STEM FACULTY PERCEPTIONS OF INTERNATIONALIZING THE CURRICULUM IN THE AGE OF GLOBALIZATION:

A QUALITATIVE STUDY

A Dissertation in

Adult Education

by

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ABSTRACT

The purpose of this qualitative study is to examine the role of STEM faculty as they prepare students to gain cultural and global perspectives in the current globalized workplace, at a time when higher education has become a real part of the globalization process and is responding with internationalization. More specifically, this research focuses on the ways that internationalization is impacting higher education in today’s global knowledge economy and what the faculty are doing in the classroom to instill global perspectives and respect cultural differences in their students. Neoliberalism, human capital theory, and systems thinking frame this study. The design of the study utilizes a basic interpretive qualitative approach. Data collection consists of syllabi reviews and semi-structured interviews with eight STEM faculty who have at least four years of teaching experience. Sources of data included the transcribed interviews.

The findings of the study are organized into two main categories of *multiple motivations and understandings of globalization and internationalization* and *diverse approaches to internationalizing the curriculum*. Findings relating to multiple motivations and understandings identify three themes: overlapping definitions and concepts, profit versus garnering a bigger version of the world, and increasing relevance of internationalization. The diverse approaches to internationalizing the curriculum yield five additional themes: international partnerships, projects and assignments, student and scholar mobility, faculty engagement, and global learning communities. The study ends with a consideration of findings in light of the theory and the research questions, as well as outlines the limitations of the study and makes suggestions for future research.
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Chapter One

INTRODUCTION

This chapter provides an overview of a qualitative research study that examines economic globalization, internationalization, and Science, Technology, Engineering, and Math (STEM) in the twenty-first century. The focus is on STEM faculty, and their role in preparing students for the new global and information age workplace. Higher education plays a crucial role in preparing a new generation of graduates for an interdependent global reality. This chapter begins with a background of the study, where information technology, knowledge economy, globalization, internationalization, and neoliberalism in higher education are discussed. It also includes the review of the studies about the globalized workplace, various approaches to teaching in the new technology environment, STEM field and faculty, and the various global competencies that the new graduates need to acquire in today’s globalized workplace. This provides context for the problem statement, purpose and research questions, which are discussed next. This chapter also provides an overview of the conceptual frameworks, the research methodology, significance of the study, and a brief consideration of the assumptions and limitations of the study. The chapter ends with a definition of terms that are used in the study.

Background to the Problem

In today’s highly globalized economy, there is increased integration and dependence of economic interchange between nations. Due to globalization, the world is becoming more diverse (Gibson, Rimmington, & Landwehr-Brown, 2008). In the most basic terms, as defined by Castells in 2010, globalization is a process that involves the flow of capital, commodities, technology, cultural influences, and human resources across national boundaries, thereby creating a networked society. A network society is a rise in horizontal connections among related
institutions in diverse localities and dependent on computer-mediated technologies. Aptly, Altbach, Reisberg, and Rumbley (2009) highlight the fact that globalization is the key reality in the 21st century that has profoundly influenced higher education. The newer definition defines globalization as the reality shaped by an increasingly integrated world economy, new information and communications technology (ICT), the emergence of an international knowledge network, the role of the English language, and other forces beyond the control of academic institutions. Initially, globalization in higher education was related to growing interrelationships between different parts of the world and blurring national borders (Teichler, 2004). Lately, there has been a shift of meanings; globalization in relation to higher education is characterized by market and competition.

Information technology (IT) is a driving factor in the process of globalization and vice versa (Lowry & Turner, 2007; Stromquist & Monkman, 2015). Information technology is defined by the Information Technology Association of America (ITAA) as the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware (Kaliski, 2007). With the advent of globalization and fast-changing demographics, our workforce is being exposed to cultural differences and opportunities for information exchange with people from around the world (Alfred, 2015). This growing global platform demands workers to be prepared to work effectively within a diverse workforce. Research, initiatives, and innovations in the STEM fields are as diverse as they are global (NAFSA, 2018). As science, technology, engineering, and mathematics emerge as key disciplines driving innovation and change, it becomes ever more imperative to establish core competencies and metrics for what makes global-ready graduates. However, the challenges of internationalizing curricula, identifying specific approaches to
collaboration, and developing strategies and processes for exchange remain. Major responsibility falls on higher education to prepare students for this new landscape and to produce students who can competitively work in a twenty-first century diverse societal context.

The challenge for colleges and universities is to figure out how to prepare a future workforce to value and attend to cultural and international diversity. Important conversations are taking place across higher education institutions that are focused on how to best prepare students for working in an increasingly-globalized world. Colleges and universities are being challenged to reevaluate the education they provide, so that it remains relevant within the global learning context to prepare students to become productive global citizens in the 21st century (Kutner & Armstrong, 2012). Globalization in higher education can be conceptualized in terms of economic, political, and societal forces pushing today’s institutions, learning, and teaching towards more international involvement. For the first time global capital has been heavily invested in knowledge industries worldwide (Altbach & Knight, 2007). This investment is the evidence of the emergence of the knowledge society, which is the rise of the service sector, and the dependence of many societies on knowledge products and highly-educated personnel for economic growth. On our way toward becoming a knowledge society, increased attention has been paid to higher education in the public discourse, and research on the international dimensions of higher education has also substantially grown in recent years (Kehm & Teichler, 2007).

Globalization and internationalization are closely related and often used interchangeably (Knight, 2004), but they are not the same. Globalization is related to strong economic undercurrents having associations with competitive markets, transnational education, and commercial knowledge-transfer (Teichler, 2004). On the other hand, internationalization in the
context of higher education is increasingly used to discuss the international dimension of higher education (Knight, 2002, 2004). Process of globalization being a contested terrain, internationalization can represent a positive exchange of ideas and people who recognize and respect differences and traditions between nation-states (Currie, DeAngelis, de Boer, Huisman and Lacotte, 2003; Gacel-Avila, 2005).

Globalization has brought education into the international market, emphasizing knowledge and skills (Stromquist & Monkman, 2015). Over the past two decades, the concept of the internationalization of higher education has moved from the fringe of institutional interest to the very core (Brandenburg & de Wit, 2011). Activities described as internationalization in the late 1970s and the mid-1980s were either named differently or did not carry the same prestige as today. However, in the late 1980s, internationalization began carrying an ever-increasing importance. Higher education institutions striving to produce global competence, or a sense of civic responsibility that extends beyond the local or national level, are guided by the global framework by explicitly stating those goals in their mission and strategic planning documents (Rumbley, Altbach, & Reisberg, 2012).

Knight (2004) describes the internationalization of higher education as the process of integrating an international, intercultural, or global dimension into the purpose, functions, or delivery of post-secondary education. However, it is important to recognize that there have always been many different terms used for the internationalization of higher education (Knight, 2008). In literature and in practice, commonly-used terms are expended to address only a small part of internationalization (de Wit, 2011). For example, most of these terms used to describe internationalization are either curriculum related (e.g., international studies, global studies, multicultural education, intercultural education, peace education) or mobility related (e.g., study
abroad, education abroad, academic mobility). Over the past ten years, a new group of terms has emerged related to the cross-border delivery of education and are a consequence of globalization on higher education. Altbach, Reisberg, and Rumbley (2009) simply define internationalization as the variety of policies and programs that universities and governments implement to respond to globalization. No particular definition of internationalization is used in this study, although a variety of terms and the transition of the term over the years is discussed later in the study.

Given the complexities of internationalization and globalization, this section provides adequate background to the problem, with a discussion of internationalization of higher education in the context of globalization. Next is a consideration of communication technology in higher education, which examines both the discipline itself and STEM faculty as adult learners, followed by a discussion of learning in the globalized workplace. Even though this study does not look directly into the differences between internationalization and globalization, it does analyze the perspectives of STEM faculty in internationalizing their curriculum as the central issue and sees globalization as the underpinnings of neoliberalism.

**Internationalization of Higher Education in the Context of Globalization**

As pursuit of education becomes an ideal the world over, higher education has the responsibility to prepare students to become engaged citizens, ethical human beings, and productive workers who will contribute to the societies in which they live (Suarez-Orozco & Sattin, 2007). Unfortunately, educational institutions are often out of sync with the realities of a global world, yet have an obligation to prepare students for global citizenship. Green (2002) describes the world we live and work in today is “where national borders are permeable; information and ideas flow at a lightning speed; and communities and workplaces reflect the growing diversity of cultures, languages, attitudes, and values” (p. 12). According to Zha Qiang
(2003), predicted in the early years of the new millennium, internationalization has and will continue to become increasingly important to higher education as academic and professional requirements for graduates progressively reflect the demands of the globalization of societies, economies, and labor markets. Higher education must respond and provide adequately to meet these requirements.

The effects of globalization as related to higher education require attention to the integration of research, the use of the English language as dominant in scientific communication, the growing international labor market for scholars and scientists, the growth of multinational and technology publishing, and the use of information technology (Stromquist & Monkman, 2015). Since globalization tends to concentrate wealth, knowledge, and power in those already wealthy and powerful and the internationalization of higher education is seen as a part of this process, there are aspects of higher education that can contribute to the developing world. Students do move largely from south to north for educational purposes, and some do so permanently, though many return to their home countries (Altbach, 2011). Nonetheless, the north largely controls the process. While globalization may be unalterable, the internationalization of higher education still provides us with choices.

Globalization and its processes are closely related to a neoliberal agenda (Olssen & Peters, 2005). Neoliberalism is an idea that relates to freedom from economic regulations and unmonitored free trade. This ruling ideology is a dominant economic discourse or philosophy, which “constitutes the hegemonic discourse of western nation states” and has produced a fundamental shift in the way universities have defined their role and relevancy (Olssen & Peters, 2005, p. 314). As education becomes an internationally-traded commodity, the challenge is to understand both the context and the implications of the globalization of the knowledge economy.
(Altbach, 2002) in light of neoliberalism. Today multinational corporations and global education
corporations are influencing global education policies with the goal of promoting and shaping
human behaviors for the corporate workplace (Spring, 2009). Globalization has brought
education into the international market, emphasizing knowledge and skills, particularly those that
either explicitly or implicitly support neoliberalism (Stromquist & Monkman, 2015).

Although American higher education is seen by many countries as the finest in the world
today, Spellings (2010) questions if it is fine enough for the way forward. Technology is
advancing quickly, requiring educators to improve and shape curriculum to adapt to the new
global workplace. Research by the American Council on Education (ACE) suggests that a
considerable gap also exists between national rhetoric and institutional policies and practices
(Green, 2002). There is a fear that U.S. and European companies may lose their competitive edge
to technology graduates being trained in other countries (Armstrong et al., 2008). As higher
education grapples with what it means to provide a relevant 21st century global learning
experience, STEM faculty have an important and unique role in producing information literate
students who can be successful in this new information age.

**STEM in Higher Education and Globalization**

Science, Technology, Engineering, and Mathematics (STEM) is defined by the National
Science Foundation as an interdisciplinary approach to learning, where rigorous science,
technology, engineering, and mathematics concepts are coupled with real-world lessons.
Students make connections between school, community, work, and the global enterprise enabling
the development of STEM literacy and with it the ability to compete in the global economy
(Tsupros & Kohler, 2009). The STEM disciplines have a key role in globalization and in the
internationalization of higher education. Hence, the next section considers both the discipline itself and STEM faculty as adult learners.

**The discipline of STEM.** Science and technology are now globalized to a greater extent than ever (Finkelstein et al., 2009). Higher education, including science and technology, is central to development agendas globally (World Bank, 2002; UNESCO, 2009). Due to rising concern about America’s ability to maintain its competitive edge in the global economy, there has been a renewed interest in STEM education (Chen & Weko, 2009). According to the National Academy of Science (2005), three prominent U.S. scientific groups, The National Academy of Science, the National Academy of Engineering, and the Institute of Medicine, jointly issued a report, *Rising Above the Gathering Storm: Energizing and Employing America for a Better Economic Future*, that called for strengthening the STEM pipeline from primary through postsecondary education. This report recommended increasing investment in STEM programs, enhancing the STEM teaching force, and enlarging the pool of students pursuing degrees in STEM fields. Other organizations and government agencies (Government Accountability Office, 2006; National Science Board, 2007; U.S. Department of Education, 2006, 2015) made similar policy recommendations. Support for this cause has been undergirded through investments in educational programming, many of which are focused on postsecondary education.

STEM fields can include a wide range of disciplines. The National Science Foundation defines STEM fields broadly, which include the common categories of mathematics, natural sciences, engineering, and computer and information sciences, as well as social/behavioral sciences such as psychology, economics, sociology, and political science (Green, 2007b). Many recent federal and legislative efforts are, however, aimed at improving STEM education mainly
in mathematics, natural sciences, engineering, and technologies (Kuenzi, Matthews, & Mangan, 2006). Likewise, for this study, STEM fields include strictly the technical fields of mathematics, natural sciences, engineering, and computer/information sciences.

The complexities of today’s world require all people to be equipped with a new set of core knowledge and skills to solve difficult problems, gather and evaluate evidence, and make sense of information they receive from varied print and digital media (U.S. Department of Education, 2015). The learning and doing of STEM helps develop these skills and prepare students for a workforce where success results not just from what one knows, but what one is able to do with that knowledge. Thus, a strong STEM education is becoming increasingly recognized as a key driver of opportunity, and data show the need for STEM knowledge and skills will grow and continue into the future. Those graduates with practical and relevant STEM precepts embedded into their educational experiences will be in high demand in all job sectors. It is estimated that in the next five years, major American companies will need to add nearly 1.6 million STEM-skilled employees (Business Roundtable & Change the Equation, 2014). Labor market data also show that the set of core cognitive knowledge, skills, and abilities associated with a STEM education are now in demand not only in traditional STEM occupations, but in nearly all job sectors and types of positions (Carnevale, Smith, & Melton, 2011; Rothwell, 2013).

Unfortunately, the U.S. has persistent inequities in access, participation, and success in STEM subjects that exist along racial, socioeconomic, gender, and geographic lines, as well as among students with disabilities (U.S. Department of Education, 2015). STEM education disparities contribute to the nation’s ability to close education and poverty gaps, meet the demands of a technology-driven economy, ensure national security, and maintain preeminence in
scientific research and technological innovation. In recognition of the widening skills and opportunity gaps in STEM, the Obama administration initiated several efforts to motivate action (Handelsman & Smith, 2016).

Because of this need for greater participation of qualified college graduates in the STEM workforce (Wang, 2013), American higher education is facing an unprecedented need to increase the number of students who study in STEM disciplines. Future STEM graduates will be expected to communicate and collaborate across cultural, linguistic, and national boundaries on a daily basis; and globalization of the labor markets further means that U.S. STEM graduates must be prepared to compete at the international level (Dewhurst, Harris & Heywood, 2012; McGraw & Demirel, 2003). Moreover, global experience is increasingly perceived as essential to career success in science, technology, engineering, and math (Leggett, 2011). STEM faculty are responsible for educating and training our future generations of scientists and engineers to maintain U.S. competitiveness and preeminence.

**STEM faculty as adult learners.** STEM faculty strive to educate students and provide them with the knowledge and skills they need to succeed as STEM professionals. The preparation and continued education of STEM faculty are more important than ever for purposes of educating more STEM graduates needed for the workforce and ever-increasing demands on faculty members’ time (Stefl et al., 2017). IIE’s 2009 report, *Promoting Study Abroad in Science and Technology Fields*, says “curricular innovation, international collaborative research, development of dual/joint-degree programs across borders and distance learning will all be needed to provide students with an international perspective and to produce globally competent professionals” (Blumenthal & Laughlin, 2009, p. 18). On the contrary, faculty who are engaged in teaching subjects outside the STEM fields such as in the humanities and social sciences, are
more apt to address global issues in their classes than those in the STEM fields (Finkelstein et al., 2009). However, research universities train the majority of future faculty members in the U.S. and 100 such universities train more than 80% of the graduate students in the STEM fields (Gaff & Lambert, 1996). This study looks at STEM faculty as adult learners and their role in preparing students for today’s globalized workplace.

**Learning in the Globalized Workplace**

As businesses become increasingly global, higher education is facing the challenge of preparing a workforce that can effectively work within that environment. A survey from *The Association for Talent Development* (ATD, 2012), identifying trends in training a workforce for today’s global organizations showed only 32% of learning professionals indicated that global learning initiatives have been successful to a high or very high extent. This research report from also shows that there is much more to global learning and development than simply delivering training to employees. There is a need for so-called soft skills, laid upon a solid base of technical knowledge (Huber & Watson, 2013). There is also a contention that students benefit from global perspectives integrated into the curriculum (Conner, Roberts, & Harder, 2014).

STEM is increasingly important to the global competition between West and East in key areas of innovation, economic growth, and geo-strategic positioning (van der Wende, 2018). According to Morreale and Pearson (2008), the millennial generation needs training in skills required to navigate a global world, including competencies related to electronic and intercultural communication. *New York Times* columnist and best-selling author, Thomas Friedman (2007) stresses the importance of liking people, managing or interacting with others, and having good people skills, especially in a flat world, where advances in technology and communication is leveling the competitive playing field between industrial and emerging market
countries, putting diverse people in touch as never before. He goes on to say that these are the things that college graduates need to know and be able to do, to be successful in the 21st century. Researchers in higher education have described a varying mix of skills as essential to the success of our students (Huber & Watson, 2013). Knowing that students are not well prepared for the 21st century job markets (Edens, 2000), various scholars have indicated other skills and abilities besides the basic digital competencies that may be beneficial to today’s workers, such as global learning, intercultural communication, intercultural competence and diversity. A brief description of each of these skills is provided below.

**Global learning.** As globalization affects all aspects of our lives, including education, Merryfield (2002) suggests that in order to deal with these challenges, effective world citizenship knowledge, skills, and attitudes are essential. The author also emphasizes that education using global learning can help students tackle stereotypes, promote the habit of examining multiple perspectives, educate about power, discrimination, and injustice, and impart cross-cultural experiential learning. Some see global learning as a social-constructivist learning activity that involves experiential and project-based learning (Gibson, Rimmington, & Landwehr-Brown, 2008). An emphasis on pedagogical approaches fosters engagement with complex global issues, including problem-based learning, interdisciplinary education, service and experiential learning, and transformative education (Kutner & Armstrong, 2012).

Global learning also encapsulates internationalization of student bodies, study abroad opportunities, and second language learning (Kutner & Armstrong, 2012). Large universities such as Duke and Ohio State, have initiated offices and administrative positions to focus on global education throughout the curriculum, and Connecticut College has shown this commitment by directly incorporating the intent to prepare globally competent students in their
mission statement. Some of the global learning concepts in education are global citizenship, internationalization, and problem-based learning. As higher education institutions engage in international activities, such as study abroad programs, dual degrees, faculty exchanges, or offshore (transnational) programs, even a few decades ago, a general consensus existed among higher education administrators, faculty, students, parents, and employers that international activities promote students’ preparation for world citizenship (Harari, 1981).

Global citizenship is another term used for world citizenship, which refers to someone with global competency and an informed understanding of the world. In fact, Harari (1981) even explains that “international understanding has come to represent a very practical and urgent need, and clearly higher education has the responsibility in this area in the long term” (p. 1). Global citizenship is a key strategic principle in higher education (Schattle, 2009), which contains the following three strands: learning to live together, learning to live sustainably, and learning to live responsibly (Haigh, 2014). Internationalization, a multi-layered process, has arisen from the concern about the survival and adaptation to a globalizing world (Haigh, 2014). Through internationalization, learners understand that they are part of this world, and that they should respect its limits and the rights of other inhabitants, as well as accept their personal responsibilities for the welfare of all. Today, “this notion of global citizenship has become part of the internationalisation discourse in higher education around the world” (Deardorff & Jones, 2012, p. 295). One way to understand internationalization of higher education is to look at research on students to see if they are “globally aware and competent graduates” (Green, 2012, p. 4).

**Intercultural communication, competence, and diversity.** The highly interconnected nature of the global economy is exposing workers to cultural differences and opportunities for
information exchange with people from around the world (Fall, Kelly, MacDonald, Primm, & Holmes, 2013); thus, intercultural communication training is deemed essential for higher education. Intercultural communication is effective communication between people of different cultures, beliefs, and/or ethnicities and associations from the field of intercultural communication imply that exposure to intercultural communication increases competence.

Altbach, Reisberg, and Rumbley (2009) suggest that it is not possible for higher education to opt out of the global environment, since the effects of globalization are unavoidable. The work of senior international officers and administrators in higher education has resulted in a substantial body of literature exploring many facets of this phenomenon (Rumbley et al., 2012). International mobility of students and scholars is increasing and is one of the most obvious and important aspects of internationalization today. However, the increasing internationalization of university campuses does not guarantee by itself that students are receiving adequate intercultural communication instruction (Otten, 2003). The importance of human, business, and interpersonal skills, in addition to technical skills has already been established by previous research (Trauth & Farwell, 1995; Trauth, Farwell, & Lee, 1993); however, dynamic STEM workforce needs to understand their clients to come up with creative solutions for social inclusion and increased productivity. The students of the professional STEM arena in the 21st century will also require having familiarity with, as well as exposure to, more than just the technology content.

University education must not be only about training for demands of professional practice (Leask, 2013); there are moral responsibilities that come with local, national, and global citizenship, which are also important. The students today need to solve problems, such as resolving economic, environmental, religious, and political differences, which are global in
Since higher educational institutions have the responsibility to prepare our graduates through various disciplines for today’s workplace, Hudzik (2004) suggests that we require “problem-defining and solving perspectives that cross disciplinary and cultural boundaries” (p. 1). According to Leask and Bridge (2013), knowledge in and across disciplines is at the heart of internationalization of the curriculum. Hence, Leask (2013) asserts that there is clearly a need for cross-disciplinary conversation and collaboration.

Students who do not develop cross-cultural awareness are not being adequately prepared for the global workplace of the 21st century (Lowry & Turner, 2007). Although research on the international dimensions of higher education has substantially grown in recent years, the general state of research in this area is characterized by an increase of theoretically and methodologically ambitious studies without a dominant disciplinary, conceptual, or methodological home (Kehm & Teichler, 2007). While selecting literature for this study, it was challenging to find work that reported on what was happening in the classrooms of post-secondary institutions in the STEM field. There was more emphasis on what internationalization is, rather than on how it was working inside the classroom in a particular discipline. A sizable number of studies and publications cover the institutional strategies of internationalization. Sparse research exists in assessing how STEM faculty are preparing students to be competent workers in a highly global and information-rich world, where universities must embrace innovation for scientific advancements.

**Statement of the Problem**

Based on a 2013 report by the International Association of Universities (IAU) 4th Global Survey, Madeleine Green (2014) acknowledges the U.S. narrative about its higher education being the best in the world. She also concedes that other nations have made higher education a
greater priority in their public policy than has the U.S. These efforts in other parts of the world are paying off in an increased overall quality and reputation, research productivity, recruitment of international students, and recruitment of top faculty. A number of national studies, including the National Academy of Sciences’ *Rising Above the Gathering Storm* and similar reports by the Committee for Economic Development, the National Bureau of Economic Research, and the Council on Competitiveness focus attention on America’s growing shortages in STEM graduates and the need to dramatically expand the number of American undergraduates and graduates in STEM fields (Blumenthal & Laughlin, 2009).

Likewise, internationalization is a very high priority for many institutions and countries, which is largely driven by the recognition that quality teaching and research must be global in outlook and practice. Even though U.S. higher education institutions have been increasingly engaged in internationalization, few have institution-wide international plans or articulated goals in STEM areas (Sutton & Lyons, 2014). Unlike many other countries, the U.S. has no national policy on internationalization, nor is it the province of state policymakers (Green, 2014). Hence, U.S. institutions are left to decide for themselves what level of importance is given to internationalization efforts and the strategies used to implement them. Comparatively, many U.S. institutions do not assign as high a priority to internationalization as others around the world and are less likely to have a strategic plan for internationalization in place. While short study sojourns abroad have shown positive effects on students and ensued personality transformations (Hadis, 2005; Williams, 2005; Dekaney, 2008; Lenz & Wister, 2008; Coryell, et al., 2012); there are growing concerns that current American graduates of STEM programs lack the cross-cultural skills and international experience required in the global academic community (Blumenthal & Laughlin, 2009).
Even though our workforce is becoming more diverse, diversity by itself does not guarantee that they are becoming globally competent. While other countries have invested heavily in developing globally competent engineers, institutions in the U.S. have generally been slow to respond to this trend, leaving our graduates ill-prepared to compete in the modern marketplace (Doerry & Charles, 2013). Moreover, a lack of analysis on how these developments have affected higher education and academic faculty members still exists (Bedenlier & Zawacki-Richter, 2015). Academic faculty members are key contributors to a higher education institution’s successful internationalization process (Childress, 2010; Knight, 1994; Stohl, 2007); however, their internationalization experiences as recipients and participants are lacking in research (Kim & Locke, 2010). Specifically, very little is known about STEM faculty and how they are preparing students to be competent in this globalized and diverse world.

**Purpose and Research Questions**

The purpose of this qualitative research study was to examine how STEM faculty in higher education are preparing students to gain global perspectives in a globalized workplace, at a time when higher education has become a part of the globalization process and is responding with internationalization.

The research questions that will guide this research effort are:

1. In what ways do STEM faculty perceive that internationalization is impacting higher education in the current global knowledge economy?

2. How do STEM faculty view their role in preparing students to work in the globalized workplace?
3. What are STEM faculty doing in the classrooms to instill global perspectives in their students to manage the challenges of the new global workplace, and respect cultural differences in others?

**Theoretical Framework**

To answer the three research questions, the concept of globalization and the resulting internationalization of higher education were explored through the lenses of neoliberalism and human capital theory, which helped explain much of its underpinnings of globalization and internationalization of higher education. A systems thinking approach helped ensure that comprehensive strategies were formulated to improve and respond to the growing complexities of globalization and to make internationalization of higher education more sustainable. These frameworks, underpinnings, and approaches are discussed in detail in Chapter Two; however, a brief description of why they were chosen is provided here. The field of adult education is just starting to grapple with the issues of how best to respond to the impact of globalization through the internationalization of research, curricula, and practice.

STEM education is growing quickly, and leaders in these fields often struggle between two opposing views of the purpose of science and technology education: some see it as education for all learners, while others see it as career or technical education (Kelley & Kellam, 2009). The growth of globalism will continue to demand workers who have greater understanding of different cultures. Science and technology educators should adopt a curriculum that prepares students to be globally competent and understand human differences. As higher education has now become a part of the globalization process by matching the cross-border supply and demand, higher education can no longer be viewed in a strictly national context (Qiang, 2003). There is an influence of economic globalization on higher education and how universities are
becoming more consumer and market-oriented. This emphasis on the commodification of higher education and the push for universities to have a more neoliberal ideology is evident, as there are more funding cuts to higher education.

Internationalization is becoming increasingly important in the higher education sector, where graduates need to be prepared in, not only academic and professional knowledge, but also multilingualism, social and intercultural skills, as well as attitudes. There is a need for collaborative efforts and intensive international cooperation. The recruitment of foreign students and the use of new information and communication technologies in the delivery of education are the two developments that are increasingly influencing the international dimension of higher education. International students who are highly skilled are also more likely to pursue available positions in areas such as science, math, engineering, and technology, which are not favored by domestic students (Congressional Research Reports for the People, 2008). Moreover, the faculty plays a pivotal role in the internationalization of the curriculum (Harari, 1989; Shute, 2002), so their attitude towards the value of international perspectives in the curriculum greatly impacts students’ learning. Despite any negative impact of globalization, Merriam, Cervero, and Courtenay (2006) see the potential to transform adult education by suggesting adopting a critical stance, or taking an overt theoretical position.

The work of Gary Becker (1962) on human capital theory demonstrates how gaining education, such as technical and cross-cultural skills appropriate to the demands of the workforce, can increase the economic value of an individual, as well as society at large. As graduates increase their knowledge of other cultures and gain global competence, they increase their human capital in an internationally interdependent world. Human capital theory can serve as an ideological device to justify and legitimize the shifting rationale of internationalization of
higher education from political/academic to economic one. A systems thinking approach, founded by Jay Forrester, allows people to make their understanding of social systems explicit (Aronson, 1998). By viewing systems as wholes, rather than compilations of individual components (Davis, Dent, & Wharff, 2015), this approach can be used to study the process of internationalization of higher education in an expanded view and look into the interactions that make this a holistic process. This concept, where all key processes in an organization are interrelated, is vital to understanding the relationships between the various stakeholders of internationalization, such as faculty, administrators, and policy makers. Definitions and the rationales for internationalization must be clearly articulated to fully understand the intentions of the higher educational institutions, as they are reflected in the policies and programs developed and implemented (Knight, 2007). From a systems perspective, Mestenhauser (2006) addresses the current, challenging state of internationalization of higher education, which is seen as fragmented, complex, multidimensional, interdisciplinary, and intercultural. There is a growing acknowledgment among American educators and policy makers that scientific research is a global, rather than a national enterprise (Blumenthal & Laughlin, 2009).

Significance

The significance of this study relates to broadening the appeal of STEM curriculum by incorporating awareness, knowledge, and skills necessary for professional success and leadership in a global context. Globalization is a central issue confronting higher education today, and institutions are responding to the impact of globalization through the process of internationalization (Alfred, 2011). Whether the driver for internationalization of higher education is capitalism and international trade (Qiang, 2003) or the development of global citizenship (Currie et al., 2003), higher education must be actively engaged with the global
phenomenon (Merriam, Cervero, & Courtenay, 2006; Qiang, 2003; Ramdas, 1997). Qiang (2003) argues that academic and professional requirements for graduates increasingly reflect the demands of the globalization of societies, economies and labor markets; thus higher education must provide adequate preparation to meet these demands.

Adult education must take an active role in the discourse on globalization and the internationalization of higher education (Alfred, 2011). For the most part, adult education has not taken a critical stance on engaging in conversations beyond the local issues (Alfred & Guo, 2007). Even though the general state of research in the internationalization of higher education is characterized by an increase of theoretically and methodologically ambitious studies, there are not many disciplinary dominant, conceptual or methodological studies (Kehm & Teichler, 2007), which are particularly scarce in the STEM field. Moreover, academic faculty members have mostly been neglected as a subject of research on internationalization impacts, even while assuming a vital position in an institution’s internationalization process (Kim & Locke, 2010).

This study is significant to adult education because it advances an understanding of the social context of adult learning. Adult learning does not occur in a vacuum; it is largely determined by the society we live in (Merriam, Caffarella, & Baumgartner, 2007). Demographics, globalization, and technology are important forces that affect society, as well as adult learning.

Finally, as an adult educator, this study has particular personal importance. Adult educators, such as STEM faculty in this study, are being assigned the primary responsibility for equipping learners with competencies, such as cultural competence for work and life. This study is personally significant as I am a former adjunct instructor of Information Technology at the local community college. I strongly believe that context and culture matter in a curriculum. To address the cultural diversity challenges in the global workplace, higher education should
incorporate a more consistent and systematic way of teaching cross-cultural issues to future STEM professionals and move beyond the local to more global issues. This study serves to enhance my teaching experience by integrating international knowledge, skills, and competencies necessary for college graduates to work in a more diverse world. By conducting this study, my hope is not only broaden the appeal of STEM courses in higher education institutions, but also make STEM courses more diverse and inclusive. The perspectives of STEM faculty on internationalizing their curriculum can prove valuable in creating inclusive learning, which may help provide effective cross-cultural educational experiences for our university students.

**Overview of Design and Methodology**

This qualitative research study focuses on STEM faculty in higher education and how they are preparing students for the globalized workplace. This is discussed in depth in Chapter Three because qualitative research aims to uncover the way people construct meaning and make sense of their world through their experiences (Merriam & Tisdell, 2016). It is most appropriate to explore the role and perspectives of STEM faculty and how they incorporate knowledge, skills, and competencies necessary for the 21st century world.

With the purpose of generating reasoning from the perspectives of a few STEM faculty, rather than generating data from a large sample, this inductive approach helped uncover patterns that help explain a phenomenon. This type of research is context-bound (Patton, 2015), which works in the favor of this investigation, as each faculty participant is in a unique situation with respect to the university and the internationalization strategies used within that university. Similarly, since the qualitative approach posits multiple creations and interpretations of reality that converge and change over time (Merriam & Tisdell, 2016), depending on the institution and
its approaches to internationalization, multiple voices of STEM faculty will be incorporated in the research. The key to understanding qualitative research lies with the assumption that individuals socially construct meaning as they interact with their world.

Among the various types of qualitative research, a basic interpretive qualitative study fits the research problems. A basic interpretive and descriptive qualitative study exemplifies all the characteristics of qualitative research just discussed. Basic qualitative research typically makes use of three types of data collection methods: interviews, observations, and/or analysis of documents or artifacts (Patton, 2015). A rich, descriptive account of the findings are presented and discussed by using references to the relevant literature that framed the study in the first place (Merriam & Tisdell, 2016). The primary means of data collection for this study were in-depth interviews with STEM faculty who have been teaching for at least four years. Documents in the form of curricula and syllabi were another source of data collection. The data collected was recorded, transcribed, and verified to accurately reflect the perspectives of STEM faculty. Qualitative research is an appropriate approach in exploring the personal and individual experiences undertaken by this faculty in internationalizing their curriculum.

**Assumptions and Limitations**

Academic research generally begins with an issue or concern, involves systematic investigation of phenomenon, and generates new knowledge, evidence, or contributes new ideas to society or practice. Like any other research study, there are inherent assumptions and limitations that underlie this study. The assumptions inherent in this study are as follows:

1. To be competitive in the global world, students must value diversity and be globally competent.
2. STEM faculty in higher education plays a significant role in preparing students to work effectively in a global world.

