lecture: "I would say more of instructor talking. It would generally be a little more of one-way traffic." Avery said that because there were so many students, professors in their home country believe they must lecture in order to ensure all content is covered.

Alex and Sam both noted how classes in the US were more practical than in their home country. In the participants' US classrooms, all students had an opportunity to do lab work that directly applied to what they were learning in class. Sam stated that in their home country there was not always enough equipment for all students to participate in labs. In the US, practical lab work is critical for student learning, as Alex reported on their major impressions of teaching:

> One other impression was how practical most of the teaching is, because chemistry has to
> make things real... There are certain things which are kind of abstract. To do well,
> you must have a lot of imaginative power… The fact that [in the US there are] practicals
> and students have all lessons, equipment, and tools at their disposal makes teaching and
> learning very unique here.

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Alex realized the power of hands on, practical learning. They were able to see how students could take abstract ideas and understand them in a meaningful way. While this method of teaching was different from what the participants were used to, they found value in how well their students responded with opportunities for practical application.

Assessment is also different across cultures, as well. Avery found that assessment in math is different in the US and their home country. In the US, they explained, grades were:

more cumulatively broken up into smaller portions, whereas [in my home country] we probably had three tests, … you might have couple of quizzes in a semester, and then you have one final exam… where you essentially cover everything you

have seen in the whole semester.

Therefore, it was important for Avery to adjust to new teaching norms by creating and giving multiple modes of assessment to their students. Avery also noted that in their home country there was much less monitoring of student work and progress "My instructors very rarely came and looked at what I was doing in my book…Whereas here, to make the people learn, I have to be peeping on what they are doing." Similar to Alex and Taylor in chemistry labs, Avery found they needed to regularly monitor students' work to ensure they are learning.

While there are many differences in methods of assessment, there is one mode assessment that is similar across cultures, and that is the use of rubrics for grading lab reports. All the west African chemistry participants had experience using rubrics for grading lab reports in their previous positions. They all felt comfortable using the rubrics given to them by their departments to grade their students' work. Sam also felt comfortable using the department-provided rubrics for grading despite never having taught before. Additionally, Morgan, the physics ITA, created their own rubrics to grade the physics lab reports. Rubrics are one form of

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assessment practices that are similar cross-culturally and that the participants felt comfortable using.

Another major cultural teaching difference for the participants was the diversity of students in their classes. In the ITAs' home countries, only students majoring in science took science classes, which is different from the US. As Jamie reported, in US classrooms there is much more diversity in terms of what students are studying:

> I had a student who was doing music as a major, but for some reason she was interested in doing one chemistry course. You have students from journalism, you have students from mathematics, you have students from different special majors, and interests, and backgrounds, but they are required to take chemistry class. When you are teaching such a class, you have to take all of these things into consideration.

Many of the participants were not used to having students who lacked backgrounds in their fields of study. In their countries, undergraduate students had strong skills in their areas of study because that was their major. The next sub-theme, undergraduate students' lack of preparation and fear of math, provides more explanation about how undergraduate students' weak math skills affects how ITAs approach teaching in the US.

To conclude, the participants were able to adapt to teaching in a different cultural context over time. Morgan concluded that to adjust to teaching in a new culture, "You have to basically grow into it." It took time for ITAs to adjust to a new culture and new methodology of teaching and to feel comfortable as a teacher in the US.

Undergraduate Students' Lack of Preparation and Fear of Math

One of the sub-themes that emerged from ITAs' teaching experiences was undergraduate students' lack of preparation in math during high school and their fear of math. Avery and Eagle, the math ITAs, both described students' fear and aversion to math. Eagle stated it very clearly: "One thing I realized among American students is that, if not all of them, majority of them have a fear for math." In Eagle's experience, most of their students had a fear of their course content. Avery stated something very similar about their students:

> You have a big bunch of people with various backgrounds who have had a very disturbed past. Essentially when they're asked, the way their instructor communicated made them feel real stupid. That has delivered a strong mark on the people. They're not one individual. I've seen a significant population.

Avery found that their students were deeply and negatively affected by their previous math teachers. From working with American undergraduates, Avery described how they believed undergraduates' previous math teachers made them feel stupid and inadequate, like they would never be able to do math. The students did not have confidence in themselves or their background to do math. Avery said that many students stated explicitly, "I'm stupid at math."

Eagle described this happening in this class, too. Therefore, on the first day of class, Eagle addressed this undercurrent of fear most of the students have:

> I ask this question, "Are you afraid? Do you feel uncomfortable? Are you scared of the subject?" Initially, you only see a hand or two. I realize they don't even know me, they don't know why I'm asking that question. If I can make them feel comfortable in class, at the end of the day I get more than half telling me "yes," they are scared because they are not good at math. They hate math.

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Eagle believed that in order to help the students overcome their fears, the students and the instructor both had to recognize the math phobia that was present in the class. To foster student learning, Eagle realized students needed to recover from that fear in order to learn: "My goal has always been to help them get out of that fear, get that part and mentality out of their system." Eagle was focused on student learning, and the only way students could learn was if they overcame their fears.

Because undergraduates' fear of math was so pervasive, it directly affected Eagle and Avery's approach to teaching. They both realized that overcoming the fear of math was a significant accomplishment in their US classrooms. Avery explained that their goal for their courses was for students to have confidence in themselves; that students knew that they earned their grade and that they could do math. At the end of the course, Avery explained that they wanted all students to be able to say, "I earn this in math class. I can do math. I'm not stupid.'" Avery knew that students needed to feel ownership over their learning, which resulted in confidence in their math abilities. For Eagle, assisting students in recovering from a fear of math was a point of pride: "I enjoy helping students get out of that phobia for math… If I am able to help students understand and then overcome that fear, that, I really enjoy. That gives me some fulfillment."

Eagle recognized that it was difficult for students to recover from their fear, so they must take a multi-faceted approach. First, Eagle helped their students understand their fears and encouraged them to start the class with a clean slate:

> I make them understand the fact that it's not the subject that makes you scared, but it's your thought. The moment you told yourself you did not like the course or you were no good at it, that sticks in there no matter what you do…I help them get that mentality out.

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Assume everybody in the class is starting afresh. Assume you've never had a math class before. Make your mind neutral, start from scratch.

Eagle recognized the power of resetting one's mind and getting a fresh start. Next, Eagle encouraged students to focus on their own learning, without worrying about what other people may think:

Then I encourage them, whenever they come to class, they should ignore everybody around them. Think about you as yourself, you alone and the professor…They think if they ask a question in class, people think they are dumb. Ignore them…If you have a question, don't feel anybody will intimidate you. Forget about them and ask your question. There is no dumb question in the class.

Eagle sent a clear message to students that they were all an important part of the class and that they deserved to learn. The students did not need to worry about their classmates because each student took their own tests. As a result, students had the responsibility to ask questions when they did not understand a concept.

Finally, Eagle attempted to come to the students' level. Eagle was not interested in impressing students or whether they thought Eagle was smart. Instead, Eagle was focused on connecting with students to help them learn:

I make them understand that I'm not superman. I may make mistakes. I may not understand certain things. If I make a mistake, feel free to correct me if you know it… We are all at the same level. The only difference is that I got the opportunity to study ahead of you…. I come to their level and that helps to some extent, gets those idea or mentality away.

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To connect with students, Eagle explained that they were not different from each other in talent. Instead, Eagle explained that they were just further along in the academic process than the students. Nobody is better than anybody else; some are just further along in their learning than others.

ITAs' Focus on Student Learning

The third emergent sub-theme of the ITAs' teaching experiences is their focus on student learning. All the participants had a desire to ensure their students were learning and discussed the strategies they used to ensure this happened. Some of the ways the participants focused on student learning included making learning meaningful through connections with industry, using assessment to help students learn, and getting to know students to bring out the best in each of them.

Several of the ITAs discussed how it was important for them and for their students to make real world application to what they were learning in class. Jamie, Taylor, Eagle, and Avery all explained how they worked hard to give specific examples of how their lessons and labs were used in industry. Jamie gave examples of how different chemical reactions were used to create different materials that were developed by an industry-leading company located near the university. Jamie noticed that students became more attentive when they found out that a company they were familiar with did similar reactions in the lab that they would be doing that day in class. Jamie also brainstormed practical applications to questions that students might have in order to "gain the interest of the student." Taylor also used their own real-world experience in industry to help students make connections to what they were doing in the lab. Because Taylor had worked in industry in their home country, they tried to give examples of how chemistry is

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used in that industry. Similarly, Eagle and Avery tried to bring in practical examples of how math is used to solve problems. They explained that while understanding the theoretical underpinnings of a lesson is crucial, it is equally important for students to know how they can use those theorems to solve problems in banking, industry, or daily life.

Many of the participants also used assessment as a means of increasing student learning. Jamie, Taylor, Sam, and Morgan all discussed how an important part of their jobs was to grade students' labs every week, and they all used grading as an opportunity to teach students and help them learn. Jamie explained how they took time on every lab report to do calculations for students so that they could see the correct way to do them. While not all students looked at the feedback, those who did were grateful for it. When I asked whether Jamie thought students learned from their feedback on lab reports, Jamie responded, "They learn from that, yes. I take my time to grade their work." Jamie valued how students learned from feedback, so they took a lot of time each week to provide quality feedback on lab reports. Similarly, Taylor found that grading helped the students learn. In each lab report, they detailed where students missed points and wrote down the correct answer. This allowed students to learn from their mistakes.

Sam also took pride in giving back quality feedback in lab reports. They knew that students learned from the feedback, so Sam ensured that it was very detailed:

Whenever I am taking a mark off and grading their lab paper, I am saying, "This mistake you did here can actually reduce the mark, so be careful about that part… You did this. You have to do this. I really want you to get an A because I know your work. I read your work. You spell things really specifically, really nicely and explain things in a certain way that I want and the teacher wants. Or the teacher has given us the grading sheet and

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everything he wants. But you did a couple of mistakes, so you have to work yourself out these mistakes."

Sam gave specific feedback to students about where the students did well and where they lost points and why. Sam was also specific in their feedback about what needed to happen next time so that the students did not lose points again. Additionally, Sam mentioned that their students discussed how much Sam tried to help them improve their grades on their end of semester feedback forms. Sam described what students wrote on the feedback forms: "[Sam] really tries to improve our grades… really tries to let us understand this stuff or the calculation stuff." Or sometimes specifically write, "[Sam] helped me in my calculation. Understanding them fully so I can do it by myself." The students noticed the detail of Sam's feedback and how it helped them learn.

Morgan also focused on student learning through assessment, which was apparent through the development of rubrics for their students' lab reports. All of the chemistry ITAs were given rubrics by their coordinators; however, physics did not have standard rubrics. Therefore, Morgan decided to create their own in order to grade student work accurately and efficiently. It also made grading easier:

> Part of my motivation in making these rubrics… is to really guide them in how to prepare the lab manual, because I have to grade like 60 lab reports every week…. if I don't have a structure, they would just write from their own understanding and organize stuff in their own way and then I have to just go back and forth within the report to find where they are writing stuff, and that's too much waste of time for me.

While Morgan explained that rubrics were helpful in saving time, they were also designed to specifically guide students in what Morgan's expectations are. Morgan's rubrics had each of the

components of the lab listed, what was required of the students, and the number of points for each part. Because they were given a rubric, there was no guessing about format, and they were not penalized when they did something that they did not know about. Through these rubrics, students learned how to write an appropriate physics lab report. Jamie, Taylor, Sam, and Morgan all facilitated labs and did not have the opportunity to do explicit lessons before the lab began. Therefore, giving extensive feedback on lab reports was one way they could connect with their students and foster learning.

Finally, one important way ITAs fostered student learning was by getting to know their students and helping them be the best that they could be. Alex explained:

> I think the best that you can do as a teacher is to try to bring out the best in each of the students. I look at the people who, even if they are encountering problems, want to try several times before they come to you for help…And then there are people that are more eager. Once they have this, they'll come to you. I try to be open minded or I try to know that there are different kinds of people. I have a broader approach.

Alex realized that there was not a one-size-fits-all model for teaching and learning. They realized that ITAs must learn who their students are, connect to them, and adapt to their unique ways of learning. Alex explained that students' success was their objective: "The ultimate goal is to see my students excel, so being able to play a part in somebody's life… is fulfilling." By making individual connections, Alex was able to bring out the best in each of their students, which contributed to their goal of student success.

Sub-Question: How do University Training and Support Influence These Lived Experiences?

Three major themes emerged around the question of how university training and support influence NNES ITAs' lived experiences. They were: (1) how ITAs are trained to teach, with sub-themes of departmental training and the ITA training program; (2) sources of support in the US, with sub-themes of departmental support, support from outside their department, mentors and peers: the importance of someone to rely on, and sense of belonging; and (3) ITAs' own suggestions for improved training and support.

How ITAs Are Trained to Teach

One of the emergent themes about how university training and support influence ITAs' lived experiences was how they are trained to teach. There were two places where the participants were trained to teach, in their departments and in the ITA training program that occurs at the beginning of each fall semester for new ITAs. Therefore, the two sub-themes for this major theme are departmental training, and the ITA training program.

Departmental Training

The ITAs who participated in this study were from three different departments: math, chemistry, and physics. Because these departments are unique and separate from one another, the training policies are completely different and separate. Therefore, how the ITAs were trained to teach is highly variable and dependent on the department in which they were studying and teaching.

The math department conducted a required one-week training for all new TAs that occurred two weeks prior to the start of the semester. Eagle described how the program ran:

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It's a full week program. You have a facilitator that comes to expose you to teaching in the college, what expectations are. Then the courses that you are going to be teaching, they have the coordinators coming in to talk to you about what the level of students you are going to be, what they expect you to teach and how to teach. Then we spend time discussing some teaching methodologies in the United States based on articles and research papers and stuff like that. That is a training program that is mandatory for every TA to attend. Until you go through that training, you will not teach.

This training was designed to help all math TAs, both domestic and international, prepare for being independent instructors of their own courses. They learned about departmental expectations, their students' mathematical backgrounds and skill levels, and US teaching norms.

At the end of the week, all the new math TAs gave a mock lesson. Avery described the lesson and what they learned from it:

On the final day of my departmental workshop, we had to do a mock teaching session. Similar to what we had [in the ITA training program]…That was when I got to know about some mathematical [terminology used in the US]...That sort of gave me an insight on some things which I use frequently while teaching.

Avery explained that some of the feedback on their lesson was quite critical, but some was very constructive. They were able to learn from the experience, especially from feedback given by the graduate student coordinator who facilitated the training and the doctoral-level TAs who also helped during the training.

The math department also provided on-going training to its TAs through coursework because some of the core coursework for the master's and doctoral courses were from the math education division of their department. Eagle explained: "You are made to take some core

courses from… each math education [and] statistics." Therefore, all math graduate students had on-going education in math teaching methods so that they were prepared to teach math during their program and after they graduated.

The chemistry and physics departments assigned their TAs as facilitators of labs; the TAs were not the teacher of record for any of the courses. Therefore, they provided significantly less training in teaching for their TAs. Morgan did not describe any training provided by the physics department, and the participants from the chemistry department described minimal training. At the beginning of the semester, each chemistry lab course had a meeting to discuss the course and expectations. Sam explained that even after the meeting, they still were unsure of what to do:

When I first came here, I had a really small idea, what to do or how to talk to the students, but we had our training—you can say meeting actually—there we meet our teacher and everything and then we talk how to do stuff.

Because the meeting did not provide much information, Sam and their friend, who was also an international student, went to the lab and asked a professor to guide them through some of the lab equipment. This was not something normally done; rather, the two ITAs sought out additional help.

While there was minimal training prior to the start of the semester, most of the participants from the chemistry department mentioned that they met weekly with the coordinator of the lab and the other TAs who facilitated the lab sessions. Jamie explained what happened each week in their lab:

Every week before the lab section, you have the coordinator explain everything to all the TAs. We go through step by step and know the safety procedure, what we are supposed to expect, the questions that are possible to be asked by the students. The coordinator

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takes time to go through every step in the lab manual before we go to the lab. And we are

given the materials. If necessary, we are shown where chemicals are.

Therefore, each week the chemistry TAs met with their coordinator to learn about what they

would be facilitating that week, the problems they should anticipate, and how they could solve

those problems. Despite having a meeting at the beginning of the semester and a meeting before

each lab section, many of the other participants were still unsure about what they are supposed to

do while they are in the lab. They understood the procedure, but they did not understand how to

interact and engage with—how to teach—the students in their lab.

ITA Training Program

The other major contributor to the ITAs' training in teaching was the ITA training

program. This optional training program was something to which the ITAs were invited and

encouraged to attend; however, it was not required, and they received no compensation for

attending. All of the participants except Morgan—who was out of the country when it

occurred—participated in the ITA training program the year that they arrived on campus. All the

participants, except Taylor, mentioned the ITA training program as a teaching resource during

the interviews.

When asked about how they were supported in teaching by their department, Alex

replied, "For teaching, I think so far the only support that we've had has to be with the kind of

experience that I acquired during the ITA training." Alex was from the chemistry department, so

the only teaching training they received was during the ITA training program; they did not have

any formal teaching training from their department. Eagle, who had teaching experience and

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received teaching training from their department, also said that they benefitted from the training program specifically designed for ITAs:

> Even though I was teaching before I came, I think what helped me was the fact that I learned some form of communication skills, about gestures when you are talking to American students. Gestures, language, terminology. As an international student, you don't necessarily expect that… Those things I also picked up from that training which are very helpful.

Despite having prior teaching experience, Eagle was able to learn about how to implement their teaching knowledge and skills in the US with American students. The training provided communication strategies that was helpful for Eagle who was an experienced teacher but had never taught in the US.

Sources of Support in the US

The participants were supported in their adjustment to life in the US in many different ways; however, they did not differentiate between teaching and academic support and ways they were supported in adjusting culturally and socially. Therefore, this section examines where participants got support and how they felt connected to their new place as a result of that support. There are four emergent sub-themes: (1) departmental support, (2) support from outside their department, (3) mentors and peers: the importance of someone to rely on, and (4) sense of belonging.

Departmental Support

When the participants described support from their departments, they all discussed how they were supported academically. When asked, "How do your department and other offices on

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campus help you to adjust to life in the US?", all of the participants explained how they were assisted in their academic adjustment. There was a dearth of discussion on how their departments provide assistance in adjusting to life in a new culture and in a new language. Taylor's response exemplified the responses of the others: "Life? I think it has to do with academics." The ways in which they were provided support and the level of the support they received varied. Some of the ways departments provided support to the participants included academic support, teaching guidance, openness of the professors and staff, and social activities.

The participants received guidance from multiple people in their departments, including advisors, mentors, and research teams. Jamie described an extremely close relationship with this advisor, whom Jamie described as a father-figure. Their advisor provided advice about research and personal issues, and they were in regular communication. Taylor also communicated regularly with their advisor and described how the advisor supported their research:

> I think he really helped me a lot because even when I wanted to change my program, he really helped me and advised me. He always advised me. And the program that I'm doing he came up with, suggested some articles, and we all sat down and came up with the projects and the direction. He always guides me. All the time.

Taylor met with their professor for an hour each week, and those regular meetings were important for Taylor. It helped them feel as though their professor was present and engaged in their work. For Jamie and Taylor, regular communication with their advisors was something they both highly valued and was something that helped them adapt to their lives in the US.

Morgan also descried how they were supported by their advisor in their research. They explained that their advisor provided help and guidance while preparing them to be an independent researcher:

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Your professor would actually advise you to find your [own] way. He might not have a

clear-cut answer in the specific problem that you are facing, but he would always be there

whenever you ask him. He would always try to give you different options to explore… I

would say that he gives you the general outlook of a researcher, where you can actually

put your mind and be creative solving problems.

Morgan appreciated that their advisor did not dictate how to solve problems and do research.

While they wanted help in solving problems, it is clear that Morgan was pleased in the ways they

were pushed to use their own problem-solving skills. Morgan indicated that their advisor was

supportive whenever needed, which is another important aspect of support. While professors do

not solve problems for students, they need to be available to students.

Sam and Alex reported that they felt supported by their department while they searched

for an advisor. They explained that the chemistry department had a very systematic way of

finding a research advisor and research team. Before they chose an advisor and a research team,

they were required to visit multiple labs and meet with multiple professors. This process helped

the participants get to know and feel connected with their new department.

Departments also helped the participants adapt to teaching in the US. Avery, who was a

new teacher when they arrived, found that the coordinator of math graduate teaching assistants

was critical to their teaching success. This person was someone on whom Avery could rely,

which helped them feel comfortable and enjoy teaching:

Having a rock-solid supervisor, person who's open for you to go and ask any

form of doubts when students go to [complain]… The person is a sweet person… the

reason why I loved teaching got enhanced five times at least because of having such a

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person. And the department taking care to ensure there is one person whose role it is to teach one course and be available for the students at all times. It's super important.

Avery explained that their coordinator was there for the TAs, no matter what. They not only helped them learn how to teach, but they also gave guidance when there were problems with students. Because they had such a strong support person behind them, Avery felt confident in the teaching decisions that they made. Furthermore, if they ever had questions or concerns, they knew that they could go to their coordinator to help.

Many of the participants also appreciated the equipment and technology available to them and their students. One of the major reasons Morgan also felt supported in teaching by the physics department were the resources available:

> The first thing that comes to mind is any kind of resources…Any support we need if we run into trouble with equipment. That's always the case in physics labs. Whenever we report to our coordinator of the department, we have the equipment replaced so that the students don't suffer from that. TAs don't come out bad in front of the students because one thing that I have found is that whenever the equipment is not working or not functioning, usually the TAs tend to get a share of the blame from the students, because you are in charge.

Having adequate resources is important for the students to learn, and the physics department supported TAs by ensuring the equipment worked. Morgan noticed that the TAs often got blamed by the students if the equipment did not work. Therefore, when the department fixed broken equipment or replaced it quickly, the TAs were also able to maintain professionalism and the respect of their students. This type of support, which ensures undergraduate student respect for ITAs, is critical for maintaining professionalism.

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Morgan also explained that the clear guidelines the TAs received from the physics department was an essential part of their success in teaching in the US. They explained that in their home country they were the teacher of record and responsible for everything in the classroom. Therefore, they appreciated how their department clearly outlined the responsibilities of the TAs: "Exactly what we have to do during our labs and outside the preparation of our labs, it was all spelled out. You know the steps that you need to take." Morgan explained that they valued how well the physics department communicated expectations and that all the TAs understood what they needed to do and when.

Many of the ITAs found there was more openness on the part of professors in the US than in their home countries, which helped them to adjust to life in the US. In addition to professors' openness, the participants also mentioned that there was less social distance between professors and graduate students in the US than in their home countries. Taylor, Jamie, Eagle, and Morgan specifically discussed how open their professors were to them, their questions, and their problems. The participants also explained that they were able to communicate with their US professors in a more informal way than they could in their home countries. They all discussed how professors were happy to meet with them to discuss their research and learning, which helped contribute to their adaptation to US academic life.

In addition to professors' openness, Eagle found the whole math department to be very open, friendly, and willing to help them. They explained:

> Honestly, it's quite a friendly department. You can walk into anybody and ask anything you want. The department chair has an open-door policy. You don't necessarily have to go through a secretary to see him. His door is open; the secretary's door is open. If you think you want to talk to him about any concerns or any issues, you can.

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Eagle felt at home in the department because people were available and willing to talk to them. They did not have to make multiple appointments with multiple people to get help. Instead, they were able to go to the head of the department to get help or questions answered. This open-door policy and overall friendliness of the department, from the department chair to the department secretary, helped Eagle feel comfortable in the department and adjust to life in the US.

One important way the math, chemistry, and physics departments helped the participants connect to their new cultural context was through departmental meals and activities. These events helped the participants connect with their professors and peers on a personal level, which was very important to them. Avery explained that initially they were very nervous to connect with their professors, but the department potluck helped assuage those fears:

We would have a potluck in the department for all faculty and all graduate assistants. That really helped me because… probably it would have taken me way more time [to warm up] if I was just seeing them in official [setting]. So that was really very valuable.

During the potlucks Avery was able to observe how other graduate students addressed the professors in a casual way. Seeing this helped them realize that professors in the US were more open and that they did not need to be concerned about talking to them. This helped speed up the process of feeling comfortable in their new department and cultural context.

In the chemistry department, Sam, Taylor, and Jamie all stated that the departmental meals were an important way to meet people and to get to know the professors and other TAs. Jamie said the meals were "good because you get to talk to a lot of people. And the department is in such a way that all the professors are very friendly, so you can talk to anyone at all." It was important for the participants to be able to connect and communicate with people from their department outside of the lab setting. Morgan also described how they used these events to learn

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about people beyond their research: "When they arrange departmental picnics or departmental outings, I found that quite refreshing because you get to know the faculty and the students on a social platform rather than talking about work and research." The focus of most of the participants' lives was teaching and research, so they enjoyed getting an opportunity to socialize in a casual setting.

One way that the participants did not mention they were supported was in using English in the classroom. While many discussed challenges using English, particularly in the classroom, none of them mentioned ways they were supported by their department to improve their English language teaching skills. This was an important component of their teaching and feelings about teaching; however, it was not a way in which they were supported.

Support from Outside their Department

Very few participants mentioned any kind of support from outside their department. While some participants were aware that the counseling center hosted events designed for international students and graduate students, none of them chose to participate. The only source of support that was mentioned was the university's teaching and learning center. Avery attended many events and received a graduate teaching certificate for participating in the majority of the sessions designed for TAs. Eagle only attended one session but understood their value:

> I find those training or workshops helpful. They teach you things… about how to balance your academic work and your teaching workload, how do deal with pressure while studying, how to be effective teaching in a class, how to use multiple techniques of teaching in class and stuff like that. Those things also help a lot.

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Eagle explained that they were not able to attend more because the events were usually offered while they were in class, either as a student or teacher; holding office hours; or in meetings. While they were often unable to attend, Eagle paid attention to what was offered because they understand the value of the workshops.

On the other hand, Jamie chose not attend teaching workshops. They did not believe that the sessions were applicable because they taught a lab, rather than a class:

I don't know if I need them or whether it will be important to my class or not because we don't have our own specific time for those things. We are made to go straight in the lab manual and the time is not enough for any other thing.

Jamie recognized that the teaching and learning center provided important information that was valuable. Indeed, they understood that these sessions could contribute to their professional development: "From my own personal development, those things would be very important to my knowledge." However, they chose not to attend because they did not believe the sessions were designed for TAs who facilitated labs and did not plan their own lessons. None of the other participants mentioned that they had attended any teaching and learning center workshops nor whether they were aware of the opportunities.

Mentors and Peers: The Importance of Having Somebody to Rely on

Having a mentor or peer to rely on was one of the critical factors that helped the participants adjust to life in the US. Some of the participants relied on their mentors during the adjustment and others had friends that helped them in their adaptation process.

Jamie, Eagle, Alex, and Taylor relied on their academic professors and advisors to help them acclimate. Jamie indicated that they had both a personal and professional relationship with

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their advisor, and that the advisor was the first person they went to when they needed anything: "My advisor is like my [parent]. We chat on Facebook. We play soccer together. We do everything together. [They are] just like a friend. [They are] more like a friend than an advisor." Jamie relied on their professor to understand life and academics in the US. When asked how much their advisor helped in their adjustment to life in the US, Jamie replied, "A lot because if I have any problem, [they] will be the first person to talk to, not even my [parents] back home." This personal aspect to mentorship was a critical component in Jamie's adaptation to life in the US. While Taylor had a less personal relationship with their advisor, their advisor also played an important role in Taylor's ability to adapt to life and research in the US. Taylor met with their professor each week to discuss their research results, and this close connection was important for Taylor in feeling connected to their advisor and adapting to their new cultural context.

Eagle and Alex used their mentors as an inspiration. Eagle explained, "My mentor is somebody that I see everybody talks about in terms of how the person teaches, in terms of how knowledgeable the person is in the field." Knowledge of math was important for Eagle, and it was one of the reasons that person was their mentor. Additionally, Eagle got inspiration from their mentor. They also strove to be a role model in math and teaching, just like their mentor. Similarly, Alex's mentor was a professor whom they met in a class, and Alex was very impressed with their knowledge of chemistry. Alex was proud of the connection they had with their advisor.

Avery described how they were supported by multiple people, including the graduate student coordinator of the classes that they taught: "The doors were open for us to go meet and do the things. That too was very helpful many times." Avery felt connected to their coordinator and described them as a "gem of a person." The coordinator assisted Avery in their transition to

life in the US and to life as a teacher. Avery also relied on friends to ask questions and help navigate the new culture. They explained that their friends helped them feel more comfortable in the US. Similarly, Sam's unofficial mentor was a friend from their home country. Their friend helped them adjust to life, especially in the beginning:

> The best thing was I had a friend here. Obviously the first two months will be the toughest because you are in a new place, new department, new people. This is not my country. This is a new country, and everything is new here… So, it's a good thing you have a friend who can actually [tell] you what to do, what not to do… Someone is ushering you.

Sam felt much more comfortable moving to the US because they had a friend already here. Additionally, once they arrived, they were able to adjust more quickly because of their friend who gave advice and provided needed guidance.

However, not everybody felt deeply connected with their source of support. Alex recognized the need for mentors, especially peer mentors: "If you are fortunate enough to have a senior course mentor… that person becomes your point of reference." Many of the participants did not mention having senior course mentors; however, they can be critical in helping guide new students. Senior course mentors are able to help and advise in ways that professors often cannot. Having a senior course mentor, and the academic and social benefits that go along with it, should not be left to luck.

Sense of Belonging

A critical part of adapting to life in the US for international students is having a sense of belonging. The participants indicated that there were many people and activities that helped them

feel like they belonged on campus and in the community, including their departments, advisors, and friends.

Eagle, Morgan, and Taylor all described how their departments helped them feel as though they belonged. Eagle explained that many people in the math department, from the secretary to the faculty, helped them gain a sense of belonging: "There are many people… Faculty members also made me feel belonging to the environment because when they meet you in the hallway, they check on you." When people gave some attention and showed they cared, Eagle felt as though they belonged in the department and on campus. Similarly, Morgan found the whole physics department, especially the secretary, to be welcoming and to give them a sense of belonging: "I would say the whole physics department…Our chair is a wonderful person… my advisor is there, but I would say the office secretary… she was really welcoming and was always there in answering any kind of questions and issues." Morgan found helpfulness in their whole department, and it helped them to feel as though they were welcome and belonged. Likewise, Taylor reported that the whole chemistry department helped them feel as though they belonged on campus, particularly their research team.

Jamie felt like they belonged because their advisor and department gave them a sense of family: "I have my advisors…my head of department, who is also very good. We are like a family. We are very small. We know each other. You can just walk into anybody's office and talk if there's anything worrying you." Jamie described a feeling of community within their department, and they felt as though they were part of that community. Alex also found that the professors helped them feel as though they belonged: **"I think what I would say is most professors here welcomed me. I didn't anticipate that, and so it makes me feel welcomed."** Alex

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was anticipating a more formal environment, so the connection between graduate students made them feel as though they belonged.

Sam found that sharing meals with friends and classmates helped them feel a sense of belonging. After a friend brought a sweet dessert to their office to share, Sam brought some food to share with that person, as well. This sharing of food helped Sam connect with their peers. They explained why sharing food was a good way to connect with other: "A good way to touch anyone's heart is through the stomach, an easy way I think. If you can cook, you can make a good meal." Sam felt happy to share their own cultural traditions of sharing food with Americans, and this sharing helped them feel as though they belonged on campus.

Avery appreciated that international and domestic students were treated similarly at the university, and they believed that was a contributing factor to international students' sense of belonging:

> I don't think people treat you in any different way. I think that is the sole reason why my experience at school here would be great…. There are so many international people everywhere around. School believes we are all part of the [university] family… I feel way more welcome across all people. I don't miss my family too much when I was at this school solely because I thought everyone to be like my family in a lot of ways.

Avery also felt a sense of family at the university. They saw people from all around the world on a daily basis, which was something valuable to Avery. Not only did Avery hear the message that the university is a family, they felt it.

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ITAs' Own Suggestions for Improved Training and Support

In general, all the participants indicated that they were satisfied and grateful with the support that they received from their departments and the rest of the university. All but one of the participants were returning to the university in the fall, so their returning to campus may have had an impact on how comfortable they felt responding critically. Despite their reticence to critically analyze their training and support, many of the participants provided suggestions about how they could be better prepared to teach.