3. A relationship exists between STEM education, faculty, diversity, and global competence.

4. American STEM graduates, while receiving excellent technical training in the field of technology, are under-prepared to act as responsible global citizens and to respect the intercultural aspects of the diverse world in which we live.

As mentioned earlier, along with the assumptions, all research studies come with limitations. Some of the potential limitations of this study include:

1. The participants in this study were limited to STEM faculty, hence only the experiences and practices within the STEM field are captured.

2. The findings of this study are difficult to generalize because of the qualitative design of this study.

3. Data was collected from faculty from a few colleges or universities offering STEM majors, so the study may reflect regional tendencies and cannot be theorized for all U.S. STEM faculty.

4. As an instructor of technology, my own opinion on the topic may interfere with the faculty’s perceptions of preparing students for the global workforce.

5. The study did not directly examine students’ global competence skills, but rather STEM faculty’s views and perceptions in preparing them.

**Organization of the Study**

The study is organized into five chapters. Chapter One is the Introduction to the study. It introduces the research topic and includes the background including the context in which the
study is set, problem statement, overview of the theoretical frameworks, significance of the study, assumptions and limitations, and definitions of key terms. Chapter Two, Literature Review, examines previous studies and provides a discussion of the literature on internationalization of higher education and the theoretical frameworks that guide the study. Chapter Three is the Methodology, which explains the qualitative research model selected for this study and analytical methods applied to this study. Chapter Four is the Presentation of the Findings and presents the findings of the research study. Finally, Chapter Five provides a discussion of the findings and draws conclusions, as well as the implications for the study.

**Definition of Terms**

- **Diversity** is about the differences in all humans (Parvis, 2003); it is not limited to race and ethnicity, but is expanded to include a vast array and variety of cultures, ethnic groups, physical features, languages, opinions, socio-economic backgrounds, religious beliefs, gender identity, and thought processes within any single population (Cox, 1991).

- **Global Citizenship** refers to the willingness of individuals to apply their knowledge of interrelated issues, trends, and systems and multi-perspective analytical skills to local, global, international, and intercultural problem solving (Boni & Walker, 2013)

- **Global Competencies or Learning** refers to attributes in three areas: knowledge, skills, and attitudes that graduates need to function successfully in a global world.

- **Global or Globalized Workplace** is a product of globalization, and the reality of today, where employees of different cultures and abilities come together physically or in collaboration to work together. They are expected to value diversity and create a shared environment of tolerance.
- **Globalization** is a process that involves the flow of capital, commodities, technology, cultural influences, and human resources across national boundaries, thereby creating a networked society (Castells, 2010). Globalization is a key reality in the 21st century shaped by an increasingly integrated world economy, new information and communications technology, the emergence of an international knowledge network, the role of the English language, and other forces beyond the control of academic institutions (Altbach, Reisberg, & Rumbley, 2009).

- **Intercultural Competence** is a long-term change of a person’s knowledge (cognition), attitudes (emotions), and skills (behavior) to enable positive and effective interaction with members of other cultures both abroad and at home (Bennett, 1993).

- **Ideology** refers to a set of principles, underpinnings, desired goals, and strategies that structure actions and beliefs (Stier, 2003).

- **International Education** is an all-inclusive term encompassing three major strands: a) international content in the curriculum, b) international movement of scholars and students concerned with training and research, and c) arrangements engaging U.S. education abroad in technical assistance and education programs (Harari, 1972). According to NAFSA (Association of International Educators) (2016a), international education advances learning and scholarship; builds understanding and respect among different peoples; and enhances constructive leadership in the global community. It is believed to be fundamental to fostering peace, security, and well-being.

- **Internationalization** is defined as the variety of policies and programs that universities and governments implement to respond to globalization (Altbach, Reisberg, & Rumbley, 2009). Knight (2004) defined it as the process of integrating an international, intercultural and/or
global dimension into the goals, functions (teaching/learning, research, service and delivery of higher education.

- **Internationalization of the Curriculum (IoC)** is defined as the process of curriculum development and curriculum change, which is designed to integrate an international dimension into the content of the curriculum, and if relevant, also into the method of instruction (OECD, 2011).

- **Knowledge Society** is an increasingly important element of globalization and is defined as the rise of the service sector, and the dependence of many societies on knowledge products and highly educated personnel for economic growth (Castells, 2010; Friedman, 2007). This is by and large a function of knowledge generation and information processing. In this new information age, the production and use of knowledge has become the power and wealth creator for nations (Knight, 2007).

- **Neoliberalism** is a body of economic theory and political stance (Kotz, 2000). It is an idea that the free market should shape society and the economy should be deregulated and privatized.

- **STEM (Science, Technology, Engineering, and Mathematics)** on its surface is an acronym of science, technology, engineering, and mathematics employed by the National Science Foundation. It is defined as an interdisciplinary approach to learning, where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in context that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy (Tsupros & Kohler, 2009).
• **STEM Faculty** refers to the academic staff of a college or university responsible for preparing students for STEM related jobs.

• **Study abroad** is defined as education that occurs outside the participant’s home country. Besides study abroad, examples include such international experiences as work, volunteering, non-credit internships, and directed travel, as long as these programs are driven to a significant degree by learning goals (Forum on Education).

• **Twenty-first Century Workplace** is the work environment built around the integration of technology, fast communication, and automation.
Chapter Two

LITERATURE REVIEW

The purpose of this qualitative research study is to examine how STEM faculty are preparing students to gain global perspectives in a globalized workplace, at a time when higher education has become a real part of the globalization process and is responding with internationalization. The research questions that will guide this research effort are:

1. In what ways do STEM faculty perceive that internationalization is impacting higher education in the current global knowledge economy?
2. How does STEM faculty view their role in preparing students to work in the globalized workplace?
3. What are STEM faculty doing in their classrooms to instill global perspectives in their students to manage the challenges of the new global workplace, and respect cultural differences in others?

In keeping with the purpose of the study, in this chapter, I will attempt to assimilate, analyze and build upon the current debate on internationalization of higher education in light of the forces of globalization. Following a brief discussion of the methods used to conduct a review of the relevant literature; this review is organized into three parts. The study is theoretically grounded in the globalization and internationalization in the context of examining literature on adult higher education. It begins with a discussion of globalization, its forces and its theoretical underpinnings, particularly in regard to higher education, and includes a discussion of neoliberalism and the history, approaches, rationales, elements, and status of globalization and internationalization. Next is a more in-depth discussion on the effects of globalization on the internationalization of higher education. The third part focuses on the empirical studies sharing
the application of internationalization in higher education. Fourth is a discussion on adult
education research, the gap in the current body of literature, and implications of this study.

A high-quality review, if complete, focuses on concepts, and covers relevant literature on
the topic and is not confined to one research methodology, one set of journals, or one geographic
region (Webster & Watson, 2002). Keeping these recommendations in mind, this literature
review is designed by selecting conceptual and empirical studies, reports, as well as books that
inform the topic of internationalization. Scholarly literature on the development of research and
theory on international higher education from the past twenty years is included. Seminal work is
also important, as it helps better understand and ground the study. Internationalization, being a
global topic, demands literature review of not just U.S. higher education, but also international
and global institutions. Hence, the studies of a local, international, and global nature are all
included in the review.

Articles for this review were located by searching through the following databases:
ABIInform, Business Source Premier, Compendex, EBSCO, ERIC, IEEE, Inspec, ProQuest, and
ProQuest Education. Many times, for an initial search on a keyword(s), I found Google Scholar
quite useful. It helped provide a broad range of materials associated to keyword searches. Since
this topic is interdisciplinary, I looked at information technology, as well as engineering
databases. In addition to this, other dissertations and theses were also reviewed. Finding the
studies for the review began with using related search terms such as: globalization,
neoliberalism, and internationalization of higher education. More keywords were searched for,
individually and in various combinations to set the direction for this review: internationalization
of the curriculum, study abroad, comprehensive internationalization, global education, higher
education, global competence, faculty, and STEM. Moreover, reference lists located in the
selected articles were reviewed for pertinent citations. The study is theoretically grounded in the globalization, internationalization and adult higher education literature. Hence, we begin with a more in depth look at the theoretical underpinnings of globalization itself.

**Globalization, Its Forces and Theoretical Underpinnings**

Globalization and its effects continue to coercively affect society, impacting education in huge ways. According to Spring (2009), globalization of education refers to worldwide networks, processes, and institutions affecting local educational practices and policies. Spring (2015) analyzes the intersection of global forces and education, and suggests that all cultures are slowly integrating into a single global culture through the processes of globalization. Such processes are affecting the international dimension of higher education, which is also changing significantly (Knight, 2004). *The Washington Post* reported in 2013 that “the global education market is now worth $4.4 trillion—that’s TRILLION—and is set to grow a lot more over the next five years” (Strauss, 2013). There are several factors related to globalization that have contributed to the surge of interest in internationalization of higher education, especially, a growing societal recognition that our graduates will compete in a global labor market and need to develop the ability to work more effectively in international and multicultural settings (Pandit, 2009). Moreover, universities are becoming more corporatized, and as they do so, seek to internationalize the college experience to attract overseas collaborations, attract international students, promote multi-country research, for economic and other reasons, while attending to academic outcomes.

Where there is a struggle to define what internationalized education is or should be, and what values the process of internationalization should advance, Hudzik (2011) sees internationalization of education as a core reality in today’s globalized world, that distinguishes
current discussion and action from that of the past, and views it as an institutional imperative. As recognized by the NAFSA Task Force (2008), internationalization can ultimately leverage the collective assets of the higher education sector to create a new generation of global citizens capable of advancing social, and economic development for all. However, education at all levels must be based on a conviction that it is not simply a commodity to be bought and sold in the marketplace (Altbach, 2002). While an education system should provide the skills needed for economic success, it should also build the underpinnings of a civil society and of national or international participation. We are living in an entirely new era of power and influence, where, multinational corporations, media conglomerates, and even higher education institutions are seeking to dominate not simply for ideological or political reasons, but rather for economic gains for the owners of capital (Altbach, 2002).

Our lives have profoundly changed, especially in the last quarter of the previous century with the emergence of technologies, chief among them are the information and communication technologies (ICTs). The innovations in microelectronics, computing (hardware and software) and telecommunications are collectively abbreviated as ICT, which has been the reason for the exponential growth of the Internet. The ICT revolution is transforming the “industrial society” into the “knowledge society” and the “global knowledge economy”, and obviously the ICT world, including faculty and programs offered at universities dealing with ICT, are a part of this globalization process and the internationalization of higher education. It is against this backdrop that I designed this study to explore the evolving and complex narrative of globalization and internationalization in higher education, particularly from the perspective of STEM faculty. The internationalization of higher education is shown to enhance scholarship and discovery, as well as to foster economic links between communities and the rest of the world (Pandit, 2009). With
the dominance of globalization and neoliberal ideology, instead of simply responding to market
driven international trends, higher education must also integrate holistic and global perspectives
into the curriculum, embracing the principles of inclusion, diversity, and cross-cultural
understanding. This study hopes to examine how STEM faculty are dealing with these
processes, but it is important to have a good understanding of the forces and underpinnings of
globalization to understand its effects on higher education.

In order to understand the forces of globalization better and its relationship to the
internationalization of higher education, here I first explore the theoretical underpinnings of
globalization itself, particularly neoliberalism and human capital theory. I also briefly examine
systems thinking approaches to help formulate and improve upon the comprehensive strategies
of internationalization in higher education, especially in the STEM discipline.

**Neoliberalism, Globalization, and Internationalization in Higher Education**

Currently, globalization is the intense force for the massification of higher education
(mass access to higher education), leading to structural changes of universities worldwide.
Shifting from industrial economies to knowledge economies is the key to a nation’s growth and
sustainability, making access to higher education significant to goals for both individual and state
well-being (IIEP, 2007). When neoliberal policies took root in the 1980s and early 1990s, many
governments drastically reduced funding for higher education, causing universities to compete
for private funding and student tuition (Torres & Schugurensky, 2002). Many universities in the
United States responded to the neoliberal pressures by adopting market-based strategies, such as
competing for external funding, forming partnerships with private industries, increasing student
fees, and selling educational programs and services (Stromquist, 2007). Higher education
institutions have always valued the mobility of scholars and ideas; however, the recent pressure
to internationalize their campuses, curriculum, and activities has evolved to encompass much more than scholarly exchange (Garson, 2012). This increasing compulsion has led nearly all higher education institutions today to embrace some form of internationalization (Green & Schoenberg, 2006). Nevertheless, many argue that the rhetoric around internationalization is a plot to divert attention from competitive, market motivations (Stromquist, 2007). This is because of its neoliberal and human capital theoretical underpinnings.

**Neoliberalism and globalization.** *Neoliberalism* is both a body of economic theory and political stance (Kotz, 2000). Neoliberal theory claims that a largely unregulated capitalist system embodies the ideal of free individual choice, as well as achieves optimum economic preference with respect to efficiency, economic growth, technical progress, and distributional justice. In other words, it is an idea that the free market should shape society and the economy should be deregulated and privatized. Since neoliberalism is a notion that relates to freedom from economic regulations and unmonitored free trade, it is often linked to globalization (Olssen & Peters, 2005). This makes neoliberalism a critical element of globalization. Globalization is a much broader phenomenon that has partly ensued as a consequence of changes in technology and science. In fact, it is an economic discourse or philosophy, which has become dominant and effective in world economic relations as a result of super-power sponsorship.

The United States provides the world’s dominant academic system that many countries carefully study and follow (Altbach, 2007). The United States hosts about one-third of the world’s international students, and American universities hire foreigners in large numbers. The medieval European tradition is the basis and characteristic of the institutional structure and orientation to teaching universities internationally. The Internet and other manifestations of globalization are supposed to bring knowledge equality to the world, however, evidence suggests
the unequal world of globalized higher education adversely affects many developing countries and smaller academic systems. Powerful universities always dominated the production and distribution of knowledge, including research and teaching, knowledge dissemination, and organizational patterns and directions. The trend continues and hegemony in the current educational system has been exemplified with English being the Latin of the 21st century; major universities in the United States and United Kingdom hosting the key international research journals and databases; multinational corporations, media conglomerates, and some leading universities seeking power and influence for commercial gain; limited range of cultural perspectives represented in curricula; subordination of the purpose of education to narrowly defined economic and instrumental conditions; and many English-language products dominating the international academic marketplace (Altbach, 2007).

The globalization of higher education is often interpreted from a neoliberal perspective because it emphasizes increased global competition with limited protective policies and the implementation of global and regional laissez-faire trade regimes, such as World Trade Organization (WTO) and the North American Free Trade Agreement (Shields, 2013). World Bank contends that the focus on competition dominates policy discourses (as cited in Shields, 2013), and neoliberal categories of competition, rational choice, and the knowledge economy are widely accepted by the academic literature. In *Constructing Knowledge Societies*, the World Bank also worries that “the capacity to generate and harness knowledge in the pursuit of sustainable development and improved living standards is not shared equally among nations.” (Spring, 2009, p. 9). Altbach, the director of Boston College’s Center for International Higher Education in an article in the center’s publication *International Higher Education* titled “Globalization and Forces for Change in Higher Education” suggests that massification of higher
education reflects global inequalities with developing nations being at a disadvantage (as cited in Spring, 2009).

Today, multinational corporations and global education corporations are influencing global education policies with the goal of promoting and shaping human behaviors for the corporate workplace (Spring, 2009). Providing higher education to students from nonaligned countries asserts and maintains American supremacy not only as a creator of knowledge, but also creates a generation of educated elites with favorable ties to the United States, and produces a skilled labor force that contributes to growth in strategically important areas (Altbach, 2004). The most important counter-hegemonic perspective of internationalization is the reason why such efforts are even necessary (Schoorman, 1999). These include: world peace, national security, political, economic, academic, and international cooperation. Sadly, few educators have highlighted the pedagogical reason for internationalization. The key components of Schoorman’s vision of internationalization include the requirement to be: i) counter-hegemonic, ii) on-going, iii) comprehensive, iv) multifaceted, and v) integrated (Schoorman, 2000). The author suggests focusing on pedagogical issues of teaching and learning, and not just administrative solutions and outcomes. Education rooted in the need for democracy and social justice is considered counter-hegemonic. Knight (2003) also suggests the above-mentioned facets of internationalization, but Schoorman’s counter-hegemonic stance and program of action speaks to a transformative curriculum. Along these lines, internationalization efforts are seen as the means to facilitate among students a sense of caring, as citizens of a globally interdependent society, whose goals would be to make the world a better place for all its citizens. Student mobility may be beneficial for students in developing intercultural competence as they move to a different setting. However, does it impact how they learn and study abroad opportunities are primarily
accessed by a very small (elite) group of students. Internationalization scholars Harris (2008) and Stromquist (2007) also question if internationalization is a mechanism for institutional revenue. To some it is a means to adapt education to global contexts and embrace potential opportunities for real change in the form of global citizenship education (Alfred & Guo, 2012; Gacel-Avila, 2005) or intercultural education (Deardorff, 2006; Leask, 2010). Brandenburg and de Wit (2011) have invited educators to reconsider internationalization as a means to a goal rather than a goal in itself. Once the higher educational institutions identify the correct rationale for internationalization, instructors should examine them for their hegemonic or counter-hegemonic biases (Schoorman, 1997).

The major institutions affecting worldwide educational policies are: the Organization for Economic Cooperation and Development (OECD); the World Bank; the United Nations Educational, Scientific, and Cultural Organization (UNESCO); the World Trade Organization (WTO); and its General Agreement on Trade in Services (GATS); and other IGOs and NGOs, such as human rights, environmental, and women’s organizations. English as the global language of business and tourism also impacts local schools often resulting in English being made part of the curriculum (Spring, 2009). Neoliberalism is based on the basic assumption that deregulation and institutional autonomy lead to superior institutional performance (Chang, 2015). Differentiating between neo and classical liberal discourse is important to understand as it provides an important key to understanding the distinctive nature of the neoliberal revolution as it has impacted on OECD countries over the last 30 years (Olssen & Peters, 2005). Although classical liberalism represents a negative formation of state power in that the individual was seen as an object to be freed from state interventions, neoliberalism signifies a positive conception of the state’s role in creating the suitable market by providing the conditions, laws, and institutions
necessary for its operation. Classical liberalism characterizes an individual as having an autonomous human nature to practice freedom, whereas, neoliberalism creates an individual into an enterprising and competitive entrepreneur.

Under neoliberalism, though the governments tend to minimize rules and regulations to provide more institutional autonomy, in higher institutions, the governments are in fact indirectly involved through various evaluation mechanisms (Ferlie et al., 2008). There are numerous evaluation indicators in place for quality assurance, accountability, and rankings in the world. Most governments tend to link the particular evaluation results to their funding allocation, which in turn exercises influence on universities. Lately, one of the key intents of the reform in higher education has been to implement aspects of competition as a method of increasing productivity, accountability, and control (Chang, 2015). Within a neoliberal context, increased competition tends to represent improved quality, with internationalization, fiscal reduction, and university-business links being added advantages.

Neoliberalism can help identify key issues in internationalization of higher education and analyze this phenomenon. As neoliberalism claims that globalization increases competition, we are seeing the flows of students overseas move largely from the developing countries to the industrialized nations (Altbach, 2015). The imperatives of the market are now driving internationalization trends worldwide (de Wit, 2002; Scott, 1998). Universities and academic systems continually seek to make themselves attractive to overseas students, and to build connections with universities in other countries to enhance their global reach. This often means teaching in English in addition to the national language, developing the means to market higher education programs effectively, treating intellectual property as a commodity, and adopting strategies of profit-driven corporations. In this new era of power and influence, multimedia
corporations, media conglomerates, and even a few major universities are the new neocolonists—seeking to dominate not for ideological or political reasons, but rather for economic gain (Altbach, 2002). The more education is seen as an internationally traded commodity, the less it is seen as a set of skills, attitudes and values required for citizenship and effective participation in modern society, which is a key contribution to the common good of any society.

Ultimately, Boucouvalas suggests, international education must be concerned with not just the individual adult, but also the development of the greater context in which adults find themselves, whether it be the nation, society, the community, an organization or a group (as cited in Coryell et al., 2012). In their case studies of four universities in the U.S. and the U.K., Coryell and others (2012) indicate a need for the entire university community (faculty, students, administration, and staff) to develop and acquire intercommunication skills, knowledge of international principles in one’s discipline, and transcultural sensitivity. As STEM’s research is organized in a global science system and engineering, it is one of the most globalized of the regulated professions (van der Wende, 2018). At a strategic level, performance in STEM strongly defines the standing of the university in global rankings, as well as being central to global competition between West and East in key areas for innovation, economic growth, and geo-strategic positioning. Of course, global competition is not exclusively defined by research; in order to train 21st century scientists and engineers, institutions need to seek new cross and interdisciplinary combinations to prepare their students for successful careers to stand out in the global tech world.

Globalization of higher education has cross-national implications, including mass higher education; a global marketplace for students, faculty, and highly educated personnel; and the
global reach of the new Internet-based technologies, among others (Altbach, 2015). In essence, commodification of education has major implications for nations, as well as for higher and adult education. As Knight (2004) states, internationalization is changing the world of higher education, and globalization is changing the world of internationalization.

**Internationalization.** Internationalization in higher education tends to be treated as an extremely normative topic with strong political undercurrents (Kehm & Teichler, 2007). There is an unspoken rivalry of certain values. On the one hand, internationalization in higher education is regarded as positive and important, which is prevalent in most higher education institutions’ mission statements. On the other hand, internationalization is embedded within a national value system, and it reflects the existing international inequality between nations and world regions, as about three-fourths of the world mobility is vertical. Cooperation and competition is one of the overarching themes that is being discussed often. There has been a shift from cooperation to competition. It is true that international students bring economic benefits to the institutions and communities that host them, hence, many institutions now strive to internationalize, and the focus has been on increasing international student enrollment (Garson, 2016). Even though globalization suggests increasing erosion of borders and of the traditional idea of the nation-state, national policies continue to play an important role (Kehm & Teichler, 2007). Where the U.S. discourse on internationalization is robust and most institutions are actively expanding their international activities through education abroad and global learning in the curriculum, recruiting international students is still the strong focus, since it has the added benefit of increasing revenue (Green, 2014).

Most curricular efforts in internationalization should be centered on issues to represent global perspectives, which is not often the case (Schoorman, 2007). To implement
internationalization as counter-hegemonic, curriculum content should encompass not only curriculum-content, but the pedagogical process as well. Moreover, instructors should determine that their curricula represent a balanced representation of the globe, rather than a reliance on certain dominant text such as an American or westernized version of issues. Internationalization has been integrated in the liberal arts or business realms more than in the sciences. Instructors need to recognize its relevance to all academic areas, and relevance of internationalization must be recognized and advocated by not just the personnel, but other stakeholders, such as the students, faculty, businesses, and the government. American colleges and universities can take advantage of this autonomy to develop collaborative, mutually beneficial initiatives and policies, eschewing profit-making ventures that advance the hegemony of powerful academic institutions and systems (Altbach, 2007).

**The Underpinnings of Human Capital Theory**

Human capital theory explains much of the underpinnings of globalization and its resultant internationalization of higher education as it relates to internationalization in response to current neoliberal ideology and globalization trends in higher education. My argument is that internationalization of higher education, if wholly or partly based on human capital theory, is unlikely to alleviate inequalities or improve accessibility of education. Another argument that I will present in this context is that human capital theory serves as an ideological device that justifies and legitimizes the shifting rationale of internationalization from political/academic to economic one. *Human capital theory* is a comprehensive approach to analyze a wide spectrum of human affairs in light of a particular mindset, and proposes policies accordingly (Tan, 2014). The focus of this theory is on education as a capital good related to the concept of human capital (Almendarez, 2013).
Chicago School of Economics' tradition reflect in their work the consideration of schooling as an investment in human capital (Spring, 2015). Human capital is defined in *The Oxford Handbook of Human Capital* as “The stock of knowledge and skills that enables people to perform work that creates economic value” (as cited in Spring, 2015). It is a well-known fact that quality education is key to economic growth and development, which is also true for higher education. Education, seen as a capital good related to the concept of human capital emphasizes development of skills as an important factor in production activities, and is therefore, sharply critiqued by educators, economists, sociologists, and philosophers.

The passage of the Congressional 1958 National Defense Education Act provided funds to attract students into the fields of science, engineering, and math. The Cold War also sent a wave of anti-communism through public schools and universities. The universities started to favor economists advocating free markets. Anti-communism, in addition to some other fears, contributed to the dominant role in education of the Chicago School’s idea about free markets and human capital (Spring, 2015). The debate over the General Agreement on Trade in Services (GATS), an effort by multinational corporations and some government agencies in rich countries to integrate higher education into the legal structures of the World Trade Organization, indicates the importance of universities to a knowledge economy (Larsen, Martin, & Morris, 2002; Knight, 2002; Altbach, 2002).

Human capital emphasizes the development of skills as an important factor in production activities and defined by OECD (2001) as “productive wealth embodied in labor, skills, and knowledge”, and Garibaldi refers to it as any stock of knowledge or the innate/acquired characteristics a person has that contributes to his or her economic productivity (as cited in Tan, 2014). Human capital represents the investment people make in themselves that enhance their
economic productivity. In Gary Becker’s writings, a 1992 Nobel Prize winner, education becomes an investment that results in economic growth, increased productivity, higher incomes, decreased economic inequalities, and the ending of poverty (Spring, 2015). The widely accepted notion that education creates improved citizens, helps upgrade the general standard of living in a society, and can be an agent of change in many developing countries, has led to heavy investments in it (Almendarez, 2013). The pressure for higher education in many countries has certainly been helped by public perception of financial reward from pursuing such education.

According to human capital theorists, an educated population is a productive population. Human capital theory stresses how education increases the productivity and efficiency of workers by increasing the level of stock of economically productive human capability, which is a product of innate abilities and investments in human beings.

Human capital theory theorizes that investment in human capital will lead to greater economic outputs. While in the past, even though labor was a necessary component, tangible physical assets such as land, factories, and equipment were the economic strength of a nation, today, human capital is seen as the most important asset. The term human capital has a long, but discontinuous history (Kiker, 1966). Formally introduced in the 1950s, its analytical framework was developed by academicians at the Chicago School of Economics, such as Theodore Schultz and Gary Becker (Tan, 2014). At the time, the term human capital was severely criticized by some liberal academicians due to its negative connotations with slavery. Even before the 20th century, the liberal philosopher J. S. Mill (1806-1873) criticized it, and pointed out that “the human being himself...I do not class as wealth. He is the purpose for which wealth exists” (Mill, 1909, p. 47). The human capital theorist, Schultz (1959) referred to these liberals as sentimentalists; the ones who argued that treating human beings as commodities or machinery
could lead to the justification for slavery. Since then, the concept has been widely used as an instrument to shape educational policies in various countries. Even though human capital is not limited to education and training, the scope of this study is confined to higher education in the context of neoliberalism, globalization, and internationalization.

Coming back to the earlier thought on investment in human capital, Schultz (1961) points out that although it is obvious that people acquire useful skills and knowledge, it is not obvious that these skills and knowledge are a form of capital. This capital is in substantial part of deliberate investment, and growing in Western societies at a substantial rate. Economists have long known that people are an important part of the wealth of nations, but are seldom timid to stress that people invest in themselves, and that these investments are very large. They stay away from the abstract analysis and are wary because of deep-seated moral and philosophical issues attached to investing in humans. Free men are not property or marketable assets, rather first and foremost, the end to be served by economic endeavor. Today, knowledge is increasingly regarded as an essential growth factor, which is also true for higher education and workforce. *Intellectual capital* can be seen as the assets related to the employee’s knowledge and expertise (Kok, 2005). According to Edvinsson, intellectual capital is the ability to transform knowledge and intangible assets into wealth creating resources (as cited in Kok, 2005). He also states that intellectual capital takes two distinct forms: human capital and structural capital.

Human capital is the combined knowledge, skill, innovativeness, and the ability of the organization’s individual employees, as well as the organization’s values, culture, and philosophy. Human capital may be considered as the brainpower of employees that is useful to the enterprise, or the capabilities that provide solutions to customers, which creates value for the organization. So, these can be innate and naturally endowed with desired skills or characteristics,
or can also be acquired (Schultz, 1981). The organization cannot own human capital. Whereas, structural capital refers to hardware, software, databases, organizational structure, patents, trademarks, etc. Unlike human capital, structural capital can be owned by the organization and hence traded. Human capital relates to the individual competencies of the STEM graduates or of researchers and lecturing staff. By making use of the latest developments in the structural capital such as, Information and Communication Technology, and expertise of faculty, education can be made available to students all over the world.

At the university level, internationalization is a subtle response, which not only affects academic programs, faculty, and students, but also creates new administrative structures and privileges (Stromquist, 2007). The majority of U.S. research universities mention internationalization in their current mission statements, and about half include it in their strategic plans (Siaya & Hayward, 2003). The Association of American Colleges and Universities (AACU) endorses global education to prepare students for the global world of work, as well as to bring about a shared future marked by justice, security, equality, human rights, and economic sustainability (Stromquist, 2007). Human capital theorists are primarily concerned about how individuals acquire human capital. Gary Becker (1975) rightly suggests there are certain “activities that influence future monetary and psychic income by increasing resources in people, and these activities are called investments in human capital” (p. 9). It is through such investments that individuals improve their skills, knowledge or health, and as a result, increase their monetary and psychic incomes. Even though, there are possibly numerous ways to acquire human capital, human capital theorists typically limit their analyses to schooling, work experience, childcare, health, and migration.
For the purpose of the study, this critique of human capital theory focuses on STEM graduates learning skills to be able to bring them to the global workplace. There is no doubt that by acquiring human capital, individuals can generate favorable economic outcomes, such as access to higher jobs and higher earnings (Crocker, 2007). Human capital theory not only predicts that increased knowledge and skills will yield improved economic outcomes for individuals, but investments in people will also yield improved economic benefits for societies as a whole. The demand for STEM fields continues to grow at a relatively rapid rate; nine out of the ten fastest growing occupations that require at least a bachelor’s degree will depend on significant math or science training, and engineering occupations are predicted to grow faster than the average rate for all occupations (Lacey & Wright, 2009; National Science Board, 2010).

Human capital theory derives from the neoclassical school of thought in economics (Tan, 2014). In the neoclassical economic model, individuals are assumed to seek to maximize their own economic interests. Similar to the STEM graduate trying to gain expertise to increase their value in the marketplace, human capital theory postulates that individuals invest in education and training in the hope of getting a higher income in the future. The neoclassical economic model focuses on two core paradigms through which it attempts to explain social/economic phenomenon. These paradigms are: methodological individualism and rational choice theory. According to Hodgson, methodological individualism is a doctrine that places the individual at the center and emphasizes the human agent over social structures (as cited in Tan, 2014). As STEM students gain technical skills from the curriculum, the phenomenon of internationalization will instill the international/intercultural dimension in them. The individuals are undertaking human capital formation as they seek to maximize their interests. Individuals, according to
human capital theory, are also rational, self-interested actors who attempt to maximize their utility (Tan, 2014).

*Rational choice theory* provides a model to understand and predict human behaviors (Tan, 2014). It is concerned with the intentions and motivations of individuals and the means they use to reach goals under certain conditions. Indeed, we can make this claim to STEM graduates when talking about how they are taking courses in higher education in preparation for working in today’s global environment. As internationalization has become an important facet of higher education in the 21st century, there is hope that these graduates in most universities will not only gain technical knowledge, but global perspectives to cope with the global academic environment. In applying the logic of rational choice theory, human capital theorists posit that individuals will attempt to acquire human capital in order to maximize their economic interests (Tan, 2014). If we continue to follow the economic rationales and benefits of internationalization, this entails constantly weighing the costs and benefits for the students. Whereas, if the rationales are more academic and civic, then instead of weighing in economic terms, the focus can be on cooperation and global learning for democracy and the common good of the world. If neoliberalism continues to reign as the dominant ideology and policy stance, it is fair to say that human capital theory has recently become popular among academics, as well as non-academics, even though its assumptions have a long history that dates back to the beginnings of classical economics.

From the perspectives of Becker and Schultz, one reason for the growing popularity and importance of human capital theory resides in the relationship between human capital and physical capital, as the term human capital compared human beings to slaves or machinery (Tan, 2014). This comparison to innate objects implied by the term was seen as degrading and
dehumanizing, although over time, the growing emphasis on human capital over physical capital is seen as an important shift (Schultz, 1981). Knowledge economy being central to the 21st century and the belief that education leads to greater economic success, education has been placed at the center of human capital theory, and is considered the source of economic development (Tan, 2014). As students acquire skills and knowledge in STEM programs, they enhance their economic productivity, which will increase in earnings for those individuals. In contributing to individuals’ productivity and progressive ability through the acquisition of human capital, schooling is considered an investment because of the financial returns generated (Tan, 2014).

When human capital arguments contribute to thinking about education as solely an economic activity, knowledge and skills learned in school become capital to be utilized in economic activity (Spring, 2015). Using a cost benefit perspective, global businesses and organizations represent their interests that support the idea of the human capital approach to education as it emphasizes teaching skills needed in the workplace. Clearly, in this context, human capital goals for education trump other educational goals, such as education for social justice, environmental improvement, political participation, and citizenship training (Spring, 2015). I critique human capital theory for this very reason. In the age of neoliberal ideology and globalization, there is a high potential of negative impact on traditional academic values (van Vught, van der Wende, & Westerheijden, 2002). The fear is that these values are endangered by the heavier emphasis in higher education on for-profit activities, and on response to market forces. If higher education becomes just another industrial interest, there is a risk of losing sight of values such as the pursuit of scholarship, curiosity-driven research, and preparation for civic life (Newman, 2000). Today, the fear is even more, as Altbach (2002) contends, because
education is becoming an internationally traded commodity. If the learners in the study are acquiring these values in addition to the technical skills, then all the knowledge acquired is not just for financial gains, but also about expanding their global and cross-cultural competencies, such as, contributing for the common good of the society, and learning to live together sustainably. The return to education may become more difficult to quantify, and the individuals will invest in education without trying to constantly equal the costs and benefits. Of course, one can still argue that the set of skills, attitudes, and values acquired for citizenship and effective participation in society can still be part of an individual’s human capital. To that effect, Tan (2014) points out that the human capital theorists do not necessarily disregard the nonmonetary contributions of education to the individual and society. They acknowledge the social, cultural, intellectual, and aesthetic benefits of education, but call them positive externalities.

The review and critique of the human capital theory helps outline its key assumptions and application to internationalization in today’s world of neoliberal ideas and globalization. In trying to maximize their utility, individuals are learning skills and knowledge to develop their human capital; in relation to this study, they are building a technical skill-set to be competitive and a strong international foundation for a lasting positive impact on their careers and personal lives. Content education, along with global perspectives allows STEM graduates to develop their human capital. Education awards economic benefits to individuals and society, which are seen as gains in economic productivity. Education, placed at the center and considered the source of economic development has been criticized here. The critiques should normally have a better alternative for education policies. This critique is driven ideologically, but the appeal is to not to look at education as a commodity, but as a central part of culture and of a society, and treat it differently than other parts of the marketplace (Altbach, 2002). It is important for higher
education to take responsibility to prepare students in a concrete and meaningful way for the
global world. Next, I look at another aspect of internationalization in the light of the new
multidimensional approach, systems thinking in order to improve internationalization in higher
education.

**Systems Thinking**

Systems thinking has its foundation in the field of system dynamics, founded in 1956 by
MIT professor, Jay Forrester (Aronson, 1998). Systems thinking allows people to make their
understanding of social systems explicit, and improve them in the same way people can use
engineering principles to definitively improve their understanding of mechanical systems. The
approach of systems thinking is fundamentally different from that of traditional forms of
analysis. In traditional analysis, the focus is on studying the individual pieces separately. In
contrast, *systems thinking* is an approach that focuses on the study of how system components
interact individually and in sets with other components to produce behavior. It is also described
as a discipline for seeing “the interrelationships rather than the linear cause-effect changes, and
seeing processes of change rather than snapshots” (Senge, 2006, p. 73). This approach can be
helpful for understanding how the concept of internationalization in higher education institutions
has evolved over the last decade and is impacting higher education in today’s global knowledge
economy. In the 1980s, internationalization was commonly defined at the institutional level in
terms of a set of fragmented activities (Knight, 2007). The definition proposed by Arum and Van
de Water (1992) is evidence of this. They referred internationalization as “the multiple activities,
programs and services that fall within international studies, international educational exchange
and technical cooperation” (p. 202). Van der Wende (1997) rightly points out that an institutional
based definition has limitations. Systems thinking offers a means to help higher education
institutions respond to the growing complexities of globalization and make internationalization more sustainable.

Systems thinking views systems as wholes, rather than compilations of individual components allowing one to see the interconnectedness and interdependencies of agents within systems, to frame problems as patterns, and to get an underlying causality (Davis, Dent, & Wharff, 2015). Instead of isolating the individual parts of the system, systems thinking works by expanding the view to consider larger and larger numbers of interactions to study an issue (Aronson, 1998). This perspective draws attention to the link between physical and human domains related to internationalization in universities. There is a need to bring together many players across and outside the university who are involved in internationalization in order to base this process on community and citizenship instead of survival and competition. According to Haigh (2014), the various terms related to internationalization are either contested or not clearly defined, and can signify different things to different stakeholders. If systems thinking is a cohesive approach that views all key processes as parts of an overall system, rather than in isolation or as segments (Furst-Bowe, 2011), there is a need to practice internationalization in universities from a systems perspective.

Again, systems thinking is based on the idea that all key processes in an organization are interrelated. If universities trying to internationalize are socially conscious organizations, then they need to find a powerful tool for reimagining opportunities and confronting challenges related to internationalization. In response, Mestenhauser (2006) addresses the current state of a “fragmented, complex, multidimensional, interdisciplinary, intercultural field” from a systems perspective, while recognizing the important influence culture has over how international education initiatives unfold (p. 61). Now that internationalization is no longer a fringe word in
U.S. higher education, Mestenhauser, along with authors such as Philip Altbach, Hans de Wit, Madeleine Green, and Jane Knight has helped recover international education’s long history as something much larger and more complex (as cited in McAllister-Grande, 2013). This holistic approach is meant to counter the typical model of U.S. international education, which treats each part, such as study abroad, culture, international students, the rest of the academy, etc. as a separate sphere (McAllister-Grande, 2013).

Comprehensive internationalization is a strategy that focuses on this process being conceptualized and implemented as organization-wide; it involves all departments and all members at the university (Schoorman, 1999). The American Council on Education popularized and embraced the term as a mantra, moreover, Hudzik (2011) referred to comprehensive internationalization as an organizing paradigm to think holistically about international education in higher education. Specific performance indicators with regards to internationalization in higher education may include: quality assurance and accreditation of programs and providers; positive faculty engagement; intersection of international and intercultural aspects; shifting of rationales; and contribution of academic mobility. Systems thinking can be a valuable tool for internationalization because it shifts the focus of analysis from distinct parts (e.g., recruitment of international students, study abroad programs, and incorporating foreign language programs) to include interactions and interdependencies among parts. It is also important to remember that each institution is unique and contextually defined.

**The Internationalization of Higher Education**

Internationalization is not new to universities and higher education policies; students and scholars have been mobile since medieval times (Altbach, 1998; Pandit, 2009; Van Damme, 2001), and U.S. colleges and universities have been engaged in foreign language training going
back to the establishment of the earliest universities (de Wit, 2002). In the years following World War II, however, the emphasis on international education became more explicit (Hines, 2001). The promotion of international education was primarily a force for peace and mutual understanding, and ultimately a means through which the United States could build and maintain its influence in the world. Underlying initiatives, such as the Fulbright Act of 1946, generated new flows of international students and catalyzed overseas exchanges and study abroad (Rutherford, 2002) and Title VI of the Higher Education Act of 1960 helped provide federal funding for multidisciplinary area studies programs and foreign language centers (de Wit, 2002). Other aspects that spurred the internationalization of the curricula were sympathy, peace, and understanding towards the United States.

Since 1990, the notion of Internationalization of Higher Education replaced concepts such as international education and international cooperation for the precise description of the phenomenon that was taking place in higher education (Chang, 2015). The shift reflects the growing significance of international dimensions gradually moving from the margins of higher education to its core (Jones & de Wit, 2012). In the age of globalization and post-September 11th, U.S. colleges and universities face an urgent and perplexing set of questions about how to educate students for the new world.

The Bologna Declaration of 1999, when leaders from twenty-nine European countries started the effort to improve the quality of European universities, and thereby, attracted overseas students and international employers of their graduates (Pandit, 2009) followed by the Lisbon Strategy of 2000 initiated the two dimensions of internationalization—cooperation and competition (de Wit, 2011). From one standpoint, both processes emphasize cooperation to develop a European area for higher education and research. Then, from the other standpoint, the
argument stands that this cooperation is required in order to face competition from the United States, Japan, and China, as well as other emerging economies. There is a need to pay close attention to our choices, since when internationalization aligns with globalization as inevitable and driven by the free market, the larger social issues and the public good can be overlooked (Garson, 2016). Beginning the same year of 1999, the American Council on Education (ACE) began publishing a series of reports that highlighted the current state of internationalization in U.S. universities, and put in place resources and programs to support comprehensive internationalization (ACE 1999, 2003).

**Globalization Versus Internationalization**

*Globalization* offers tremendous opportunities and multiple challenges. Altbach and Knight (2006) define globalization in higher education as the “economic, political, and societal forces pushing 21st century higher education toward greater international involvement” (p. 1). Other scholars elaborate on the concepts, and define globalization as the 21st century reality shaped by our increasingly integrated world economy, new information, communications technology, the emergence of an international knowledge network, the role of the English language, and other forces beyond the control of academic institutions (Altbach, Reisberg, & Rumbley, 2009). Knight (1997) sees globalization as an activity, and defines it as “the flow of technology, economy, knowledge, people, values, and ideas…across borders. Globalization affects each country in a different way due to a nation’s individual history, traditions, culture, and priorities” (p. 6). This definition acknowledges that globalization is a multi-faceted process, and can impact countries in vastly different ways, but it does not take any position as to whether this impact has positive and/or negative consequences (Knight, 2007).
A number of factors are closely related to this flow, and are seen as integral elements of globalization (Knight, 2007). These include: the knowledge society, information and communication technologies, the market economy, trade liberalization, and changes in governance structures. It is debatable whether these are catalysts for globalization or whether they are consequences of globalization. Here, they are presented as the elements or factors of globalization, which have an enormous impact on the educational sector. Knowledge society, an increasingly important element of globalization, is due to the production and use of knowledge as a wealth creator for nations (Knight, 2007). Global capital has, for the first time, heavily invested in knowledge industries worldwide, including higher education and advanced training (Altbach & Knight, 2007). This investment has resulted in the emergence of the knowledge society, the rise of the service sector, and the dependence of many societies on knowledge products and highly educated people for economic growth (Castells, 2010; Friedman, 2007; Odin & Mancias, 2004). It is a challenge to understand both the context and the implications of the globalization of the knowledge economy (Altbach, 2002). Globalization and the transition to a knowledge society seem to create new and exceptional demands and constraints towards universities as knowledge centers (Van Damme, 2001). This constitutes a dramatically different environment for higher education institutions and policy makers to work in; it asks for policies, balancing both the global and the local.

The commodification of education has also made the higher education sector amenable to global free trade (de)regulation, a transformation that was supported by the WTO’s General Agreement on Trade in Services (GATS) (Shields, 2013). As Altbach (2004) shares, this liberalization was accompanied by increasing levels of internationalization across the higher education sector, evident in the establishment of international branch campuses, offshore
delivery models, twinning, franchising, migration of academic talent, and international research collaboration. Even the role of universities in research and knowledge production is changing and becoming more commercialized (Knight, 2007). Implications for the international dimension of higher education of a knowledge society may include: new types of public and private providers delivering education and training programs; programs more responsive to market demand; increased international mobility of students, academics, education, research, providers, and projects. The new providers include media companies such as Pearson (U.K.) and Thomson (Canada); multinational companies such as Apollo (U.S.), Informatics (Singapore) and Aptech (India); corporate universities (such as those run by Motorola and Toyota; and networks of professional associations and organizations.

New developments in information and communication technologies and systems have impacted higher education by delivering new methods used for domestic and cross-border education, especially online and satellite based (Knight, 2007). Lately, there has been a growth in the number and influence of market-based economies around the world. This has brought greater commercialization and commodification of higher education and training at domestic and international levels. This leads to increasing emphasis on commercially oriented export and import of education programs and diminished importance to international development projects. Finally, the implications of globalization for internationalization have resulted in creation of new international and regional governance structures and systems in the areas of quality assurance, accreditation, credit transfer, recognition of qualifications, and mobility of students.

Internationalization is a term being used widely to discuss the international dimension of higher education, and more so in postsecondary education (Knight, 2007). Internationalization is not a new term; it has been used for centuries, but grown in popularity in the education sector
since the early 1980s. Prior to this time, international education and international cooperation were the favored terms, and still are today in some countries. Internationalization means different things to different people, and is therefore used in a variety of ways. For some, it is a series of international activities such as academic mobility for students and teachers; international linkages, partnerships and projects; new international academic programs and research initiatives. For others, it is a delivery of education to other countries through new types of arrangements, such as branch campuses and franchises, and using a variety of face-to-face and distance learning techniques. For some others, it is the integration of an international, intercultural, and/or global dimension into the curriculum and teaching learning process. Others see the international development projects and alternatively, the commercial trade of higher education as internationalization (Knight, 2007).

The definition of internationalization has evolved in the past decade or so. Internationalization in the 1980s was more or less defined at the institution level in terms of a set of activities. This definition by Arum and Van der Water (1992) is a classic example of this approach. They offered internationalization as “the multiple activities, programs, and services that fall within international studies, international educational exchange and technical cooperation” (p. 202). On the other hand, by the mid-1990s, Knight (1993) describes internationalization of higher education as “the process of integrating an international and intercultural dimension into the teaching, research, and service functions of the institution (p. 21). The process or the organizational approach was introduced to illustrate that internationalization was a process rather than a set of isolated activities that needed to be integrated and sustained at the institution level (Knight, 2004).
In Knight’s definition, in addition to the dynamic process, it also mentions the principal and universal functions of an institution, such as teaching, research, and service. The argument against this definition is that it does not specify any further goals of the process of internationalization (Qiang, 2003). This may suggest that internationalization is an aim in itself, while in many countries and settings it is rather seen as a way to achieve a wider goal of quality improvement, restructuring and upgrading of higher education systems and services (van der Wende, 1997). The critics of this definition attempt to include in the definition “any systematic, sustained efforts aimed at making higher education responsive to the requirements and challenges related to the globalization of societies, economy and labor markets” (van der Wende, 1997, p. 19). Thus, such internationalization becomes more than an aim in itself; it turns out to be an important resource in the development of higher education. It can create a system in line with international standards, as well as one that is open and responsive to its global environment. Though this definition includes important elements, it only positions the international dimension in terms of the external environment, specifically globalization, hence not providing a contextual framework for internationalization in terms of the education sector and its goals and functions (Knight, 2007).

An updated working definition for internationalization is necessary because Knight (2004) believes definitions can shape policy, and also practice can influence definitions and policy. A working definition proposed at the national/sector/institutional levels is, “the process of integrating an international, intercultural, or global dimension into the purpose, functions or delivery of post-secondary education” (Knight, 2003, p. 3). The term process not only conveys that internationalization is an ongoing and continuous effort, but also denotes an evolutionary or developmental quality to the concept (Knight, 2004). The terms international, intercultural, and
global dimension are used as a triad to reflect the breadth of internationalization.

Internationalization reflects the sense of relationships between and among nations, cultures or countries. Since internationalization is also about relating to the diversity of cultures that exists within countries, communities, and institutions, intercultural is used to address the aspects of internationalization at home. Finally, global, a very controversial and value-laden term, provides the sense of worldwide scope. The three terms complement each other and together give richness both in breadth and depth to the process of internationalization. The concept of integrating specifically denotes the process of infusing or embedding the international and intercultural dimension into policies and programs to ensure that the international dimension remains central, not marginal, and is sustainable. The terms teaching, research, and service used in Knight’s (1993) earlier definition have been replaced by more generic terms of purpose, function, and delivery here. Using these generic terms makes the proposed definition relevant for the sector level, the institutional level, and the variety of providers in the broad field of postsecondary education (Knight, 2004). Purpose refers to the overall role and objectives of an individual’s higher education. Function refers to the primary elements or tasks that characterize a national post-secondary system and also an individual institution such as teaching/training, research and scholarly activities, and service to the society at large. Delivery, a narrower concept, refers to the actual offering of education courses and programs either domestically or in other countries.

Recently, internationalization has been defined as the variety of policies and programs that universities and governments implement to respond to globalization, such as study abroad programs, branch campuses, etc. (Altbach, Reisberg, & Rumbley, 2009). Many would argue that the process of internationalization should be described in terms of promoting cooperation and solidarity among nations, improving quality and relevance of higher education, or contributing to
the advancement of research for international issues (Knight, 2007). As the rationales, providers, stakeholders, and activities of internationalization change, it is important to revisit the definitions and ensure that they reflect the realities of today (Knight, 2004).

Further, NAFSA Task Force on Education (2008) defines internationalization as the conscious effort to integrate and infuse international, intercultural, and global dimensions into the ethos and outcomes of postsecondary education. It further contends, in order to be successful, there must be active and responsible engagement of the academic community in global networks and partnerships. Over the last two decades, Brandenburg and de Wit (2011) believe the concept of internationalization has moved from the fringes to the very core of institutional interest. Many institutions envision the articulation of an international education, but very few are able to implement this approach in ways that are consistent with the core values of higher education. Internationalizing a university campus is a complex process, and requires the efforts of a dedicated team of faculty, students, administrators, and staff. A new rendition of Knight’s (2004) widely cited definition supports new ways of thinking about internationalization as it focuses on academic endeavors and education for the public good. This new definition of internationalization is:

the intentional process of integrating an international, intercultural or global dimension into the purpose, functions and delivery of post-secondary education, in order to enhance the quality of education and research for all students and staff, and to make a meaningful contribution to society. (de Wit et al., 2015, p. 29).

Various authors below have written extensively about the intricate relationship between globalization and internationalization (Altbach, 2006; Knight, 2008; Maringe & Foskett, 2010; Scott, 2005; Teichler, 2004). According to Scott (2005), both internationalization and
globalization are complex phenomena with many strands, with suggestive rather than categorical differences; they overlap and intertwine in many different ways. In recent years, the term globalization has been replaced by internationalization in the public debate on higher education, simultaneously resulting in at the same time in a shift of meanings: “the term tends to be used for any supra-regional phenomenon related to higher education […] and/or anything on a global scale related to higher education characterized by market and competition” (Teichler, 2004, p. 23). Many analysts consider internationalization efforts to be countries’ or institutions’ proactive responses to the external macro socioeconomic processes and effects of globalization (Knight, 1997; van der Wende, 1997). In examining the differences between internationalization and globalization in the current development of higher education, internationalization is seen as something institutions do, while globalization is something that is happening to them (Mitchell & Nielsen, 2012). Knight (1999) makes a helpful contribution when distinguishing the two terms. She argues, “globalization can be thought of as catalyst, while internationalization is the response, albeit a response in a proactive way” (p. 14). Inappropriately, the more frequently these terms are used, the more their meanings get mingled and confused (Enders, 2004). Nielsen’s (2011) study indicates that internationalization can be, and possibly should be, considered a leading variable, enabling globalization, however, not just a response variable describing how institutions respond in the presence of globalization in the spheres of economics, politics, culture, and social interactions.

When seen in terms of practice and perception, van Vught and others (2002) note, internationalization is being closer to international cooperation, mobility, and values, whereas, globalization refers more to competition, and higher education as a commodity. If internationalization is often regarded as good, and globalization as bad, Brandenburg and de Wit
(2011) go so far as to claim internationalization to be the last stand for humanistic ideas against the world, which runs on pure economic benefits represented by the term globalization. There is a need for academic programs, institutions, innovations, and practices created to cope with globalization, and to reap its benefits (Altbach & Knight, 2007). Globalization may be unalterable, whereas, internationalization involves many choices. Globalization tends to concentrate wealth, knowledge, and power in those already possessing these elements.

For the past 20 years, the globalization of the economy has brought into question the identity and sovereignty of the nation state (Bresser-Pereira, 2008). The role of nation states differs under globalization and internationalization. Likewise, Enders and Fulton (2002) argue that globalization refers principally to increased interdependence and, eventually, convergence of markets, cultures, and societies, where individual states are seen to have little power (as cited in Kreber, 2009). By contrast, internationalization describes greater mutual cooperation between states and activity across state borders. Globalization challenges the power of the nation state; internationalization assumes that states still play an important role. Furthermore, Schiller (1986) shares that individual countries have been struggling to maintain their traditional decision-making power and authority against the mobilization of global financial markets and the increasing reach of the multinational corporations (as cited in Selwyn & Brown, 2000). With this background, Brown and Lauder (2000) observe governments around the world developing policy initiatives with the aim of improving the quality of their human resources in an attempt to win a competitive advantage in the new competition (as cited in Selwyn & Brown, 2000). In the Western economies, neoliberalism views most forms of state intervention as an impediment to the operation of the market, which is seen as being the most efficient means of economic organization (Castells, 2010).
Approaches to Internationalization

A review of the literature uncovers that some scholars have used a similar typology of approaches to promoting internationalization in their institutions (de Wit, 1995; Knight, 1994, 1997). Four basic approaches used to describe the concept of internationalization are: activity, competency, ethos, and process.

**Activity approach.** The activity approach describes internationalization in terms of categories or types of activities (Knight & de Wit, 1995). It promotes activities such as curriculum, student/faculty exchange, technical assistance, and international students. This is the most prevalent approach, characteristic of the period when one described the international dimension in terms of specific activities or programs. This approach was synonymous with the term international education in the 1970s and 1980s, and often leads to a rather fragmented and uncoordinated approach to internationalization.

**Competency approach.** The competency approach emphasizes the development of skills, knowledge, attitudes, and values in students, faculty, and staff (Knight & de Wit, 1995). The central issue to this approach is generating and transferring knowledge to develop competencies in the personnel of higher education institutions so that they can become more internationally knowledgeable and interculturally skilled. The development of internationalized curricula and programs are not seen as an end in itself, but as a means towards developing the appropriate competencies in the students, staff, and faculty. As the emphasis of outcomes of education grows, there is increasing interest in identifying and defining global/international competencies. A growing concern in this approach is due to the increasing orientation towards the demands and concerns of the labor market.
**Ethos approach.** The ethos approach emphasizes creating a culture or climate that values and supports international/intercultural perspectives and initiatives (Knight & de Wit, 1995). This approach relates organizational development theories, which focus on the creation of a culture or climate within an organization to support a specific set of goals and principles. Institutions who follow this approach believe that the international dimension is fundamental to its institution.

**Process approach.** The process approach frames internationalization as a process, which stresses integration and infusion of an international/intercultural dimension into teaching, research, and service through a combination of a wide range of activities, policies, and procedures (Qiang, 2003). The main fear in this approach is the need to address sustainability of the international dimension. Hence, the emphasis is on program aspects, as well as organizational elements such as policies and procedures. A wide range of academic activities, organizational policies and procedures, and strategies are part of this process (Knight & de Wit, 1995). This can be described as the most comprehensive approach to describing internationalization, and the various elements identified next, play an important role in this process (Aigner et al., 1992; Scott, 1992; Knight, 1994).

Most of these elements are different types of academic activities, for example, student/faculty exchanges, curriculum, recruiting/hosting international students (Qiang, 2003). In other cases, organizational factors such as policy statements, annual planning, and review systems are identified as the elements. Hence, in the process approach, the various activities can be differentiated and divided into academic/program and organizational strategies.

The *program* strategies refer to those academic activities and services of a university or college, which integrate an international dimension into the main functions of a higher education
institution (Knight & de Wit, 1995). Some activities falling under the broad category of program strategies are: research-related activities, education-related activities, technical assistance and development cooperation, and extra-curricular activities. One of the most prominent education-related activities is study abroad. Study abroad is an opportunity for a student to learn formally in an international locale, and it is an integral part of internationalizing efforts in the U.S. higher educational institutions (Eckert, et al., 2013).

Study abroad can take many forms; it can be short or long-term, be led by faculty at the students’ home institution or by instructors in the international setting, be unilateral or bilateral, and be offered within one or more fields of study. Whatever the form or procedure, study abroad programs can provide students an opportunity to learn about global diversity and the interdependence and interrelationships of local, national, and international issues affecting the world’s population today.

The organizational strategies include those initiatives which help to ensure that an international dimension is institutionalized through developing the appropriate policies and administrative systems (de Wit, 2002). Traditionally, the program strategies were the focus of the internationalization process. By only focusing on the program activities one can overlook the process issues, which can be important to ensure that the different activities reinforce each other, and they become vital to the mission of the institution. Similar to most other instances, the whole is greater than the sum of its parts. Giving importance to both the strategies will prevent internationalization activities from becoming easily isolated and fragmented.

Three different approaches to internationalizing the curriculum are also being used in Canadian post-secondary institutions (Bond, 2003). Based on very different assumptions, the three approaches to internationalizing the curriculum are: the add-on approach, the curricular
infusion approach, and the transformation approach. Being at the entry level, the add-on approach has a narrow focus, limited participation, and limited impact. The adding-on of something from a culture other than one’s own represents the early attempt to internationalize the curriculum. Infusing the curriculum is probably the most widely used approach to curriculum change in Canadian post-secondary institutions. Its premise is that if enough coursework can be enriched with international content of some kind, the cumulative effect will be an impressive international education (Mestenhauser, 1998). The transformational approach produces reform, which requires a shift in the ways in which we understand the world (Bond, 2003). As an approach to curriculum reform, transformation is realized much less frequently, but has the potential to involve many more people, and change in fundamental ways how faculty and students think about the world and their own place in it. For internationalization to be successful and sustainable, it must be entrenched in the culture, policy, planning, and organizational process of the institution (Knight & de Wit, 1995). There is a propensity towards an economic rationale with increased competition in the recruitment of international students, branding, the increase of study abroad programs and exchanges, cross-border delivery of programs including satellite campuses, partnerships with universities in developing countries for the delivery of in-demand educational programs, all contributing towards this trend (Knight, 2008). The next section synthesizes the various rationales for international education as they began to shift from politics to economics after the end of the Cold War.

**Meanings and Rationales for Internationalization**

The dynamics of internationalization of higher education are changing, and are reflected in the meanings of internationalization and globalization, and their rationales (de Wit, 2011). There have always been different terms used in relation to internationalization of higher
education (de Wit, 2002; Knight, 2008). Some of these terms commonly used in literature and in practice address a small part of internationalization and/or emphasize a specific rationale for internationalization. Some of these terms are curriculum related, such as: international studies, global studies, multicultural education, peace education, etc., and the others are mobility related, and may include: study abroad, education abroad, academic mobility, etc. A whole new group of terms have emerged over the past ten years, and are used to actively debate on the purposes and concepts behind the internationalization of higher education. These terms are related to the cross-border delivery of education, and are a consequence of the impact of society’s globalization on higher education. These terms may include: borderless education, education across borders, offshore education, and international trade in educational services.

In 2002, de Wit (2002) stated that as the international dimension of higher education gains more recognition and acceptance, people will use it in the way that best suits their purpose. Various scholars have provided a number of rationales or motivations for wanting to integrate an international dimension in higher education. Three major reasons provided by Aigner et al., (1992) are: interest in international security, maintenance of economic competitiveness, and fostering of human understanding. Seven imperatives identified by Scott (1992), for global education are: economic competitiveness, environmental interdependence, increasing ethnic and religious diversity of local communities, the fact that many citizens work for foreign-owned firms, the influence of international trade on small business, the reality that college graduates will supervise or be supervised by people of different racial and ethnic groups from their own, and national security and peaceful relations between nations. Others have proposed similar models and dimensions for internationalization (Blumental et al., 1996; Davies, 1992; Johnston & Edelstein, 1993; Knight & de Wit, 1995; Warner, 1992). Subsequently, Knight (1997) and de
Wit (2011) cluster the possible rationales for internationalization into four groups. Following these, Qiang (2003) provides a useful conceptual framework of four different possible rationales for internationalization in higher education: the political, the academic, the cultural/social, and the economic.

A rationale is the underlying reason for something, in this case, the reason why a country, sector or institution wants to address and participate in internationalization (Knight, 2007). It is important to have a clear, articulated rationale, as the rationale of an organization is reflected in its policies and programs that are developed and eventually implemented. The political rationale relates to issues concerning the country’s position and role as a nation in the world, such as security, stability and peace, as well as ideological influences ensuing from internationalization efforts (Qiang, 2003). As (Knight, 1997) rightfully contends, “Historically, international education was seen as a beneficial tool for foreign policy, especially with respect to national security and peace among nations. While this is still a consideration today, it does not have the importance it once did” (p. 9). To maintain and expand their influence, knowledge of other cultures, languages and systems, was of crucial importance to nations.

The economic rationale refers to objectives related to either long-term economic effects, where internationalization of higher education is seen as a contribution to the skilled human resources needed to compete in the world, where foreign graduates are seen essential to the country’s trade relations or direct economic benefits (Qiang, 2003). At present, the economic rationale is considered more dominant than the others, even though the academic rationale for internationalization is also becoming imperative. The recent flurry of activities and terms of internationalization further allow institutions to define the internationalization of higher education in relation to a specific rationale or purpose. At the economic level, a university may
internationalize to equip domestic students with the skills and knowledge to compete in a
globalizing world or attract international students. The contemporary emphasis on free trade
stimulates international academic mobility (Altbach & Knight, 2007). The current thinking sees
international higher education as a commodity to be freely traded and perceives higher education
as a private good, not a public responsibility. Earning money is a key motive for all
internationalization projects in the for-profit sector. One fundamental concern with the economic rationale, where efforts are aimed at developing the human resources needed for the nation to stay internationally competitive is that it can all too easily become the principal driver in how the purposes of higher education become defined (Kreber, 2009).

Whereas, academic, as well as social and cultural foci are based on the expectation that universities bear a responsibility for creating a globally responsible citizenry, which is well-versed in issues of ethics, justice, and cultural awareness. The academic rationale includes objectives related to the aims and functions of higher education, such as achievement of international academic standards for teaching and research (Qiang, 2003). It is a common assumption that by enhancing the international dimension of teaching, research, and service, value will be added to enhance the quality of a higher education system.

Cultural and social rationales concentrate on the role and place of the country’s own culture and language, and on the importance of understanding foreign languages and culture. Knight elaborates on this rationale:

The preservation and promotion of national culture is a strong motivation for those countries which consider internationalization as a way to respect cultural diversity and counter balance the perceived homogenizing effect of globalization. The acknowledgment of cultural and ethnic diversity within and between countries is
considered as a strong rationale for the internationalization of a nation’s education system (Knight, 1997, p. 11).

Related to this point is the need for improved intercultural understanding and communication. The preparation of graduates who have a strong knowledge and skill base in intercultural relations and communications is considered by many academics as one of the strongest rationales for internationalizing the teaching/learning experience of students in undergraduate and graduate programs (Knight, 1997, p. 11).

The above two quotes by Knight emphasize the inter-cultural dimension integrated into the process of internationalization. A similar thought is shared by OECD (1999), and expects higher education to develop greater international awareness among students and faculty, as well as produce graduates with sufficient intercultural competence to compete in the global economy. I completely agree with this, and hope the faculty engages the students in learning other cultures, not at a superficial level, but deeply. More recently, Jane Knight (2011) suggests internationalization pushes us to consider the term beyond the institutional level. In order to move further in the process of internationalization, Sutton and Deardorff (2012) propose that it is time to internationalize internationalization, meaning institutions need to understand their role and actions as functioning within an emerging global system of higher education. The goals of outward connection seek ways that share resources, increase knowledge and expand access, and advance the global educational system. To counter the latest trends of higher education for economic gains, and literature that has long been dominated by western voices, Jones & de Wit (2012) call institutions to truly listen to the emerging scholars from nonwestern settings as there is much to learn from each other as we tread waters together in the future and turn our collective wisdom toward the pressing issues of the 21st century.
The shifting emphasis on the various rationales is quite prevalent in higher education. Knight (2008) states, “Internationalization is changing the world of higher education, and globalization is changing the world of internationalization” (p. 1). Whereas, after World War II, based on political considerations, internationalization was focused on humanitarian aims of improving understanding between people for peaceful existence, today, the concerns are more related to international competence and competitiveness (Qiang, 2003). With changes over time, many observers today feel that internationalization has become increasingly economically motivated (van der Wende, 1997; 2001). It seems like the international labor markets require the higher education system to prepare graduates with academic, linguistic, and intercultural qualifications that are internationally competitive. The academic and cultural/social rationales, often reflected in methods such as the mobility of students and staff, the improvement of the quality of education, a greater compatibility of study programs and degrees, and enhanced knowledge of other languages and cultures, all seem to be derived from the overarching economic rationale of strengthening human resources for international competitiveness. An obvious problem with the economic rationale is that all the efforts aimed at developing the human resources to stay competitive in the international arena can be geared towards generating income for the higher institutions as they attract more foreign students (Jeptoo & Razia, 2012). This can easily become the chief motive in how the purposes of higher education become defined.

The fundamental restructuring of higher education over the past two decades has transformed university education from a public good into an internationally traded commodity (Altbach, 2006; Harris, 2008; Slaughter & Rhoades, 2004). However, if education is not seen as a simple commodity, but a central part of a culture and of a society, then we are in business.
When analyzing rationales, it is necessary to take into account the diverse stakeholder groups within higher education, such as government, education, and private sectors (Qiang, 2003). Different stakeholders may attribute different levels of importance to the four major rationale categories.

According to Knight (2006), these generic categories remain a useful way to analyze rationales, however, the categories seem to easily blend into each other and have led to the identification of cross-cutting rationales at both the national and institutional level. In order to provide clarity and prevent the blurring of the rationales across categories, such as political or economic rationale, the rationales are being distinguished at the national and institutional levels.

**National level rationales.** Developing and recruiting human capital (or brain power) through international education is gaining importance due to an increased emphasis on the knowledge economy, demographic shifts, mobility of the labor force, and increased trade in services (Knight, 2007). Higher education is under pressure to recruit the brightest students and scholars from other countries in order to increase the nation’s scientific, technological, and economic competitiveness. Changes in recruitment strategies, incentives and immigration policies are some of the examples of efforts to attract and retain those students and academics with potential for boosting human capital of a country. Strategic alliances can be seen as both a driving rationale and a means of internationalization. These can be considered rationales for various academic, economic, political or social/cultural purposes. Closer geopolitical ties and economic relationships can be developed through the international mobility of students and academics, as well as collaborative research and education initiatives. In order for countries to achieve stronger economic and political integration, there has been a definite shift from alliances for cultural purposes to those for economic purposes. With more emphasis placed on economic
and income generating opportunities attached to cross-border delivery of education, there have been new franchise arrangements, foreign or satellite campuses, online delivery, and increased recruitment of fee-paying students. Education being one of the 12 service sectors in the General Agreement on Trade in Services is positive proof that importing and exporting of education and training programs and education services is a potentially lucrative trade area. An educated, trained and knowledgeable citizenry and workforce, as well as the capacity to generate new knowledge are key components of a country’s nation-building agenda. Many countries lack the physical/human infrastructure and the financial resources to offer postsecondary education opportunities to their citizens. Where some countries are interested in the export of education for income revenue purposes, other countries are interested in importing education programs and institutions for nation-building purposes. These four emerging, yet primary rationales are closely linked to the political and economic categories of rationales, whether for technological, economic, or scientific development, advancement or competitiveness. Finally, the social and cultural rationales, especially those that relate to promotion of intercultural understanding and national cultural identity are still significant, but perhaps are fading in importance in comparison to economic and political based rationales. Knight (2007) finds it optimistic, but reassuring to think that social and cultural rationales for internationalization will be given equal importance as the economic and political ones. Next, let us explore if more emphasis is given to the social and cultural rationales at the institution level than at the national level.