A few of the participants suggested that ITAs needed more training and support from their departments in addition to what they get with the domestic TAs. While they were able to participate in the ITA training, that training was generalized for all ITAs on campus. They came from different cultures and different ways to approaching teaching and learning within their discipline. Therefore, some of the participants thought a meeting of ITAs in their departments would be helpful. Sam explained that this would help because labs—and the technology in them—were quite different:

> In [home country], our lab was quite different than this lab. If there was an hour training, just to give us a review because we all are international students. There are other students I talked to, and they had some sort of difficulty also because they're also… new.

While Sam felt prepared to run experiments in the chemistry in the lab, they believed that international students needed a bit extra training in the standard equipment in the US, which was different from the equipment in many of their home countries.

Alex also believed that the chemistry department needed to do more for international students when they first arrived:

I think maybe if there were some kind of meeting, especially for international students, because this is a new environment. There's a new culture. Even though the ITA [training] was very good, the kind of things that we did at the ITA [training] isn't the same thing that we did [in the chemistry department]. Because the ITA training was most of the time about, assuming you have a class that you teach.

All the chemistry ITAs came from a different culture, and Alex also found that the preparation they were getting with the domestic students was not sufficient. In addition to more training by the chemistry department, Alex also had suggestions for modifying the ITA training program. While they found it helpful, they suggested the training program should provide a few different training sessions for those facilitating labs in the science, technology, and engineering departments because most of the training is designed for and those who are teaching their own courses or sections, as is the case in several of the other departments on campus.

Avery, who had a week of training with the math department, also thought international students needed additional information from their department to what they receive with their domestic peers. Avery explained that the math training lacked explanation of students' backgrounds in high school. Avery suggested:

If they could have given me an insight on what are the common things students have studied in their high school. More than giving me textbook. If I'm given some insight in a nutshell at least what they'd learned [that] will help me greatly because I'm not a full-time instructor… because I studied this in my grade six and seven.

Avery explained that ITAs needed more background about their students. They needed to know what the students have learned in high school because there was a large gap between the domestic undergraduate students' math background and the ITAs' math background. This

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background knowledge is something that the TAs who grew up in the US may take for granted because they have experience with math in US elementary and secondary school systems. ITAs would also be able to address students' fear of math if they had a better understanding of their math background.

Morgan and Jamie had suggestions for their department regarding the amount of time in the lab. They both thought that the students would benefit from a little bit more time in the lab. More time would help the ITAs devote enough time to ensuring students were learning. They found this difficult with limited time because each week they only had enough time to complete the assigned lab, without time for scaffolding and additional instruction. Jamie found that facilitating the lab limited what they could do to apply new teaching techniques:

> When we work in the lab we have fixed procedure that we supposed to follow. So even if you have your own ideas, you just have limited time to apply them… a normal classroom I think where you have students interacting… activities that you can't do in the lab sections because we have just a limited time for the lab work.

Jamie was interested in trying new methods to help students engage in the lab, but they believed that there was not enough time to do so.

Morgan also reported that they do not have enough time to assist all their students, which left some undergraduate students without help:

> Probably having even, the class time a little extended, or having a less number of students in one section… Sometimes it's really hard because once you are trying to address questions or troubleshooting in one station, and then there would be other students who are left behind.

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Morgan mentioned that students complained on their end of semester feedback forms about not getting enough attention during lab time, and Morgan believed that this was having an impact on student learning.

While most of the participants felt the training and support they received was adequate, there are ways that the university and STEM departments can improve the teacher training of ITAs, how they support their teaching development, and how they support their transition to life in a new country.

Sub-Question: How do their Experiences Influence their Perceived Preparation Towards their Career?

Two major themes emerged around the question of how NNES ITAs' lived experiences influence their perceived preparation toward their career. They were: (1) ITAs' career goals, with a sub-theme of the positive effect being an ITA has on career goals; and (2) fostering ITAs' goals.

ITAs' Career Goals

In order to understand how the ITAs perceive career preparation from the university, it is incumbent to understand what their career goals are. Therefore, one of the emergent themes was the ITAs' career goals. Overall, most of the participants were interested in earning PhDs and becoming faculty members. The priority for many of them after they graduated was to research, and many of them listed teaching as a priority, as well. However, there were two for whom that was not a priority. Sam reported that they were unsure about whether they wanted to continue studying to earn a PhD, and Avery decided to look for an industry job in their home country.

These two were also the only participants who were not necessarily inclined to stay in academia and become professors.

Jamie, Eagle, and Morgan all planned to finish their doctoral programs and become faculty members. Jamie indicated their priority was to be an active part of the chemistry community: to research, teach, and write books. While they were flexible about their timeline and getting other experiences, Jamie explained that they ultimately wanted to be a professor:

> I actually want to teach chemistry in the college. I'm actually open to either working in the industry for some time, but I like teaching… Whatever chance that opens for me, I will do it, but my ultimate goal is to just teach in a college, write books. That's what I want to do.

Jamie believed the position of professor will allow them to research, write, and teach, which were all things they enjoyed doing. Jamie mentioned multiple times in the interview that they enjoyed teaching while discussing their career goals. Teaching was a central part of their view of being a faculty member, not a marginal one.

Eagle was also focused on finishing their PhD and then planned to pursue a faculty position, perhaps while also working as a consultant. They had experience in both academia and industry, so they believed that they had "fair exposure" to both areas. Eagle explained why they were interested in academia: "Because I enjoy teaching. I enjoy seeing the 'aha moment' on the faces of my students. I enjoy helping students get out of that phobia for math." Because of the enjoyment they got from teaching, they wanted to stay in academia. However, Eagle was realistic and was willing to take a job that was a good fit for them: "At this point, I'm open. Depending on what I get after my doctoral degree, if I get an industry job, I'll go for it. If I get a faculty job, I'll go for it." They explained that they would like to stay in the US after graduating:

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"I believe the US has helped me in a way and it would be nice to give back." While they were open to any place they get a job, they would initially like to stay in the US and contribute to the country where they received their graduate degrees.

Morgan also had a goal of finishing their PhD then getting a tenure-track position. However, in physics, they explained, it is necessary to get several post-doc positions before achieving their ultimate goal of becoming a faculty member in their home country:

Probably I have to take two or three stints of postdocs before I can actually go for a faculty position, tenure track… I don't know how things might work out in the long term, but still I have a strong intention to go back to [home country].

Morgan's career goals were research-driven; therefore, they knew that they would have to do several post-docs in the US or Europe before they could become a professor. Their research was theoretical, and most of the schools which offered these types of positions and had the right lab equipment were in the US and Europe. Morgan explained that they would look at schools that are strong in their field of research, so location was not important to them regarding their post-doc positions. However, ultimately Morgan would like to return to their home country for a faculty position.

Alex and Taylor both indicated that they wanted to pursue PhDs after they completed their master's degrees and then become faculty members and researchers. Alex's short-term goal was to get into a doctoral program, and their long-term goal was to return to their home country and become a faculty member: "I'm looking at going back to my previous university in [home country] to be a professor." Alex wanted to return as a professor to the university where they studied as an undergraduate student and worked as a teaching assistant. Taylor explained that they also plan to pursue a PhD after they finish their master's degree and then "I want to work as

a researcher, scientist" while also maintaining a business in their home country. When asked about where they would like to conduct research, Taylor was open to going wherever they got a good opportunity: "I think if I get opportunity here [in the US], I will do it here. And if I don't, I will go back." Taylor was focused on the opportunity to be a researcher, and they were willing to go wherever was needed.

Sam and Avery, on the other hand, did not indicate a strong desire to stay in academia and be professors. Sam was unsure whether they want to pursue a PhD after they completed their master's. They explained that they had not decided either way yet: "I'm still figuring out whether to study more or joining a workforce." Avery was clear that they were not interested in pursuing a PhD, so they concluded that they had two options: "Either I could take up a teaching job or I could have gone to industry." Even though Avery indicated a true enjoyment of teaching in the US, they were not inclined to pursue a teaching job for two reasons. First, they did not want to teach in the US because that meant navigating the world of optional practical training and community college teaching, which did not interest Avery. Second, they were not interested in teaching in their home country because of the old-fashioned teaching approach there: "The one problem in the system is the chairperson and people of my parents' generation, their [teaching] approach I feel is outdated." Avery knew that because of their young age, they would not be able to implement the teaching practices they had learned in the US. Therefore, instead of teaching, Avery decided to return home to find a job in industry.

While most of the participants had goals of being professors, not all did, and those that were interested in remaining in academia were also open and interested in work in industry. In fact, Morgan and Alex were the only participants who did not have experience in industry and did not indicate any interest in working outside of academia. All other participants had worked in

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industry or were interested in pursuing a work outside of higher education. Therefore, work in industry, as well as academia, is an important aspect of ITAs' future career goals.

The Positive Effect of Being an ITA

All the participants explained that being an ITA was an important part of their experiences as graduate students in the US. These experiences had a positive effect on them as individual teachers and students, as well as on their personal career goals. Jamie, who aimed to be a professor, believed that their work as a TA was aligned with their personal career goals. The courses they taught and the research they conducted connect with their goal of being a chemistry professor:

> I'm assigned to courses or teaching duties that are in my research in life, academic life. The content of the teaching is contributing to what I want to be in future. And then the classroom environments, the experience I get, it was also building me a lot in terms of how to be very patient in the classroom, to deal with students, how to even write on the board… and how to speak in a classroom.

Jamie wanted to teach and research, so the opportunity to teach as a part of an assistantship directly helped them achieve their career goals. They had the opportunity to gain more teaching experience and to become a more proficient teacher as a result.

Morgan, who also planned to be a professor, believed that their work as an ITA has contributed to their personal career goals. They explained how being an ITA helped them be a better teacher:

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I think it contributed very much. In a very positive sense, because obviously the first thing being exposure to the US educational system…I'm way better prepared to address a classroom filled with US students. It has helped me instruction-wise, or presentation wise, in improving my own English, and the way I present physics to a different kind of audience.

Being an ITA gave Morgan the opportunity to learn about US culture and education, which helped them connect with their current students and will help them connect with future students from different cultures. Morgan also improved their teaching skills by learning how to explain physics to undergraduate students in English, not just those who are already experts in the field. As a result, Morgan believed that they were more prepared to find post-doc and tenure-track faculty positions as a result of their experience as an ITA.

Alex also found that being an ITA helped contribute to their goals of being a professor. As an ITA, they were getting experience in both teaching and research: "I'm getting experience because ultimately when you become a professor, you are essentially a researcher, and then you teach also. Being a TA is giving me the opportunity to learn both, which I think is a good experience." Alex recognized that what they were doing as an ITA—teaching and researching— was giving them experience and some insight into what they will be doing when they become a professor.

Alex also believed that being an ITAs was valuable because it gave them experience at a diverse university. The world is changing and becoming more global, and Alex realized that this cross-cultural experience will help them teach future students from around the world:

I think being an ITA has also given me the platform to interact with people from diverse

backgrounds… The world is becoming more of a global village… Being in this setting I

think is also preparing me for maybe in the near future where I might be able to maybe

have a class where they are from diverse background and the opportunity to maybe

interact with people from a different culture. That is also exciting.

Alex described how their experiences with diverse people in their research lab and in the lab

sessions they taught prepared them for their future career. They recognized that in the future, as a

professor, they will be teaching people from all over the world, and as an ITA they got

experience working with diverse groups of people.

Similarly, Eagle believed that their work as an ITA helped prepare them for their future

work, whether it is in academia or in industry. One of the reasons Eagle wanted to be a faculty

member was because they were motivated by helping students and seeing their faces in the "a-ha

moment," when they finally understood a concept and their faces lit up. Eagle explained that

they enjoyed making "students as a priority, helping them, making sure I can guide them. The

challenges that I faced, I can help them overcome rather than going through it the hard way."

Eagle recognized the fear and anxiety that many of their students faced, and they enjoyed helping

students get past that fear. Their work as an ITA helped prepare them to be a faculty member and

helped more undergraduate students overcome their fear of math.

Eagle also explained that their work at the university helped them prepare to work in

industry because they were also training in the field of statistics:

I think the subject area in which I'm working right now puts me in a good position to be

able to fit into industry because I'm into statistics right now and almost every decision in

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the industry right now is data driven…With people like us, with expertise in statistics, data analytics, data mining, we're able to help these institutions make informed decisions. While Eagle did not detail how their teaching position helped contribute to this goal, it is clear that they felt prepared to step into an industry position and do meaningful work. Furthermore, when discussing how their work as an ITA contributed to their goals, Eagle differentiated between his work as an instructor and the research they were doing as a graduate student.

Similarly, Taylor and Sam explained that they were better researchers as a result of being ITAs. Taylor believed that their role as an ITA helped make them a better researcher: "It has really helped me in terms of research, how to search information it has helped me. Because my professor, he has really helped me." Taylor described their goals of being a researcher and a scientist, and what they did as an ITA directly contributed to those goals. Sam also believed they are now a better researcher as a result of being an ITA. Sam had the opportunity to work in both organic and inorganic chemistry labs, and they found this beneficial: "The good thing was I'm learning all those instruments." Sam explained that gaining mastery of instruments in both organic and inorganic labs was valuable, especially if they decide to pursue a PhD. The reason for this was because professors look for potential doctoral students who do not need training on equipment and who already know how to obtain data. While Sam did not have definitive plans after they graduate, they knew that they were in a good position because they were trained in a variety of lab equipment. Taylor and Sam viewed research knowledge and skills as critical components for their future careers, which have been enhanced by their positions as ITAs.

Avery and Sam also found that being an ITA helped them develop as individuals. Avery described how they thought that teaching did more for growth and development than their

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coursework. Not only did Avery learn how to teach and effectively communicate with students, they also matured when they became a teacher. They explained:

> Teaching has made me progress in lot of different ways. Pretty tough to measure, but it has done a great difference…First and foremost made me a good student…Secondly, I become a responsible person…It helped me reach that level. It showed how to be connectable as an instructor.

Avery recognized that they matured when they began teaching. They learned how to manage their time because they were both student and teacher. After a rough first semester, Avery realized that they needed to elevate their level of professionalism. As a result, Avery became a successful student and teacher. Sam also had a positive personal experience as an ITA. They explained that one of the most important things teaching has done for them is "boosting my confidence." Sam now feels more confident as an instructor and a researcher as a result of being an ITA.

All the participants had unique career goals. Some had only one goal: Being a professor. Others were more open and flexible, depending on what opportunities arise for them. Some wanted to stay in the US, and others desired to return to their home countries. However, they all reported how being an ITA had a positive effect on their goals.

Fostering ITAs' Career Goals

In order to understand how the ITAs' perceive career preparation, it also critical to understand how their goals were fostered and by whom. Therefore, one of the emergent themes of the study was fostering ITAs' career goals. The participants described the ways in which their

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goals were fostered and that they were supported either by a mentor from their department or family and friends.

Jamie, Eagle, Morgan, and Taylor all found that their goals were fostered by a mentor from their department. Jamie, who had a very close relationship with his supervisor, explained that their supervisor knew about their goals and helps foster them:

My supervisor knows about my goals. [They] always talks about what is ahead of me because [they] had been there before. [They] talks about, "If Jamie you get done by 2021, where do you want to do your postdoc? When you want to do your postdoc? Do you want to go back to [home country] immediately? When are you getting married?"

Jamie's mentor checked on them regularly to make sure they knew what was happening and what was coming next. Not only did their mentor ask about academic goals, but because of their friendly relationship, they also asked Jamie about personal goals and plans. Jamie's supervisor knew Jamie well and connected regularly to ensure their goals were being supported. In addition to their supervisor, Jamie said that their friends and family knew about their goals. They explained that they shared their goals with their friends from their department; however, they were unsure whether their friends did anything to support those goals. While their friends may not directly foster Jamie's goals, it was clear that they had a support network of people with whom they could discuss their future plans.

Eagle, Morgan, and Taylor also found their mentors fostered their goals; however, they focused on academic goals. Eagle described how he had a close connection to his mentor, and that person helped them achieve their goals, even if they did not discuss them formally:

My mentor would know the direction I'm going because he's in the field. He knows that it's an extension of himself. Though we may not have spoken about it formally, one

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unique thing about our department is the fact that the concentration is in education, teaching. By the time you leave the department, they are confident that you can get a faculty position somewhere.