Institutional level rationales. One would expect to see a close liaison between national level and institutional level rationales. Knight (2007) speculates that in countries where internationalization is not given much prominence at the national level (which is true for many), then institutional level rationales have greater importance, and may differ substantially from one
institution to another. The institutional level rationales are influenced by the mission, student population, faculty profile, geographic location, funding sources, level of resources, and orientation to local, national, and international interests. As at the national level, the four traditional categories apply to institutions, however, the emerging rationales of greater consequence include: institutional profile and reputation; quality enhancement; student and staff development; alternative revenue generational networks and strategic alliances, and research and knowledge production (Knight, 2007).

*International profile and reputation* are important for an institution in order to attract the brightest scholars and students, as well as a substantial number of high-profile research and training projects (Knight, 2007). Even though academic standards are important, there is a perceptible shift from an emphasis on a high-quality academic experience for students and teachers to one where high academic standards are part of marketing campaigns for branding purposes in order to compete domestically and internationally. *Quality enhancement*, or the initiatives taken by an institution to improve the quality and relevance of higher education in relation to international standards is often articulated as a rationale and goal of internationalization. In this aspect, internationalization is proving to be a useful tool for institutions to benchmark, and help strengthen the quality of higher education in their primary functions of teaching, learning, and research. On another positive note, there seems to be a renewed emphasis on internationalization as a means to enhance the international and intercultural understanding and skills for students and staff (*student and staff development*). The mobility of the labor market, and the increase in intercultural diversity of communities and the workplace, require that both students and academics have an increased understanding and demonstrated abilities to work and live in a culturally diverse or different environment. The flip
side of human development is the motivation of economic development. More and more institutions today are increasingly looking for internationalization activities as a way to generate alternative sources of income. In the environment of increased accountability and competition, public institutions specifically are caught in the squeeze of decreased public funding. A factor of major concern related to income generation is the emergence of new commercial corporate providers who are primarily in business to generate income on a for-profit basis. As at the national level, strategic alliances can be seen as both a rationale and a means to achieve internationalization. According to Knight (2007), the role of higher education institutions in the production and distribution of knowledge should never be minimized. The growing interdependence among nations necessitates international and interdisciplinary collaboration to solving many global problems, such as those related to environment, health, and crime. It is key that higher education institutions find a balance between competing rationales, and clearly articulate the motivations for internationalization, as policies, programs, strategies, and outcomes are all linked and mostly guided by the rationales.

### Comprehensive Internationalization

Comprehensive internationalization is a strategy within the broad swath of activities that is built with input from the many stakeholders: faculty, students, alumni, and others (Pandit, 2009). Hudzik’s definition of comprehensive internationalization complements the 2015 definition of internationalization. He discusses comprehensive internationalization as:

Comprehensive internationalization is a commitment, confirmed through action, to infuse international and comparative perspectives throughout the teaching, research, and service missions of higher education. It shapes institutional ethos and values and touches the entire higher education enterprise. It is essential that it be embraced by institutional
leadership, governance, faculty, students, and all academic service and support units. It is an institutional imperative, not just a desirable possibility (Hudzik, 2011).

It is an organizing paradigm to think holistically about higher education internationalization, and internationalization is evolving in the United States to incorporate broader sets of objectives and people on or off campus (Hudzik, 2011). By following this, the institutions do not prescribe to a particular model or set of objectives, but recognize a diversity of approaches to comprehensive internationalization, where each one may choose its own unique path and contribution consistent with its mission, clientele, programs, resources, and values. In its 2005 publication, American Council on Education (ACE) popularized the use of the term comprehensive internationalization and viewed it as, internationalization “that sees it as pervading the institution and affecting a broad spectrum of people, policies, and programs, leads to deeper and potentially more challenging change…[and is] a broad, deep, and integrative international practice that enables campuses to become fully internationalization” (Olsen, Green, & Hill, 2005).

Most internationalization plans are simply about adding a few activities here and there, and those activities within a department or university are often initiated with little attention on how they link to one another, and therefore, do not comprise a coherent whole (ACE, 2008). Additionally, Hudzik (2011) suggests that comprehensive internationalization is not a call for all institutions of higher education, or all of their academic units and programs, to engage in all ways of internationalizing, impossible for individual institutions. There is no set path toward this big tent, varying missions and starting points will produce uniquely tailored responses to the challenges and opportunities of internationalization and globalization. However, there are common features to a commitment to comprehensive internationalization. If effectively
implemented, comprehensive internationalization impacts the entire campus life and learning and fundamentally shapes the institution’s external frames of reference, partnerships, and relations (Hudzik, 2011). The institutions will choose specific policies and programs according to their goals and intended outcomes, as it is the outcomes that give comprehensive internationalization its value. To think that higher education must either think locally or globally is false; both are realities for many institutions today, even though they may have different positions on a continuum of local-global orientation.

ACE’s 2008 *Mapping Internationalization of U.S. Campuses* concluded that U.S. institutions have made progress, but it is neither complete nor even. In the same report, Green and Olson (2008) state, “Many institutions do not see internationalization as integral to their identity or strategy…Few institutions have an internationalization strategy…a gap exists between institutional rhetoric and reality” (p. 81-82). Earlier ACE findings also point to a disconnect between student beliefs and attitudes, as well as what institutions provide and what students actually do. The internationalization of U.S. higher education is an emerging reality; moreover, its process has multiple dimensions, and as stated earlier, institutions greatly vary depending on their goals and missions, the manner and degree to which they embrace various elements of internationalization. Despite the general agreement that globalization or internationalization is a major trend in education or a worldwide phenomenon, the barriers to internationalization exist (Green, 2003). These hurdles can be individual, resulting from faculty and student attitudes; institutional, caused by long-standing policies, practices, and traditions; or some reflecting the attitudes and culture of the wider American society. Policies may be one of the obstacles, and need to be aligned and integrated along with the other programs in order to develop international competence in the students.
Policies

Globalization has profoundly influenced higher education, in aspects of policy-making, governance, organization and academic work, and identity (Vaira, 2004). There are challenges at both the institutional level and national/sector level (Knight, 2007). The national/sector level has an important influence on the international dimension of higher education through policy, funding, programs, and regulatory frameworks. The policies at the national sector level that affect or are affected by an international dimension of education may include policies related to foreign relations, development assistance, trade, immigration, employment, science and technology, culture and heritage, education, social development, industry and commerce, and others (Knight, 2004). At the education sector level, policies relating to the purpose, licensing, accreditation, funding, curriculum, teaching, research, and regulation of postsecondary education will be spelled out here. These education-related policies have direct implications for public and private, or for-profit institutions, as well as companies. It is imperative to include the companies offering educational programs and services as there is a growing commercial education industry being established that might help provide insight in today’s internationalization process. Moreover, many of the policies related to the international dimension of education will affect both public education institutions and commercially oriented private providers.

At the institutional level, policies can be interpreted in different ways, and would include statements and directives that refer to priorities and plans related to the international dimension of the institution’s mission, purpose, values, and functions (Knight, 2004). The institutional mission statement or policies on study abroad, student recruitment, international linkages and partnerships, cross-border delivery, and international sabbaticals are a few that could fall under this level. Further, a broader interpretation of policies at the institution level would include
statements, directives, or planning documents that report implications for or from internationalization. An integrative and sustainable approach to internationalization can lead to a very broad range of policy and procedure statements such as quality assurance, planning, finances, staffing, faculty development, admission, research, curriculum, student support, contract, project work, and so forth.

As far as overall national priorities are reflected in federal programs and spending, international education has been low on the list (Green, 2002). The U.S narrative about being the best in the world in its higher education system still holds true, however, other nations have made higher education a greater priority in their public policy than has the United States (Green, 2014). The United States is threatened by other countries today, as it has no national policy on internationalization and institutions are left to decide for themselves what level of importance is given to these efforts and what strategies will be used to implement internationalization in their higher education institutions. Over the years, federal initiatives have been few, far between, and modestly funded. Combined federal spending under the largest such programs in the U.S. Department of Education, State Department and Department of Defense amounts to less than one percent of federal discretionary expenditures for higher education. Even the jewel in the crown of international education programs, the Fulbright program, initiated more than 50 years ago, is a modest program of $123 million. Much of the current federal support for international education grew out of the Cold War. Higher education institutions have been marked by sporadic high-profile studies and pronouncements from policy makers. Twenty years elapsed between two major events—the 1979 President’s Commission on Foreign Language and International Studies and President Clinton’s 1999 Memorandum on International Education. The 1999 memorandum
from President Clinton committed the federal government to supporting international education with a complete, admirable list of recommendations, but without any supplementary funding.

Another thing to note is that governments are becoming less and less significant players in the global economy (Anderson & Cavanagh, 2000; Guehemo, 1993; Keaney, 2002; Office of Technology, 1993). There are indications on a global level that the rate of funding for education from private investment is rising more rapidly than from public funding (Levi, 2003). According to the Global Forum, governments over the last few decades have been steadily losing control of the global economy to the multinational corporations, to the extent that of the largest 100 economies in the world in the year 2000, 51 were global corporations and only 49 were countries (Anderson & Cavanagh, 2000). Freudenberg (2015) from The CIA World Fact Book and Global Fortune 500 List found that of the 100 governments and corporations with the highest annual revenues in 2014, 63 were corporations and 37 were governments. As corporations take over the world economy, borders are becoming meaningless. The multinational corporations are no longer concerned with who the citizen of a particular country is any more, but more concerned about cheap and efficient labor. As competition increases, numerous observers predict that countries will experience more pressure with international competition and this contest will expand drastically through initiatives by the WTO, particularly the highly contested General Agreement on Trade in Services (GATS) (Kreber, 2009). GATS considers higher education as a trade-related sector and legalizes the cross-border/global trade in educational services (van Vught, van der Wende, & Westerheijden, 2002). Education and training represent the fifth largest service sector in the United States, which explains the strong interest of the United States, Australia, the United Kingdom, and New Zealand, in supporting the liberalization of free trade of higher education across borders (Stromquist, 2007; Van Vught et al., 2002).
A question posed by Jocelyne Gacel-Avita (2005) and others in academia is an important question for this study as well, how can institutions of higher education adequately prepare their graduates to live and participate in the community as global citizens and professionals? STEM graduates, like their counterparts in other disciplines, should be equipped with attributes that will enable them to meet the inevitable challenges of global citizenship. Global citizenship requires understanding the role of ethical behavior in one’s personal and professional life, which involves responsible knowledge and skills at the local, state, national, and global levels in today’s pluralistic society (Andrzejewski & Alessio, 1999).

I side with Gacel-Avila (2005) in her thinking when she says, “In this new global environment one of the basic and fundamental functions of a university should be the fostering of global consciousness amongst students, to make them understand the relationship of interdependence between people and societies, to develop in students an understanding of their own and other cultures and respect for pluralism” (p. 123).

**Internationalizing the Curriculum in STEM Subjects**

The first international study on the theme of internationalization of the curriculum was initiated by the Centre for Educational Research and Innovation of the OECD, which defined it as the process of curriculum development and curriculum change, which is aimed at integrating an international or global dimension into the content of the curriculum, as well as into the method of instruction (OECD, 2011). Similarly, Betty Leask’s (2015) definition is: “The incorporation of international, intercultural, and/or global dimension into the content of the curriculum as well as the learning outcomes, assessment tasks, teaching methods, and support services of a program of study” (p. 9). This results in an internationalized curriculum, further defined as, curricula with an international orientation in content, aimed at preparing students for
domestic performing professionally or socially in an international and multicultural context, designed for domestic, as well as foreign students (van der Wende, 1996a; 1996b). The early attempts at internationalization often involved the additive approach (Banks, 1999), such as including an international case study or example in the curriculum to show awareness of the global perspectives of the topic.

It could be argued that the natural sciences curricula need not be internationalized as their content is already universal. However, pragmatically, facilitated by an already strong international research and publication culture, STEM fields were among the first movers in internationalization (van der Wende, 2018). STEM was among the first fields to switch to English and attracted a lot of international students; they mostly came to OECD countries from the other parts of the world. Engineering was also among the first fields to take accreditation across borders through The American Board of Engineering and Technology (ABET). According to Wainwright, Ram, Teodorescu, & Tottenham (2009), scientists today “come from many different countries and collaborate across national borders on problems that do not respect state boundaries. Science is truly global and the new scientist has to be equipped to succeed in an international and intercultural environment” (p. 382). The same reaction is echoed in the 2014-2018 National Science Foundation Strategic Plan, which noted the importance of “preparing a diverse globally competent STEM workforce” (National Science Foundation, 2014). It is widely known that STEM fields add considerable weight to the criteria that define a university’s position on global rankings (Marginson & van der Wende, 2007). STEM is increasingly important to the global competition between West and East in key areas for innovation, economic growth and geo-strategic positioning.
As analyzed by the OECD (2011), it can be complicated to define the skills required by research and innovation. Top ten institutions around the world are seeking new cross and interdisciplinary combinations to prepare their students for successful careers to stand out in the global tech of the 21st century (van der Wende, 2018). They are looking for models from both the traditional STEM (for innovation) and to prepare graduates for work in the globalized context (focus on integrity, diversity, and intercultural performance). The global significance of STEM, in terms of scientific and applied research and the engineering profession, holds serious implications for the STEM curriculum. For STEM graduates to be successful in a global context, intercultural skills, foreign language proficiency, and a deep understanding of integrity and diversity are key assets, including soft skills such as sound collaboration and hard competition. In the words of MIT’s director Bernd Widdig (2015), the universities should combine technical and scientific creativity with an understanding of the world’s political, cultural, and economic complexities. In this challenge, universities can provide a strong basis for our graduates to make contributions to a better world.

Despite strong efforts that began in the 1980s and 1990s to recruit more students into STEM fields, the percentage of undergraduate degrees granted by U.S. institutions majoring in the STEM disciplines has remained relatively steady since the 1960s (Woodruff, 2009). Even though efforts by ABET to make the undergraduate curricula relevant to emerging globalization and industries have helped to pave the way for more engineering students to study abroad, there has only been a slight increase noted.

The next section shares the findings of the myriad empirical studies in the internationalization of higher education, including its international curricula, faculty role, study abroad, and barriers, successes, and failures thus far.
From Theory to Practice: Findings

In the interest of the global nature of the topic, the studies in this literature review are not limited to the U.S. higher education, but also include international and global studies. There is a subtle difference between international and global, and Knight points out these terms are used in ways that differentiate one from the other (Knight, 2004). The term international emphasizes the notion of nation and refers to the relationship between and among different nations and countries. Global refers to worldwide in scope and substance, and does not highlight the concept of nation. In the context to this study, international refers to another nation or nations, whereas, global pertains to the entire world. In higher education, there are generally two frames of cross-national research—international and global. International research generally focuses on specific issues within national systems of higher education, such as policy issues in a particular nation or how the implementation of neoliberal policies led to a change in a specific nation. Even though, internationalization incorporates global perspectives in students, global research is “seen as world-wide … it is not the special product or province of one particular group, nation, or empire, but the joint product of the total experience of humankind…” (Modelski, Devezas, & Thompson, 2008, p. 420). Global research activities transcend national boundaries, and look at global trends and growing global issues and concerns. I would say internationalization studies conducted in some western countries, such as the United States, United Kingdom, and Australia, where high profiles for recruitment, competition, and the search for recruitment is relentless, can have more global consequences for higher education in other parts of the world (Maringe & Foskett, 2010), than studies conducted in say a developing nation such as Indonesia, where internationalization is still in its initial stages. Countries in the European Union are in general increasingly active. Thus, both international and global studies on internationalization are important for this study.
Moreover, they are separated by institution-wide and department-wide internationalization initiatives.

This literature review includes a total of twenty-two empirical studies, which are discussed in this section. These include a combination of fourteen qualitative and eight quantitative studies. The general purpose of incorporating these is to summarize the prior research contribution on internationalization of higher education to provide support and understanding of this study. To date, most studies described next are discussed in four major themes that have reinforced the importance of the various elements of internationalization in higher education. These themes include: study abroad, international curricula, faculty role, and barriers to internationalization. Below is a summary of each of the themes as depicted in scholarly literature.

**Study Abroad**

Study abroad, any opportunity for a student to learn formally in an international location may be a short- or long-term program, normally led by faculty at the students’ home institution. Study abroad is defined as education that occurs outside the participant’s home country. Besides study abroad, examples include such international experiences as work, volunteering, non-credit internships, and directed travel, as long as these programs are driven to a significant degree by learning goals (Forum on Education). Study abroad experiences are often significantly transforming and have shown positive effects on students (Coryell et al., 2012; Dekaney, 2008; Hadis, 2005; Lenz & Wister, 2008; Williams, 2005), especially in the areas of linguistic awareness, cross-cultural perspectives, attitudinal reflection and student perception of academic skill development (Zamastil-Vondrova, 2005). The results of the students’ perceptions yield conceptual themes of global relevance and the importance of respecting the views and values of
other traditions and cultures (Zamastil-Vondrova, 2005). The students feel that the short-term study abroad program will benefit them in their future careers as they gain confidence, correct earlier misconceptions about the host country, adapt to the experiential learning, and emerge with different levels of sophistication and awareness. Even the Association of International Educators (NAFSA, 2003) has continually stressed that study abroad must become the norm and not the exception at higher education institutions.

In a study that sampled student attitudes and beliefs (Green, 2005), it has been shown that over 70 percent of all undergraduates should be required to study abroad. Moreover, research implies that even short-term study is valuable to a college student’s overall academic success (Lenz & Wister, 2008; Zamastil-Vondrova, 2005). However, at times, good intentions do not always produce the kind of learning, development, and transformation that is intended (Gray, Murdoch, & Sebbins, 2002; Green, 2007a). As Wu et al. (2015) found out, international students often need special assistance dealing with language issues that affect test-taking, academic assignments, and social interaction. Accordingly, VandeBerg (2007) suggests that if study abroad students are to learn effectively, faculty in these programs must intervene before, during, and after these experiences to form and support their learning. Similarly, Green (2007a) also recognizes that faculty must develop an internationalized mindset to create learning that is comparative, integrative, interdisciplinary, contextual, and global. Hudzik (2011) further points out, study abroad without learning objectives and structured learning connected to the curriculum and reflected in intellectual outcomes risks being little more than tourism for credit.

International academic mobility favors well-developed education systems and institutions, thereby compounding existing inequalities (Altbach & Knight, 2007). Making a case for community colleges, Green & Olson, (2008) suggest that in many ways, the academic
pathway via internationalization of the curriculum is the key to accomplishing the goal of producing global citizens, since many community college students cannot engage in study abroad or even extracurricular activities. Even in colleges and universities, just under 1.5 percent of all U.S. students enrolled at institutions of higher education in the United States and about 10 percent of U.S. graduate students studied abroad (NAFSA, 2016b). Although, diversity of study abroad participation has increased in recent years, minority students are still greatly underrepresented in study abroad. In relation to study abroad, the idea of internationalization comes down to academic mobility, something possible only for a few students. In some instances, this creates a sense of elitism arising from the perception that study abroad is only possible for the top-notch student who has the financial means to fund a study abroad experience (Knight, 1999). Elitism resulting from this inequality can lead to a negative perception of the value of internationalization and its purpose for a large number of students, which creates yet another barrier.

Some of the things that do not occur in the short study abroad program are: it does not allow for real cultural immersion due to the limited time with host country nationals; academic outcomes are perceived as shallow compared to the intrinsic benefits students had gained; and they don’t identify a serious focus or interest in business related outcomes (Zamastil-Vondrova, 2005). Short-term study abroad experiences did help them examine their own strengths and weaknesses, in a constructive manner build their self-confidence and esteem, and enabled them to reflect on how to succeed in a global village. Two areas exhibiting growth between 2001 and 2006 were availability of study abroad and on campus events with an international focus (Green & Olson, 2008; Green & Siaya, 2005). Study abroad is considered one of the important parts of academic programs and activities necessary to promote successful internationalization by
national higher education groups such as AACC and the ACE. Although study abroad and global learning have often been perceived to be the domain of liberal arts or foreign language education, recent years have shown an increasing attention towards students’ needs in STEM majors to develop the skills and competencies often associated with study abroad. (Campbell, 2011; Nair, 2011). Unfortunately, STEM majors in the United States are not participating in study abroad at the same rate as their non-STEM peers (Institute of International Education, 2013). STEM faculty can lack the necessary knowledge and experience to lead study abroad programs, and may be reluctant to get involved (Vaz & Demetry, 2010).

**International Curricula**

Most research articles reviewed on university-wide efforts at internationalizing curriculum yielded a substantial number of studies on initiatives, such as internationalization of the curriculum led by colleges and universities. Curriculum internationalization is the key element, which promotes global themes and content as a way to promote change and the need for internationalization in all courses. This is logical as not many students will be able to travel abroad to gain global competence. Categories under curriculum included program of study, interdisciplinary, core curriculum, foreign language, awareness and engagement, and communication. Faculty engagement influences success since they are responsible for carrying out the internationalization of the curriculum (Hudzik, 2011). It seems, most often, the goal is profit as “global capital has, for the first time, heavily invested in knowledge industries worldwide, including higher education and advanced training” (Altbach & Knight, 2007, p. 290). In a rush to compete in a global economy, many post-secondary educational efforts toward internationalized curricula have been compartmentalized, with little assessment done to determine the success of the outcomes (Deardorff, 2006). In fact, Ibrahim (2005) suggests an
international curriculum that must draw on “insights from human rights education, peace education, anti-racist and multicultural education as well as development education” (p. 178).

**Faculty Role**

If an internationalized curriculum constitutes the heart of internationalized higher education institutions, then the faculty can be seen as the heart of an internationalized curriculum. Specifically, faculty support and contribution are pivotal in the internationalization of the curriculum (Childress, 2010; Harari, 1989; Knight, 1994; Shute, 2002; Stohl, 2007), as well as to the implementation of internationalization efforts (Backman, 1984; Henson, et al., 1990; Paige, 2003; Schoorman, 1999). Preparing students to understand other cultures and to be able to interact with them, “is directly correlated to the development and teaching of curricula that broadens the global perspective of students” (Carter, 1992, p. 42). Since internationalization of curricula involves infusing Western and non-Western perspectives into courses, and offering students opportunities to compare and contrast issues across cultural perspectives, faculty seems to have the authority to direct students’ international learning. This suggests the faculty can choose to model the knowledge, behaviors, and values of an “international mindset” (Paige, 2003, p. 58).

Even though faculty play a critical role in higher education institutions’ efforts to internationalize, data from colleges and universities indicate that the institutional support for faculty engagement in internationalization does not always reflect this reality (ACE, 2011). Along similar lines, Harari (1981) concludes that, “the degree of internationalization of a campus is not a function of size, location, or overall budget. In the last analysis it is a function of faculty competence and commitment and of institutional leadership” (p. 29). Despite the close ties between faculty internationalization and the internationalization of higher education institutions,
the Carnegie Foundation 1992 study shows American faculty being the least committed to internationalism among scholars from fourteen countries (Altbach, 2005). The report also states that American faculty demonstrates mixed feelings toward internationalization. American professors show enthusiasm in dealing and teaching international students and participating in conferences abroad, alternatively, they seem less likely to incorporate academic work into their classrooms.

The ACE report, intended to examine current internationalization efforts in U.S. colleges and universities pointed that 67% of the faculty agree with the statement that it is all faculty responsibility to provide students an international education (Siaya & Hayward, 2003). The same report showed only 25% agree, “international education is useful but not necessary component of undergraduate education” (p. 10). Other scholars also indicate that some faculty do not recognize the benefits of infusing international perspectives in their teaching, research, and service (Bond, 2003; Cleveland-Jones, Emes, & Ellard, 2001; Johnston & Edelstein, 1993). It will serve higher education well to acknowledge the mixed attitudes faculty have toward internationalization. As faculty plays a key role within higher education by shaping the teaching, research, and motivating students, higher education institutions concerned with internationalization should pay close attention to their institution’s current policies that affect hiring, promotion, tenure, and curriculum (Johnston & Edelstein, 1993). Prior research on faculty commitment towards internationalization has recognized the important role that lack of experience, interest, and cross-cultural competence plays in preventing faculty members from engaging in internationalization efforts (Andersean, 2003; Green, 2007a).

To counter the attitudes of the faculty, and other barriers to internationalization, institutional rewards and communication structures are critical to faculty engagement (Backman,
Faculty is in a uniquely influential position to model an international mindset for students. A four-tiered strategy was identified by Paige (2003) for University of Minnesota leaders to develop incentives for faculty to take part in international research, teaching, and consulting initiatives. The first is, to augment departmental funding for faculty attendance at international meetings. Second, to provide faculty with information and advising about the Fulbright educational exchange program. Third, in some instances, the university rewarded international activities in the annual salary review. Finally, the university offered periodic course development grants “to encourage faculty to add an international dimension to their courses” (Paige, 2003, p. 58). This study also aligns with the findings of previous studies (Backman, 1981; Ellingboe, 1998) that institutional rewards and communication structures are critical to faculty engagement in internationalization.

Another study (Niehaus & Williams, 2015), which explored the potential for professional development initiatives to foster the transformation in perspectives that are necessary for faculty members to engage in curriculum internationalization shows institutional interventions and efforts have the potential to help faculty members engage in the process. The study explicitly indicates that with adequate support, not only faculty members without substantial international experience benefit, but even those with a great deal of prior international experience broaden and deepen their understanding of internationalization. In the same study, the faculty development program created a small, but important incentive by providing a modest stipend for faculty members, which in turn motivated them to make time to internationalize their courses. The findings of the study have potential for such programs to contribute to larger internationalization goals of an institute, but several limitations were also uncovered, as they were not directly connected to the faculty members’ research agendas.
Specifically, Paige (2003) studied the University of Minnesota faculty, as they employed several specific strategies in internationalizing their curricula. These strategies include (a) tapping international students as learning resources in their courses, (b) using international examples, readings, and other resource persons in their courses, and (c) encouraging students to engage in study abroad programs and international research projects. To capture the faculty’s awareness in, commitment to, as well as a more sustained interest in internationalization, Stohl (2007) suggests how there is a need to move beyond conceptualization of the internationalization or globalization, and start to focus on various aspects of teaching, research, and service functions of the university, and examine how the activities encourage greater learning and discovery.

Despite the importance of developing faculty engagement in internationalization, there are various challenges and barriers that our institutions face today, that make it difficult to effectively involve faculty in internationalization plans. Besides some other barriers (which will be discussed in the next section), research indicates the lack of financial resources prevents the development of incentives for faculty to engage in international activities, as well as other internationalization plans of an institution (Backman, 1984; Bond, 2003; Ellingboe, 1998; Green & Olson, 2003). Duke University and the University of Richmond successfully developed funds from a variety of sources (federal and private) and institution levels to engage faculty in their institutional planning (Childress, 2010). It can be postulated from through substantial investment, institutional leaders can signify that their institutions are committed to enabling faculty involvement in international scholarship and service.

**Barriers to Internationalization**

A survey of more than 1,300 institutions worldwide by the International Association of Universities has identified the biggest institutional risk of internationalization as being that it
primarily benefits wealthier students, and the most significant societal risk as the growing commercialization of higher education (Lee, 2014). A study by Schoorman (1999) explored the impact of organizational rhetoric for internationalization on the daily experiences of faculty in two departments at a large Midwestern university. The study indicates a gap between the internationalization goals articulated by the university for two of its departments, and the implementation of those goals. Based on the focus of their disciplines, faculty in different departments attributed a different level of importance to internationalization. Some other barriers in Schoorman’s study include- faculty members’ lack of awareness of the internationalization plan; administrators’ failure to include faculty members in the implementation of the internationalization plan; faculty members’ skepticism of the rationales for internationalization or dissatisfaction with current efforts; and ineffective communication channels between administrators and faculty to hear faculty perspectives on internationalization.

**Adult Education and Research**

According to Chomsky (2016), the dominance of the neoliberal ideology has created a context, where education has been increasingly reduced to the attainment of professional specialized skills that cater to the needs of the business world. As adult learners are challenged and shaped by the context of commercial education, Poon (2006) indicates all adults are in some way shaped by an increasingly competitive market. This knowledge-based economy is a context in which knowledge and skills have to be continuously upgraded and expanded to meet constantly changing conditions. It is suggested that instructors and faculty have become disseminators of goods, or commodity producers, within an organizational system not aimed at education, but at earning capital (Noble, 1998). Hence, what is left is “only a shadow of education, as assemblage of pieces without the whole” (Noble, 2002, p. 31). Concentrating on
the relationships between educational systems and lifelong learning in the areas of policy
development, access, technology, and workplace learning, Merriam, Courtenay, and Cervero
(2006) call for adult educators to become better facilitators of learning by forming partnerships
within and across formal and informal educational organizations. Recognizing globalization as a
challenging and complex issue, they adopt the perspective of “bringing together the world” (p.
487). In the end, it is important not only to understand the world, but also to change it. It is
important to understand the motivations of internationalization as STEM faculty enhance
international and intercultural understanding in their classrooms. Next, I look into the gaps and
inconsistencies in the adult education literature on this topic, along with the implications for
adult educators and research.

**Gaps and Inconsistencies in the Literature**

Despite the growing emphasis on international activities, little emphasis has been given
to how international activities fit into the current higher education institutions’ structures and
processes (Burriss, 2006). Moreover, U.S. adult educators have paid very little attention to the
global aspects. This research study will seek to contribute to the existing body of knowledge, and
will explore the activities of internationalization, and recount the experience of particular
disciplines and how STEM faculty are integrating global dimensions into their curriculum. Adult
educators have the responsibility to raise important and challenging questions to expand learners’
experiences about how to embrace and promote global holistic perspectives as part of technology
education. Similar to this idea, Tisdell (2011) sees an opportunity for collaboration with new
colleagues from an adult learning perspective. She believes there is unity within our diversity.
The more STEM faculty collaborate with other fields, such as international programs to create
interdisciplinary courses, the more we have an opportunity to prepare graduates who will be productive contributors to civic life both locally and globally.

Adult educators are not actively engaged in research and conversations about the impact on the global phenomenon (Alfred & Guo, 2007; Nesbit, 2005). As Nesbit (2005) notes in his review of the Handbook of Adult and Continuing Education, adult education has not taken a critical stance on engaging in conversations beyond the local. Very little light has been reflected on serious issues such as corporate scandals, the rapid increase in economic globalization, the growing gap between the rich and the poor, and so forth. Similar neglect has been seen in the past ten years in Adult Education Research Conference (AERC) and Canadian Association for the Study of Adult Education (CASAE) proceedings, with little mention of globalization, immigration, or other international issues (Alfred & Guo, 2007). There is a general reluctance on the part of adult educators to move beyond the local to more global issues.

**Implications for Adult Education and Research**

Education around the world is designed to prepare students to become engaged citizens, ethical human beings, and productive workers who will contribute to the societies in which they live (Suarez-Orozco & Sattin, 2007). The disappointment is the fact that educational institutions are out of sync with the realities of a global world, even though they have an obligation to prepare graduates for global citizenship and have most often failed in achieving that goal. There is no doubt that in the twenty-first century, “college graduates will live and work in a world where national boundaries are permeable; information and ideas flow at lightning speed; and communities and workplaces reflect the growing diversity of cultures, languages, attitudes, and values” (Green, 2002, p. 12). Today, globalization is a central issue confronting higher education, and one-way institutions are responding to this impact of globalization is through
internationalization (Alfred, 2011). When globalization is seen in relation to adult education, Merriam identifies globalization as leading to better understandings of other concepts of learning and the nature of knowledge (Saudelli, Mogadime, & Taber, 2012). For example, the rise of globalization offers the opportunity for STEM graduates to work with those coming from different cultural backgrounds or to be able to manage culturally diverse settings when working for foreign firms or multinationals. This possibility for reciprocity of knowledge mobilization through international adult learning relationships can open up prospects, but can also be a challenge for adult educators.

As Merriam, Caffarella, and Baumgartner (2007) state, “Adult education does not occur in a vacuum. What one needs or wants to learn, what opportunities are available, the manner in which one learns—all are to a large extent determined by the society in which one lives” (p. 25). We live in a globalized world today, where the movement of people, goods, culture, services, and ideas flows across national boundaries, and higher education is no exception. Globalization, with its market-driven economy supported by information technologies, has solved some problems and created others. One can instantly communicate with someone at the other end of the world, and corporations can produce goods ever more cheaply today, however, there are people and nations that are excluded from the benefits of globalization. Such divisions only exacerbate the differences between the rich and the poor, creating ethnic hatred and global instability (Chua, 2003). Since the field of adult education historically has not only been concerned with improving the lives of individual learners, but also bringing about a more equitable, democratic society, I have adopted a critical stance in this review of the literature on globalization and internationalization.
Although adult education and higher education are generally regarded as distinct fields of practice and study, with separate organizations, structures, funding arrangements and bodies of scholarship, there is often sizeable convergence between the two (Kreber, 2005). Most observers regard both adult and higher education as key to citizenship and democracy, hence, individual countries and international institutions often base their policies on this assumption (Milana & Nesbit, 2015). In fact, adult education policies are incoherent and fragmented and have not yet systematically penetrated international education and development agendas. According to Smith (2007), globalization is driven by two conflicting phenomena, production and consumption. He describes globalization as the restructuring of capital, the integration of financial markets, and the movement of jobs to foreign countries, whereas, internationalization is influenced by immigration and globalization. The rapidly increasing foreign-born population and changing demographics call for adult higher education to redefine its curricula and practice. Adult educators must be more deliberate in planning for a global civil society (Alfred & Guo, 2007).

Globalization being an exceedingly complex issue, Merriam, Cervero, & Courtenay (2006) note that it has the potential to build societies, but at the same time destroy individuals, groups, and communities within nations. Globalization often serves the interests of corporations at the expense of ordinary citizens. Work and workplaces have been so affected by technological innovations and economic uncertainty that jobs are progressively shifting from developed to less-developed (and cheaper) nations, while workers’ rights and their organizations remain under constant siege (Nesbit & Welton, 2013). On the brighter side, the massification of higher education has brought about increased enrollments of adult and other so-called non-traditional students (Milana & Nesbit, 2015). Adult education, if seen as a global concern, is influenced not
only by nation states, but also by those international organizations that contribute to shaping national responses to the needs of vulnerable adults, especially at times of socioeconomic crisis.

The growing inequalities in the United States are at the heart of this worldwide phenomenon (CEPN & SCEPA, 2008). The widespread increase in inequality, observed in the United States as well as Europe, has often been associated with the greater internationalization of the economies concerned, higher education included. To show the linkage, the latest OECD Employment Outlook (2007) points to a paradox. Whereas, increased internationalization of a large number of economies should be a win-win game, there is a growing discontent due to the increasingly unequal impact that accelerating internationalization has on winners of this process versus the losers (as cited in CEPN & SCEPA, 2008). The international dimension and the position of higher education in the global arena are given greater emphasis in international, national, as well as institutional documents and mission statements than ever before. The UNESCO World Conference on Higher Education 2009 report notes the rise of English as the dominant language worldwide, changes in information and communication technologies helping concentrate ownership of publishers, databases, and other key resources in the hands of the strongest universities, and some multinational companies being located almost exclusively in the developed countries (Altbach, Reisberg, & Rumbley, 2009). An argument by Brandenburg and de Wit (2011) suggests that the constructed antagonism between internationalization and globalization ignores the fact that activities more related to the concept of globalization, such as higher education as a tradable commodity are increasingly executed under the name of internationalization.

The concerted effort during the 1980s and 1990s on American university campuses to internationalize, to focus on their teaching, research, and service missions and to become more
fully engaged internationally has come a long way today (Stohl, 2007). However, the process by which this occurred, the areas that were affected, and the level and sustenance of success varied widely. The fact that conflicting arguments for the importance of internationalization in higher education arise from many sources can have implications for adult education practice. There is agreement with J. William Fulbright (1945) that “We must try to expand the boundaries of human wisdom, empathy, and perception, and there is no way of doing that except through education and thus advocate for the promotion of international goodwill through the exchange of students in the fields of education, culture, and science.” Since the establishment of the Fulbright program almost 70 years ago, mobilizing support for international education initiatives has been framed in terms of national security defined first in terms of traditional political and military security, and then as economic security and competitiveness. American Council on Education (ACE), developed in 1999 in the U.S. with similar intentions, provides an in-depth analysis of critical international education issues and supports the internationalization of higher education.

Although there is always an opportunity to include a paragraph based on Fulbright and the importance of intercultural knowledge and understanding, the selling points were national security and economic competitiveness (pointing to the need to remain the best and the fear of falling behind). There are two schools of thought on globalization and internationalization. According to Currie, DeAngelis, de Boer, Huisman and Locotte (2003), the term globalization represents neoliberal economic ideology and competition that aim to increase profits and power for transnational corporations. Even though the authors see the process of globalization as promoting homogenization of cultures, they see the driver for the internationalization of higher education as the development of global citizenship. Whereas, Qiang (2003) claims that the delivery of education has now become a real part of the globalizing process, and sees capitalism
and international trade as the main cause of internationalization. In this market-driven perspective, Giroux (2008) sees profit making and the exchange of capital taking precedence over social justice, the development of socially responsible citizens, and the building of democratic communities. One of the casualties of neoliberalism includes the capitalist influence on public and post-secondary education (Alfred, 2016).

Globalization being a contested terrain, and the growing inequalities resulting from supposed free trade across borders, the internationalization of higher education is seen as one avenue through which democratization of information and interconnectedness of world cultures can be realized (Alfred, 2011). From this outlook, it is imperative that adult education takes a more active role in the discourse on globalization and the internationalization of higher education. Keeping the above arguments in mind, this section explores the recent changes in national and international policies of adult education and lifelong learning, and how they intersect with developments in higher education. Next, issues of access, participation, and other global concerns to learning in a globalized world are discussed. Finally, the key question we need to ask is whether internationalization of higher education is increasing or diminishing equitable participation?

Education, becoming an internationally traded commodity, is no longer seen primarily as a set of skills, attitudes, and values required for citizenship and effective participation in modern society (Altbach, 2002). Open markets in higher education reinforce the inequalities that already exist. If educational borders are completely open, the strongest and wealthiest education providers will have easy access, while the countries and institutions unable to compete will not flourish. Multinational corporations, media conglomerates, and a few elite universities dominate this new era of globalization. The result is the loss of intellectual and cultural autonomy for those
who have less power. For one particular segment of the population, globalization may mean the concentration of wealth and power, whereas, for the rest of the human segment, it means misery and poverty (Ramdas, 1997). The numbers of those who fall into the category of suffering are increasing day by day.

UNESCO Institute for Lifelong Learning 2009 report states that many national government education and social policies have not prioritized adult learning and education as had been expected and hoped for (as cited in Milana & Nesbit, 2015). In the mostly grim picture of adult education and lifelong learning, Merriam, Cervero, & Courtenay (2006) provide hope to transform adult education to respond more critically to the impact of globalization on marginalized populations. They suggest that we do the following: (a) create space and listen to voices; (b) adopt a critical stance; (c) attend to policy; (d) develop partnerships; and e) foster collective learning and action. It is crucial to make a deliberate attempt to include and make the international dimension visible in all programs, so it is through internationalization of the curricula that it will be possible to attend to the roles and responsibilities of which Merriam et al. speak of. Similarly, adult education must clearly define the goals necessary to internationalize their field (Alfred & Guo, 2007). Adult education has the responsibility to build civil societies, while preparing graduates to be able to work in the global workplace. Adult education must take a more aggressive stance in researching, teaching, and speaking out against the negative impacts of globalization (Alfred, 2011).

This study will identify a wide array of possible positive outcomes associated with the process of internationalization; future research should explore how comprehensive internationalization can alter existing institutional frames of reference, prompting faculty, staff, and students to think and behave differently. Moreover, it will be helpful to consider how various
faculty motivations might be related to their experiences and perspectives with teaching and research. Finally, while this study examines the role of STEM faculty in preparing students for the globalized workplace, future research should explore information about STEM students’ perceptions of the internationalization phenomenon on their learning. Any barriers or challenges identified by faculty should be delved into further so that they can be tackled and help motivate faculty’s participation in internationalization.

**Concluding Summary**

Globalization, the emergence of the knowledge economy, and internationalization are the new realities and challenges of the current environment. As Hans de Wit (2011) suggests, when talking about internationalization, it is crucial to make the distinction between why we are internationalizing higher education, and what we mean by internationalization. The process of internationalization is interpreted and used in different ways in different countries, and by different stakeholders (Knight, 2007). The developing countries and smaller institutions will always be at a disadvantage. Of course, there are many positive rationales for internationalizing higher education, such as ones suggested by institutional leaders in Latin America (Gacel-Avila, 2011). They are: improve student preparedness for a globalized world; to internationalize curricula and improve academic quality; and to strengthen research and knowledge capacity production. Essentially, Haigh (2002) posits internationalization of the curriculum as giving equality of opportunity and a better educational experience to all students. It is our goal to prepare graduates to meet the demands of global labor markets, as well as to prepare them to respond through critical action to the impact of globalization on marginalized groups and communities (Qiang, 2003). In this era of rapid globalization, there is an urgent national priority to develop a globally competent STEM workforce as modern engineers and scientists will need
to be able to work seamlessly across national, cultural, and linguistic boundaries to collaborate in globally distributed research and design teams (Doerry & Charles, 2013). In order to do this, adult educators must first start global conversations to explore different possibilities on various global issues (Alfred, 2011). A new agenda for adult education is to re/claim globalization and to engage in research and pedagogical activities that would bring the benefits and pitfalls of the phenomenon to light.
Chapter Three

METHODODOLOGY

The purpose of this qualitative research study is to examine how Science, Technology, Engineering, and Mathematics (STEM) faculty are preparing students to gain international perspectives in a globalized workplace, at a time when higher education has become a real part of the globalization process and is responding with internationalization. The intersection of STEM and diverse cultural learning is the focus of this study. Most of the minimal number of articles dealing with that intersection looked mainly at diversity and the STEM workforce, as well as how it is beneficial in the current global world we live in. This study will focus on how cross-cultural competence and diversity issues need to be imparted to new STEM graduates. The research questions guiding the study are:

1. In what ways do STEM faculty perceive that internationalization is impacting higher education in the current global knowledge economy?
2. How do STEM faculty view their role in preparing students to work in the globalized workplace?
3. What are STEM faculty doing in the classrooms to instill global perspectives in their students to manage the challenges of the new global workplace, and respect cultural differences in others?

This chapter primarily details the selection and implementation of the methodology for this study. It begins with an overview of the qualitative research paradigm and the rationale for choosing a basic interpretive research design. Next is a discussion of my own background as a researcher. Third is a discussion of participant selection followed by a consideration of data collection and analysis techniques. Next is a discussion regarding the strategies to ensure the
trustworthiness of the study. Finally, I end this chapter by introducing the participants and providing a table with demographic information that serves as a good segue to Chapter Four where the findings will be discussed.

**Qualitative Research Paradigm and Basic Interpretive Study**

Among the multiple definitions of research, in its broadest sense, it is the notion of inquiring into, or investigating something systematically in order to learn more about something, contribute to the knowledge base, assess the value of something, or address a particular, localized problem (Merriam & Tisdell, 2016). Researchers often select appropriate plans and procedures, called research designs, to seek answers to their research questions. The nature of the research problem or the issue being addressed becomes the basis of the selection of a research design (Creswell, 2013). The worldview assumptions that the researcher brings to the study inform the overall decisions regarding the design of the study. Other factors also influence the selection of the research design, such as, nature of the research problem or issue being addressed, researchers’ personal experiences, and the audience of the study.

Philosophical worldviews play an important role in the practice of research. There are basic sets of beliefs that guide our action in research (Guba & Lincoln, 2011). Creswell (2013) calls these worldviews, whereas, others have used terms such as, paradigms, epistemologies and ontologies, or broadly conceived research methodologies. The way we think about the world (Lincoln & Guba, 1985) may guide the researcher in the type of research conducted, as well as the use of the data. The studies that are qualitative in nature emphasize “the intersection of social context and biography” that lies at “the root of contemporary descriptions of qualitative research as holistic” (Bogdan & Bilken, 2007, p. 9). This aspect is conducive to this research and in answering the research questions of this qualitative study because the purpose of the study is to
explore how STEM faculty are preparing students not just in the technical aspect, but also in the social and holistic learning that is required for this new global workforce environment.

**Overview of Qualitative Research**

Qualitative research is defined as research that is interested in understanding the meaning people have constructed, for example, how people make sense of their world, as well as the experiences they have in the world (Merriam & Tisdell, 2016). Various strategies may be encompassed under the rubric of *qualitative research*; they all typically share certain features (Bogdan & Biklen, 2007). These include a naturalistic setting, rich or thick descriptive data, emphasis on words or pictures rather than on numbers, and a concern with process more than outcomes or products. Some of the other assumptions underlying qualitative research described below are: its inductive form of logic, research is context-bound; a constructivist view of the world; multiple realities in a study; multiple perspectives of the participants; its flexibility; and the researcher being the primary instrument in the study. These assumptions are also the general characteristics of qualitative research. These features cultivate the capacity to learn from others.

This qualitative study focuses on individual meaning that STEM faculty assign to what they think is important for students to learn as they enter the global workplace. Qualitative research seems to be the most befitting paradigm for this investigation because of several reasons. The philosophical worldview proposed in this study honors an *inductive* style, which is also generally associated with qualitative research. In other words, the reasoning arises from the perspectives of a few STEM faculty, and develops a generalization, instead of generating data from a large sample of study subjects. Hence, no hypothesis was necessary at the onset. The researcher decides how much to formalize generalization or leave such generalizing to readers. The extent to which the findings of a qualitative study can be generalized or transferred to other
situations (transferability) continues to be the object of much debate (Merriam & Tisdell, 2016), and it is generally assumed that readers should make the determination of the extent to which the findings of the study can be applied to a similar situation in education; this is considered reader generalizability or applicability. A case can be made in qualitative research studies, such as this one, that a small, purposeful sample is selected precisely because the researcher wishes to understand the particular in depth, and not to find out what is generally true of the many. As inductive approach is concerned with the generation of new theory emerging from the data, the goal is to carefully uncover patterns and theories from the purposeful sample that help explain a phenomenon. An inductive method of research differs from a deductive model, as there are no hypotheses at the beginning of the study. The inductive approach did not forecast a hypothesis; instead, important questions can emerge as the research progresses. For example, when the participants shared experiences about incorporating international dimensions in their teaching, themes and patterns emerged giving meaning to their experiences. Generally describing a qualitative inquiry, Patton (2015) explains that inductive analysis in qualitative research is an immersion into “details and specifics of the data to discover important patterns, themes and relationships” (p. 41). This type of research is also context-bound (Patton, 2015), and researchers must be context sensitive as each situation is unique and cannot be repeated. Qualitative research gives the researcher the capacity to provide contextual information (Guba & Lincoln, 2011).

Unlike in a positivist, quantitative approach, where the world or reality, is a fixed, single, agreed upon, measurable phenomenon, in a qualitative approach, there are multiple creations and interpretations of reality that are converging and that change over time (Merriam & Associates, 2002). Multiple perspectives were included in the study in the form of the voices of STEM faculty as the researcher strives to understand their meanings constructed based on their world
and their experiences. The key to understanding qualitative research lies with the assumption that individuals in interaction with their world socially construct meaning. This study’s primary interest is in understanding a phenomenon, where there are no absolute truths, for there may be different ways to interpret the information that STEM faculty provides. Participants’ experiences and perspectives shape our worldview, which in turn may mold our knowledge regarding preparing students for the new globalized workplace. As mentioned above, the findings of qualitative research are not meant to be generalized since the samples are purposeful (Creswell, 2013); rather the more significant issue is how the findings might be applied in similar situations. Such an approach is suitable for this investigation because the study got the perspectives of a select STEM faculty on how they were preparing students for the globalized workplace environment, and could perhaps be applied to faculty in similar education situations. Even though qualitative research is flexible in its design, it must be carefully constructed and designed by ensuring that useful data is generated, and then interpreted intelligently to show trends or patterns. It is a systematic subjective approach used to describe life experiences, and to examine how participants make meaning.

STEM faculty and professionals especially have to pay attention and adapt to the accelerating change in science and technology in order to gain a competitive advantage. As the forces of globalization are refashioning economic structures and challenging the authority of the nation state, globalization is also impacting higher education institutions. In order to meet these challenges, the last twenty-five years have seen the international dimension of higher education become a central agenda of international organizations and national governments, institutions of higher education, and their representative bodies, student organizations and accreditation agencies (de Wit, 2011). This study has attempted to understand a phenomenon, where it will
explore how the faculty prepares the future STEM professionals for the current globalized landscape. The flexibility and open-ended nature of qualitative research will allow for various factors to influence and possibly change the course of the investigation if needed (Sayre, 2004).

As there are various ways of interpreting experiences, there are various types of qualitative research (Merriam & Tisdell, 2016). The researchers may study how participants make meaning of a situation or phenomenon (basic interpretive), individuals (narrative, phenomenology); explore processes, activities, and events (case study, grounded theory); or learn about broad culture-sharing behavior or groups (ethnography). A typical challenge to novice researchers that are new to qualitative research is figuring out what kind of qualitative research study to opt for, as each have a somewhat different focus. Basic interpretive qualitative study fits the research problems and was selected for this study.

**Basic Interpretive Qualitative Research**

A basic interpretive and descriptive qualitative study exemplifies all the characteristics of qualitative research discussed before. This type of qualitative research is the most common in applied fields of practice such as education, administration, health, social work, counseling, business, and so on (Merriam & Tisdell, 2016). Individuals constructing reality in interaction with their social worlds are the center of the basic qualitative research. According to Creswell (2012), we use interpretive qualitative research to study problems that seek to understand the meanings of individuals or groups as they identify with a social or human problem. Constructivism is the basis of this kind of research study as the researcher is seeking to examine and understand the meaning of a situation, phenomenon, a process, the perspectives and worldviews of the people involved, or a combination of these. Interpretive constructionist researchers work to figure out shared meanings, yet recognize that each person will interpret the
experience in their unique way based on previous life experiences and socio-cultural influences (Rubin & Rubin, 2005). The emphasis is on meaning construction. The faculty, depending on their individual experiences and situations, shared their meaning and interpretation of internationalization, and how they were incorporating global aspects in their teaching and preparing students for the new kind of workplace. The study focused on these meanings constructed by STEM faculty as they engaged with their world of teaching college graduates. As a researcher, my interest was threefold, 1) how STEM faculty interpreted their experiences, 2) how they constructed their world of teaching for the challenging globalized working environment, and 3) what meaning they attributed to their experiences.

Basic qualitative researchers frequently employ several methods in a single study. These may include interviews, observations, and document analysis (Merriam & Tisdell, 2016). These data are inductively analyzed to identify the recurring patterns or common themes that cut across the data. These recurring patterns or themes supported by the data from which they were derived made up the findings for the study. As a researcher, my understanding of the participants’ grasp of the phenomenon of interest will constitute my overall interpretation of the study. This study reports on faculty perspectives of preparing new graduates who would soon be part of the STEM professional field in a highly competitive, globalized landscape.

A rich, descriptive account of the findings is presented and discussed by using references to the relevant literature that framed the study in the first place (Merriam & Associates, 2002). The researcher provides such descriptions by providing direct quotes or direct citations from field notes to support the themes of the findings. This lends support to the fact that the emerging themes are based on participants’ experiences. This is how the researcher provides some “empirical evidence” (Hathaway, 1995, p. 553) in support of the themes. It is also important to
keep the audience in mind when considering the format for reporting qualitative research. Nevertheless, the researcher might influence the outcomes of the study by bringing subjectivity and preconceived notions, as it can be difficult to separate one’s perceptions and beliefs from the analysis of the data.

**Background of Researcher**

A common characteristic of all forms of qualitative research is that the researcher is the primary instrument for data collection and analysis, where the researcher is asking the questions and creating rapport with the participants (Merriam & Tisdell, 2016). The perspective or position of the researcher shapes all research, including quantitative research, because even quantitative researchers determine the questions of a study. But in qualitative research, the researcher herself or himself is the instrument of data collection, and as a way of owning one’s position, and to attempt to deal directly with bias; it is important for researchers to discuss their background and relationship to the study. When the researchers are conscious of their own assumptions and behaviors they may bring to the study, they may strive to make their perspectives known through self-reflection by self-disclosing the subjectivities in their writings—a strategy referred to as reflexivity (Creswell, 2013). During the research process, I learned to reflect on my behavior and thoughts, as well as the phenomenon under study; Merriam and Tisdell (2016) emphasize the importance of reflexivity, as “such a clarification allows the reader to better understand how the individual researcher might have arrived at the particular interpretation of the data” (p. 219). The researcher must attend systematically to the context of knowledge construction at every step of the research process, and continually understand the position, perspective, beliefs, and values of the human research instrument. Hence, it is important to share my background relative to the study, and share how my backdrop may affect the research study.
A qualitative researcher tries to understand and make sense of phenomenon from the participant’s perspective. Similarly, as a researcher of this study, I am interested in the faculties’ understanding of imparting global education and interpretation of the internationalization issues, and how those interpretations can provide insight for the field of STEM. Essentially, a short overview of my own relation to the research design and to the subject is explained next. Being a lifelong learner, information and educational technology have been my passion, because of my own learning and interests. Technology has played a crucial role in my life since I graduated from college. After taking science classes in my high school years, and completing a business degree in college, my certification in computer technology came next. After moving to the United States, Masters in Management Information Systems was my next level of academic achievement.

Years later, teaching Computer Information Systems at a local community college lured me into getting a teaching certification in business, which allowed me to teach computer classes in a high school setting, along with the other business classes. As part of the adult education degree, there was an element of excitement when taking an elective class on critical theory. Being an immigrant from India, my interest for this study naturally veered towards diversity issues. Today, diversity does not seem a trend anymore, but a reality in our lives and workplace. There was a part of me that wanted to combine my two interests for this research study, technology and human differences. There are many issues of diversity that are frequently brought up across industries, but as technology becomes more and more integrated in our daily lives and organizations are working hard to encourage diversity in the digital space, my former role as an instructor teaching technology inspired me to study how new STEM graduates are being
prepared for their future careers in the new globalized environment. In terms of the impact on this study, my personal background surely impacted the study in a number of ways.

As a start, the topic of my research was selected because of my own background as an educator and an immigrant to the United States. I can assume that being a Computer Information Systems instructor and an immigrant, who understands human differences, participants would feel more comfortable speaking to me. The research design and data chosen were based on my preferences as a researcher, but, of course, guided by theory, which is rooted in the literature. As the researcher is the human instrument for data collection and interpretation, this reality provided strengths as well as potential shortcomings. One of the most important strengths is that I work in the Computer Information Systems field; hence, I know the discipline. Also, as an immigrant to the U.S. and having been educated both in India and the U.S., I have first-hand experience of the phenomenon of internationalization. But the study could also have some potential biases based on that experience. It was difficult to completely eliminate the effect of bias, but identifying and monitoring the biases as they shape the collection and interpretation of data can help reduce it or make it more explicit. The hope was to come up with a product that will be rich and descriptive with limited bias. My assumption was that there were some STEM faculty who were teaching for human understanding and social inclusion.

**Participant Selection**

As previously stated, qualitative research’s key concern is to understand the phenomenon of interest from the participants’ perspectives (Merriam & Tisdell, 2016). Qualitative research is considered “a situated activity that locates the observer in the world” (Denzin & Lincoln, 2011, p. 3). Qualitative researchers study things in their natural settings, as they try to understand and interpret a phenomenon with regard to the information brought to them by the participants.
For this particular study, data was collected from various higher education institutions by purposeful sampling, where the campus’ approach and faculty’s engagement in providing global education was a high priority. I determined this by doing an online search for institutions that have been recipients of either the Senator Paul Simon or ACE awards for internationalization in higher education. Early on, the role of faculty was identified as a significant factor contributing to how successful institutions were at attaining significant levels of internationalization. A survey of its members by the American Association of State Colleges and Universities reported that the extent of internationalization on college and university campuses was not the product of size, location, or budget; rather it was “a function of faculty competence and commitment and of institutional leadership” (Harari, 1981, p. 29). Another finding echoed by Harari (1989) highlighted the centrality of faculty involvement in support of internationalization. Internationalization of the curricula and faculty engagement continue to play a critical role in the internationalization of higher educational institutions (Childress, 2009, 2010; Paige, 2003; Siaya & Hayward, 2003).

The next step after the general problem had been identified, and the role of the researcher decided was to purposefully select individuals for the proposed study. As generalization in a statistical sense is not a goal of qualitative research, the study employed the nonprobability instead of the probability sampling method for sample selection (Merriam & Tisdell, 2016). To solve “qualitative problems, such as discovering what occurs, the implications of what occurs, and the relationships linking occurrences” (Honingmann, 1982, p. 84), the most common form of nonprobabilistic sampling method is called purposive (Patton, 2015). This is a widely used sampling method, where the researcher for the particular study selects the participants, by including participants that meet specific criteria (Polit & Hunglar, 1999). Qualitative research
makes use of purposeful criteria in order to select participants who will offer information rich
data (Merriam & Tisdell, 2016). Sample sizes are typically small and specific, focusing on the
particular in depth. By selecting information-rich cases for the study, researchers are able to learn
a great deal about issues of central importance to the purpose of the research. Purposive sampling
is apt for this study as the interest is in to discover, understand, and gain insight into the
perspective of STEM faculty preparing students for the globalized workplace. The faculty must,
then, be the sample from which most can be learned from (described below).

My interest in this study was to specifically inquire into how STEM faculty were
incorporating awareness, knowledge, and skills of professional life in a global environment.
Being a Computer Information Systems instructor, my curiosity was in learning how faculty
teaching technical subjects were broadening the undergraduate experience in today’s globalized
world. It was surely difficult to find such faculty, as unlike both scientific inquiry and economic
enterprise, which are global, the technical field has largely remained parochial in both course
content and student experience (Douglas, Farley, Lo, Proshurowski, & Young, 2010). The
process of selecting my participants started out with emailing committee members of
professional international associations such as NAFSA and ACE. I was lucky that more than half
responded and referred me to some administrators or faculty members who they thought could be
of potential help to my research. Then, I got in touch with some provosts, directors, and other
administrators whose universities recognize international dimension in their mission statements.
They further referred me to some STEM faculty with whom I spoke directly to see if they were
in any way involved in internationalizing their curriculum. Briefly, this was how I investigated
and found my participants. There were telephone interviews with all the participants and they all
lasted about an hour. As part of the research process, the appropriate documents, such as the syllabi and curriculum were inspected, in addition to conducting the interviews.

A discussion about participants and sites included four aspects as identified by Miles and Huberman (1994): the setting, the actors, the events, and the process. The setting for the study was the higher education institutions that offered STEM degrees. The university’s Institutional Review Board (IRB) approved the study. Criteria for participant selection (actors) involved STEM faculty, who had at least four years of teaching experience. They had to be actively engaged in the internationalization process of the institution, and strongly believe students need to obtain global competence to work in this interconnected world, across cultures and countries. The reason behind purposeful sampling lies in selecting information-rich cases for study in depth (Patton, 2015). Thus, a unique, purposeful sample was selected, where some atypical STEM faculty were developing students’ global competence within the STEM curriculum. The events involved included what the faculty perceived their role to be, and how they were fostering global competencies as part of the STEM curriculum. The faculty must also recognize the challenges associated with cultural diversity, and identify the importance of developing cultural awareness in their students. Eight faculty were interviewed for this study. Finally, the process is the evolving nature of events undertaken by faculty within the higher education setting. For example, as the internationalization process in their institution becomes more pronounced and intentional, the faculty may also become more ingrained in incorporating international and intercultural components through trainings and workshops.

**Data Collection**

In order to gather information from STEM faculty to assess how they are preparing students for the globalized workplace by integrating international perspectives into their own
scholarship, and thereby, advancing the implementation of their institutions’ internationalization plans, more than one method of data collection was used to enhance the trustworthiness of the findings. The data collection strategy typically used in qualitative research are interviews, observations, and analysis of documents and artifacts that are relevant to the study (Merriam & Tisdell, 2016). Data collection methods used for this study included: interviews and documents. Each of these methods is described below.

**Interviewing**

Interviewing, the most common form of data collection in qualitative studies, is a process in which a researcher and participant engage in a conversation to focus on questions that are related to the particular research study (deMarrais, 2004). The main purpose of an interview is to obtain a special kind of information, also referred to as “conversation with a purpose” (Dexter, 1970, p. 136). The purpose of interviewing for this study is to allow the researcher to understand and make meaning of the faculties’ perspectives on internationalization by asking questions about their thoughts on preparing students for the globalized workplace. The researcher should strive for quality in the interview (Merriam & Simpson, 2000). Use of interviews served as the primary mode of collecting data that addressed the how and what to make meaning of the participants’ experiences. The theoretical framework steered my whole research activity and research questions were no exception. I was continually reflecting on the theoretical framework as I was developing my interview questions.

Given the nature of the study and the amount of structure desired, an appropriate type of interview is decided upon (Merriam & Tisdell, 2016). For this study, a semi-structured approach as an interview strategy was adopted combining an interview guide, which included a mix of more and less structured interview questions. A semi-structured interview is a less structured
alternative in an interview. The largest part of the interview is guided by a list of questions or issues regarding international dimension and intercultural components that the faculty incorporates in their teaching. It allowed for consistency in questioning, which Patton (2015) calls standardized open-ended interviews. The questions asked during the interview related directly to my research questions, which helped to explore more about the role STEM faculty plays in preparing students for the new global workplace. Their answers shed light on the key significant teaching experiences these faculty had promoting the internationalization process in their institution. This particular format allowed a combination of covering questions in some format while allowing some flexibility in other areas of questioning.

As the researcher, I conducted telephone interviews with the faculty during a time that was appropriate and mutually decided upon. It took place in one round requiring specific data from all participants guided by the list of questions about issues related to faculty’s role in preparing students for the new globalized workplace. While I provide an interview guide in Appendix A for a semi structured interview, there was flexibility in the order of questions depending on how the interview unfolded with each participant. Questions explored the participants’ perspective as they teach and prepare students with technological and intercultural skills, and how they get them ready for the future jobs that are more global in nature than ever before. All interviews were taped and later transcribed for analysis. The interviews lasted approximately one hour. The interview guide and list of questions can be found in Appendix A.

**Documents**

In addition to the interviews, documents such as the syllabi and the model curriculum for STEM majors were collected to include in the data analysis. The curriculum and syllabi of the various STEM majors aided in getting a deeper understanding of how the internationalization of
higher education is impacting the requirements students need to take to complete their programs. The purpose of viewing these documents was to see how international and global components are addressed in the STEM curriculum, both in content and teaching practices. The strength of documents as a data source is in the fact that they are already present in the situation (Merriam & Associates, 2002). Documents are a ready-made source of data easily accessible to the resourceful and imaginative researcher (Merriam, 2016). Moreover, documents are not dependent upon the whims of human beings, whose cooperation is essential for collecting data through interviews and observations.

**Data Analysis**

Once the purpose of the study is established, and a purposeful sample to collect data selected, the researcher begins to uncover and understand the phenomenon, and what this means. The data analysis process carries great responsibility and demands the need for integrity, honesty, and rigorous analytic procedures (Jones, 2002). The final product is shaped by the data that are collected, and the analysis that is associated with the entire process (Merriam & Tisdell, 2016). Data analysis took place simultaneously with data collection and began with the first interview. This approach was utilized throughout the course of the study, which was facilitated by semi-structured interviews. This allowed for checking emerging interpretations and for adjustments to questions or discussion at hand as the research progressed, and the modifications were easily accommodated.

Most qualitative research is inductive in nature. In other words, the researcher begins with a unit of data (any meaningful word, phrase, narrative, etc.), and compares it to another unit of data (Merriam & Associates, 2002). This strategy commonly referred to as constant comparative method will be adopted, which was originally presented by Glaser and Strauss.
(1967) as an aspect of developing grounded theory, though this is not a grounded theory study; rather, I used the constant comparative method as a means of data analysis. This went on, all the while looking for common patterns across the data. Ryan and Bernard (2003) contend that the task of discovering themes is at the heart of qualitative research since interpretation and presentation strategy is used to explicate meaning through common themes. The meanings embedded in a given context were explored in depth to understand the perspective of STEM faculty, as well as allow for their individual perspectives to be retained.

After each interview, I wrote analytic memos outlining what stood out for me about the participants’ interviews in relation to the purpose, research questions, and theoretical orientation of the study. These memos were notes I wrote to myself to amplify concepts and patterns that were emerging in the data. They provided a summary of the patterns found in the raw data. At a later point, the memos were useful for further analysis and writing my findings. The interviews were taped and transcribed, keeping the confidentiality of the participants in mind. Various techniques have been suggested to discern themes in data analysis, such as word repetition (how frequently words or phrases are used), indigenous categories (local terms that sound unfamiliar or are used in unfamiliar ways), a search for missing information (what is not mentioned), and use of metaphors and analogies to represent people’s thoughts and behaviors (Ryan & Bernard, 2003). After transcribing each interview, I organized my data, coded it, wrote memos and tried to find patterns. After each interview, I recorded the initial themes and then explored as the next step. Interview transcriptions were also reviewed concurrently, in addition to preparing researcher memos by noting keywords and general categories as they emerged (Merriam & Tisdell, 2016). For this particular study, the method of constant comparison analysis helped to develop themes by breaking down the transcribed interviews into chunks, which were then coded
with a meaningful descriptive title. These codes were then grouped into themes based on the similarity and connection between the codes (Leech & Onwuegbuzie, 2008). After deriving a tentative scheme of categories or themes or findings, all of the evidence was sorted out. Code-and-retrieve approach was used, which involved labeling passages of text according to content, and providing a means to collect similarly labeled passages. After reviewing the transcribed interviews, I looked for key words or phrases that reoccurred and the ones related to my research. These words and phrases were noted down in the margins and then, I attempted “to integrate categories and their properties” (Merriam & Simpson, 2000, p. 116). The similar categories were further reduced to a smaller number of categories and data was checked again to ensure it was appropriate in the overall framework of the study, and lastly, the final themes were developed.

According to Richards and Richards (1998), “the generation of categories, even the simplest descriptors…is a contribution to theory” (p. 215). This process was repeated several times to allow for further refining of categories into final themes that adequately represented all relevant data. Data was validated throughout the data analysis process. I compared the research information generated through interviews with documents such as syllabi and curriculum.