Eagle recognized that their success reflected well on their mentor; therefore, they knew that their mentor was investing in their goals. Additionally, Eagle felt confident that their training of math education prepared them to be faculty members. As this was one of their career goals, this fact helped Eagle feel like their goals were being fostered.

Morgan explained that their advisor was the one responsible for helping them find a post-doc position, which made them responsible for helping achieve their career goals. Morgan described how the post-graduation process works in physics:

Your advisor is responsible because usually the recruitment at the postdoctoral level or beyond PhD is done through recommendation. It's where your professor has connections… This helps you in achieving those [goals] because you need those connections so that you can actually present yourself, and people know you. Then whenever you are applying, they can know that he's coming from that connection.

Morgan said that their advisor knew their goals and actively worked to foster those goals. One way their advisor did this was through helping Morgan attend a professional development workshop. Their advisor helped them find these opportunities, and the department helped fund Morgan's attendance at the workshop. This opportunity allowed Morgan to make their own connections, meet new people, and expand their network of academics, which aided Morgan in getting one step closer to achieving their goals.

Taylor's advisor knew about their goals and encouraged them to think about what they wanted to achieve. Taylor described how their advisor was supportive without being overbearing:

> I think he always encouraged me. But he doesn't make it like he's forcing me to stay. He always tries to tell me the advantages of pursuing PhD or not. That's what we discuss. Because the research that I'm taking right now, the masters alone cannot help me finish that research. So maybe I will have to stay and do it, or I will have to leave for someone to continue. That one is up to me to decide.

Taylor understood what their options were for research and pursuing a PhD, and their advisor communicated with them about the benefits of continuing their research. However, Taylor knew that the decision to pursue a PhD—and where to pursue it—was their decision alone.

Some of the participants also shared their goals with their friends and family. In addition to their advisor, Taylor also had a friend from their home country who helped foster their career goals. This friend was a year ahead of Taylor in the master's in chemistry program. This friend introduced Taylor to their advisor and shared a lab with them. Taylor said that they shared their goals with this friend, as well. Sam explained that they talked to their friends and their parents about their goals. They explained that their friends in the US studying for a graduate degree were helpful because "they know what we are doing here." Sam found that this group of peers were able to support them in important ways. Additionally, Sam explained that their family in their home country were able to provide emotional support when they first arrived. They explained that the initial cultural shock was difficult to handle, but their mother back home was very supportive and reminded them of their goals and why they were in the US. Both Taylor and Sam found support from friends and family helpful in achieving their goals.

To achieve their goals, Alex shared their goals with a supervisor. When asked, "Who knows about your career goals and who helps you achieve them?" Alex explained that his supervisor knew their goals: "Actually I have told my supervisor about it. She knows that I'm aiming to get a PhD... the ultimate goal is to get into a professor job description." However, Alex did not describe how their supervisor fostered those goals. On the other hand, Alex was very clear about how their training and experience helped them achieve their goals:

> I think my training here is actually preparing because I'm actually thinking of getting a PhD, also. And if I apply for a PhD, I'm applying with a lot of people with an undergrad degree, so just as the first degree. Me having a master's, I would have better research experience and it would better position me to compete for spots in the PhD screen. I'm excited.

Alex clearly believed that getting a master's degree would help them achieve their ultimate goal of being a professor. They knew that their background in research and teaching would give them an advantage to getting into a doctoral program in chemistry.

Most of the participants described ways their goals were fostered by their departments. Some found individual attention and support from mentors while others sought support from friends and family. However, for some, there is a perceived lack of formalized career preparation. Avery and Eagle both reported that the math department provided much training and preparation for a career in teaching and as a faculty member. However, Avery reported that the math department did little to prepare them for a career in industry. Avery explained that many of the faculty were out of touch with the job market and helping graduate students prepare for professions outside of academe. While their professors invited the university's career office to

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speak to their classes, Avery found that this was insufficient in preparing them and their classmates for their careers.

Eagle, on the other hand, had previous experience in industry and thus felt comfortable knowing that a job in academia or in industry would be a possibility for them. They knew that the skills they were developing in their doctoral program, coupled with their prior job history and current teaching experience would propel them to a desirable position. Avery, who had no prior work experience, did not necessarily feel confident that their current teaching experience and master-level coursework were adequate to assisting them find a job in industry in the US. As a result, they decided to return to their home country, where they were much more confident in finding a desirable position in industry.

The participants in this study showed flexibility in their career goals. Many of them indicated a desire to become faculty members, partially because of their enjoyment of teaching. However, many were also open to working in industry after graduation. The ITAs' goals seemed to be independent from the training and support they received from the university. Only Avery indicated that they were not adequately prepared for a job within the US; however, they also indicated that this was a benefit to them because it spurred them to return home to their family, where they believed they belong. Overall, the career goals of ITAs are positively influenced by their experiences as ITAs, if not by the training and support they received from their support systems.

Conclusion

This chapter presented several emergent themes surrounding the research question and sub-questions. For the research question regarding NNES ITAs' lived experiences, this study

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found that there is an initial adjustment period for NNES ITAs as they adjust to their new lives. This study also found that using English created some challenges for ITAs, especially at the beginning of their journeys and in the classroom. NNES ITAs also had to adapt to cultural differences, both in and out of the classroom. Overall, for the participants, their teaching experiences were extremely important parts of their lived experiences.

For the sub-question of how university training and support influence NNES ITAs' lived experiences, three major themes emerged: how ITAs are trained to teach, sources of support in the US, and ITAs' own suggestions for improved training and support. The data reflect there are differences in the training and support provided to ITAs across departments on campus. The participants perceived they needed more training and support, especially in teaching, within their departments and in the entire university. For the sub-question of how NNES ITAs' lived experiences influence their perceived preparation toward their career, two major themes emerged: ITAs' career goals and fostering ITAs' goals. This data reflect the flexibility many participants have in their career goals, as well as a desire for many of the participants to become faculty members in the future. However, the data show that ITAs' career goals are positively influenced by their experiences as ITAs.

Chapter V provides an analysis of the findings presented in this chapter and situates them within the literature presented in Chapters I and II. Following the interpretation of the findings, theoretical and practical implications are presented. Next, there is a critique of the study, including limitations and delimitations followed by recommendations for future research.

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CHAPTER V

DISCUSSION OF FINDINGS

Introduction

ITAs are important for colleges and universities because they are responsible for the instruction and facilitation of large numbers of undergraduate courses (Austin, 2002; Kaufman & Brownworth, 2006; Smith et al., 1992). In addition to their instructional value, ITAs also bring diversity and international perspectives to IHE, which benefits their departments and the undergraduate students in their courses (Smith et al., 1992). As faculty in colleges and universities continue to focus on expanding research agendas, departments will continue to distribute more teaching responsibility on ITAs (LoCastro & Tapper, 2006), making them an indispensable part of undergraduate education in the US (Luft et al., 2004).

Despite the importance of ITAs and their domestic counterparts, training and development of these key groups is still underrepresented (Gorsuch, 2012; Gorsuch, 2016; Parker et al., 2015). Although some studies inform the structural support ITAs receive at the organizational level (Brinkley-Etzkorn et al., 2015; Trebing, 2015), there is a dearth of research regarding ITAs' perceptions of their support systems and how their experiences can shape effective policies for ITA programming in order to prepare them for the current roles and future careers. Colleges and universities need to both address' ITAs challenges and meet the needs of the departments in which ITAs are teaching (Jia & Bergerson, 2008).

Grounded in hermeneutical phenomenology, this qualitative study examined the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study was to examine ITAs' lived experiences, the influence of the

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university's training and support on those experiences, and how those experiences prepare them for their future careers. This study built upon and adds to the work of Trebing (2015), who identified suggestions ITAs themselves had for improving ITA training programs. The current study extended this research by analyzing ITAs' career goals and how institutional training and support programs help prepare them to achieve those goals.

To understand non-native English-speaking ITAs' experiences and their perceptions of support, I investigated the following research question:

- What are the lived experiences of non-native English-speaking International Teaching Assistants in STEM?

The following sub-questions also helped drive the study and answer the research question:

- How does university training and support influence these lived experiences?

- How do their experiences influence their perceived preparation towards their career?

In Chapter V, the emergent themes from Chapter IV will be situated within existing literature and analyzed using Lave and Wenger's (1991) situated learning theory through a constructivist lens. First, this chapter presents a summary of the findings presented in Chapter IV. Second, there is an interpretation of the findings, which ground the results in the literature and provide further analysis. Third, I discuss the implications of this study to theory and practice. Fourth, there is a discussion of the limitations and delimitations of the study. Finally, I present recommendations for further research in the areas of ITA career plans, female ITAs in STEM, institutional perceptions of ITA support and preparation, and perceptions of graduate student career training and support after graduation.

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Summary of Findings

The research question guiding this study asked about the lived experiences of NNES ITAs in STEM. This study found four emergent themes around this question: (1) the initial adjustment period, with sub-themes of the spoken English adjustment period, teaching adjustment, and social adjustment; (2) experiences using English, with sub-themes of adjusting to a different variety of English and language adaptation strategies; (3) cultural differences and adaptation with sub-themes of feelings of being a cultural outsider and adaptation strategy: ask and listen; and (4) teaching experiences, with sub-themes of teaching in a different cultural context, undergraduate students' lack of preparation and fear of math, and ITAs' focus on student learning.

In addition to the research question, two sub-questions guided the study. The first sub-question asked about how university training and support influenced ITAs' experiences. Four emergent themes resulted for this question: (1) how ITAs are trained to teach, with sub-themes of departmental training and the ITA training program; (2) sources of support in the US, with sub-themes of departmental support, support from outside their department, mentors and peers: the importance of someone to rely on, and sense of belonging; (3) workload affects ability to adapt to life in US; and (4) ITAs' own suggestions for improved training and support. The second sub-question asked about how their lived experiences influenced their perceptions of career preparation. Two major themes emerged around this question: (1) ITAs' career goals, with a sub-theme of the positive effect being an ITA has on career goals; and (2) fostering ITAs' goals.

Interpretations of Findings

This section provides an interpretation of the findings of this study. It is is organized by research question and grounds the findings in the literature that in some cases reinforces and in other cases offers a differing perspective of ITAs lived experiences.

Research Question: What are the Lived Experiences of NNES ITAs in STEM?

Understanding NNES ITAs' lived experiences is the first factor that needs to be considered in understanding how they are trained and supported and how that training and support prepares them for their future careers. Therefore, implications of the first research question are presented first, followed by the sub-questions.

Current Political Climate in the US

First, it is important to consider the current political environment in the US. The political climate surrounding immigrants in the US is tenuous and has a direct effect on international students studying in the US. While running for president, Donald Trump used threatening rhetoric about people from Central and South America and the Middle East. Directly after taking office, President Trump signed two Executive Orders that banned entry into the US from multiple Muslim majority countries (Executive Order No. 13769, 2017; Executive Order No. 13780, 2017). From the President of the US and the media, there has been consistently negative messaging about immigrants since before the US presidential election in 2016. As a result, international students regularly contend with racism, potential violence, and the rise of White supremacy in the US (Ariza et al., 2018).

Ariza et al. (2018) reported that international graduate students have feelings of fear and uncertainty due to the current political climate, even if they are not from one of the seven

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affected countries. This was the case for one potential participant. One NNES ITA declined to participate in the study despite having graduated and knowing that the interviews would be anonymous. This potential participant explained that they were concerned that their participation could have had a negative effect on immigration status and potential employment opportunities. Fear about speaking about experiences as an international student could have limited more than one potential participant from participating in this study. Those who have abundant feelings of fear and discomfort may have declined participation, so this study may not be representative in showing the feelings and fears of international students.

Despite the negative political climate, none of the participants in this study discussed the current political anti-immigrant rhetoric nor feelings of fear. Avery described their status as a "legal alien," which iterates the rhetoric in the mass media about legal and illegal immigrants in the US. The term *alien* is rather outdated, and it gives a significant sense of otherness. Furthermore, the topic of immigrating legally and illegal is clearly one about which they have had to think. Using the term *alien* also indicates that Avery did not necessarily connect or feel as though they belong to the country, despite their legal status. Sam also described how they are "in a foreign country," indicating that they also did not necessarily feel as though they connect and belong. However, Avery explained that they felt very comfortable on campus and that the family-feeling on campus was one of the reasons they did not miss their family back home. While Avery seemed aware of the national anti-immigrant rhetoric in the US, it is not something that Avery felt on campus. None of the other participants mentioned this either.

Surprisingly, religion was something not discussed much during the interviews. Two of the participants in this study identify as Muslim, but during the interviews they did not mention confronting anti-Muslim rhetoric or sentiment. However, they also did not discuss their religion

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either. One of the participants did not mention religion at all and the other only very briefly. This could have been a result of the current political situation, or it could have been because the questions in this study were more focused on teaching and learning. However, the responses from the all participants about their lives and adjustment to life and studying in the US did not include much about religion. Similarly, Morgan downplayed their participation and leadership in their local religious organization. When asked about socializing off campus, they hardly mentioned their participation and leadership role. This could have been because the national rhetoric against non-Judeo-Christian religions, modesty, or because the questions in this study were more focused on teaching and learning. However, Morgan mentioned some religious and cultural differences in an email prior to our first meeting but not in person. Religion was an important part of Morgan's life; however, it was not something they chose to discuss when describing their lived experiences to me.

Initial Adjustment Period

Cultural, academic, and social challenges were most profound during ITAs' first weeks and months of life on campus. Many of the participants described feelings of discomfort and foreignness as they navigated their new school and culture. They felt uncomfortable using English for daily purposes and struggled with fluency. They knew what they wanted to say, but they struggled to recall words and speak with confidence and clarity. The varieties of English they used in their home countries were different from US English, and they were conscious of the differences. Wu et al. (2015) found that all international students face academic, social, and cultural challenges at US colleges and universities, but these challenges are most profound for ITAs during their first weeks and months on US college campuses.

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ITAs also struggled to understand their roles as teachers and as participants in the community. During their first semester teaching, they did not what they were supposed to do in the classroom, and they did not know how to help their students. Because they were in a new cultural setting, they felt lost in the first months of being an ITA. They knew that they wanted to help their students, but they did not know how to do it. Because they did not know how to approach students to help them during lab time, they stayed on the edges of their classrooms waiting for students to ask them questions. They did not actively seek ways to support their students learning during their first semester. Furthermore, ITAs also struggled to find where they fit socially into the campus community. They did not know how to connect with people in their labs and how to make friends. However, all of the ITAs reported that they were able to adjust by the beginning of the first semester. They felt more comfortable using English on a daily basis, they understood their roles as leaders in their classrooms, and they developed strategies for making friends. Similarly, Ankawa (2017) found that the challenges international graduate students face are more difficult at the beginning of their sojourns.

The Impact of English on Experience

One of the primary features of language for NNES ITAs is that they cannot take language for granted; they have to think constantly about using the language. In their home countries, they could use language automatically, without thinking about it; however, in the US they cannot do that. Before they can speak, they must think about what they want to say and how they want to say it. For some, using English regularly was so daunting that felt like a full-time job, in addition to their teaching and studying.

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The participants in this study did not describe any kind of support for their language challenges, despite facing linguistic challenges in and out of the classroom. English language skills are critical to the success of international students, and colleges and universities have an obligation to provide adequate language support to all students they accept (Andrade, 2009; Andrade et al., 2015; Eggington, 2015; Evans & Andrade, 2015). The host university of ITAs has an obligation to provide them support as they navigate teaching, learning, and socializing in English. Language support can help ITAs understand the causes of miscommunication with students and give them confidence in their language as they teach.

It takes vast amounts of time and energy to use a new language in a new country. As a result, ITAs cannot take language and communication for granted, unlike their native English-speaking peers, who use language with relative ease, as English is the language they have used in their homes and throughout their entire education. Native English speakers negotiate the challenges of graduate school and a teaching assistantship in their native languages; however, NNES must navigate this new experience in a non-native language, making the task much more difficult.