**Verification Strategies**

Research aims to produce valid and reliable knowledge in an ethical manner. *Verification* of the data analysis is concerned with the idea of trustworthiness, which according to Creswell (2013) is critical to evaluating the quality of qualitative research. He also believes in employing Lincoln and Guba’s criteria of trustworthiness, credibility, and authenticity when evaluating qualitative research. In order to have any effect on either the practice or the theory of a field, research studies must be rigorously conducted so that they can present insights and conclusions that carry weight for the readers, practitioners, and other researchers (Merriam & Tisdell, 2016).
To ensure credibility (validity) and trustworthiness (reliability) in qualitative research, one must conduct the investigation in an ethical manner (Merriam & Tisdell, 2016). This study incorporated techniques designed to establish and enhance trustworthiness.

Verification of the research was approached through careful attention to the study’s conceptualization, as well as the way in which the findings were presented, which required an unwavering attention to the details of four criteria proposed by Lincoln and Guba (1985): confirmability, credibility, dependability, and transferability. These elements are important for this study as qualitative studies are highly subjective and based on different assumptions about reality and different worldviews that are holistic, multidimensional, and ever changing. The following sections address these aspects and appropriate strategies for dealing with each issue.

**Credibility**

Credibility, also referred to as internal validity, relates to something that is not seen as reality by everyone (Lincoln & Guba, 1985) or how research findings match reality (Merriam & Tisdell, 2016). It is the believability or credibility of the research findings, as the reality in qualitative research is not a single, fixed, objective phenomenon waiting to be discovered, observed, and measured as in quantitative research (Creswell, 2013). If there are multiple constructions of how people have experienced a particular phenomenon, made meaning of their lives, or how they have come to understand certain processes, then as Maxwell (2005) concurs, one can never really capture reality. Credibility becomes relative, and a goal rather than a product. Credibility is the assessment of whether the researcher has captured and represented these multiple realities adequately. It has been agreed in research that since human beings are the primary instrument of data collection and analysis in qualitative research, applying rigor in research helps us get closer to reality. Rigor is thought of in terms of the quality of the research
process, which results in more trustworthy findings. Thus, credibility becomes a definite strength of qualitative research (Merriam & Tisdell, 2016).

Having a background in teaching Computer Information Systems was helpful, as it allowed the participants to say and share things in a way that could be understood. Triangulation also played a key role in helping to establish credibility of the study, which incorporated using multiple methods of data collection to check against each other. Two out of the three methods of data collection—interviews and documents—were employed in the study as part of the triangulation strategy. The documents included the syllabi of the discipline that STEM faculty taught. The data collected from assignments about global content from the syllabi was compared and cross-checked against the interview data that was relevant to study the international, intercultural, and global dimension of the curriculum (Merriam & Tisdell, 2016).

In order to find strong supportive evidence for alternative ways of presenting the data, adequate engagement in data collection was important as it allowed me as a researcher to get close to STEM faculty’s understanding of how they are preparing students for the new workplace environment. Providing thick, rich description such that the reader is taken into the exact setting that was being described (Patton, 2015) was particularly important with regards to transferability, as it allowed the reader to determine whether transferability applies to other environments. A thorough account of the methods and procedures was followed during and after data collection, which helped support transferability as well as dependability and conformability.

Being the researcher of the study, I was also on a lookout for data that could support alternative explanations, as Patton (2015) argues that credibility hinges partially on the integrity of the researcher. Additionally, related to the integrity of the qualitative researcher, all effort was made to critically reflect on myself as researcher, also called researcher’s position or reflexivity,
which Lincoln and Guba (2011) refer to, the “human as instrument”. Explaining my biases as former faculty, any dispositions and assumptions regarding the research allowed the reader to better understand how the researcher arrived at the particular interpretation of the data.

**Transferability**

Transferability or external validity is concerned with the extent to which findings can be generalized or inferred (Patton, 2015) to other settings, contexts, or populations. Patton (2015) promotes the idea of extrapolating rather than generalizing, as extrapolations are modest speculations under similar, but not identical conditions. Certainly, as Guba and Lincoln (1989), point out the study must be first internally valid, as generalizing meaningless information is insignificant. Some researchers argue that applying generalizations from the aggregated data of enormous, random samples to individuals is not as useful as a single case, or small, nonrandom, purposeful sample as the selection is for the precise purpose of understanding the particular in depth, and not to find out what is generally true of the many (Merriam & Tisdell, 2016).

As Lincoln and Guba (1985) suggest with the notion of transferability, “the burden of proof lies less with the original investigator than with the person seeking to make an application elsewhere” (p. 298). This depends on the degree of similarity between the original situation and the situation to which it is being transferred. The original investigator does not know or cannot specify the transferability of findings; in fact, whether the findings are applicable to the new situation is up to the applier and left to the reader. The person who reads the study decides whether the findings can apply to his or her particular situation or not. Moreover, to enhance the possibility of the results of a qualitative study transferring to another setting, the most common is the use of rich, thick description (Merriam & Tisdell, 2016). Similarly, Lincoln and Guba (1985) contend, to create a “thick description of the sending context so that someone in a potential
receiving context may assess the similarity between them and…the study” is the ideal way to confirm the possibility of transferability (p. 125). The findings of this study as presented in Chapter Four provide much data support and thick rich description, which will help the reader decide what might be applicable to similar situations.

**Dependability**

The notion of dependability relates to the need for the researcher to account for ever-changing context within which research occurs. As there is no single reality and human behavior is never static, questions may be asked about the constancy of phenomenon. Qualitative researchers seek to describe and explain the world as explained by those who experience it (Merriam & Tisdell, 2016). The responsibility lies with the researcher to also describe the changes that occur in the setting and how the changes affect the way the researcher approached the study. The changing contexts and circumstances may be due to instability or design-induced changes implemented as insights emerge throughout the research process. The question should not be whether findings will be found again, but whether the results make sense and are consistent with the data collected (Merriam & Tisdell, 2016).

Triangulation, investigator’s position, and the *audit trail* was used to ensure for dependability. The first two have already been discussed earlier under credibility. Audit trail is a method where independent readers can authenticate the findings of a study by following the trail of the researcher (Lincoln & Guba, 1985). I have tried my best to clearly outline the research process in the study, so the others will easily be able to follow the trails of how and the data were collected, categories were derived, and decisions were made throughout the inquiry, without giving out too much information about the participants. Confirmability is the last criterion of trustworthiness that a qualitative research must establish.
Confirmability

Qualitative research tends to assume that each researcher brings a unique perspective to the study. Confirmability refers to the degree to which the results can be confirmed or corroborated by others. It is concerned with recognizing potential areas of bias or distortion, and whether the researcher is aware and has accounted for individual subjectivity or bias. A number of strategies can be applied for enhancing confirmability. First, the role of triangulation in promoting such confirmability must be emphasized again (Patton, 2015). Miles and Huberman (1994) consider that a key criterion for confirmability is the extent to which the researcher admits his or her own disposition. All efforts were made to ensure that the process of data collection analysis and findings were clearly documented and transparent, inclusive of correspondence (emails, etc.) and documentation (articles, transcripts, surveys, etc.). Another strategy could be to have a colleague be a devil’s advocate, and argue against the study, while documenting this process can be documented. Finally, conducting a data audit can help examine the data collection and data analysis procedures, and make judgments about the potential for bias or distortion. Constructing two diagrams, one is a data-oriented approach, showing how the data eventually leading to the formation of recommendations was gathered and processed during the course of the study (audit trail). These strategies increased the rigor of this research study, and provide evidence for the credibility and dependability of the findings.

Introduction of the Participants

This last part of Chapter Three in essence serves as a segue to Chapter Four where the findings will be discussed and introduces the participants of the study. Semi-structured, in-depth interviews were conducted with eight STEM faculty who all self-identified as actively engaged in internationalizing their curriculum. All of the participants had at least four years of teaching
experience in the STEM discipline in higher education. The participants ranged in age from 49 to 67 years and had varying discipline education in the STEM field. Table 3-1 provides a summary of the demographic information on each faculty interviewed, including age, race, years in teaching, highest education attained, and the current discipline they are teaching. Pseudonyms were used to protect participant confidentiality. The institution names where the participants teach will also not be disclosed. Of the eight participants, three were females, five males, four Caucasian, and one each of Chinese-American, African-American, Indian-American and German-American ethnicity.
Table 1

*Participant Information*

<table>
<thead>
<tr>
<th>Participant’s Name (Gender)</th>
<th>Age</th>
<th>Years in Teaching</th>
<th>Highest Education</th>
<th>Current Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linda (Female)</td>
<td>49</td>
<td>10</td>
<td>Masters, Computer Science</td>
<td>Computer and Information Science</td>
</tr>
<tr>
<td>Ronald (Male)</td>
<td>67</td>
<td>12</td>
<td>Ph.D., Environmental Science and Forestry</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Jenna (Female)</td>
<td>67</td>
<td>27</td>
<td>Ph.D., Health Services Organization and Research</td>
<td>Kinesiology and Health Sciences</td>
</tr>
<tr>
<td>Garrett (Male)</td>
<td>55</td>
<td>16</td>
<td>Ph.D., Earth Sciences</td>
<td>Earth Sciences</td>
</tr>
<tr>
<td>Thomas (Male)</td>
<td>62</td>
<td>24</td>
<td>Ph.D., Engineering</td>
<td>Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Martin (Male)</td>
<td>58</td>
<td>28</td>
<td>Ph.D., Industrial Engineering, Systems Engineering</td>
<td>Mechanical, Industrial, and Systems Engineering</td>
</tr>
<tr>
<td>Timothy (Male)</td>
<td>54</td>
<td>18</td>
<td>Ph.D., Hydrology and Water Resources Management</td>
<td>Geosciences; Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Sabrina (Female)</td>
<td>53</td>
<td>15</td>
<td>Ph.D., Environmental Health Engineering</td>
<td>Science, Engineering, and Technology</td>
</tr>
</tbody>
</table>
Linda

Linda is a 49-year-old Asian-American woman. She has her Masters in Computer Science and has taught in higher education for 10 years now. She is passionate about and is actively engaged in curriculum internationalization. Her other research interests include: large-scale data-driven applications, parallel systems, Computer Science education, and service learning.

Ronald

Ronald is a white male Associate Professor of Chemistry in the STEM department. He earned his Ph.D. in Environmental Science and Forestry. He has been teaching in higher education for the past 12 years. His primary area of expertise is Organic Chemistry and he teaches basic Chemistry courses.

Jenna

Jenna is the Department Chair and an Associate Professor in the Department of Kinesiology and Health Sciences at one of the top 100 research universities. She has a doctorate in Philosophy - Health Services Organization and Research. Her Masters is in Science - Community Health Education, with specialization in Health Care Management. She also serves as Program Coordinator for the Community Health Education concentration. She has been teaching in higher education for about 27 years. Her main teaching focus areas are: Health Disparities, Global Health Promotion, and Disease Identification, Prevention and Control. She also directs Health Promotion Service Learning-Study Abroad experiences that involve student engagement with community partners in developing countries. Her research interests target primary and secondary prevention of chronic diseases in underserved, disadvantaged populations with particular emphasis on HIV, breast cancer, and prostate cancer.
Garrett

Garrett is a professor in the Department of Earth Sciences. He has been teaching in higher education for the past 14 years. He earned his Ph.D. in Earth Sciences and his Bachelors in Geology. His research interests in Applied Earth Sciences include: The Human Dimension, Introduction to Oceanography, Global Environmental Change, Introduction to Geochemistry, Global Warming Science, Environmental Geochemistry, and Geological Oceanography. He is also affiliated with the Center for Urban Health.

Thomas

Thomas, a 62-year old Environmental Engineering professor teaches in the Civil and Engineering department. He earned his bachelor's in Civil Engineering and masters and Ph.D. in Environmental Engineering. His teaching career started when he taught as a graduate student and also conducted some workshops at the time. Overall, he has 24 years of teaching experience in higher education. The predominant majors his students come from are: Environmental Science, Civil Engineering, Mechanical Engineering, and Chemistry.

Martin

Martin is a 58-year-old professor of Mechanical, Industrial, and Systems Engineering at a flagship public research university, as well as the land and sea grant university in the United States. He attained his Ph.D. in Industrial and Systems Engineering. He has been teaching in higher education for the past 18 years. His current research focuses on highly automated manufacturing systems and sustainability.

Timothy

Timothy is a European-American professor of Hydrogeology at a major research university. He is 54 years old and obtained his Ph.D. in Hydrology. His interest in
internationalization has led to integrating global dimensions in all his courses, as well as various collaborations and affiliations with institutions in India, Indonesia, and Taiwan. His research program is supported by government agencies and international institutions. He teaches a variety of classes in the Department of Geosciences and some General Education courses.

**Sabrina**

Sabrina is a Caucasian woman, and a professor of Environmental Engineering. She has a Ph.D. in Environmental Health Engineering. She has been teaching for about 15 years now. She teaches undergraduate and graduate courses in hydrology, hydraulics, risk assessment, and chemical fate and transport. Her research interests include storm water management, soil ecology, bioremediation, and runoff pollution. She is studying the impact of storm water runoff on the physical, chemical, and biological quality of surface water bodies. She is also looking at the development of effective treatments at the source to reduce chemical impacts of runoff.

**Synopsis of the Participants**

Adhering to the selection criterion, all eight participants identify as STEM faculty who have a minimum of four-years teaching experience, which range from 10 to 28. Their ages range from 49 to 67 years of age. All, except three participants are Caucasians, the others being African-American, Indian-American, and Chinese-American. In terms of educational attainment, all participants, with the exception of Linda, have earned a Ph.D. in their discipline of teaching. They all currently hold teaching positions in a STEM field. Table 3-1 earlier provided a summary of the participants’ information. In the next chapter, I display the data and present my findings.
Chapter Four

PRESENTATION OF THE FINDINGS

The purpose of this study is to examine how STEM faculty are preparing students to gain global perspectives in a globalized workplace, at a time when higher education has become a part of the globalization process and is responding with internationalization. The research questions that guide my study are:

1. In what ways do STEM faculty perceive that internationalization is impacting higher education in the current global knowledge economy?
2. How do STEM faculty view their role in preparing students to work in the globalized workplace?
3. What are STEM faculty doing in the classrooms to instill global perspectives in their students to manage the challenges of the new global workplace, and respect cultural differences in others?

This is a qualitative research study that employed a basic interpretive method. Eight STEM faculty participated in this study and data were collected from individual interviews. Chapter Three provided methodological details as well as profiles of participants, which are summarized in Table 1 in Chapter Three on page 127. This chapter presents the findings of the research study and is divided into two main sections: (1) Multiple Understandings and Motivations of Globalization and Internationalization and (2) Diverse Approaches to Internationalizing the Curriculum. The themes and sub-themes that emerged under the two broad categories are summarized in Table 2 on the next page, and the findings are described in the pages that follow. Patterns, relationships, and themes are described and supported by the data. The final section of this chapter concludes with a summary of the findings.
### Table 2

*Data Display of Themes*

<table>
<thead>
<tr>
<th>Category</th>
<th>Theme</th>
<th>Sub-themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Motivations and Understandings of Globalization and Internationalization</td>
<td>Overlapping Definitions and Concepts</td>
<td>Increasing desire and presence of international students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diversity as a benefit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driven partly by revenue</td>
</tr>
<tr>
<td></td>
<td>Profit versus Garnering a Bigger Vision of the World</td>
<td></td>
</tr>
<tr>
<td>Diverse Approaches to Internationalizing the Curriculum</td>
<td>Increasing Relevance of Internationalization</td>
<td>Interesting content</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Appreciation of others</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Practical or tangible benefits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Global mindset</td>
</tr>
<tr>
<td></td>
<td>International Partnerships</td>
<td>The role of images and social media</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Study abroad</td>
</tr>
<tr>
<td></td>
<td>Projects and Assignments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Student and Scholar Mobility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Faculty Engagement</td>
<td>Facilitator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Personal interest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Academic freedom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strategies</td>
</tr>
<tr>
<td></td>
<td>Global Learning Communities</td>
<td></td>
</tr>
</tbody>
</table>
Multiple Understandings and Motivations of Globalization and Internationalization

The first category of findings focuses on STEM faculty’s multiple understandings and motivations of globalization and internationalization. As internationalization becomes an obvious and abundant goal for most universities in the climate of globalization, universities are striving to internationalize their institutions for various different reasons. The first theme within this category focuses on how the two terms globalization and internationalization are often mingled and can become ambiguous. The second theme, profit versus garnering a bigger vision of the world, centers on the rationale of why an institution chooses to internationalize and the increasing desire and presence of international students, which further discusses the growing financial factor over other factors such as academic, social, and political. The third theme, increasing relevance of the topic, points to the active development of internationalized policies and programs in institutions today. Next, the detailed findings from each theme are presented.

Overlapping Definitions and Concepts

At the beginning of all of the interviews, the participants were encouraged to share a definition of internationalization their campus uses. If they were not able to come up with a definition, I shared two definitions and asked them which one their university closely followed. The first definition is the newer definition by Altbach, Reisberg, and Rumbley (2009), which is defined as “a variety of policies & programs that universities and governments implement in response to globalization” (p. 7). The second one is a definition by Knight (2004), who describes internationalization as “the process of integrating an international, intercultural, & global dimension into the purpose, function or delivery of post-secondary education” (p. 11). All but one faculty member said that they follow the second definition, which is the most widely-used and simple definition in higher education. Linda and Timothy share that “definition two is closer
to what their university follows.” Similarly, Jenna comments that she liked the second definition better than the first one. Garrett and Thomas also think that their university follows a definition closer to the second one. Finally, Sabrina also sides with the second definition, saying the following:

I think in Engineering the second definition by Knight is closer to what we practice. I can understand the first definition, from the faculty’s point of view to describing what we do and how we do it and quantify it, and how it fits in our courses and activities.

None of the participants explained why they chose the second definition. In retrospect, I could have asked them to explain why they thought their university was using the second definition. I could have also not given them the choice of two definitions, instead, pressed them to share what they think their definition is for their university.

One of the first things that caught my attention during the data collection process was that it seemed like, the participants were using the terms internationalization and globalization largely interchangeably. I got the impression that there was no clear distinction between the usage of the two terms. Even though, there was no direct question asking the participants to distinguish between the two concepts, it looked like most participants unknowingly confused the two terms or used them synonymously. The participants used these terms conversationally with answers not confined to one question. There were nine such instances during the interviews, where five participants seemed to have conveyed inconsistency of the use of internationalization and globalization. I share these few examples of their comments.

When asked to describe how she instills global perspectives in her students and respect cultural differences in others, Linda talked about how every time there is an opening for her to include global perspectives in her courses, “just whenever a topic comes along, I use it as an
opportunity to talk about globalization.” In Linda’s database class, she aims to intentionally infuse international elements into her course content by using global examples. She does not teach a globalization topic or class, thus in her explanation it seems like there is confusion about the use of the term globalization. As the term globalization is not part of the curriculum she teaches, it seems like in a casual conversation, the two terms are used interchangeably.

When asked what role STEM faculty plays in internationalizing the curriculum, Jenna uses the two terms casually, even though the question was only framed around internationalization. She comments, “some faculty more so than others are interested in the globalization and internationalization.” When asked about her and the university’s approach in infusing international content, Jenna says the following: “we are doing quite a bit to enhance their globalization and internationalization.” On multiple occasions such as here, she freely uses the terms without differentiating. She goes on to share this, “I am able to weave in a globalization piece...university has been very forward in thinking in terms of globalization.”

Research shows that internationalization is something that institutions do in response to globalization. In her comment, Jenna’s university might be thinking ahead about the globalization today and involved in internationalization efforts, however, she probably means to weave in global or international content. Again, Jenna talks about faculty and how they can engage with internationalization, but uses the term globalization instead, “But for those who are interested, there are opportunities for people to get involved and some do significant works around globalization.”

Similarly, Thomas also seems to confuse the two terms and may be using the terms interchangeably. When asked how does his institution encourage or discourage internationalization, he shared the following:
the university has pretty much tried to depend upon faculty-based initiatives. And again, we do have some overall strategy for the university…and there was a document several years ago that was approved by the faculty saying that to promote internationalization or globalization of our curriculum.

Faculty and institutions internationalize in response to the forces of globalization. Hence, the use of the two terms by Thomas may not be compatible with the true meaning of the two terms. Moreover, Martin seems to conceptualize the two concepts in the same way, even though they have different meanings. In response to if it is possible to internationalize any discipline, he responds, “You can internationalize anything…we can instill some of global awareness. And the other end is, globalization or internationalization is certainly part of that.” Finally, when asked about their institution’s role in internationalization, Timothy shares they promote the short-term study abroad very well and “are very active when it comes to globalization”. Again, Timothy is referring to how his university is very active in terms of the formation of skills for its students, which are required to operate in a global environment. There might have been an assumed understanding on my part, when inferring how these terms are treated. I could have asked a follow-up question about these two terms as there seems to be confusion in their use. There will be further discussion about the implications on how internationalization and globalization were used by the participants in relation to the literature in Chapter Five. The growing emphasis on the economic and academic rationales such as an increased desire to have more international students, rankings, etc. are the topics discussed next.

**Profit Versus Garnering a Bigger Vision of the World**

Participants were very forthcoming in sharing why their universities choose to internationalize and what is being internationalized. They openly stated their universities’
overwhelming desire and emphasis largely from an economic perspective. Many factors influence the internationalization decisions of an institution. The participants of the present study share their perspective on why internationalization is important to their institution and the three sub-themes which emerged are: increasing desire for and presence of international students, diversity as a benefit, and driven partly by revenue.

Increasing desire for and presence of international students. U.S. campuses are one location where it is evident that the world has become more mobile and that higher education is becoming more global. The participants shared multiple perspectives on international students on their campuses and all of them had something to say about student mobility, especially in regard to the current emphasis on incoming international students. Thomas and Martin speculate on the sudden increase in international students at their campuses and discuss the real intent for their universities to internationalize. Thomas wonders why the previous college leadership did not have this kind of directive about increasing the number of international students and shares that his college is seeing a rapid increase in the number of international students. The International Office is also a little bit proactive in terms of attracting students from other countries. He also notices that the previous college director prior to Harvey, did not have this kind of mandate. Thomas reiterates his curiosity about recruiting international students: “One of the things we see is the greater influx of international students...All of a sudden we were seeing all this steady increase of international students” and attributes it to the agenda of the new college leadership. He also feels that part of the reason that his institution internationalizes has certainly to do with in terms of international students. Finally, Sabrina also contends that lately there are quite a few international students studying Engineering at their university.
Driven partly by revenue. As the overall expansion of internationalization increases, higher education is looking to find a balance of values. Some participants in the study discussed the growing number of international students on their campuses and some clearly share how the main emphasis of the internationalization efforts at their institution is on economic gains, rankings, and reputation. Linda and Jenna here simply mention the increasing number and desire of international students they see at their universities. Linda comments, “We have a lot of international scholars and we have a lot of international students at the graduate level, but we really hope to get more students at the undergraduate level.” Jenna does not share the intent to internationalize, but says, “we do have a strong effort right now to increase as a whole at the university level, to increase international students coming here.”

Ronald feels that his university sees a marketing advantage when they can say that they can provide an international experience to their students, which connects to an economic rationale. Aligning to the theme of profit versus garnering a bigger vision of the world, Thomas thinks revenue and reputation are the two primary components for why his university has interest in internationalization. He also admits that part of the reason his university internationalizes has to do with the international students. Injecting almost $22 billion dollars into the U.S. economy each year, international students are a vital source of revenue for the higher education institutions (Hegarty, 2014).

When prodded about how they would rank their institution from one to five on how internationalized they think their institution is, one being low and five being high, Jenna made a comment that is worth mentioning. Her remarks were, “And the only reason I will say four and a half instead of five is that I am aware that we do have a strong effort right now to increase as a whole at the university level, to increase international students coming here. So that means that
the university is not maxed out in terms of its efforts to recruit international students.” Keeping in mind, the United Nations Educational Scientific and Cultural Organization (2014) reports that the number of international students worldwide is expected to rise to 8 million by 2025, Mohammad reports (as cited in Khalid et al., 2017), the United States’ potential world market in terms of providing international higher education is 21.2%.

Again, Garrett communicates about the push for recruiting international students. He shares the real reason his university internationalizes is, “a lot of this has to do with the push for recruiting international students…We have a very strong support from the administration and our own programs to recruit more international students.” It is important to note that previously, the phenomenon of international student mobility and cross-border education was considered to increase mutual understanding and global cooperation among nations (Khalid et al., 2017). In today’s society, maximizing revenue is the primary approach which garners competition between institutions in order to establish themselves in the global knowledge market by attracting maximum consumers. Such as, in the U.S., internationalization of higher education is an opportunity to upsurge revenue in globalized economy.

Now Thomas and Martin explicitly share the real reason that drives internationalization at their universities. Thomas contends the following:

The university is interested in the additional revenue that they can get from international students. And that actually has been stated in meetings. That they wanted to see that the number of international students increase because of the revenue that can be generated. I also think that the university encourages by saying that we wish you would go do that, but not encouraging with the other kind of incentives...I think the increased visibility internationally has been and can lead to again more students, international students. I
think there it is the revenue and the reputation, are the two primary components that the university has interest in internationalization because of that.

Martin is also fully aware that economics plays a big role in the movement of students in today’s global world. He shares the following along with the escalating trend towards isolationism:

And I think they recognize the potential of bringing in these students. Australia is recognizing it. But then again for Australia, unlike Germany, where students come in and pay the local rate, for Australia, for them it is a cash cow. And the U.K. is now trying to follow the same model. They are becoming very inward looking, but they are thinking of becoming the cash cow...

Martin further highlights the contribution of international students economically, “there is revenue from internationalization. So, if you can get international students to come and pay the fee, that is good money...And most programs that are not very profitable will get squeezed back.” Sabrina is also forthcoming on this issue and indicates that where, more Engineering students are traveling and solving international problems, “They have also been prized by educational institutions, as they typically pay a higher tuition. So there has been a push for international student populations because of tuition differential. They are a huge source of revenue.” In the current study, we see how internationalization of higher education institutions has its challenges and opportunities.

**Diversity as a benefit.** While the faculty value the presence of international students on their campus and classrooms, they also seem to be concerned about rapid recruitment of fee-paying international students, with a growing focus on economic gains. Where some faculty in the study are apprehensive about the rapid expansion of foreign students, some also see them as
an opportunity to increase diversity in their classroom, and to adjust their curriculum in positive ways as a result. These faculty assume that having more international students will translate into more internationalization, particularly with respect to diversity. The samples of comments from the participants below illustrate the element of diversity, how the participants bring in diversity and internationalization in the learning environments.

Linda, Garrett, and Thomas see the potential of international students in the classroom. Linda shares the following, and discusses how it could affect the curriculum and potentially the classroom dynamic:

...the more international students we have, the more, there will be more interaction between domestic and international students. And then once we have more student pool, now the faculty member will see the need to you know, we have more international students now. In my teaching now, could I accommodate you know international students. Because if I have 20 students and only one or two international students, I may not adjust my course content. But then even if I try to promote intercultural learning, there is not much cultural diversity there. But, when we have more international students, it’s much easier with that. Overall, that will help recruit more international students and overall push the internationalization.

In essence, in her comment, Linda is sharing what she might do as a faculty and speculating about others. She is talking about the fact that by increasing the number of international students, there is a likelihood that faculty will make some accommodations in the curriculum. This does not necessarily mean however, that faculty actually will do that with increased numbers of international students.
Garrett and Thomas touch on the fact that it is enriching to have international students in the environment. For example, Garrett is assessing his university’s internationalizing effort and says: “I think a lot of this has to do with the push for recruiting international students and expand the student base.” Thomas also sees it as a positive impact for the students, and comments that the presence of international students presents opportunities for re-thinking some of the curriculum, and says it “…seemed like an opportunity to help integrate them into the class a little bit better as to provide a little bit of content within the course that they can relate to.” He goes on to share this:

I do want them [students] to be able to work with you know, an individual from another country, because it is very likely that they are going to have to do that when they work professionally...the international students we have here on campus provide a wonderful opportunity for that kind of learning process to occur.

Sabrina also sees diversity as a benefit that allows students to work in the international arena. She sees the rise in international students as fabulous as this can help make students make connections and it helps the local students to see the similarities and differences in the problems that we face at home and in other parts of the world.

From the point of view of some participants, the interest in increasing international student numbers can provide opportunities for domestic students to engage with those coming from different cultures. Of course, having more international students does not automatically translate into meaningful interactions among students (Deardorff, 2009). Whatever the rationale for internationalization, most faculty consider internationalization as having increased in importance within their institution than in the past and they are being increasingly strategic about it.
Increasing Relevance of Internationalization

When asked as to how did the participants perceive that internationalization is impacting higher education in the current global knowledge economy, all of them responded with positive benefits. They all see an increasing relevance of internationalization in higher education overall. However, Linda is more specific about this and sees internationalization at her campus as less impacting at the curriculum level, and more so at the campus level and also impacting courses that have already embedded global learning into the syllabus. Linda feels that at her institution, there is more focus on institution-level or campus internationalization, rather than on strategies and practices to transform coursework that help faculty infuse global knowledge, awareness, and cross-cultural competence throughout the curriculum. She also sees internationalization as more prevalent in courses that were already internationalized (such as International Studies, Comparative Religions, etc.) or lend themselves to an already internationalized content than in other courses. The participant further explains how courses such as Business Studies, International Studies, or Foreign language courses are inevitably going to incorporate global dimensions. Most universities are already promoting intercultural learning with international events on campus, as well as by providing good student service. Timothy shares that internationalization is highly regarded today. The important benefits of internationalizing their curriculum as expressed by the participants are discussed next. The participants offered four arguments in favor of internationalization in higher education: interesting content, appreciation of others, practical or tangible benefits, and global mindset.

Interesting content. Linda, Ronald, and Jenna see one of the benefits of internationalization as making the courses more interesting for the students. Linda says that the students are very tuned to this topic and are really interested in this kind of stuff. Ronald shares
that his students being more invested in the research than they were when working on these term papers individually, “there was kind of an excitement to the collaboration...there has been an improvement in student motivation and commitment to the research paper.” Moreover, Jenna also contends that “It has made it more attractive for our students...it creates a better higher education experience.” Even Garrett feels that the students went way above and beyond their work on an international project, and he himself learned a tremendous amount about the topic. There are of course more benefits of internationalization besides merely making the content attractive and interesting for the students.

Linda shares no reluctance in pointing out that the relevancy of internationalization is more at the campus level, and less at the curriculum level. Her argument is that it is easy to embed global content in courses such as Business Studies or International Studies, as these “…courses you are going to inevitably going to teach global learning.” She further remarks how “…majority of higher education courses are about teaching the skill, the content. You know Math course, Biology course, Computer Science, you don’t have any room or there is no need to teach global learning.” According to Linda, the relevance of internationalization is more at the campus level and less at the curriculum level.

Appreciation of others. To have an appreciation of others’ situations and cultures seemed to be the top advantage of internationalizing the curriculum given by the participants. This occurred twelve times and was shared by six different participants. Linda sees internationalization of the curriculum benefiting students in getting “…ready to work in a team setting, where students are from a different culture, are aware of sometimes the conflicts, you know because of the culture differences.” Ronald sees his nursing students gaining an appreciation for the situations of families in other countries, when his students did collaborative
work with students in another country. He further adds, “Our understanding of international cultures is very box-like; the people in many different cultures are far more diverse than we could imagine.” When he shows pictures of the conditions that people live in other countries, his experience in teaching has shown that it is a bit of an eye-opener for them. Additionally, Ronald further adds, “The students should have some exposure to international experience so that they can appreciate that someone from another part of the world may be thinking differently from how they do.” Jenna and Garrett believe that by including global content in their teaching, the STEM faculty can increase the students’ perspectives beyond the United States, make their teaching more relevant to other countries and cultures, as well as transformative. Thomas would want his students to be a little bit more open to other cultures and languages. And he contends that he can make his students a little more accepting of international students also by incorporating international dimensions in his teaching. His vision is that he would want his students to be able to function not just in the United States, but equally well elsewhere in the world. Sabrina shares how slowly there is a realization that we live in an international world and internationalization can help break the stereotypes, as well as there will be a realization that many countries are suffering from the same problems. As these STEM faculty aspire to teach global perspectives to their students, the second most instance regarding the benefits of internationalization are the practical or tangible benefits.

**Practical or tangible benefits.** Six STEM faculty share tangible benefits of internationalization in higher education thirteen times in the study. According to Jenna, one promising thing about internationalizing the curriculum is a student’s good chance of acceptance into the next level of education program with a scholarship. Jenna tells a story about a student and how exposing her to the global aspect of community and health helped her solidify what her
future could look like. This student took advantage of her study abroad course and was able to
decide what she wanted to be in healthcare after she took the trip. This student was one of her
most successful stories. The student went on to receive a donation of $20,000 towards her tuition
from an anonymous donor who was so impressed by her work she learned during her semester
abroad. She was also accepted at John Hopkins, School of Nursing because of what she had been
able to accomplish after her study abroad course. Another student of Jenna’s went through a
transformation after her study abroad experience as she decided to do a Masters in Public Health
first before applying to get into a medical program. She decided to provide her services in
Jamaica as part of her research practicum and complete her senior project before pursuing her
dream of becoming a medical doctor. It is fascinating to hear these stories, as Jenna says,
“Unless they have the experience, they will never know.” Here are a few more stories on the
tangible benefits of internationalization.

Garrett shares that “There is a much better job prospect for the students after they take
these internationalized courses because they are able to share their experiences with the
employers.” He also sees students do a much better job with their projects and outdo their final
projects, which are modeled on their experience overseas. The students often share with their
professor how the course completely changed their course in life. This STEM faculty feels
students exposed to internationalization get more practical understanding of the interplay
between economics and international development. Moreover, internationalized curriculum has
“led students to a changed career path, they might not have otherwise thought about.” Some even
got their first job out of college, they think largely on the fact that they worked with the U.S.
State Department on a project. The employers are very impressed when the students actually
show the outcomes of the project in terms of the project report. Thomas feels strongly that his
students will probably have to work with individuals from another country professionally. He confesses that we think “People in other countries don’t know anything or don’t do anything well...that their engineering is poor, their science is poor, but in fact, I think they are not taking the opportunities to investigate...may be approached differently, but it’s certainly not any less than what we have here...if not, in some cases it is better.”

Students have often come back to Timothy and changed their majors because they felt strongly about the world environment. According to Timothy, the students have also gone into jobs that they had not considered before. Some of his former students are also studying in these countries they had visited as students. A particular student he remembers joined him at the university to simply work on a project for which he raised money himself as he strongly believed in it. Sabrina shares, “Students who have studied internationally are more inclined to work and travel.” The tangible personal benefits of internationalization for students can be powerful and life changing. Finally, the third benefit of internationalization shared by the participants is the students having a global mindset.

**Global mindset.** This was mentioned eleven times by seven different participants in the study. In Linda’s opinion, globalization is entering into all walks of our lives, and most careers involve collaboration on an international scale, so it becomes more imperative for the students to be able to understand the nuances of working with international partners and having a global mindset. Jenna also feels that internationalization helps students to expand their vision and their perspective. She feels the students not only need to be aware of other countries out there, but also respectful of them, and international experiences can be transformational for the students. Similar to the other participants, Garrett contends that the graduating students will understand and function well in the globally interdependent, and will make students think deeply. He also
sees it as bringing students to the global stage, an international experience for the students. His intention is to produce globally minded people, instead of locally minded people and increase the international diplomacy. Timothy also expresses the need to expose our students to global content. He thinks it is really rational that we live in a global economy and global place. His belief is a realization that the students need to get exposed; they need to have a global view on things, so it is beyond money. He shares:

They learn in completely different environments in Asia...they have never seen it before. So, there is the cultural exposure and then also the intellectual, and the scientific exposure to questions relating to water quality and environmental degradation and biodiversity. They definitely get it from all sides. And that is confirmed by having many discussions with many students taking these courses. I have been five times now.

Success for Timothy is when students tell him afterwards that the global content and perspectives have shaped their lives in a way that they did not anticipate before going on the trip. Such curriculum makes them realize that the world is a much bigger place and it opens their eyes to issues that they never thought about before. Sabrina sees internationalization as an opportunity to “broaden the horizons of our students”. Indeed, given in today’s evolving globalized world and knowledge economy, it is the responsibility of higher education institutions to ensure that their graduates have an international experience and leave with truly global mindsets. The next category is the diverse approaches STEM faculty make use of in their teaching when internationalizing their curriculum. The diverse approaches can include: international partnerships, projects and assignments, student and scholar mobility, faculty engagement, and global learning communities.
Diverse Approaches to Internationalizing the Curriculum

Unlike the first three themes, the subsequent five themes are more specific to the various approaches that STEM faculty utilize in internationalizing their curriculum. The fourth theme focuses on the international partnerships

STEM faculty have established in order to embody international dimensions to their curriculum. Moreover, in the fifth theme, the projects and assignments that the faculty assign to their students are shared. Next, the sixth theme of student and scholar mobility, which has most significantly expanded recently is identified. The seventh theme of faculty engagement constitutes STEM faculty’s reflection on their role and responsibility in internationalizing their curriculum. Finally, the eighth theme, global learning communities address some of the activities participants engage in, to learn about unique, diverse cultures and learn new ways to integrate global learning into their curriculum. Similarly, a study abroad program can also be the source of certain projects and assignments.

International Partnerships

International partnerships are an essential part of internationalization as all the participants, except one share something about the international partnerships they formed with other universities and organizations. Most of these relationships seem to be either faculty to faculty or individual relationships with companies or institutions. Some faculty share the challenges they have faced in establishing such international partnerships. Of course, technology plays a huge part in maintaining, interacting, and executing lessons with the international partners. For many institutions, scope, style, and country of the partnership varies. Most participants voice concern about funding and the extra effort required to set up their collaborations.
The role of images and social media. As part of the COIL (Collaborative Online International Learning) collaboration, Ronald has taught his courses interacting with other professors in Mexico, Netherlands, and South Africa. He made a number of remarks about these partnerships. When speaking about his Mexico partnership he discusses the role of social media and states, “This semester we are communicating mostly through Facebook. These students are going into very poor communities. So I discuss with students what it means to buy food when these people have to live on 60 cents per day/person.” While he at times spoke of Facebook and social media more generally in speaking about the Netherlands, he highlighted the role of Skype:

The study that we had last spring in the Netherlands, those students communicated by Skype a couple of times, as there is a time difference.

But they were able to communicate directly and ask questions to the students in the Netherlands. And I think they both gained a little bit of perspective as a result of the interviews.

Because of another partnership in South Africa, Ronald exposes his students to a different world. He shares:

It is a bit of an eye opener and I show them the pictures that the students upload what kind of conditions these people are living in. So I see that my students have learned a lot about how these people live in South Africa by seeing in pictures and seeing the descriptions that people have posted in South Africa.

Study abroad. A popular activity enabled by international academic partnerships is study abroad. Jenna teaches a Community Health Promotions course with Jamaica as the study abroad location. She says she was able to travel to South Africa with the university delegation a couple of years ago to establish a relationship with a university there. The idea behind this was to try to
interface and match faculty with a university that shares similar interests and research in teaching service. Garrett did not elaborate much, but has collaboration with the embassies in Myanmar and Saudi Arabia to create learning opportunities for his students. Similarly, Thomas has forged partnerships in China and Japan. He has taken several trips to these places for his sabbatical and otherwise to bring in content and real-life examples to use in his classes. Timothy offers short-term study abroad courses to Indonesia and India, which he feels is very effective.

Finally, Martin prides on his international connections, which he contends are his own individual efforts. He has partnered with a few countries such as: Canada, Germany, and India. Here are his comments about his international partnerships:

We have a very active program, where we interact with Germany...I think in the field of Engineering my interaction with the program is the highest. Now, I’ve a collaboration with BITS Pilani, that is my own…I mean that is how I work, my connections are international and I work with people in Canada, Europe, India, on the eastern side, I need those connections…I can do India, so the first few times it was a lot of effort, now it is not so much effort to set up…it is still work, but not so much. There are a couple in Civil Engineering who are doing this. But it is mostly our own efforts...the university is hiring a vice-president for international affairs. Some of them might come on board and might be obliged to internationalize because that is their job. There is a lot of talk about how we are international...have the most prominent international program. So that is the institutional effort. I have done my things pretty much independently.

Over a period of time, Timothy has forged many collaborations, which help him and his students. Because of these connections, some of his students are even working overseas and he knows who they are working with and keeps in constant touch with them. It is evident from the participants’
comments that the interpersonal relationships with the collaborating institutions are a regular feature with these faculty. Even though they were not asked directly about elaborating on their collaborations, these opportunities came up during the interview, where they were able to share about these partnerships. It was clear that because of these partnerships, several projects and assignments came about for these participants to use in their classes.

**Projects and Assignments**

Projects and assignments seem to be a common way to deliver international competency through the core student learning in the classroom. Each participant’s internationalized curriculum looked different depending on the course and the partnerships created by STEM faculty. Most of the faculty share in the interview how they have built a globally-focused curriculum in their classrooms. The comments by the participants below are evidence of the assignments incorporated in the overall internationalization. All, except one STEM faculty had students do research papers or projects with the partner country. One faculty had her students develop and set up a health fair. Ronald has his students complete a research paper on diet. He shares this:

for the COIL component, the international component, I have had my students, I have assigned my students a research paper, where they are assigned to pick what I call a named diet...pair up with teams in the collaborating country...that was the Mexico.

In another semester, his students worked with the partnering universities in Netherland and South Africa. He described how the students from Netherland did their projects with input from the students in his university on their named diet, and vice versa. In another semester, his students worked with the nursing students from South Africa to write their report on the named diet.
Garrett has his students do a project on environmental evaluation in Myanmar. He shares this about the Diplomacy Lab and other projects:

The Diplomacy Lab now, in a public-private partnership helps to internationalize the curriculum through diverse projects...we have a different project of interest. So it has ranged from the environment of Myanmar to fresh waters security and Arctic to university partnership with Brazil to Red Sea protection policies in the United Arab Emirates.

Thomas’s students work on the wetlands project in China. Martin, on the other hand took his students to India for about four weeks, did a paper on it, and discussed what they saw. In the process he introduced them to engineering in India. Jenna’s students did research on a global health issue and developed a community health fair. Most of these group projects and assignments comprised of teams of both domestic and international students working in collaboration either in-person or online. Mobility of students and scholars plays a big role in institutional internationalization plans.

**Student and Scholar Mobility**

All participants, except Ronald situate mobility as the main component of internationalization. In spite of the difficulty in setting up a study abroad program, they see the benefits for the students. Due to the funds and time constraints, five out of the eight STEM faculty in the study have their students participate in short-term study abroad programs, even though some see the long-term study abroad programs as being more effective. The travels span across different continents, depending on the course they teach and the collaborating country. Student mobility at the undergraduate level consists of mobility for coursework or program work. There seems to be scholar mobility not just for study abroad programs, but also to forge
partnerships in other countries and even to bring back content to their classrooms. Martin has been to Germany as a visiting scholar. One faculty share their institutions’ desire to hire international faculty in their disciplines. To reflect on these aspects of student and scholar mobility, here are the comments and programs that the participants engaged in with their students:

Linda shares about the preparation for study abroad courses, “Once you start a study abroad program, you really have to do a lot of prep work.” Garrett similarly admits, “My study abroad course took a tremendous amount of effort both in planning and implementation follow-up, but received no teaching credit basically.” Thomas also thinks it is not something that one can do in a hurry, “It does take a significant amount of time to try to incorporate or develop a study abroad type activity. Now that is not something you just put together quickly.” All faculty see value in study abroad courses and in Garrett’s words, “study abroad courses are clearly effective. Not the short-term ones, but the long-term study abroad programs are highly transformative for the students as it lets them immerse in another culture.” Garrett shows his displeasure about the short-term study abroad programs:

What might frustrate me is that to do learning in the actual international context, like the study abroad experience. You end up having to do it in a relatively small window, otherwise, it is not affordable for the students to do a super long.

Thomas is also unhappy with the way the long-term study programs are set-up by his university:

Usually just me, we try to do a group with the students I guess about three years ago or four years ago now. And by the time the cost got added on to it because of the summer tuition, it was just too expensive, several of the students just couldn’t afford it. That was kind of a problem with it, with the way college has that
tuition structure.

Faculty-led study abroad programs in the study that enhance student experiences allowed faculty to build and strengthen outside programs. The participants conducted short-term programs in Jamaica, South Africa, China, Myanmar, China, and India, to name a few. Martin shares this about his study abroad trip to India, “I took students regularly to India as part of an International Production Systems course. We go in December and visit factories in India.” Ronald describes his study abroad program, where the students are responsible for setting up a health fair for a community:

Study-abroad, students do not just take the trip, they have to participate in a minimum of 48 hours in the classroom work before we go...orientation to the country...research on the health status indicators...they are taught to take that information and take those trainings and develop a community health fair. Most faculty felt supported by their university’s international office. Linda says, “There is a lot of support, you know there is the international office...it is a matter of if you want to do it.”

Faculty mobility is with the students for study abroad, as well as the opportunities on their own to teach, conduct research, and attend conferences. Ronald, in particular explains this scheme to foster faculty mobility:

They create what is called the faculty development seminars. And that is what I was involved in when I went to South Africa. They had faculty development seminars, where they took the faculty to China. They have taken the faculty to Mexico. They have taken faculty to Italy...just building new relationships for exchange of information.
Thomas talks about international mobility and shares his purpose for his travels, “What I do on those trips is I do this. Just bringing back that content, to put into the classes.” He further sees benefit in faculty mobility and shares that, “The important aspect of faculty also doing the same thing as the students, being willing to travel off campus, and out of the country.” Nevertheless, he understands why this might be difficult for some faculty and says the following:

I have the advantage of not only having been a peace corps volunteer, also having spent the countless...I have been in many places for a long time for various purposes. It helps that I personally have that kind of background. I understand not all faculty have that kind of background and might find it challenging.

Whereas, Martin has been to Germany several times and tells us that he has also been to Germany as a visiting scholar.

Timothy, who is a professor of hydrogeology, goes on to say that his work is international and he likes to share his research with his students. He has spent time in Indonesia and in other parts of Asia on his sabbatical. When asked what drew him to internationalization, Timothy goes on to say:

So basically, one thing led to the next one and yeah, there was no...some planning obviously, but yeah, it just goes together. So anytime I come from my many trips, I definitely share the experience with my students. I share the information from the data I have collected, to the research I am doing, to the experiences I have had. So, students know about my international work, trips I recruit from my classes, it is probably influencing the way I teach.

Timothy is proud to share that even though his courses do not require foreign travel, which is more independent, he simply uses his experience and research to hook the students by making
them think about problems in the international perspective. He supplements his courses with either information collected during the travel courses or his other travels when he is not with his students. Jenna shares that her university has been trying to hire international faculty, in fact, this past Friday have been able to confirm the faculty member and offered the position to start in the fall. This faculty is not an American, and is proud that her university is integrating more in their faculty “to represent a more global perspective.”

Faculty Engagement

Another critical dimension of global learning that participants discuss is STEM faculty’s engagement in internationalization. This section covers one of the primary goals of the participants, their role in internationalizing the curriculum, and what happens in the classroom with that regard. The participants were given the opportunity to share what role they played in the internationalization of their courses and teaching practices. It is divided into four sub-themes: facilitator, personal interest, academic freedom and strategies.

Facilitator. When asked how do they view their role as a STEM faculty in preparing students for the globalized workplace, three faculty see themselves as facilitators or an example for their students. Linda admits: “We try to be a facilitator to help them along the way you know by organizing classroom activities, enforcing teamwork with another culture. I would say, play a facilitator, that type of role.”

Similarly, Garrett shares:

My role is to help guide them to their understanding in the international and global context...my role is to bring a little bit of the world to my students. And then let my students bring a little bit of expertise to the world. So, I am largely a facilitator.
Along the same lines, Martin sees himself as an example and a provider for his students and says this:

Well, I am the provider. I am in some ways a paradigm for them. And, like everything else, how do I view my role as an industrial engineer. Often the time at the university, there has to be a difference in their thinking. If that is not achieved, all they have taken away are formulae. Then we haven’t done a thing. Their approach to problem has to become specific to the discipline.

Similar to being a facilitator, like some of the other participants, Jenna, Timothy and Sabrina see their role as someone fairly responsible as a STEM faculty. Jenna shares:

I feel my role is not something that is optional. I feel it is an obligation to expose my students to ideas and perspectives that are not just U.S.-based because that is not the world we live in. And so, going forward as the United States becomes more and more diverse, that I just have an obligation towards my students to be globally-competent and culturally-competent.

Timothy also sees it as his obligation to make his students aware that they live in a connected, internationalized, and global world, where they have to compete against people around the world, who may be equal or more qualified than them. Finally, Sabrina contends that “As a faculty, I have an obligation to think how international students are feeling included in the class in the American higher education and Engineering program.”

**Personal interest.** A number of participants accept that it is their personal interest that they choose to internationalize their curriculum and take every opportunity they can get to integrate global content into their syllabus. Almost all faculty shared that their syllabus and curriculum do not reflect that they are internationalizing their curriculum. Garrett said that the
Diplomacy Labs that he does with his students is an example of this, but the syllabus only suggests the tangible projects. Martin said that, “it is not formal, but I have a lot of anecdotes that I share with my students.” Timothy expressed that he will be in the same category where the syllabus does not show any sign of internationalization and goes on to say, “but maybe that is something I should change.”

Most faculty shared their syllabus and from analyzing their syllabi, there was only limited obvious indication that they were internationalizing their curriculum, based on what was written or assignments. Jenna teaches a class with a global topic, so her syllabus lists the optional spring break study abroad experience or alternative service learning options. Timothy’s syllabus has two student-learning outcomes using the terms “global” and “international”, but the actual assignments listed in the syllabus do not convey much about internationalization. Garrett has a Diplomacy Lab Forum listed in the syllabus, which is international in description, but unless one looks at the details of the assignment, it is difficult to say that it is global in nature. But the syllabus obviously does not include what faculty say in classes, and based on the interviews these faculty are including international content where they can.

Most faculty trust that all courses can be internationalized and it depends on the faculty to decide if they choose to do so. One faculty member is involved in other ways and volunteers in various programs at her university to enhance internationalization at her campus. Henceforth, Linda shares her engagement and sees the challenge as it relates to international engagement of some other STEM faculty:

I am the faculty advisor of the Asian Student Union; I go to international festivals. I volunteer for international events; group of faculty members get together you know once a month. We talk about strategies on how to promote intercultural learning in helping
domestic students…organize some student activity events…inside the classroom that is the difficult part; it just takes the faculty member to understand you know how it can be done without really a lot of extra time and effort.

For Jenna again, her personal interest comes into play as she internationalizes her course. She admits:

Personally, I have always had the fascination with cultures. That’s just that, as long as I can remember I have been fascinated by cultures, and learning about different people’s cultures and different cultures and different countries and that kind of thing. So my personal curiosity just matched very well what they offered here in terms of both global and local opportunities. If they did not have that or I would have been at a university that did not have that, I would not be as happy there as I have been here...This has been a personal interest of mine, I am in an environment where they welcome me doing this kind of course creation.

Jenna’s comments here further demonstrate her initiative and interest in internationalization, “The two courses I shared with you earlier I taught them from the global perspective. These two courses I created, and they were not university’s curriculum. Those two were the courses I created.” Here Jenna shares what most excites and frustrates her about internationalization, where she talks about the added opportunity:

I think actually it has made it more attractive for our students because they feel that it is an option that they can include global experiences in their education. And speaking on the faculty, it is the same thing. They see that it is something they can get involved in they didn’t think in the past that they couldn't. I think it is just added opportunity.
Garrett points out how his personal interest, experience, and opportunity helps him internationalize his course. In his first comment, he is referring to a frustration with his chair department and then refers to the opportunities:

I would say that would be an issue with the department chair, rather than the university. We need a different kind of intellectual space to do that. We all have enough to do already, that you can’t just say, oh here, here’s another opportunity. Because we all have plenty of opportunities already in our lives. It is just a question of directing our staff to do that.

In his next comment, we see how Garrett takes advantage of the opportunity when his university became one of the Diplomacy Lab university sites. He explains that this was one of his opportunities to integrate international experiences into two of his courses and talks about his own experience with international work and states, “It helps that I personally have that kind of background…I take advantage of using that experience to inform students about in this case, it is about coastal sustainability and ecosystems.” He also refers to his other faculty in his department about their international research and how it helps them to internationalize their courses. Thomas also has issues while dealing at the department: “It just seemed like you in particular at the chair level or the department chair, that is where I would get the most resistance in actually doing anything or proposing anything.”

Thomas comments on the opportunities his other STEM faculty counterparts should exploit – he refers to his role as a STEM faculty in the following quote, “My role as one being to make sure they are aware that I think it is important for them to have a perspective
beyond Arizona or the United States.” He continues to discuss that with some preparation any STEM faculty should easily be able to incorporate global perspectives in their classrooms:

So, air pollution, of course is a topic that you could easily grab issues that are happening in China. There is a lot you can get from the journal articles as well and help integrate that into the course. That is a lot that I would say is easy to do, and in a class. Is that you have these topics in class, and these are not unique to the United States. You just have to go find the information that allows you to present that in the context...something happening elsewhere in the world. I will do that in any class pretty much.

In summarizing the fact that he thinks it’s quite easy for faculty to incorporate international issues in the curriculum, while staying on task with the content of a course, he notes:

But, I also don’t see that there is much of an issue trying to bring in internationalized context into your classes. Because you can still accomplish the same thing within the curriculum. It’s just that, you know it is a little bit more preparation to do, they have to become familiar with that global perspective itself.

In contrast to what the other participants believe regarding any course being internationalized, Ronald, even though he internationalizes one of his courses, does not feel comfortable internationalizing his other courses. He comments:

It depends on if the faculty chooses to collaborate and what form that collaboration take...Have some other expert faculty in internationalization model how to go about internationalizing their curriculum...I am not comfortable to moving it to other courses.
When asked what frustrates Sabrina in the internationalization efforts at her university, she shares how it falls on the faculty as there aren’t any real efforts at her university to internationalize. She shares that there is an institutional barrier to internationalization, so there is no encouragement and whatever happens regarding internationalization happens organically. She goes on to say that those faculty who are internationalizing are doing it because they are interested in it. This seems like an interesting finding regarding faculty engagement that most participants seek the opportunities themselves to internationalize, rather than their institutions’ effort to involve their faculty in this process. When asked what their institution can do in terms of internationalization, three participants voice their concerns about their administration. Garrett shares how despite faculty’s efforts to internationalize, they are not compensated for their endeavors:

It took a tremendous amount of effort, no teaching credit basically. They are patted on the back when they do it, but they are not supported for it...They are limited in terms of their resources they provide, that I think the university could provide more at the college level, some funding that may encourage faculty to do more outreach or travel abroad.

According to Garrett, his institution is understanding and needs to figure out how best to systematize the funding and strategically engage faculty in internationalization. He says:

Their heart is in the right place, and they need a lot of effort to get there. I believe the cost of internationalization is not rated by classroom, it is largely a faculty effort. And that is exactly why we are going through this exercise of analyzing internally how we go about internationalizing the curriculum.
On the contrary, Garrett also shares, “these funds are completely underutilized in the STEM field. STEM faculty seems relatively disconnected from this effort.”

Thomas mirrors Garrett’s view regarding the independence with which the faculty handle internationalization. He comments:

The university has pretty much tried to depend on faculty...there was a document several years ago that was approved by the faculty saying that to promote internationalization or globalization of our curricula. But it is still at a point where it depends on the individual faculty to actually do anything.

Martin also shares a similar response: “There is a lot of talk about how we are international...have the most prominent international program. So that is the institutional effort. I have done my things pretty much independently.” Then in pondering what he thinks the university could do, he notes:

They could underwrite some of the cost. But that is not going to happen. Other than that, just stay out of my way, that is pretty much it...The institution needs to have checks and balances, that I recognize and have no problem with it...they have not done this to me yet. They start questioning what we do. That kind of independence you know. I sense it is coming. Else, it is something I will continue doing.

He admits that his purpose to internationalize does not align with the university’s, but he doesn’t work against it. He also shares that he does this because he thinks it is necessary and believes in it.

**Academic freedom.** Along the same lines of personal interest, Linda points out:

“But, you know everybody wants their academic freedom, right? You don’t want people to influence or tell what they should do, so that part is frustrating...but it’s hard to get other faculty
to buy in what I am doing.” When asked what your institution can do in terms of internationalization, Garrett addresses some travel grants and programs “underutilized in the STEM field”. He goes on to share, “STEM faculty seems relatively disconnected from this effort.” He hopes the university could probably do a more concerted outreach to STEM departments in that front. Regarding the School of Engineering, he uses the following phrase, “You can lead the horse to water, but you can’t make them drink.” He feels that this is just the characteristic of the mindset of the STEM field; they tend to be inwardly focused and lab focused”. In response to in what ways does your faculty encourage or discourage internationalization, Thomas shares the following:

I think the university has pretty much tried to depend upon faculty-based initiatives. And again, we do have some overall strategy for the university, a global component. And there was a document several years ago that was approved by the faculty saying that to promote internationalization or globalization of our curricula. But it is still at a point where it depends upon the individual faculty to actually do anything. So, what may discourage that, so we have a lot of individual faculty who may or like doing more international types of projects or international study abroad programs grants on their own. Faculty independence, their choice to internationalize or collaborate, and academic freedom are a few elements that stand-out in the interviews with the participants.

**Strategies.** Finally, throughout the interviews, STEM faculty talk about strategies they use to internationalize their courses. The various strategies shared by the participants, besides study abroad, which has been covered under mobility earlier, are shared here. Study abroad was one strategy that was recommended by all. Each of the participants share some form of an internationalization strategy to use in order to facilitate the acquisition of international
knowledge and competence in their students. Linda shares three strategies, one being, “I have the students working in groups. Make sure every group has a person from different culture.” She goes on to elaborate on her next strategy here:

It just takes the faculty member to understand you know how it can be done without really a lot of extra time and effort. Because you can just use a different example. Give them an assignment with some global learning requirements in it or the way you do group projects, you know enforce that. You have to mix up different cultures, mix up students with different culture backgrounds and sometimes students do not like that. They have to deal with the additional you know, but I have to enforce. When I have Chinese students in my class they want to be together working on a project. So I have to tell them. No, no, you cannot do that. You know you have to pair off you know with a domestic student.

She also recommends adding global examples in teaching STEM disciplines and hopes to get more international students in her classes. She feels if they get more international students, it will be easy to overall push internationalization.

Though, Ronald is uncomfortable with internationalizing any course, he suggests adding history to whatever you are teaching in order to incorporate global dimensions in their curriculum. He says: “The only thing I say I do is when I talk about chemistry I do include some of the history which includes several, several people from other countries who had inventions in Chemistry.” Similarly, Jenna incorporates community projects from a foreign country, brings in examples when she can, pushes students to try new things, as well as, appreciate her institution for hiring international faculty, who can bring new global perspectives for their students. She shares:
And in that classroom work, they get an orientation to the country that we are going to go to. Just in terms of the country’s history, in terms of the country’s established as a developing country and historically, why they are still classified as a third-world nation and a developing country. Then they have to do research on the health status indicators of the country. And from that we decide what health promotion activities we are going to be involved in when we get to the country. I train them on doing blood pressures, blood glucose, body mass index, vision checks. They also get trained on various aspects of health education, including nutrition education, physical activity education, stress management, sexually-transmitted inspection prevention. And then they are taught to take that information and take those trainings and develop a community health fair. So when we get to the global site, we actually conduct community health fairs as outreach efforts working through a hospital in the host country.

Then Jenna goes on to explain how she provides examples when she gets an opportunity to incorporate international dimensions in her course:

And many of those sub-groups in those classifications are immigrants. And so that way we are able to talk about the Hispanic population, how does the federal government define the Hispanic population and through that definition, the students are able to see where the students come from Latin America, etc., etc. So even with the course by then, which is totally focused on global health. But because of the categories of people we study in the course, I am able to weave in a globalization piece.

She also provides an example of how she pushes her students to find a new comfort zone:

Because I just feel so strongly that being able to, students have a difficult time
leaving their comfort zone, sure they are comfortable in their area. You don’t realize that when they leave, they can create another comfort zone. You know working in another country or working with people that are different from us, there can be many comfort zones that can be created for them. Unless they have the experience, they will never know.

Lastly, Jenna describes the new faculty hires at her university:

This is something recent that happened in the department here. When we were recruiting for the migration studies position, but the two tenure track hires that we just hired, just confirmed since the first of January, the latest one was last Thursday. And they will start on August 16. Both of those faculty members are from the outside of the United States. And so even being able to hire more faculty, they are bringing in the international perspective. I think that goes a long way...we are integrating more in our faculty to represent a more global perspective.

Contrary to the strategy of bringing in examples recommended by some participants to internationalize the curriculum, Garrett comments: “Just by saying the example, I don’t think that's really adding an international component to my course. I think it is actually having students deeply engaged in the international context that allows them to do that.”

Like some other participants, Thomas also suggests putting international and domestic students to work together. He shares the following:

Probably the thing that students do not like at first is like when we do team activities or we will do a project that have themes working on it, what I will do is intentionally make sure that the teams are as well distributed as possible with
however, many international students I have in class. Now, some semesters it is a little bit more difficult than others. And so at first they try to work together with one another, but then I think, and then each group of students from each country want to try to show to the other students that they are a good student and they can work hard. So it seems to motivate individually all the students within the teams. And I think they do get a better appreciation of these other students. When I see them in later classes, more willing to work together by choice. I think that is the success, that they will actually choose to work with an international student. And the international student will choose to work with an American student, when I initially push them together to encourage that.

For Martin, inviting international authors can be an effective way to internationalize a curriculum. The strategies shared above are by no means an exhaustive list of the strategies that STEM faculty are currently using, but this is what was explicitly captured during the interview from the participants. Besides the effective strategies, students and faculty are sometimes part of global learning communities to learn and enhance their internationalization and global-competency skills. Timothy sees Science a cultural issue and suggests that students should be required to take at least some international courses as part of their program. He goes on to share, “You do not study in a vacuum; any academic work is done based on input from around the world”, so it should be easy to internationalize any course. Finally, Sabrina brings in international examples and feels that “Just by sliding it in as part of the discussion” she is able to show how things are done in other countries. Global learning communities play an important role for faculty and students as the internationalization efforts continue to take various forms in higher education institutions.
Global Learning Communities

A few participants share some global learning opportunities for students and faculty on and off campus. Linda and Garrett mention the international festival that is held at their institution, where they celebrate the international presence at their university. Most participants also talked about other events on their campus to promote interaction between the international and the domestic students. The STEM faculty were not aware of each and every program, but did knew that there was plenty of opportunity on campus, if anyone was interested. These campus-wide activities are open to the faculty and students alike. In order to facilitate the international competence in their students in the classroom, the faculty needs to enhance their own international competence. This aspect is also referenced during the interviews.

Linda points out:

They have a big global learning theme every year, at the conference...so there are global learning workshops every year at our campus. So I would say people who are interested, you can definitely find the conferences, workshops to go to, and you know literatures, books.

Similarly, Jenna and Thomas bring in information about faculty development seminars or lectures on their campuses. In order to encourage greater faculty and student exchanges, these development programs are encouraged, but not mandated. Jenna mentions about the Faculty Development Seminars in China, Mexico, and Italy. Thomas mentions, “I know several faculty have been involved with doing what we got in terms of the, through the China program we got Faculty Lecture Series.” There is also a faculty-driven initiative, which Linda refers to:

So there is intercultural learning in communities of practice. Like a group of
faculty members get together you know once a month. Now we talk about strategies on how to promote intercultural learning in helping domestic students (know about other cultures) and helping international students. We share readings. You know we talk about documents and if any good articles are about this, we will share. And then in the meetings we talk about what we should do. We will have workshops to help other faculty members in their presentations. We will organize some student activity events.

On the contrary, when asked what more can their institution do in terms of internationalization, Ronald points out the need for the universities to create such opportunities for the faculty to learn how to incorporate international components in their curriculum, specifically for courses that do not automatically embed global learning in the syllabus. He shares: “I suppose, maybe bringing in other professors from the US who have taught different courses and to share their experiences on our campus with how they set up their international collaboration experience that might be of some use.” Also, when asked how should global competence be taught in the STEM academic disciplines, his response was similar:

I'm not sure how internationalization will penetrate into the STEM disciplines.

Again my Diet and Nutrition course is kind of a bit on the periphery of the traditional STEM courses. And it’s because I have that freedom to manage the delivery of the information in the course that I felt that I could take the freedom to expand into an international perspective, but many of the STEM courses we have a rather specific pedagogical objectives and rather specific learning outcomes. And I'm pretty sure that many of the professors would consider internationalization to be a bit of an impediment to achieving the traditional outcomes that they think are somewhat important and they are. So I want to go back to the thought that if some STEM professors were to come to
our campus and maybe give examples, say how they can integrate an international collaboration with a say General Chemistry or say Algebra or even Calculus, that our professors might have a greater deal of comfort in terms of taking the risk to take the time out of their syllabus to do the international component.

Similar to the global learning communities set up for the faculty, there are some that are created for the students. Here are a few that the STEM faculty share. As Jenna explains:

We have several living and learning communities for students at our university...one of the more recent ones is called pseudonym (The Globe). They live together in the particular dorm. They take certain courses that are required of them as a Globe student and of course all courses have the global focus and are internationally focused...graduate those students with a special certificate.

Garrett identifies courses providing international experience at his university called SOAR (pseudonym). Such courses prepare students for graduate school careers and global citizenship. Garrett’s university is committed to increasing course offerings that respond to the SOAR requirements. Students taking the SOAR courses are able to travel so that they can learn outside the United States and are able to engage in cross-cultural elements. As Garrett shares, “On top of some of the other requirements, we have something called SOAR. They incorporate a global perspective in the students by requiring them to take the SOAR courses”. Additionally, he specifies how his university became one of the Diplomacy Lab university sites, a partnership between the U.S. Department of State and the university that allows university faculty and students contribute to policy making process, while also helping the Department of State access an underutilized reservoir of intellectual capital. Students participating in the Diplomacy Lab program work under the guidance of faculty experts to explore real-world challenges and
develop innovative responses to these challenges. The foreign policy projects are led by faculty with goals outlined by the State Department. In addition to the global learning communities created by the campus, the STEM faculty in the study share how they create opportunities for the students to be involved in such communities. All, except one faculty (who was reluctant) shared that it is possible to internationalize any course or discipline. Ronald was the only faculty who was a bit hesitant about this claim, however, was open to the any learning or professional development opportunity to be able to do that with his discipline.

Chapter Summary

The data for this study was collected using semi-structured interviews with STEM faculty who have been teaching for at least four years. The findings of the study were broadly presented in two major sections: (1) Multiple Understandings and Motivations for Internationalization and (2) Diverse Approaches to Internationalizing the Curriculum. The first section focused on the various understandings and motivations of why the higher education institutions choose to internationalize as they are pushed and pulled along by the forces of globalization. The first finding focused on the possible overlapping of the concepts of internationalization and globalization. During the interviews, the participants seemed to be using the terms internationalization and globalization interchangeably, and I got the impression that there was confusion about what the two words. When given the choice to pick one out of the two definitions, mostly all of the participants picked the 2004 definition by Knight. This definition uses the word process to explain internationalization in higher education, which is indicative of an on-going and sustainable process in higher education.