Language is an important part of the US educational experience for NNES, and using language with fluency and with reasonable accuracy is extremely important for ITAs (Hoekje & Williams, 1994). However, most ITAs struggle with language challenges. Swan et al. (2017) reported that over 75% of ITAs face language barriers, and in this study, all the participants reported having language difficulties. Arshavskaya (2015) found that many ITAs are concerned with limited fluency of English, but fluency was not a concern for the participants in this study. Few of them indicated that they had fluency problems. Even for students without fluency problems, they still indicated linguistic struggles.

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Accent Affects Confidence

One of the ITAs' most significant language difficulties was their accent, and their perceptions of their accents affected their confidence in speaking. They all discussed how their accent—the way they pronounced their words, syllable stress in words, and syllable stress across utterances—sometimes created a barrier to communication. Many of them were aware of how they spoke differently from native English speakers, so they were sometimes nervous about talking to their students or saying the wrong thing. Many of the participants were concerned with how their language affected communication with their students, so they took responsibility for ensuring effective communication. The way the ITAs took responsibility for effective communication was by addressing their accent with their classes and requiring their students to participate in the communicative process. They asked their students to tell them if they did not understand something, and they were also willing to ask students to repeat if necessary. These actions gave their undergraduate students agency in the communicative process that occurs in the classroom.

Accent was something that the participants were aware of, and most of the participants had positive views of their language differences. Many were proud of their accent and from where they came. Their pride in their accent indicated a comfort in their identities as international students and their home countries. It is important for ITAs to feel comfortable in who they are and what they do so that they teach well and enjoy their experiences. Andrade (2009) explained that English language skills affect NNES' social and academic adjustment to life as student in the US. Therefore, their skills affect both their confidence and their ability to adjust to their lives in the US.

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It is also important to note that none of the participants discussed any type of support they received from their departments or the rest of the university about getting help for their students or themselves in negotiating their dialectal difference. They navigated these differences alone. This factor is discussed further in the implications section of this chapter.

A Shift in Teaching Pedagogy

Upon their arrival to the US, ITAs had to adjust the way they understand teaching and learning, how instructors share knowledge, and the way students learn. Instead of lecturing and imparting knowledge on students, in the US the participants learned, quite successfully, the importance of providing opportunities for students to engage in the content through discussion and questions. It is challenging to adjust one's understanding of how students learn and how to help them gain mastery of the content in the course, and creating interactive learning opportunities is a paradigm shift from lecture-based lessons that ITAs are accustomed to. However, the attempt of shifting teaching paradigm is crucial in their development as teachers because once ITAs make the adjustment to the "new pedagogical culture," they can be effective instructors (Ross & Dunphy, 2007, p. 117) in the US context. By building in US teaching strategies and understanding their value, the ITAs demonstrate their development as emerging experts in teaching.

The participants also understood that student-centered teaching objectives in the US are meant to help students apply abstract concepts, rather than memorize them. They understood how the US teaching method helped their undergraduate students better comprehend the material taught in class. Despite the differences from their home countries, the participants valued how the US teaching style prioritized practicality, student learning, and finding opportunities for

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students to apply the concepts they are learning. The participants were able to recognize the differences in teaching pedagogy across cultures, as well as the benefits of certain teaching methods to student learning. This shows they think about and reflect upon their teaching and about the culture-specific elements that teaching has. As described by Lave and Wenger's (1991) situated learning theory in which learners become experts, ITAs learn from their experiences and their social world, and they apply this knowledge to their teaching practice.

Undergraduate Students' Lack of Preparation in STEM

One significant factor in ITAs' experiences was their undergraduate students' lack of preparation in STEM. In the US, students in introductory STEM classes major in many different disciplines, not just in STEM. In many countries around the world, undergraduate students solely focus on their area of study. For example, if they are studying chemistry, they focus on science and math; if they are studying business, they only take business-related courses. However, in the US, students take a broad range of classes, resulting in students with a variety of majors in STEM classes. As a result, their skills were lower than the ITAs had expected.

Undergraduate students' lack of preparation and fear of math also significantly affected the math ITAs approached teaching. They knew that for their students to learn, the students first had to stop feeling afraid of math. To help students overcome their aversion, they addressed the fear factor directly in class and tried to help their students heal from their traumatic experiences with math in the past. The math ITAs built their students' confidence and showed them that they can do math. They also showed their students that ITAs also made mistakes in math problems and that mistakes are part of learning, and they consistently encouraged their students in order to give them the courage and confidence they needed. At the end of their classes, the math ITAs

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wanted the students to believe in themselves and their ability to do math. This is extremely powerful because the math ITAs are working to erase years of bad math experiences. Despite being international students without experience in the US K-12 educational system, they recognize their role in giving undergraduate students another chance at math. With the knowledge that they can do math, the ITAs are empowering undergraduate students to enjoy math—one of the most fundamental elements of education.

Sarkisian and Maurer (1998) explained that ITAs in STEM often expect their undergraduate students to have more background knowledge than most US high school graduates have, which results in ITAs teaching at a level too high for their students to understand. This difference in expectations and reality of student background knowledge created one of the biggest challenges ITAs in this study seemed to face. ITAs are experts teaching their passion to students who are majoring in something else. The undergraduate students lack the passion for the subject-area, and this results in the ITAs' having a difficult time connecting with students. This was the hardest aspect of teaching: Students feeling apathetic about the content area, which limited the ITAs' abilities to share their passion.

It is important to note that the ITAs who facilitated upper-level chemistry classes did not face these challenges. Their students were STEM majors with high levels of STEM education, so there was no gap between what the students knew and what Sam and Taylor expected from them. This demonstrates the importance of preparing ITAs for the types of students they will have, as well as their students' background knowledge in the subject area. It is incumbent upon ITA programs and graduate programs that host ITAs to provide as much detail as possible about the variety of students that are in ITAs classes, their educational background in the subject matter, and strategies ITAs can implement to help all students succeed.

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Finding Balance

ITAs found it difficult to balance teaching with studying because none of the participants had experience working and studying at the same time. They studied, graduated, and then they worked. Therefore, in the US, they must balance a new combination of responsibilities that they are not accustomed to managing simultaneously. Almost all of the participants had prior work and teaching experience, but not at the same time as studying. This is different from domestic students who often work while going to school. Therefore, domestic TAs may have experience balancing work and studying, just as undergraduate students in their courses may be doing. This is a lot of new responsibility for the ITAs, and they take it seriously. There is a lot of pressure that accompanies the responsibility of teaching in a new cultural context and language, and the ITAs feel it. Colleges, universities, and their departments can provide support for ITAs in their transition from one role to multiple roles. ITAs need structured support built into their programs to help them find a way to maintain a balance between teaching and learning. They need specific strategies that they can implement to ensure they give enough attention to both their teaching and their learning and research so that they are successful in both areas. The challenge for ITAs is to a balance between teaching, course work, researching, and having a social life in which they can explore their new cultural context (Mena et al., 2013).

Teaching is one of the most critical components of ITAs' experiences. Teaching gives them opportunities to learn and grow as scholars in their disciplines in ways that research and studying fall short. However, their teaching practice is also closely connected with aspects of culture and language, and the intersection of the three is discussed in the next section.

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The Intersection of Language, Culture, and Teaching

The intersection of language, culture and teaching is what makes the lived experiences of the NNES ITAs. The participants of this study rarely described their experiences with these elements individually; rather, they described their experiences in terms of how these elements were connected in their lives. When asked about language and teaching challenges, they all presented challenges surrounding the intersection of these components. As a result of their interconnectivity and cruciality, language, culture, and teaching are often the focus of most ITA training programs (Bresnahan & Cai, 2000; Civickly & Muchisky, 1991; Gorsuch, 2012; Hoekje & Williams, 1994; Ross & Dunphy, 2007; Smith et al., 1992).

In this study, participants said their biggest difficulty was approaching students and offering help. This is a result of language, culture, and teaching differences. At the university where this study took place, most of the undergraduate students are domestic, native English-speaking students. This dynamic of undergraduate students having—as ITAs perceive—more expertise in the language can make it difficult for them to approach the students and ask them if they need help, even though they are the content-area experts. Many ITAs lack the interpersonal, cultural, and linguistic knowledge to approach students and ask how they are doing and whether they need help. They did not know how or when to approach their students. They thought—or hoped—that their students would approach them with questions

When ITAs—regardless of the amount of teaching experience—begin teaching in the US, they are entering a new pedagogical culture and are using a new language or dialect (Ross & Dunphy, 2007). Chiang (2016) explained that even though ITAs are experts in their field, they can have a difficult time explaining concepts to undergraduate students in a similar way as native English speakers. This places ITAs in a difficult position because they are content area experts,

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but they may be language novices or intermediates. This creates a tension between ITAs and their students. In fact, their identities as professionals are negatively impacted when they have trouble explaining a concept (Chiang, 2016). Therefore, linguistic competence and confidence are critical for successful teaching experiences.

The cause of instructional challenges is multifaceted and misunderstood. In this study many of the participants discussed accent and cultural differences as if they were the same. This indicates another gap between the perceptions of ITAs and their students: Communication challenges are a result of both language and culture and their intersection, not just one or the other. However, if the causes of the differences are not understood by the ITAs and their students, then solving the problem becomes even more difficult. Therefore, it is important for both ITAs and their students to learn about cultural and linguistic differences in order to improve communication and learning. Both cultural differences and communication gaps cause misunderstandings for ITAs and their students (Civickly & Muchisky, 1991; Gorsuch, 2012; Kuo, 2011). However, the ITAs and the students may not know—or agree—on what causes the gaps. Civickly and Muchisky (1991) reported that undergraduate students often perceive cultural differences to be caused by language.

One way to help both parties learn about these differences and how to navigate them is through courses and workshops focusing on intercultural differences and communication. Courses and workshops about intercultural communication differences are an excellent opportunity for IHE to teach graduate and undergraduate students about intercultural differences, and then when they work together in the classroom, they will have the skills to negotiate the differences and learn from each other in a more meaningful way.

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Feelings of Being an Outsider

ITAs often feel like outsiders, especially when they are leading a classroom full of domestic students. They do not necessarily feel comfortable in their role as content expert because of their lack in social, cultural, and linguistic knowledge. Several of the participants described themselves using words such as *alien* and *foreign*; words which have negative connotations and emphasize feelings of being an outsider. When ITAs feel like outsiders and that they do not belong, they cannot be effective classroom instructors or graduate students. It is not possible for students to fully engage in learning when they feel like they are on the periphery of their environment.

However, when ITAs can be themselves, they are able to feel comfortable in approaching their students, they can be more effective instructors. ITAs are the experts in the content, and as soon as they feel comfortable with that fact in the US context, they will be able to feel comfortable in themselves as teachers. When they feel like they belong, they can actively participate in class discussion and lab teams. It is not until ITA feel like cultural insiders that they will be able to contribute to their full potential, to the university, to their departments, to their own research, and to their students.

Finding a Sense of Belonging in their Department

ITAs found a sense of belonging through their departments, by spending time with people in their departments and research labs. They described a preference for this rather than put in effort to integrate themselves into the broader campus community. They found a sense of belonging within their academic community, and that was enough for them. Many of the participants also described how the faculty and staff in their departments helped them feel like

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they belong. Over half of the participants derived their sense of belonging from their departments, which indicates that what departments do to help ITAs develop a sense of belonging has an effect on whether or not the participants feel like they belong. The participants described how small acts, such as professors asking how things are going and sitting on the ground to answer a question, go a long way to helping ITAs feel connected to their new homes. Similarly, Ariza et al. (2018) found that faculty and staff have an important role in helping graduate students feel like they belong.

Many of the participants in this study had relationships with multiple faculty within their departments. They had course coordinators who helped them with their teaching, they had advisors who helped them choose their courses, and they had mentors who helped them navigate their research. ITAs rely heavily upon faculty and staff with whom they work closely, whether they realize it or not. They are the ones from whom ITAs gain confidence, expertise, and feelings of belonging. The experts with whom ITAs regularly communicate are vital to the growth development of ITAs as experts in their disciplines.

Another aspect of their departments and labs that the ITAs enjoyed and explained helped give them a sense of belonging was the diversity in the faculty and graduate students. These diverse departments are critical components to the excitement and feelings of belonging for ITAs. Departments need to continue to work to ensure diversity in the departments, both for faculty and graduate students. This diversity helps international students feel comfortable in their new context and helps improve learning for all because "excellence and diversity are necessarily intertwined" (CIRTL "Core Ideas," 2016, para. 1-3).

For many of the participants, departmental gatherings, such as potlucks and beginning-of-semester and end-of-semester meals were critical aspects of their sense of belonging. They

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described how they got a chance to learn about their professors, advisors, and coordinators outside of classroom and lab work. The ITAs enjoyed discussing both academic and non-academic topics with them because they believed it helped them to get to know them on a more personal level. It is also important to note that all faculty and staff—from the secretaries to the department chairs—had a direct impact on the lives and experiences of the ITAs in this study. All the interactions they had and events they planned helped ITAs to connect to their new place and role. Because ITAs depend so heavily on their departments in finding a sense of belonging, those which host ITAs have a responsibility to get to know them individually in order to help them succeed in adapting academically, socially, and culturally.

Finding a sense of belonging is different for international graduate students than for international undergraduate students because they have different personal experiences than undergraduate students (Trice, 2004). They are often older, have more education and life experience, and may have families (Lin & Scherz, 2014), all of which affects how international graduate students adapt and find a sense of belonging in their new place. Additionally, graduate students do not necessarily differentiate between social and academic life, which has an impact on how they view themselves and how they adapt in the US (Andrade, 2006). The participants in this study also did not differentiate between social and academic life, and they found a sense of belonging through their departments.

The lived experiences of NNES ITAs in STEM are multifaceted. They include current political tension; an initial adjustment period to life in a new county, culture, and language; a shift in pedagogical beliefs; feelings of being outsiders; and finding a sense of belonging. As ITAs navigate their experiences, they are becoming experts in their discipline and in teaching

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their discipline. The following section will consider how the university's training and support programs and services affect NNES ITAs' lived experiences.

Sub-Question: How do University Training and Support Influence These Lived Experiences?

Social worlds help develop knowledge and practices of emerging experts (Lave & Wenger, 1991). For ITAs, their social worlds include professors, advisors, course coordinators, department chairs, peers, and students. Lave and Wenger (1991) explained that to become experts in their field, learners need on-going guidance from a variety of people in their social world. As ITAs move from peripheral participants in teaching to full participants they must gain experience in the classroom and receive on-going training and support from their social world (Lave & Wenger, 1991). Without interaction with their social world, they cannot become fully participatory members. Because ITAs are current instructors and future faculty members, IHE have a vested interest in ITAs' success in gaining the knowledge and skills necessary to be experts in teaching their discipline (Austin & Wulff, 2004). This section considers the repercussions of training, support, and mentoring the participants the received and situates the findings within the context of the literature.

Training Increases Feelings of Preparation and Self-Efficacy

When ITAs receive more training, they have increased feelings of preparation and self-efficacy. The participants from the math department had more training than the participants from chemistry and physics, resulting in more certainty in their roles as teachers. The math ITAs in this study had the most intensive pre-teaching training, with a one-week formal training program for all TAs. Overall, the math ITAs seemed satisfied with their one-week departmental training. They had the opportunity to meet other TAs, get to know their coordinators, learn US teaching

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methodologies, and implement a mock lesson. In addition to the one-week training program, the math department provided on-going training through required math education courses. These courses gave ITAs the opportunity to learn more about teaching math, thus honing their effectiveness and giving them more self-efficacy and self-confidence. The feeling of self-efficacy is connected to the strong initial and on-going training components provided by their department.

In addition to feelings of self-efficacy, the math ITAs also had a stronger sense of belonging in the classroom as a result of their training. The math ITAs understood their role in the math department and with their students. On the other hand, the rest of the ITAs—who did not have departmental training—lacked a sense of belonging in the classroom initially. While all the participants from the chemistry department had attended the ITA training program, it did not necessarily help them navigate their roles in chemistry labs. Those from the chemistry department described how they were unsure about how to approach students and help them in their labs. They did not know what their roles were or what to do in the lab to facilitate student learning. Many chose to remain in the periphery, both metaphorically and physically, of the lab rather than actively engage with their students. Proper onboarding and training by departments results in ITAs with a stronger sense of belonging in the classroom, which results in higher self-efficacy and better teaching.

This initial reticence to engage by the chemistry ITAs indicates a need for more training and support for these lab facilitators. Hung and Huyn (2010) explained that as students adjust to their lives in a new culture, they need consistent support by their institutions. This on-going assistance is particularly important for ITAs who, in their first weeks in a new country, are teaching large groups of undergraduate students, many of whom are new to college. During the

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first weeks and months of the semester, both groups of students are vulnerable and need extra support as they navigate new worlds.

As a result of inadequate training from the chemistry and physics departments, the ITAs from these departments not only miss vital information about their department's teaching policies and practices, they also miss the opportunity for a strong start to their teaching. Lab equipment varies across countries, as most of the participants explained, so it is important for ITAs to get trained on the equipment they will be using in order to provide them with the self-efficacy and self-confidence they need to be successful teachers.

While the participants from the chemistry department lacked an understanding of their roles in the labs, it is important to point out that they had a very positive view of their department, the professors, the lab coordinators, and the department chair. When describing the people who helped them initially adjust, they only had positive things to say about the faculty and staff in their department. Therefore, it is clear that the chemistry department effectively connects with their ITAs to make them feel comfortable joining the department. However, the participants in this study needed more training from those in their new department to improve the ITAs' understanding of best teaching practices in STEM in the US. Fagen and Suedkam Wells (2004) found that TAs who had teaching training and were satisfied with their programs still needed more training in teaching.

ITA Training

In this study, all but one of the participants who attended the ITA training stated that the it helped them understand how to teach in the US context because they had no teaching experience and had never seen an instructor in the US. Therefore, they were able to take what

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they saw and experienced as a participant in the ITA training program and implement it into their teaching. Learning about the differences in teaching pedagogy across cultures is important for ITAs because academic and cultural experiences affect teaching beliefs and styles (Gorsuch, 2012). Therefore, in order to bring culturally appropriate teaching methods to the classroom, ITAs need to understand US teaching pedagogy and academic values. If ITAs do not have teaching experience or academic experience in the US, they must have the opportunity to learn about it prior to entering the classroom. This is necessary for the success of the ITAs, the undergraduate students in their classes, and their departments.

The Importance of Course Coordinators

The importance of having one person responsible for the course that the participants were teaching cannot be overstated. ITAs relied on their coordinators to answer questions and to help them navigate conflict with students. Knowing that they had an ally from their department gave them more confidence to teach. A known and trusted ally helps ITAs adjust more quickly and feel more confident in the classroom, which results in more effective teaching. These individuals are also important because faculty and staff are often uninvolved in STEM labs, ignore discussion about teaching, and do not provide the support TAs need to be effective teachers (Luft et al., 2004; Sohoni at al., 2013). Therefore, course coordinators, whose primary focus is to support ITAs in their teaching, are critical for their success in the classroom.

When ITAs feel intellectually safe in their departments, they are able to take more risks and learn more about teaching and learning. If they know that they have somebody who will support them, they will feel confident in themselves as teachers, even if they are from another country. Furthermore, having an ally contributes to ITAs' sense of belonging. Because they have

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somebody in whom they can trust, they feel as though they belong on campus and in the community.

Sub-Question: How do their Experiences Influence their Perceived Preparation Towards their Career?

ITAs' identities as international graduate teaching assistants, their practice as teachers, and their social worlds all contribute to their becoming experts in their fields (Lave & Wenger, 1991). Because ITAs are emerging experts, career preparation is an important aspect to graduate school. Graduate programs, TA programs, and ITA programs, have a responsibility to prepare ITAs for their current roles as ITAs, as well as their future roles. Graduate students have varying career goals, depending on their personal traits and goals (Horta, 2018), their disciplines (Golde & Dore, 2004), and their roles as TAs in graduate school (Bettinger et al., 2002). This section analyzes and situates within the literature: the career goals of the participants of this study, how those goals are fostered by the university, and what is missing in their career preparation.

Positive Effect of Experiences on Career Goals

The results of this study show that being an ITA has an overall positive effect on the participants and their career goals. Because most of the participants had the goal of becoming faculty, which includes research and teaching, their position of ITA aligns with their career goals. Therefore, their experience as a teaching assistant prepared them for their future careers. For many of the participants, being a researcher was also an integral part of being an ITA. They did not differentiate between what they did for their assistantship and what they did for their research. Rather, research and teaching were both understood as part of their lived experience as an ITA. They saw what they did for their graduate program and teaching as their practice,

assisting them in becoming experts in their disciplines. Experience as an ITA enriched their lives and directly complemented their career goals.

In this study, most of the participants had goals of becoming professors. These results differ from those of Golde and Dore (2004), who found that only around 30 percent of doctoral students in chemistry were interested in pursuing careers in academe; the rest were interested in industry and beyond. However, in this study prior work in industry did not change ITAs' career goals; the ITAs indicated a desire to continue researching and teaching after graduating. They did not indicate a strong desire to leave academia again return to industry. Furthermore, all the participants who had prior teaching experience had the goal of becoming faculty members. Having teaching experience helped ITAs focus their career goals.

Fostering Career Goals

All ITAs need to have a specific person at their institution who knows their career goals and helps guide them through graduate school as they work to achieve their goals. For many of the participants, teaching is a critical component of their assistantship and their career goals as faculty; therefore, they need to be able to discuss their teaching goals with their mentors and advisors. Mentors and advisors of ITAs need to be more cognizant of asking ITAs about their teaching experiences and goals and finding ways to help them achieve those goals.

While ITAs have mentors and advisors that guide them in their research, they also need individualized attention to assist them in understanding the career opportunities, as well as in the navigation of doctoral program applications, post-doc applications, and job searches. ITAs are vital to graduate programs, and graduate programs need to play an active role in supporting and guiding ITAs in achieving their career goals. Whether TAs and ITAs decide to remain in

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academia or enter industry, they need guidance and support in the career preparation and teaching development (Austin, 2002). The participants in this study shared their career goals with mentors and advisors from their departments and their family and friends.

What is Missing in Career Preparation

There is a gap between the services that the career office provided and the training ITAs receive from their department. The career office is designed for all students at the university, not international graduate students. Its purpose is to help students while applying for jobs, but their role is not to prepare them in content and to help them understand the job market. The career office has general services about job searches and departments have specific knowledge about their discipline. Departments, on the other hand, have faculty who work in higher education, and as a result, they may not know how to prepare graduate students for professions outside of academe. They are in academia, and many have held their positions for a long time; they may not know about current job searches, let alone those in a different industry. They may not know how to help graduate students pursue jobs outside of higher education or they may not have interest in it. As a result, the participants in this study explained that their department focused on preparing them for faculty jobs but not industry jobs.

However, that leaves a missing piece for graduate student career searches. Graduate students are looking for professional roles in their disciplines. As a result, ITAs need somebody who is interested and engaged in their career goals and is willing to help them achieve them. Purposeful collaboration between graduate programs and the career office would benefit all graduate students as they transition from graduate student to graduate. Graduate programs socialize their students in their roles as graduate students, as participants in their discipline, and

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in US academic life, but this is not enough to prepare them for future careers (Austin 2002). Programs need to establish policies and practices that prepare TAs in their potential roles as faculty (Austin et al., 2009), as well as in industry.

<p style="text-align:center">Theoretical Implications of the Study</p>

This study used Lave and Wenger's (1991) situated learning theory to understand the lived experiences of NNES ITAs. Situated learning theory stipulates that learners become experts through legitimate peripheral participation, which is the intersection of the learner, their social world, and their practice (Lave & Wenger, 1991). With situated learning theory, this study used social constructivism by taking the experiences of individuals and analyzing them in aggregate to construct the true essence of being a NNES STEM ITA (Moustakas, 1994). This theoretical perspective allows us to understand the whole essence of the experience, as understood through their identities, practice, and social world.

Situated learning theory helped contextualize and understand the lived experiences of ITAs. First was through identity. This study demonstrated that ITAs' identities, as NNES international students played a critical role in their lived experiences. Second was ITAs' social worlds. University faculty and staff, mentors, and peers all contributed to their lived experiences. Finally, ITAs' teaching practice was a critical component to their lived experiences and contributed to their career goals.

This study added to Lave and Wenger's (1991) situated learning theory by adding career goals. When taken in aggregate, NNES STEM ITAs' identities, social world, and teaching practice influenced their career goals. Their experiences as international students, NNES, graduate students, and STEM experts form who they were and what they wanted to achieve. The

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social world of ITAs provides support and guidance in forming their goals. Their practice as teaching assistants has a positive influence on their lived experiences as ITAs and help shape their career goals.

<div align="center">Practical Implications of the Study</div>

The implications of this study aim to improve the training and support practices of ITAs, as they relate to language, culture, teaching, and career preparation. The results of this study show that overall, ITAs are satisfied with the support they receive from the university; however, there are several ways IHE, graduate departments, and ITA training programs can improve ITAs' experiences. First, there is a need for undergraduate student preparation for international classroom settings, ITA peer mentoring programs, and an expansion of teaching and learning center services designed for ITAs. The results of this study also show that departments need to expand their training and support of ITAs. Additionally, discipline-specific training provided by ITA training programs and explicit strategies for teaching the US would help ITAs better understand their roles in the classroom. In order to help ITAs adapt to their new cultural contexts and roles, campus-wide collaboration of training and support is essential. Finally, considerable time and resources need to be invested in the training of all TAs—not just ITAs. TAs are current instructors and future faculty, and the training that they receive needs to adequately prepare them for their current roles and future goals.

Preparing Undergraduate Students for International Classrooms

Undergraduate students fill the courses ITAs teach, and IHE need to prepare undergraduate students to work with ITAs. When IHE choose to invite ITAs to teach in their classrooms, they have a responsibility to teach undergraduate students how to communicate

effectively with people from other countries. Prior to taking classes with ITAs, undergraduate students need to learn that communication is the responsibility of both parties and that they need to do their part to understand what the ITA says. Undergraduate students also have a responsibility to ensure that their ITA understands what they are saying, just as the ITA ensures they understand and are understood. While many of the participants in this study took on this challenge themselves, it is an institutional responsibility to prepare undergraduate students for an international classroom and instructor. This work broadens students' understanding of different languages and cultures.

Giving undergraduate students agency in the communicative process also stops the excuses given by native speakers that they cannot understand something their ITAs said. They will have the skills they need to negotiate meaning. This is a critical factor in helping undergraduate students learn how to communicate effectively across cultures with NNES, especially with their international instructors. When ITAs openly address language differences, they provide a valuable lesson in diversity and respect for undergraduate students. They are teaching students the value of international perspectives, language differences, and practical strategies for overcoming communicative differences. ITAs bring value to IHE and undergraduate students because of their unique experiences and international perspectives (Smith et al., 1992). While it is not ITAs' responsibility to address these issues, their active participation in teaching undergraduate students about language and cultural differences enhances undergraduate students' experiences.

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Formal Peer Mentoring Program

Graduate programs would best serve their ITAs by establishing a peer mentoring program. Peer mentoring programs partner new ITAs with experienced ITAs with the goal of helping them transition through the initial adjustment period. Sometimes ITAs do not feel comfortable talking to their professors, advisors, and course coordinators about problems they are having. Instead, ITAs seek peers who have no power over their success in class or in teaching. Despite the importance of senior course mentors for some, many of the participants did not mention having a senior course mentor. Senior course mentors can be critical components to the success of ITAs and having one should not be left to luck. Peer mentoring should be a component of deliberately created learning communities, which is critical for effective STEM education (CIRTL "Core Ideas," 2016). These programs allow new ITAs can ask questions, seek advice, and gain insights into US culture and teaching from their peers.

This type of program would benefit a graduate program in several ways. First, it would introduce ITAs to each other, thus expanding their social worlds. Second, it would give new ITAs learning opportunities not currently available. Third, it would give experienced ITAs mentoring opportunities, which will teach valuable leadership skills necessary in both faculty and industry careers. Finally, a peer mentoring program would allow faculty to focus more on graduate students' research and teaching, rather than assisting new students with transition challenges. A peer mentoring program would benefit a graduate department, from the chair to the undergraduate students who would have ITAs with greater self-confidence and self-efficacy.

Swan et al. (2017) found that ITA programs that match new ITAs with experienced peer mentors are more effective than ITA programs without formal peer mentorship. The university where this study took place did not have a peer mentoring program, but many of the participants

in this study described that having a senior course mentor or advisor was an important part of their experience. A doctoral student could fill this formal role for master's students and new doctoral students in the math department. This person would be somebody who had teaching experience, experience adjusting to life in the US, experience navigating the US academic system, and was not a supervisor or professor.

Alex equated having a peer mentor as fortunate; however, having a mentor to guide an ITA through the challenging experience of teaching in a new country and language should not be left to luck. Mentors are vital because ITAs are more successful when they have somebody with whom they can share concerns (Bresnahan & Cai, 2000). Therefore, ITA programs and academic departments should work together to find assigned mentors for all new ITAs. A formal peer mentoring program can provide the necessary on-going teaching, social, and cultural support that ITAs need to supplement the academic support they receive from their academic and research advisors.

ITA training programs can work with graduate departments to implement these programs. ITA training programs can initiate and help facilitate a peer mentoring program. Because these programs promote teaching, language, and culture, they could help experienced and new ITAs navigate their cultural and academic context. ITA programs which have peer mentoring programs are perceived as more helpful than those without mentoring program (Swan et al., 2017); therefore, programs which implement these programs will have more credibility in the eyes of ITAs than those which assign the responsibility of peer mentoring solely to graduate departments. Finally, ITAs training programs should also work with departments and centers for teaching and learning to provide meaningful on-going teaching support. Purposefully planned

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collaboration will benefit the whole IHE, as it will improve both graduate and undergraduate education.

Expanding Teaching and Learning Center Services

Many of the participants did not choose to participate in the graduate teaching assistant workshop series hosted by the university's teaching and learning center because they did not perceive that it was designed for them. Those facilitating labs did not feel as though teaching and learning center's workshops were designed for their current teaching needs. As a result, teaching and learning centers need to convey how they can help all ITAs with their immediate teaching assignment, whether they have their own classes or they are facilitating a lab. While the topics of the workshops may be appropriate for all ITAs, the participants in this study did not know that. Therefore, there is a gap between on-going teaching training offered by the university and what the ITAs perceive as helpful for them.

Another reason ITAs do not attend teaching professional development workshops is because of time. The participants in this study explained that their schedules were very tight, and they explained that they could not find time for the workshops. Trebing (2015) also found that ITAs do not participate in professional development opportunities due to a lack of time. This indicates that teaching and learning centers have an opportunity to engage more ITAs through new scheduling, perhaps finding ways to fit their workshops into the schedules of busy ITAs. The center currently offers both face-to-face and online workshops, but ITAs still cannot fit them into their schedules. If the teaching and learning center worked with the departments with high numbers of ITAs to implement workshops at convenient times and places, there may be more

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interest. For example, if the teaching and learning center held a workshop in the chemistry building, the workshop may hold more weight and seem more relevant to the chemistry ITAs.

Teaching and learning centers are important for ITAs' teaching development because they need opportunities to learn from a variety of experts in their social world as they move from peripheral to full participants in teaching (Lave & Wenger, 1991). Training needs to come from multiple areas across a college or university and should emphasize pedagogy and teaching development while monitoring growth and progress and giving time for reflection on teaching and growth (Ferzli et al., 2012). Various and appropriate training opportunities for ITAs is critical for their success as current instructors and future faculty members, the success of their current and future students, and the institutions which host them.

Departmental ITA Training

Despite their reticence to critique the university and their departments, many of the participants provided suggestions about how they could be better prepared to teach. Some of the participants noted that ITAs need more training and support from their departments than what they get with their domestic peers. Because ITAs have different language, cultural, and educational backgrounds from domestic teaching assistants, they have different challenges (Swan et al., 2017) and need additional training and support. The participants suggested departmental meetings and training with lab equipment, which is different from the equipment in their home country. From these suggestions, it is clear that ITAs need extra attention and training. They are living in a new cultural context, studying in a new academic context, and trying to navigate teaching while they learn. Therefore, departments have an obligation to recognize that the diversity ITAs bring to their departments also brings additional responsibilities

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of training and support. ITAs need more meetings that explain procedural details that may be taken for granted by domestic students, more training on equipment, more information about teaching pedagogy in the US. The colleges and universities that host ITAs must recognize that they have a responsibility to differentiate their services for TAs and to provide the services that ITAs need to be successful.

The Importance of Faculty Support for ITAs

Despite the vital role faculty graduate departments play in the lives of graduate students, faculty often lack adequate training in how to provide appropriate support for their graduate students. Therefore, faculty members also need professional development opportunities in best practices of graduate student support. Many of the participants in this study had a faculty member with whom they discussed research but not all had a mentor to whom they could get advice and support. O'Loughlin et al. (2012) reported similar results: In addition to developing their knowledge in graduate student support, faculty members who serve in roles that support ITAs can be more intentional about providing wholistic advising.

Many of the participants described real struggles in their first few weeks and months, adjusting to life in the US; however, they did not seek professional help through counseling services. In their descriptions, it was clear that they knew it was culturally acceptable in the US to seek counseling; however, it was also clear that they still had their own cultural views of counseling, which were not very accepting of the practice for themselves personally. Because of this reticence, strong learning communities created by ITAs' departments become even more critical. While faculty and staff are not trained to help with mental issues, they are people who interact with international students every day. Therefore, they have a responsibility to build

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strong communities which can support ITAs academically, socially, culturally, and emotionally. And if there is a situation when the department cannot help the ITA, they will have a strong enough relationship with them to help them find the psychological help they need.

This study found that most faculty members focus on research plans when meeting with ITAs; however, it is also important for advisors to ask ITAs about their personal, professional, and teaching goals. First, when faculty members ask about teaching, not just research, they show ITAs that their teaching matters to the department. Their demonstrated interest in teaching brings legitimacy to ITAs' teaching roles and proves that teaching is valuable. This promotes quality teaching and helps to ensure exceptional STEM education in the future. Second, if faculty members get to know their mentees, they can better help them achieve their goals. When mentors demonstrate that they care about ITAs' lives and goals, ITAs have a better sense of belonging, which is a critical component to their success.

Discipline-Specific ITA Training Programs

ITA training programs are diverse and follow many different models. Whatever model an ITA program follows, it is important that they meet the needs of the ITAs in their program. The participants in this study indicated that they learned a lot about teaching and US culture from their ITA training program. They also had an opportunity to see how teaching looked in the US-context. However, ITA programs should also provide specific training for the different roles ITAs play, from sole course instructor, to recitation facilitator, to lab coordinator. While general teaching best practices are important for all ITAs, some of the lab facilitators felt as though much of the training did not apply to them because they did not plan and teach lessons.

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Despite the benefits of the ITA training program for the participants, it was not as beneficial as it could have been for some who had previous teaching experience. Because the university's ITA training program is designed for all ITAs, it focuses more on training ITAs who teach their own courses. These results are similar to Trebing's (2015), in which ITAs did not understand how the workshops connected to them and their teaching. Therefore, ITA programs need to be designed to be more inclusive for all ITAs and make the connections between the training and their teaching explicit. ITA trainers need to consider how to train ITAs facilitating labs and recitation sections, as well as those leading their own courses. The ITAs in the program are diverse and so are their teaching assignments, and the program needs to address their needs.

Explicit Strategies for US Teaching

In order to feel comfortable in themselves as teachers and approach their students effectively, ITAs need explicit strategies and understanding about when and how to approach US students. They need to see the strategies implemented by multiple professionals in their field, and they need an opportunity to practice them prior to obtaining their own classes. ITA training programs and departmental training programs should focus on giving ITAs ample examples and opportunities to practice interpersonal interactions with native English-speaking undergraduate students. Experiences prior to teaching will give ITAs more confidence to feel comfortable in the classroom more quickly, thus allowing them to be more effective instructors.

ITAs are engaging in a new professional role in a new place and cultural context. All the participants who had prior teaching experience were required to translate their teaching experience and knowledge into a new cultural context. Like any translation, it takes multiple attempts to get an effective and meaningful outcome. This means that ITAs need to implement

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multiple teaching strategies with their students to see what is most effective for their students and for their own personal teaching style. What worked in classrooms and labs in their home countries may not work in the US because the structure of the classes, the culture, the language, and the students are all different. Therefore, ITAs must negotiate their understanding of best teaching practices with best practices in the US and find a way to make them work effectively for the students in their courses.

The Importance of Campus Collaboration

The results of this study show the importance of offices across campuses to work together in the preparation and training of ITAs. According to Lave and Wenger (1991), emerging experts need input for a variety of members of their social world. For ITAs, this includes their professors, their advisors, their course coordinators, their department chairs, ITA program facilitators, their peers, and their students. This coordination across institutions is to the benefit of the ITAs themselves, their students, their departments, and the institution as a whole.

One of the reasons for the lack of support in teaching is that there are a limited number of faculty with pedagogical training who are willing to assist STEM ITAs (Twale et al., 1997). Therefore, one approach IHE can take to provide on-going teaching support for ITAs is through the implementation of credit-bearing courses to train and support ITAs as educators in their fields. Using the NSF's CIRTL core ideas as a model, colleges and universities can improve STEM teaching and learning (CIRTL "Core Ideas," 2016). With courses dedicated to teaching support, faculty and staff without pedagogical training can continue to focus on supporting ITAs in their research while teaching experts provide the necessary on-going teaching support. This

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will ensure adequate and appropriate teaching support for ITAs and help improve STEM education at the IHE.

NNES ITAs need adequate and planned support and training from multiple areas across campus. First, they need teaching training. Training needs to come in the form of training specifically designed for all TAs and training designed for ITAs. This training can come from a centralized office, from the ITAs' departments, or from both. However, what is clear from the results of this study is that ITAs need extra training by their department from what they get with domestic TAs. They have different cultural, linguistic, and educational backgrounds, which result in the need for additional teaching training.

NNES ITAs also need on-going support as they transition to their new cultural context and teaching position. They need linguistic support, cultural support, and teaching support. This must come from multiple places, including professors, course coordinators, ITA program leaders, counseling centers, and peers. Support should be on-going and purposefully integrated into graduate study. Leaders need to collaborate and determine the value of ITAs for their campus and how the campus can work together to help them succeed. These leaders should not be limited to departments with ITAs or leaders of graduate colleges; rather, all deans, chairs, and directors need to work together to understand how ITAs support the campus community.

Linguistic Support across the IHE

In addition to culturally appropriate teaching strategies, ITAs also need linguistic support in the classroom, and this support needs to come from across the university. While many of the participants in this study mentioned challenges using English in the classroom, none of the participants discussed ways they were supported by their department to improve their language

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skills in the classroom. Therefore, graduate departments need to work closely with ITAs programs to find ways to support ITAs linguistically, even for those whose language concerns are minor.

TA Training Program

There should be considerable time and resources invested in the initial and on-going training of all TAs. Initial training is critical for the success of ITAs and their students. TAs are often new teachers, so they need extensive training in STEM instruction. Departments across IHE should work together to integrate a purposefully planned training program for their TA and ITA teacher-training. When they do this, they are investing in the success of their current graduate and undergraduate students and the success of their future faculty and students.

Training programs are important is because these programs prepare TAs to be future faculty (Austin, 2002; Austin & Wulff, 2004; Dimitrov et al., 2013). Teaching is an important component of faculty positions, as it often is one-third of a faculty member's assigned workload, and teaching and learning are critical to the future of science (CIRTL "About Us," 2016). Therefore, providing training that aligns with best practices in STEM education is critical to producing effective ITAs and future faculty members. CIRTL proposed three core learning ideas designed to guide institutions of higher education in their training and support of STEM TAs: learning-through-diversity, teaching-as-research, and learning communities (CIRTL "Core Ideas," 2016). Appropriate preparation of graduate students to teach is valuable not only to the TAs and the colleges and universities where they are earning their graduate degrees, it is also critical for the IHE at which they will work after graduating (Austin, 2002; Austin & Wulff, 2004; Dimitrov et al., 2013).

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Critiques of the Study

There were several limitations to this study. The first includes the fact that data collection occurred during the summer semesters when many students were off campus. This limited the number of potential participants who were available for three in-person interviews. Second, the current US political climate limited the number of participants interested in participating. The US governments' current immigration policies and the media attention that results because of those policies affects how comfortable international students feel sharing their experiences. One potential participant feared that their visa would be in jeopardy if they participated, and there may have been others who were fearful of participating. Third, ITAs may have been reticent to discuss issues or problems participants are experiencing in their current position. They may have feared their departments would discover if they said anything negative and retaliate. Fourth, there were ITAs from multiple departments and disciplines in this study. Because there was a variety of departments, the ITAs had a variety of training, support, and teaching experiences, which would not have been the case if all of the participants had been from the same department. Finally, another significant limitation was the limited gender diversity; there was only one female participant in this study. STEM is male-dominated; therefore, it is important to have the perspective of females, as well as males.

There are also several delimitations in this study. First, only degree-seeking, international, non-native English-speaking graduate students could participate. Native English-speaking international students could not participate, nor could non-native English-speaking domestic students. Second, ITAs had to be in STEM fields. Third, they needed at least one semester of teaching completed in order to participate. Finally, the NNES STEM ITAs were required to facilitate courses with multiple students, not provide individual lessons or tutoring.

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Recommendations for Further Research

From the literature, it is clear that there is a dearth of literature regarding NNES STEM ITAs' career plans, as well as what influences them. This study has contributed to the literature regarding NNES STEM ITAs' career plans and how their plans are influenced by their lived experiences. More studies about all ITAs' career goals, regardless of native language and discipline, are needed. Additionally, a study on the lived experiences of female NNES STEM ITAs would contribute significantly where this study fell short. It would also be beneficial to analyze the lived experiences of ITAs from one discipline. For example, studying the lived experiences of ITAs in math, who are the teachers of record for their individual courses, would provide valuable insight into the experiences of ITAs who have more independence in their teaching and lesson planning.

I also suggest a case study of an entire department, in which a researcher would interview the entire social world: TAs, ITAs, chairs, advisors, supervisors, faculty, and undergraduate students. This type of study would provide more perspective about how these stakeholders support and are affected by ITAs. Finally, I recommend a study that seeks to understand the perceptions of recently graduated ITAs and whether they were adequately prepared for their roles. This stud would inform whether ITAs are indeed prepared for their career paths and whether ITAs' career plans and goals changed.

Conclusion

The purpose of this study was to examine NNES STEM ITAs' lived experiences, the influence of the university's training and support on those experiences, and how those experiences prepare them for their future careers. The results of this study show that their lived

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experiences are multifaceted. When ITAs arrive in the US, they experience an initial adjustment period to the language and culture of their new context. They face linguistic and cultural challenges, especially initially, because their backgrounds are different from their domestic peers. Additionally, for ITAs, teaching is an extremely important part of their lived experience.

For university training and support, the participants found that the university's training and support services were adequate in some areas but lacking in others. Many of the participants described overall satisfaction with their training and support; however, they indicated that they desired more training in teaching, especially by their graduate departments. The importance of peer mentors was also highlighted several times, and the ITAs recommended the implementation of a peer mentoring program. Finally, ITAs' lived experiences influenced their career preparation, but it was their teaching assistantship that had the most impact. All the participants were satisfied with their teaching experience and reported that it had positively affected their career goals.

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APPENDICES

APPENDIX A

LETTER OF INTRODUCTION

[Date], 2018

Dear [Name],

Study Title: International teaching assistants' perceptions of support: A qualitative phenomenology

Research Investigators' Names and Departments: Anne Hornak, Educational Leadership; Caitlin Hamstra, Educational Leadership

Contact information for researchers: Anne Hornak horna1am@cmich.edu; Caitlin Hamstra caitlin.a.hamstra@cmich.edu

Introductory Statement.
My name is Caitlin Hamstra, and I am a doctoral candidate in Central Michigan University's Educational Leadership in Higher Education program, working under the supervision of my dissertation chair, Dr. Anne Hornak. My dissertation research seeks to explore the lived experiences of non-native English-speaking international teaching assistants in science, technology, engineering, and math fields as they teach and learn in the US

What is the purpose of this study?
The purpose of this study is to examine the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study is to develop clearly articulated reports of non-native English-speaking STEM ITAs' own experiences and future career plans in order to understand their perceptions of how they are being supported and of how that support prepares them for their future careers. This study will examine ITAs' perceptions of the training and support they receive across the university in order to understand whether ITAs believe the training and support they receive is sufficient.

I am asking for a description of your experience, to answer my research question:
- What are the lived experiences of non-native English-speaking International Teaching Assistants in STEM related to university training and support?

And the following sub-questions:
- How does university training and support influence these lived experiences?
- How do their experiences influence their perceived preparation towards their career?

What will I do in this study?
You will participate in three interviews about your experiences as an international teaching assistant.

How long will it take me to do this?
Each of the interviews will take one hour, and the three interviews will occur across a few weeks, as scheduled by you and me.

Are there any risks of participating in the study?
There are minimal risks in this study. Those minimal risks include a possible breach of data and confidentiality. While these risks are minimal, if they occur and your comments become inadvertently known to others, there is a risk of embarrassment and/or damage to your reputation. Rigorous steps will be taken to ensure these risks are minimized. Please see the confidentiality section about how these risks will be managed.

What are the potential benefits of participating in the study?
The benefits of this study include better services and transition support for ITAs at CMU. There are no individual benefits for participating in this study.

Confidentiality: Will anyone know what I do or say in this study
All information will be kept confidential. First, the audio recordings of interviews and the transcriptions of those recordings will be encrypted and will not have your name on them. Second, your name and email address will be stored separately in locked cabinets from the interview recordings and the transcripts. Third, all of the information I receive will be encrypted and kept on password-protected drives on my password-protected computer. Finally, all data that is collected and presented will be deidentified—including the use of pseudonyms—so that your identity is not revealed, except as may be required by law. After the study is complete, the recordings and transcripts will be destroyed.

Future use of data.
Your information collected as part of this research, even if identifiers are removed, will not be used or distributed for future research studies.

Will anyone outside of the research team have access to my collected data?
There are Central Michigan University staff, state or federal agency officials, who ensure the protection of human subjects in research, that might access your records in line with their official duties or as required by law.

Your Participation is Voluntary.
Participation in this study is completely voluntary. You are free to refuse to participate in this research project or to withdraw your consent and discontinue participation in the project at any time without penalty or loss of benefits to which you are otherwise entitled. Your participation will not affect your relationship with the institution(s) involved in this research project.

How can I contact a member of the study team for information about this study?
If you would like more information or have questions, you may contact me at caitlin.a.hamstra@cmich.edu or my dissertation chair, Dr. Anne Hornak at horna1am@cmich.edu.

Who can I contact outside of the study team for information about this study?
If you have questions about your rights as a research participant, wish to obtain information or report a case of research-related injury, ask questions, discuss any concerns about this study, or wish to offer input about this study with someone other than the researcher(s), please contact (anonymously if you wish):

>   Central Michigan University Institutional Review Board
>   600 East Preston Street, Foust Hall 104
>   Mount Pleasant, MI 48859
>   Phone: (989) 774-6401
>   Email: IRB@cmich.edu

If you would like to participate:
If you are a non-native English-speaking ITA in STEM, enrolled in a Master or Doctoral program at [University], you are eligible to participate. If you choose to participate in this project, please reply directly to this email by **Thursday 21 June 2018.** If you respond, I will be in contact with you about scheduling an interview after that date.

I want to thank you very much for taking the time to help me with my doctoral dissertation research. The data collected will provide useful information about international teaching assistant experiences and how they can be supported by different units across the university. If you would like more information or have questions, you may contact me at caitlin.a.hamstra@cmich.edu or my dissertation chair, Dr. Anne Hornak at horna1am@cmich.edu.

Best wishes,

Caitlin Hamstra

ADULT CONSENT FORM

CMU

**CENTRAL MICHIGAN
UNIVERSITY**

Adult Consent Form

Study Title: International teaching assistants' perceptions of support: A qualitative phenomenology

Research Investigators' Names and Departments: Anne Hornak, Educational Leadership; Caitlin Hamstra, Educational Leadership

Contact information for researchers: Anne Hornak horna1am@cmich.edu; Caitlin Hamstra caitlin.a.hamstra@cmich.edu

Introductory Statement.
My name is Caitlin Hamstra, and I am a doctoral candidate in Central Michigan University's Educational Leadership in Higher Education program, working under the supervision of my dissertation chair, Dr. Anne Hornak. My dissertation research seeks to explore the lived experiences of non-native English-speaking international teaching assistants in science, technology, engineering, and math fields as they teach and learn in the US

What is the purpose of this study?
The purpose of this study is to examine the lived experiences of non-native English-speaking ITAs in STEM fields at a university in the Midwest. The purpose of this study is to develop clearly articulated reports of non-native English-speaking STEM ITAs' own experiences and future career plans in order to understand their perceptions of how they are being supported and of how that support prepares them for their future careers. This study will examine ITAs' perceptions of the training and support they receive across the university in order to understand whether ITAs believe the training and support they receive is sufficient.

I am asking for a description of your experience, to answer my research question:
- What are the lived experiences of non-native English-speaking International Teaching Assistants in STEM related to university training and support?

And the following sub-questions:
- How does university training and support influence these lived experiences?
- How do their experiences influence their perceived preparation towards their career?

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What will I do in this study?
You will participate in three interviews about your experiences as an international teaching assistant.

How long will it take me to do this?
Each of the interviews will take one hour, and the three interviews will occur across a few weeks, as scheduled by you and me.

Are there any risks of participating in the study?
There are minimal risks in this study. Those minimal risks include a possible breach of data and confidentiality. While these risks are minimal, if they occur and your comments become inadvertently known to others, there is a risk of embarrassment and/or damage to your reputation. Rigorous steps will be taken to ensure these risks are minimized. Please see the confidentiality section about how these risks will be managed.

What are the potential benefits of participating in the study?
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Confidentiality: Will anyone know what I do or say in this study
All information will be kept confidential. First, the audio recordings of interviews and the transcriptions of those recordings will be encrypted and will not have your name on them. Second, your name and email address will be stored separately in locked cabinets from the interview recordings and the transcripts. Third, all of the information I receive will be encrypted and kept on password-protected drives on my password-protected computer. Finally, all data that is collected and presented will be deidentified—including the use of pseudonyms—so that your identity is not revealed, except as may be required by law. After the study is complete, the recordings and transcripts will be destroyed.

Future use of data.
Your information collected as part of this research, even if identifiers are removed, will not be used or distributed for future research studies.

Will anyone outside of the research team have access to my collected data?
There are Central Michigan University staff, state or federal agency officials, who ensure the protection of human subjects in research, that might access your records in line with their official duties or as required by law.

Your Participation is Voluntary.
Participation in this study is completely voluntary. You are free to refuse to participate in this research project or to withdraw your consent and discontinue participation in the project at any time without penalty or loss of benefits to which you are otherwise entitled. Your participation will not affect your relationship with the institution(s) involved in this research project.

How can I contact a member of the study team for information about this study? If you would like more information or have questions, you may contact me at caitlin.a.hamstra@cmich.edu or my dissertation chair, Dr. Anne Hornak at horna1am@cmich.edu.

Who can I contact outside of the study team for information about this study?
If you have questions about your rights as a research participant, wish to obtain information or report a case of research-related injury, ask questions, discuss any concerns about this study, or wish to offer input about this study with someone other than the researcher(s), please contact (anonymously if you wish):

Central Michigan University Institutional Review Board
600 East Preston Street, Foust Hall 104
Mount Pleasant, MI 48859
Phone: (989) 774-6401
Email: IRB@cmich.edu

You will be given a copy of this form to keep for your records.

Statement of Consent. *My signature below indicates that I am 18 years of age or older and all my questions have been answered. I consent to participate in the project as described above.*

Name of Subject:

Signature:

Date:

For the Research Investigator. I have discussed with this Subject or LAR the procedure(s) described above and the risks involved in this research. I believe he/she understands the contents of this consent document and is competent to give legally effective and informed consent.

Name:

Signature:

Date:

APPENDIX C

ITA INTERVIEW PROTOCOL

ITA Interview Protocol
Adapted from Trebing (2007)

Interview 1

Demographic Information:
1. Name:_____
2. Nationality:_____
    a. Did you grow up in (country) or not? _____
    b. If not, where did you grow up? _____
3. Native Language(s):_____
4. Knowledge of other languages:_____
5. Major:_____ Degree: MA   PhD
6. Gender: _____
Departmental Information:
7. Which department you have been working for:_____
    a. Which courses did you teach/are you teaching?
    b. What are/were your specific responsibilities?
    c. How many semesters have you been teaching at CMU?
Proficiency in English:

8. How do you feel about communicating in English?

9. How do you feel about your proficiency in English?

10. How do you feel about using English in the classroom, explaining concepts in your field?

11. Do you feel like you can use English to communicate effectively—saying whatever you need to say—to your:
    a. students

    b. peers (other TAs, classmates, friends)

    c. faculty members

12. How often do you use English outside of your coursework and teaching?

Cultural Adaptation:

13. Describe some of the differences between your culture and US culture.

14. How is the communication between professors and students different from the US and your country? How is it similar?

15. Describe a situation that you believe was the result of a cultural misunderstanding.

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16. What are some things that you do to become more integrated into the community?

17. How does your department help you to adjust to life in the US?

18. What other departments/units on campus help you to adjust to life in the US?

19. Are there things that your department could have done to help you adjust to life in the US more effectively? What are they?

20. Are there things that departments/units on campus could have done to help you adjust to life in the US more effectively? What are they?

Interview 2

Previous Teaching Experience:

21. Have you had teaching experience before coming to CMU? If so,

   d. Where did you teach (country, institution)?

   e. How long did you teach (time, semesters, etc.)?

   f. How would you describe your students (gender, background, etc.)?

   g. Describe your responsibilities.

Teaching Experience:

22. What was your first impression of a US college classroom?

23. What are the differences and/or similarities between teaching in the US and your home country/place you grew up?

24. What do you enjoy most about working with (teaching) American students?

25. Have you faced any difficulties or challenging situations in the classroom?

   h. If so, what kind of difficulties or challenging situations have you faced?

   i. If so, have you solved these difficulties alone or have you sought help? From whom?

26. Why do you think these problems and challenging situations occurred?

27. How did you try to change the challenge into something positive?

28. What do you expect from your US American undergraduate students?

29. How do you prepare for your teaching? Do you have enough time?

30. a. What specific teaching behaviors or techniques do you use in your classrooms?

   b. How do you approach teaching?

   c. How do students address you in your classroom? (first name, last name, etc.)

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31. What are some aspects of your teaching that you especially like? What are some aspects of your teaching that need further development?

32. If you are teaching this course again next semester, will you make any changes in your teaching approach? If so, which ones? If not, why not?

33. If you were teaching the same course in your native language, would it be different? How?

34. What kind of characteristics does a "good" or "competent" TA have?

35. What kinds of emails do students send to you and how do you respond?

36. What aspect of your teaching are you most confident about?

37. Share artifacts: syllabus, rubrics, assignment sheets, lesson plans, etc.

Interview 3

Organizational Support:

38. How does your department help you to prepare for teaching in the US?

39. What other departments/units on campus help you to prepare for teaching in the US?

40. Are there things that your department could have done to help you teach more effectively? What are they?

41. Are there things that departments/units on campus could have done to help you teach more effectively? What are they?

42. How does your department help you to prepare for graduate-level research?

43. What other departments/units on campus help you to prepare for graduate-level research?

44. Have you been assigned an official/formal mentor? If yes, who is it and how do they support you?

45. Do you have an unofficial/informal mentor? If yes, who is it and how do they support you? How did you find each other?

46. What or who has helped you feel like you belong on campus?

Career Goals:

47. What are your personal career goals?

48. How does your work as an ITA contribute to your personal career goals?

49. What are your personal goals for teaching in the US?

50. At the university, who knows about your personal career goals and helps you achieve them?

APPENDIX D

INTERVIEW QUESTIONS CROSSWALK

Interview questions crosswalk

Interview 1		
Demographic Information:		
1. Name:_____		
2. Nationality:_____		
a. Did you grow up in (country) or not? _____		
b. If not, where did you grow up? _____		
3. Native Language(s):_____		
4. Knowledge of other languages:_____		
5. Major:_____ Degree: MA PhD		
6. Gender: _____		
Departmental Information:		
7. Which department you have been working for:_____		
a. Which courses did you teach/are you teaching?		
b. What are/were your specific responsibilities?		
c. How many semesters have you been teaching at CMU?		
Proficiency in English:		
Questions	**Themes**	**References**
8. How do you feel about communicating in English?	English language use and concerns	Arshavskaya, 2015; Hebbani & Hendrix, 2014; Kim, 2016; Kuo, 2011; Renata & Meckelborg, 2013; Swan et al., 2017; Ye, 2013
9. How do you feel about your proficiency in English?	English language use and concerns	Arshavskaya, 2015; Hebbani & Hendrix, 2014; Kim, 2016; Kuo, 2011; Renata & Meckelborg, 2013; Swan et al., 2017; Ye, 2013
10. How do you feel about using English in the classroom, explaining concepts in your field?	Language fluency & flexibility Experts in field, difficult with concepts in English	Hoekje & Williams, 1994; Kuo, 2011 Chiang, 2016
11. Do you feel like you can use English to communicate effectively—saying whatever you need to say—to your:	Language fluency & flexibility	Hoekje & Williams, 1994; Kuo, 2011
a. students		
b. peers (other TAs, classmates, friends)		
c. faculty members		

Questions	Themes	References
12. How often do you use English outside of your coursework and teaching?	Meaningful English interactions	Renata & Meckelborg, 2013

Cultural Adaptation:

Questions	Themes	References
13. Describe some of the differences between your culture and US culture.	Culture	Arshavskaya, 2015; Kuo, 2011
14. How is the communication between professors and students different from the US and your country? How is it similar?	Culture	Civickly & Muchisky, 1991; Gorsuch, 2012; Kuo, 2011
15. Describe a situation that you believe was the result of a cultural misunderstanding.	Culture	Civickly & Muchisky, 1991; Kuo, 2011
16. What are some things that you do to become more integrated into the community?	Socialization	Austin, 2002; Trebing, 2015
17. How does your department help you to adjust to life in the US?	Socialization	Austin, 2002; Lave & Wenger, 1991; Mena et al., 2013; Trebing, 2015
18. What other departments/units on campus help you to adjust to life in the US?	Socialization	Austin, 2002; Lave & Wenger, 1991; Mena et al., 2013; Trebing, 2015
19. Are there things that your department could have done to help you adjust to life in the US more effectively? What are they?	Socialization	Austin, 2002; Lave & Wenger, 1991; Mena et al., 2013; Trebing, 2015
20. Are there things that departments/units on campus could have done to help you adjust to life in the US more effectively? What are they?	Socialization	Austin, 2002; Lave & Wenger, 1991; Mena et al., 2013; Trebing, 2015

Interview 2

Previous Teaching Experience:

Questions	Themes	aReferences
21. Have you had teaching experience before coming to CMU? If so, a. Where did you teach (country, institution)?	Teaching experience	Gorsuch, 2012; Hadre & Burris, 2012; Jia & Bergerson, 2008

b. How long did you teach (time, semesters, etc.)?		
c. How would you describe your students (gender, background, etc.)?		
d. Describe your responsibilities.		
Teaching Experience:		
22. What was your first impression of a US college classroom?	Reflection	Ross & Dunphy, 2007
23. What are the differences and/or similarities between teaching in the US and your home country/place you grew up?	Classroom management & instructional challenges	Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011; Ross & Dunphy, 2007
24. What do you enjoy most about working with (teaching) American students?	Classroom management & instructional challenges Reflection	Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011; Ross & Dunphy, 2007 Ross & Dunphy, 2007
25. Have you faced any difficulties or challenging situations in the classroom? a. If so, what kind of difficulties or challenging situations have you faced? b. If so, have you solved these difficulties alone or have you sought help? From whom?	Classroom management & instructional challenges	Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011
26. Why do you think these problems and challenging situations occurred?	Classroom management & instructional challenges	Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011; Ross & Dunphy, 2007
27. How did you try to change the challenge into something positive?	Classroom management & instructional challenges to something positive	Arshavskaya, 2015; Bresnahan & Cai, 2000
28. What do you expect from your US American undergraduate students?	Different teaching styles	Gorsuch, 2012; Ross & Dunphy, 2007

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29. How do you prepare for your teaching? Do you have enough time?	Classroom management & instructional challenges	Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011; Ross & Dunphy, 2007
30. a. What specific teaching behaviors or techniques do you use in your classrooms?	Classroom management & instructional challenges	Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011; Ross & Dunphy, 2007
b. How do you approach teaching?	Classroom management & instructional challenges	Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011; Ross & Dunphy, 2007
c. How do students address you in your classroom? (first name, last name, etc.)	Classroom management & instructional challenges	Arshavskaya, 2015; Bresnahan & Cai, 2000; Kuo, 2011; Ross & Dunphy, 2007
31. What are some aspects of your teaching that you especially like? What are some aspects of your teaching that need further development?	Reflection	Ross & Dunphy, 2007
32. If you are teaching this course again next semester, will you make any changes in your teaching approach? If so, which ones? If not, why not?	Reflection	Ross & Dunphy, 2007
33. If you were teaching the same course in your native language, would it be different? How?	Language & Teaching Language fluency & flexibility Experts in field, difficult with concepts in English	Gourlay, 2007 Hoekje & Williams, 1994; Kuo, 2011 Chiang, 2016
34. What kind of characteristics does a "good" or "competent" TA have?	Reflection on good teaching	Ross & Dunphy, 2007
35. What kinds of emails do students send to you and how do you respond?	Teaching, instructional challenges to something positive	Arshavskaya, 2015; Bresnahan & Cai, 2000
36. What aspect of your teaching are you most confident about?	Self-efficacy	Dawson et al., 2013; Salinas et al., 1999; Young & Bippus, 200
37. Share artifacts: syllabus, rubrics, assignment sheets, lesson plans, etc.	Reflection	Ross & Dunphy, 2007

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Interview 3		
Organizational Support:		
Questions	**Themes**	**References**
38. How does your department help you to prepare for teaching in the US?	Teaching preparation & support	Arshavskaya, 201
39. What other departments/units on campus help you to prepare for teaching in the US?	Teaching preparation & support in the US	Ross & Dunphy, 200
40. Are there things that your department could have done to help you teach more effectively? What are they?	Teaching preparation & support in the US	Ross & Dunphy, 200
41. Are there things that departments/units on campus could have done to help you teach more effectively? What are they?	Teaching training, preparation, & support in the US	Meadows et al., 2015; Ross & Dunphy, 2007; Zhou, 2009
42. How does your department help you to prepare for graduate-level research?	Socialization	Austin, 2002; Austin et al., 2009
43. What other departments/units on campus help you to prepare for graduate-level research?	Socialization	Austin, 2002; Austin et al., 2009
44. Have you been assigned an official/formal mentor? If yes, who is it and how do they support you?	Mentoring Socialization	Swan et al., 2017 Austin, 2002
45. Do you have an unofficial/informal mentor? If yes, who is it and how do they support you? How did you find each other?	Mentoring Socialization	Swan et al., 2017 Austin, 2002
46. What or who has helped you feel like you belong on campus?	Socialization	Austin, 2002
Career Goals:		
Questions	**Themes**	**References**
47. What are your personal career goals?	Socialization Understanding the needs/wants of students	Austin, 2002; Austin et al., 2009 Andrade, 2006; Eggington, 2015

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48. How does your work as an ITA contribute to your personal career goals?	Socialization Understanding the needs/wants of students	Austin, 2002; Austin et al., 2009 Andrade, 2006; Eggington, 2015
49. What are your personal goals for teaching in the US?	Pedagogical growth	Shannon et al., 1998
50. At the university, who knows about your personal career goals and helps you achieve them?	Socialization	Austin, 2002; Austin et al., 2009

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PARTICIPANT TABLE

Participant Table

Name	Place of Origin	Degree Program	Field	Number of years in US	Total number years teaching
Jamie	West African country with English as the official language	PhD	Chemistry	3	3.5
Taylor	West African country with English as the official language	MS	Chemistry	1	4
Eagle	West African country with English as the official language	PhD	Math	10	8
Alex	West African country with English as the official language	MS	Chemistry	1	2
Avery	South Asian country with English as an official language	MS	Math	2	2
Morgan	South Asian country	PhD	Physics	3	5
Sam	South Asian country	MS	Chemistry	1	1

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