The second finding focused on profit versus garnering a bigger version of the world. The participants overwhelmingly shared their university’s desire push to have more international
students. Some even explicitly voiced their concern about the economic rationale tied to this continued growth in international students coming to the United States. Some STEM faculty interviewed also see the value in having more international students as they bring diversity to their classes and help enrich the environment, as well as give them an opportunity to internationalize their curriculum.

Despite the motive of their institution, all participants see an increasing relevance of internationalization today. This was the focus of the third finding in the study. Now that internationalization is a key issue for higher education, a few participants believe that including the international dimensions in their curriculum in fact makes the content interesting for their students and they are really interested in such information. The faculty also see how the internationalized curriculum can bring about respect and appreciation of cultural differences. The internationalization of higher education can be beneficial not only in sustaining and growing science and dynamic academic exchanges, but according to some participants, also provide some tangible benefits in terms of their career and life decisions. Another key benefit shared in the third theme is that internationalization helps in producing graduates who are globally knowledgeable and cross-culturally sensitive.

The second section focused on the diverse approaches that the STEM faculty take in internationalizing their curriculum. In the fourth theme, the participants are forging international relationships in order to expose their students to international content using technology and social media. A fair number of participants shared that these partnerships are their own efforts that help them and their students. The result of these international collaborations brings us to the fifth theme of the various projects and assignments for the students. Almost all STEM faculty had students do research papers and projects with the international partners they had forged a
collaboration with. The sixth theme is related to student and scholar mobility. It seemed like student mobility was one of the top priority activities in internationalization of higher education. Even though, almost all of the participants see increased value in longer study abroad participation, they all have their students participate in short-term study abroad programs, mainly due to lack of funding and feasibility. In the study, faculty mobility comes in the forms of study abroad programs, bringing back content, visiting scholar, international faculty, research, and attending conferences. The seventh theme focused on faculty engagement shows how faculty who are seen as the drivers of the growing trend of internationalization in higher education see themselves as the facilitators in this process. Most of them shared that they internationalize their curriculum, not because it is required of them, but because of their own personal interest. STEM faculty are also engaged with the various strategies they use in their classroom to internationalize their curriculum. Some of the strategies used by these participants are having students mixed-up to work in groups, and when possible including global examples, historical contexts, and international community projects. Other suggestions included inviting international faculty to share their knowledge and requiring students to take some international courses as part of their graduation requirements. The final theme of global learning communities addressed the global learning opportunities on and off campus for students and faculty. International festivals, global conferences, faculty development seminars with an international theme, informal intercultural get-togethers and global living communities for the students are some ways the faculty said their universities develop global learning communities for them and their students.

Chapter Five will discuss the findings of the study in-depth and more specifically in relation to the research questions, theoretical frameworks, and the literature that informs the study.
Chapter Five
DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

The purpose of this final chapter is to examine how STEM faculty are preparing students to gain global perspectives in a globalized workplace, at a time when higher education has become a real part of the globalization process and is responding with internationalization. The research questions guiding this study are:

1. In what ways do STEM faculty perceive that internationalization is impacting higher education in the current global knowledge economy?

2. How do STEM faculty view their role in preparing students to work in the globalized workplace?

3. What are STEM faculty doing in the classrooms to instill global perspectives in their students to manage the challenges of the new global workplace, and respect cultural differences in others?

This chapter provides a discussion of the findings and draws some conclusions and implications for the study.

The design of the study utilized a basic interpretive qualitative research approach. The primary means of data collection consisted of in-depth interviews with eight STEM faculty that were also transcribed. Documents such as course syllabi were an additional form of data collection. I take a critical stance toward internationalization ideologies in higher education and analyze the data collected in light of the theoretical framework of neoliberalism, globalization, and nationalism as the backdrop.

As noted by Green and Shoenberg (2006) more than 10 years ago, there is no college or university today that is not making some effort to internationalize. Internationalization is an integral part of strategic planning initiatives in most universities, occurring within the context of
globalization, or with living in a globalized world. Moving forward toward greater
internationalization in various disciplines, especially in the STEM field, we need to understand
the ideologies that currently underpin globalization. According to Friedman (2007),
globalization, the predominant economic theme for the past decade has led to broad global
distribution of research, design, and production teams and facilities spanning the full spectrum of
Science and Engineering disciplines. The current debate surrounding internationalization and
globalization can have consequences for our universities. The effective preparation and training
of the STEM workforce to succeed in this diverse, multicultural, widely distributed, multi-
lingual world is part of the work most large universities (Doerry & Charles, 2013).

This chapter analyzes the findings of the study discussed in the last chapter around
current internationalization directions in STEM education and interprets the complex relationship
between internationalization and globalization. In order to make sense of these findings of the
study, then, this chapter begins with a summary of the findings in light of the theoretical
framework of the study in order to orient the reader. Next is a discussion of how the study
answers the three research questions. Third is a discussion of the implications for theory,
practice, and further research. Finally, the chapter presents conclusions and some final
reflections.

**Summary of Findings in Light of the Theoretical Framework**

This study examined the roles and perspectives of STEM faculty in preparing students for
today’s globalized workplace. As such, it is informed by the theoretical framework of
globalization and internationalization, which is itself informed by neoliberalism and human
capital theory. The findings of the study, detailed in Chapter Four highlight two broad categories:
(1) multiple motivations and understanding of globalization and internationalization; and (2)
diverse approaches to internationalizing the curriculum. In this section, we discuss how these findings relate to the theoretical framework with a review of key aspects of the theoretical framework and a consideration of the two themes from the findings in light of that theoretical framework.

**Neoliberalism, Globalization, and Human Capital Theory**

What emerges from the findings of current internationalization directions is the complex relationship between internationalization and the conflicting ideologies underpinning globalization. It is imperative to explore understandings and interpretations of the participants of the study as there is common association of internationalization with the manifestation of neoliberal discourses of globalization. Neoliberalism, “free-market individualism, private property, constitutional order, and the minimal state” as its key principles (Robertson & Scholte, 2007, p. 865) is often linked to globalization (Olszen & Peters, 2005) and emphasizes increased global competition. As internationalization over the years moves from a reactive to a proactive strategic stance, from added value to mainstream consideration, the changing dynamics in internationalization of higher education reflect themselves in current blurred meaning of internationalization and globalization, and their underlying economic rationale (de Wit, 2013).

Although the discussions of neoliberalism and globalization do not necessarily center on education per se, it should be clear that globalization impacts education in huge ways. As Spring (2009) discusses, globalization of education refers to worldwide networks, processes, and institutions affecting local educational practices and policies. Spring (2015) further analyzes the interaction of global forces and education, and suggests that all cultures are slowly integrating into a single global culture through the processes of globalization. Such processes are affecting
the international dimension of higher education, which is also changing significantly (Knight, 2004).

Closely related to globalization and its theoretical underpinnings in neoliberalism is human capital theory. Baptiste (2001) states, “The term human capital refers to knowledge, attitudes, and skills that are developed and valued primarily for their economically productive potential” (p. 185). The notion of humans as capital dates back to the 18th century, when economist Adam Smith introduced this concept in *Wealth of Nations* (as cited in Baptiste, 2001). Human capital, as described by Edvinsson in the context of an organization, is the combined knowledge, skill, innovativeness, and the ability of the organization’s individual employees (as cited in Kok, 2005). It is considered the brainpower of employees that creates economic value for the organization. The organization cannot own their employees’ human capital. Human capital as a theory, however, is most often linked to economist Theodore Schultz (1961), who theorizes that the knowledge and skills people acquire are a product of deliberate investment that increases national output. When specifically focused on education, Schultz (1961) suggests that investment in education leads to large earning increases for the individual. Another economist Becker (2009), additionally links increased educational attainment with heightened human capital. He asserts that both education and training are the most important investments in increasing one’s human capital. While many have critiqued human capital theory for its focus on treating humans largely as pawns in an economic game of gain and loss (e.g., Baptiste, 2001), it is easy to see the connections among neoliberalism, globalization, and human capital theory.

While the participants in this study did not discuss the terms “neoliberalism” or “human capital theory,” their responses during the interviews indicated that they were keenly aware of the economic agenda of their individual university’s interest in internationalization, though that
was not seen as the only agenda of their universities from these participants’ perspectives. But in summarizing the two main categories of the study, the theoretical underpinning of neoliberalism, human capital theory, and globalization with their economic considerations need to be kept in mind. It is to this discussion of these two main categories of findings that we now turn.

**Multiple Motivations and Understanding of Globalization and Internationalization**

The first category of findings of the study related to the theoretical framework centered on the participants’ perceptions of the multiple motivations and understanding of globalization and internationalization. Again, their comments in interviews indicated a keen awareness of economic interest as a driving force of their university in desiring their faculty to attend to international issues, though there was also an awareness of general interest in attending to diversity. In particular, their awareness of these issues was manifested in three primary ways: a) in their overlap and interchangeable use of the terms “globalization” and “internationalization;” b) in their direct discussion of profit concerns of the university as well as its interest in providing a bigger vision of the world through education; and c) their consideration of the increasing relevance of internationalization.

In the context of a global knowledge society, in essence, the participants recognized as de Wit (2013) implies and others discuss directly (Scott, 2005; Knight, 2013), that internationalization has evolved from a rather static and fragmented notion to a broad, innovative process that overlaps with the current forces of globalization. All the participants in the study, in one form or another reiterated the relevancy of the topic of internationalization in today’s world. Three participants clearly stated how incorporating international dimensions makes the course appealing and interesting for the students. The rest of the participants also shared other benefits for the students such as appreciation of others’ situations and cultures, providing a global
mindset for the students, and other practical or tangible benefits. This seemed to be their own primary motivation, though they recognized the economic driving forces of the university as a significant rationale for their internationalization agenda in light of the forces of globalization.

The mixing and the participants’ largely interchangeable use of the terms “internationalization” and “globalization”, as discussed in the last chapter, may be due to the fact that it is nearly impossible to tease the two terms apart from a practical standpoint: the forces of globalization, neoliberalism, and global capitalism drive universities and other organizations to internationalize. Nevertheless, the fact that the participants tended to discuss the terms interchangeably may be due, in part, to how I asked the questions. In the beginning conversation of our interviews, I asked the participants to define internationalization. When the participants hesitated, I shared two definitions with them. First, internationalization of higher education, in a recent definition is defined as a variety of policies and programs that universities and governments implement to respond to globalization (Altbach, Reisberg, & Rumbley, 2009). Second, Knight (2004) in an earlier definition defined it as the process of integrating an international, intercultural, and/or global dimension into the goals, functions (teaching/learning, research, service), and delivery of higher education. When the participants were provided with these two definitions of internationalization, to see which one their institution is currently following or is close to, all of them unanimously chose the second definition by Jane Knight without elaborating on the definition, though it might be useful to point out here that the first definition refers directly to globalization, while the second does not.

There is more than one possible interpretation for why participants preferred the second definition. They are keenly aware of the economic forces of globalization, given that many discussed the issue of balancing the profit motives of the university with the sincere concern for
the intellectual benefit of providing a larger view of the world through meaningful educational experience. Nevertheless, given that the personal agenda of most of the participants was to provide their students with a bigger vision of the world, they might not be fully conscious of the economic forces of globalization, though they referred to these economic issues. They are at least semi-consciously or somewhat aware of the forces, though they might not necessarily be able to specifically outline the theoretical premises of globalization, but they are keenly aware of the economic orientation of their universities.

When asked why they think their institution chooses to internationalize, profit seems to win in comparison to garnering a bigger vision of the world. This economic rationale is considered to be a direct response to the market forces associated with the economic dimension of globalization and is becoming more prevalent (Kreber, 2009). Until the 1990s, internationalization in higher education was largely perceived to be a cooperative effort, based either on political, cultural, or academic rationale, but today, internationalization has become increasingly economically motivated (Van der Wende, 2001). Although, the study reveals that participants were aware of the economic motivations taking priority on behalf of the institutions, the STEM faculty themselves shared more cultural and academic motivations for internationalizing their curriculum. It is important to note, while the political, cultural, and academic rationales are based on an ethos of cooperation, the economic one is based on an ethos of competition (Kreber, 2009). Most participants share how their institutions strive for rankings, marketing advantage, and more international students, since they bring in the additional revenue. But their own personal motivations seemed to be about providing a larger vision of the world, while, at the same time, recognizing economic realities.
In this vein, from an educational perspective, Knight (2015) suggests acknowledging, but not oversimplifying, the complex and rather contentious topic of globalization. She further proposes establishing parameters in order to frame the discussion. Globalization is a process that involves the flow of capital, commodities, technology, cultural influences, and human resources across national boundaries, thereby creating a networked society (Castells, 2010). According to Knight (2015), globalization is a multifaceted phenomenon with multiple effects on education. The author also suggests that from an educational perspective, globalization should be presented as a process impacting internationalization, rather than focusing on globalization itself. As noted in Chapter Two, internationalization is changing the world of education, and globalization is changing the world of internationalization (Knight, 2008). Nevertheless, Altbach (2015) warns that education is becoming an internationally-traded commodity and no longer seen primarily as a set of skills, attitudes, and values required for citizenship and effective participation in modern society, for the common good. Further, Stromquist and Monkman (2015) affirm that globalization has brought education into the international market emphasizing knowledge and skills, particularly those that either explicitly or implicitly support neoliberalism.

The point here is that the same complex and contradictory mix of motivations and contextual factors that are shaping the internationalization of higher education seemed to shape the remarks of the participants. The context of higher education today is profoundly marked by the wider processes of globalization (Egron-Polak, 2012). This was obvious in the comments of the participants in the last chapter in a myriad of ways, such as their views on why their universities want to internationalize: to put their university on the global map, that it is a marketing advantage to do so, and to be able to say that they can provide an international experience to their students. One participant commented that revenue and the reputation are the
two primary components that his university has interest in and the university internationalizes because of them. Their comments reflect the fact addressed in the literature that the imperatives of the market are now driving internationalization trends worldwide (Altbach, 2015).

One example where the economic motivation is reflected in the study is the heavy recruitment of international students, which has become a significant factor for institutional income today (Qiang, 2003). Knight (2007) contends that internationalization means different things to different people and is thus used in a variety of ways. As identified by Knight (2011), one of the misconceptions for higher education is that internationalization implies having many international students. Some participants firmly believe that if there are more international students, there will automatically be more interactions between the domestic and international students. Knight (2011) explains that there is a possibility that bringing the local and international students into the same classroom can make a significant contribution to internationalization; however, just having significant number of international students is not sufficient in itself. In fact, there are countless examples where international students are being added but remain an isolated group. A few participants even point out how one of the strategies they use in their classroom is to intentionally mix-up the domestic and international students as they tend to stay segregated from each other. Moreover, there is continuing debate and exploration on the relationship of internationalization and globalization. Frans van Vught et al. (2002) note:

In terms of both practice and perceptions, internationalization is closer to the well-established tradition of international cooperation and mobility and to the core values of quality and excellence, whereas globalization refers more to competition, pushing the
concept of higher education as a tradable commodity and challenging the concept of higher education as a public good. (p. 17)

Globalization of higher education, when interpreted from a neoliberal perspective, emphasizes increased global competition and is often regarded negatively (Brandengurg & de Wit, 2011). Internationalization, on the other hand, is claimed to be the last stand for humanistic ideas against the world of pure economic benefits and is seen as an opportunity to do good. All the participants in the study had multiple perspectives about the increased numbers of international students at their universities. Everyone, except one, who did not comment on this, saw their university as having an increasing desire for and presence of international students. As we shift from industrial to knowledge economies, more emphasis has been placed on economic and income-generating opportunities attached to greater cross-border delivery of education (Knight, 2007).

Reiterating from the literature review chapter, the start of the neoliberal policies in the 1980s and early 1990s had universities competing for private funding and student tuition as many governments drastically reduced funding for higher education (IIEP, 2007). Universities in the U.S. responded to the neoliberal pressures by adopting market-based strategies (Stromquist, 2007). Many countries, including the U.S., adapted by recruiting international students to earn profits by charging high tuition and fees (Altbach & Knight, 2007). International graduate students are seen as cash cows since universities not only recognize the wealth of international students because of the significant institutional income, but these students also provide research and teaching services for modest compensation and spend significant amounts of money in the host countries. With a record number of 974,926 international students at U.S. colleges and universities in 2014-15 (ACE, 2015), explicit participants’ statements in the study
and de Wit (2011) also confirm that, at the present time, economic rationales are considered to be more dominant, but academic rationales are also becoming more prominent. Regarding the academic rationales, several participants shared with pride the various strategic alliances they have formed on their own, their mobility, improvement of the quality of education, desire for a more affordable study abroad programs, and the importance of their university’s academic status and profile.

**Systems Thinking, Internationalization of the Curriculum, and Comprehensive Internationalization**

**Internationalization**

The second major category of findings focused on what participants actually do in their curriculum to internationalize in light of the forces of globalization. These findings demonstrate that the participants incorporate specific projects and assignments designed to increase global connections. They develop international partnerships by working with faculty from universities across the world and by getting students involved with study abroad programs. They also make use of technological connections that facilitate global learning communities. While these findings will be discussed more in the next major section, it is helpful to think about these findings in relationship to a systems thinking approach.

Systems thinking is an approach that focuses on the study of how system components interact individually and in sets with other components to produce behavior (Aronson, 1998). Applying a systems approach to internationalization in higher education conveys a message that the whole is greater than the sum of its parts (Senge, 2006) It is a framework for seeing interrelationships, rather than the linear, cause-effect changes in things, and seeking patterns of change, rather than static snapshots. Even though international education is said to have evolved from a fragmented approach of study abroad, international students, international partnerships,
and international faculty, it seems we have not come too far as of yet. Surely, many institutions have included internationalization in their mission statements; but, as noted previously, some participants and institutions describe results of internationalization in terms of how many international students they have or how many of their students study abroad. According to these study participants, international-education initiatives at universities are not currently applying a systems approach to internationalization. All internationalization activities shared by STEM faculty in the study are at the institutional level and not coordinated through common governance. The participants’ responses about the definition of internationalization also conveys how STEM faculty relates to internationalization as a process of the various strategies, rather than a means to improve education, which is reflected by all the participants when they chose the second definition by Knight (2004).

From a conceptual standpoint, systems thinking can aid higher education institutions by enabling them to effectively implement procedures and strategies in internationalization from a systems thinking perspective rather than from a more fragmented perspective. The findings seem to suggest that, to a large extent, internationalization efforts and activities remain fragmented. Despite the existing mission statements that include internationalization and multiple opportunities to participate in study abroad programs being quite common, the participants are still working more independently of their institutions to implement internationalization of the curriculum. In order to ensure that institutional policy, the curriculum, and student life are connected, internationalization of the curriculum needs to occur within an institutional policy framework, which can provide clear goals and directions for the staff and faculty (Leask, 2007). It was quite clear from the interviews that most STEM faculty had no particular institutional
policy they had to follow, but, rather, they attempted to internationalize because of their own interest, educational philosophy, or worldview.

Many institutions who are attempting to internationalize their programs are new to the subject and not familiar with its concepts, language, objectives, and methods, particularly comprehensive internationalization (Hudzik, 2011). Comprehensive internationalization is an organizing paradigm to think holistically about higher education internationalization and how internationalization is evolving in the early 21st century. The American Council on Education agrees with this perspective and views comprehensive internationalization that is pervasive throughout an institution, affects a broad spectrum of people, policies, and programs, and can lead to deeper and potentially more challenging change (Olsen et al., 2005).

If we look at comprehensive internationalization as a process rather than an end product, it can help shape the missions and goals of institutions as they consider the variables that interact with each other. It might be that the individual efforts of the participants in this study is part of that organic process, and their efforts might result in a more systemic effort to internationalize at universities. When effectively implemented, comprehensive internationalization should impact the entire campus and shape students’ global learning and cultural competence. Though this rather fragmented approach might ultimately result in more systemic efforts, seeing internationalization in fragments such as global content, study abroad, international students, international scholars, and internationalization at home is giving it a limited view.

Hudzik and Stohl (2009) argue that, when internationalization is infused throughout the institution, it has the capacity to strengthen all areas, just as the power of interdisciplinary work and perspective has the capacity to strengthen core disciplinary knowledge bases and vice versa. Modeling the systems thinking approach can help institutions to consider thinking of
comprehensive internationalization and implementing as organization-wide processes involving all departments and members at the university (Schoorman, 1999). Comprehensive approaches to internationalization are all encompassing, where the various components work together to contribute to the overall goals. An overarching framework for an institution-wide approach such as comprehensive internationalization is described by Jones (2004) as holistic and values-driven internationalization. The study indicates that currently within institutions, there is a bit more emphasis on competition and rankings, instead of cooperation. For a more holistic learning experience in the STEM field, there needs to be a growing interaction of the scattered international activities and policies, as well as inclusion of intercultural competence in the learning outcomes. In spite of the recognition of these economic incentives, the motivations of STEM faculty were out of genuine interest in providing STEM educational opportunities for their students that would attend to issues of internationalization and diversity. What the participants do to provide these opportunities is the focus of the second major category of findings, and also answers the third research question in the next section.

**Study in Relation to the Research Questions**

As previously noted, the purpose of the study was to better understand the role of STEM faculty in internationalizing their curriculum in the context of globalization and in neoliberal times. The first research question guiding the study was: In what ways do STEM faculty perceive that internationalization is impacting higher education in the current global knowledge economy? The second research question focused on how STEM faculty view their role in preparing students to work in the globalized workplace. The first set of findings, discussed above, on the relationship between globalization and internationalization, answered this research question, while the discussion of the second set of findings from a systems perspective answers the second
research question. This section focuses more specifically on aspects of the second research question as well as the third, which asks what STEM faculty are doing in the classrooms to instill global perspectives to assist their students in managing the challenges of the new global workplace and respecting cultural differences in others.

In order to address the specifics of the second and third research questions in relation to the literature, the findings from this study are discussed and divided into three areas: the fact that STEM faculty see increasing relevance of the topic; they have an overall international engagement focus; and they have diverse approaches to internationalizing the curriculum.

**Increasing Relevance of the Topic**

As discussed above, it is obvious in the comments of participants and scholars that the theme of internationalization in higher education has gained increasing attention worldwide (de Wit, 2011b; Knight, 2013). Altbach, Reisberg, and Rumbley (2009) echoed a similar sentiment in their report to the UNESCO World Conference on Higher Education as they noted that “Universities have always been affected by international trends and to a certain degree operated within a broader international community of academic institutions, schools, and research. Yet, 21st century realities have magnified the importance of the global context” (p. 7). Undoubtedly, over the past two decades, the concept of the internationalization of higher education has moved from the fringe of institutional interest to the very core (Brandenburg & de Wit, 2011). All the participants in the study, in one form or another, reiterated the relevancy of the topic of internationalization in today’s world. Hans de Wit (2002) states, “as the international dimension of higher education gains more attention and recognition, people tend to use it in the way that best suits their purpose” (p. 14). The findings of the study generally mirror this approach, as each institution internationalizes in various ways and the way it benefits them. Even as U.S. higher
education institutions have been increasingly engaged in internationalization, it appeared that none have institution-wide international plans or articulated goals in the STEM areas (Sutton & Lyons, 2014). Faculty, thus play a key role in internationalizing higher education.

**Faculty Engagement**

As the drivers of teaching and research, faculty play a pivotal role in internationalization (ACE, 2011), as do the STEM faculty interviewed for this study. Most faculty in the study see themselves as playing a role of a *facilitator* or someone responsible in the internationalization of the curriculum. Paige (2003) also suggests that it is faculty who have the authority to direct students’ international learning and the faculty can choose to model the knowledge, behaviors, and values of an international mindset.

To guide student global learning, faculty need opportunities to engage globally and develop their own international competence (ACE, 2011). Institutional policies and programs should support such engagement and help faculty incorporate international perspectives into their teaching. An institutional policy may include engaging faculty in increasing their cultural competence by including them in international meetings and seminars. STEM faculty in the study see how their own international skills and experiences play a role in enriching and internationalizing their courses, and they continuously attempt to do so. Many faculty seek the opportunities to internationalize their curriculum and do not wait for the institutions’ effort to involve their faculty in this process. Research on faculty commitment towards internationalization aptly recognizes the important role that lack of experience, interest, and cross-cultural competence plays in preventing faculty members from engaging in international efforts (Andersean, 2003; Green, 2007).
Most participants in the study have a personal interest in diversity and they are either fascinated by cultures or international work, which gives them the motivation and the background to bring in global perspectives in their courses. A few faculty said that using their own experience with international work, and when the content of the course is easy to internationalize, they take the opportunity to internationalize their courses. They also share that it is more work on their part and take pride in their independent work in internationalizing the curriculum. However, they do not get compensated for it. In an ACE report, about 70% of the faculty agrees with the fact that it is a faculty responsibility to provide students with an international education (Siaya & Hayward, 2003). As faculty is in a unique influential position to model an international mindset for students, Paige (2003) suggests a four-tier strategy. For example, one strategy is to reward international activities in the annual salary review of the faculty and another strategy suggests offering periodic course development grants. Previous studies (Backman, 1981; Ellingboe, 1998) and their findings also see institutional rewards and communication structures critical to faculty engagement. The other three strategies include: departmental funding for faculty attendance at international meetings, providing faculty with information and advising about the Fulbright educational exchange program, and offering periodic course development grants to encourage faculty to add an international dimension to their course. A more recent study, by Niehaus and Williams (2015), not only shows institutional interventions and efforts have the potential to help faculty members engage in the process; but also, with adequate support, they can broaden and deepen faculty members’ understanding of internationalization. A faculty development program in the same study increased their motivation when incentivized by a modest stipend. From this information, incentives may be necessary if universities wish to see faculty involved in internationalization efforts.
The interviewees, along with their personal interest to internationalize, indicated how academic freedom can in fact be a barrier to internationalization which confirms existing literature (Mestenhauser, 2000). Academic freedom gives faculty the freedom to teach what they know and what their departments decide should be part of a degree program. Historically, they have enjoyed this autonomy, and no one can tell them what academic and research interests to pursue, how to incorporate new knowledge into their lectures, how to adjust their teaching style or the content of instruction, how to prepare themselves for an academic career, and “whether internationalizing the curriculum is infringing on academic freedom” (p. 33). Welch (1997) extends the historical relationships between faculty and internationalization, tracing the historical roots of the relationship back to Greek and Roman antiquity. Hence, it is no surprise that the academic culture and tradition, when coupled in part with the recent idea of academic freedom, define who determines what is taught in the curriculum. Of course, the challenge today is how to maintain the freedom of inquiry for the faculty while at the same time, teach the educators about the responsibility and how can global knowledge can be integrated with disciplinary knowledge.

There are various initiatives that STEM faculty participants undertook to internationalize their curriculum. It has been recognized that faculty are crucial to internationalization, however, getting them involved is another matter (ACE, 2011). Faculty are extremely busy with myriad responsibilities at work and home, as well as often inherently skeptical of internationalization. Despite these obstacles, seeing the priority many institutions are placing on internationalization, most have at least some level of engagement in the process by at least some faculty. One of the goals of this study was to find out what STEM faculty are doing in their classrooms and what strategies they are using to internationalize their courses, which might help others learn from their efforts. It is to their particular strategies that we now turn.
Diverse Approaches to Internationalizing the Curriculum

The second category of findings focused on the participants diverse approaches to internationalizing the curriculum—what these STEM faculty actually do in their classes to internationalize the curriculum. Almost all faculty in the study either share an add-on approach (such as sharing global examples or history on a topic) or the infusion approach (infuse the curriculum with international content, such as assignments and projects) in internationalizing their curriculum. The add on approach is at the entry level of the conceptual model and has a narrow focus (Bond, 2003). It does not seem that any faculty used the transformational approach, which requires a shift in the ways in which we understand the world. While a couple of students had transformative experiences, where they changed their career choice and one became a vegetarian, it doesn’t appear that this was solely and necessarily related to a curriculum intervention, though it provided exposure to the issues that led to the change. When asked to share their syllabus for the research study, none of the syllabi contained goals or objectives demonstrating that courses were in any way internationalized. All faculty informed me about the absence of international perspective in their syllabi and explained that there is no explicit way that the internationalized content or activity is displayed in their syllabus. They said that they just internationalize by using various examples, projects, and assignments, but these are not very visible as part of the course design. Another strategy suggested and experienced by two faculty was the hiring of international faculty.

In the past twenty years, the number of international faculty members at American institutions has increased at a rapid pace. The number of full-time foreign-born faculty members in 1969 was 28,000 (10% of total) and reached 126,123 in 2007 (ACE, 2011). A couple of faculty in the study shared how the policy of hiring international faculty can represent a more
global perspective. They were experiencing the recruitment of international faculty at their institution. ACE’s effective policy framework perceives that the reason to hire faculty with international background and expertise, adequately reward them for international work, and provide funding and support for them to travel and acquire additional expertise is so that they, in turn, can facilitate the acquisition of international knowledge and competence in their students (Helms & Asfaw, 2013b).

Faculty efforts to internationalize also centered on specific international partnerships (supported with social media, and programs like study abroad); projects and assignments; students and scholar mobility; faculty engagement; and ways of creating global learning communities in the STEM disciplines. As discussed in Chapter Two, there are four approaches to internationalization, stances adopted by persons in leadership roles towards the promotion and implementation of programs aimed at internationalization (Aigner et. al, 1992; Arum & Van de Water, 1992; de Wit, 1995; Knight, 1997). These four approaches being used to describe the concept of internationalization are: the activity, competence, ethos, and process approach. As mentioned in the previous section, the participants in the study, in their statements emphasize creating a culture or climate that values and supports international and intercultural perspectives by their own initiatives, apart from the institutions’ support or mission. This approach by STEM faculty acknowledges that they strongly believe that the international dimension is fundamental to the internationalization of a university, and with this strong belief, they take it upon themselves to internationalize their curriculum. The academic and cultural/social motivations are reflected in measures taken by these STEM faculty in the study, they suggested that their university’s motivation for study programs and degrees all seem to have heavy economic motivations.
Global learning mirrors the interconnected world in which one lives and learns and demonstrates how ideas, communities, and practices intersect and cross borders (Kahn & Agnew, 2017). The STEM faculty in the study shared various global learning communities on and off campus as opportunities that can help them bring international perspectives to their disciplines. It can also be a place, where they can receive support and resources needed to enhance their teaching. As faculty plays a crucial role in institutional internationalization efforts, they serve as the stewards of the curriculum (Helms & Asfaw, 2013a). For them to be able to facilitate the international competence of their students, they also need to enhance their own international competence so that they can apply their own international background and expertise in internationalizing their curriculum. A few faculty participated in international Faculty Development Seminars and faculty-driven initiatives, which are different kinds of global learning communities. The reason to hire faculty with international background and expertise, adequately reward them for international work, and provide funding and support for them to travel and acquire additional expertise is so that they, in turn, can facilitate the acquisition of international knowledge and competence in their students (Helms & Asfaw 2013b). Helms & Asfaw (2013b) point out that institutions should not assume because faculty member grew up in another country, or conducted a joint research project with colleagues abroad, that these experiences will be reflected in the classroom and curriculum. There need to be targeted, well-planned, professional development opportunities, both on-campus and abroad for faculty to enhance their international competence. It is just as important to learn to apply it in their teaching.

Ideally, global classrooms develop learning communities, where all students are involved in a sustained conversation with difference (Kahn & Agnew, 2017). All the participants in the
study were involved in creating such classrooms for their students. It has been stated that not all coursework needs to include global learning outcomes, but the understanding is that all courses can be internationalized, including the hard sciences (Agnew, 2013; Clifford, 2009; Kahn & Agnew, 2017; Leask, 2013). The faculty I interviewed also believe that it is possible to internationalize any discipline. Internationalization of the curriculum is possible in any field of study when the faculty and students become part of the global learning community.

**Implications for Theory, Practice, and Future Research**

Although this qualitative research study adds several insights to the coming of age topic of internationalization in the fields of adult education/lifelong learning and higher education, there is a continued need to follow and explore the reasons why higher education institutions internationalize in a constantly changing political landscape. In our so called, new world order of higher education internationalization is happening in the context of Brexit, inward-looking nationalist governments in Poland and Hungary, and the rise of the populist right and anti-immigrant sentiment in Europe and the U.S. (Altbach & de Wit, 2017). There is a fundamental shift in higher education internationalization, which may mean rethinking the entire international project of universities worldwide. The nationalist-populist movement around the world will have an influence on public discourse on higher education. In the context of our global knowledge society and the rising concern about America’s ability to maintain its competitive position in higher education, the meanings, rationales, strategies, and approaches of internationalization are constantly changing in the STEM fields and need to be understood. This study focuses on how STEM faculty are broadening the global learning experiences for students in STEM courses. In light of the findings of the study, it is important to consider the implications for theory and
practice in Adult and Higher Education, along with limitations of this research and suggestions for future research.

**Implications for Theory and Practice**

Merriam, Cervero, and Courtney (2006) note how globalization is such an exceedingly complex issue and has the potential to build societies, while it also destroys individuals, groups, and communities within nation states. In respect of its impact on adult education, Cruikshank (1995) argues that under globalization, adult education has undergone massive funding cuts; it has been pressured to operate as businesses; profit making has become the priority; and the needs of marginalized groups have been ignored. The findings of the study show how STEM faculty are internationalizing their curriculum without much guidance and support from the institutional administration under the current globalization trends. Under the name of internationalization, universities are rapidly recruiting and desire more international students. As Merriam et al. (2006) suggest, there is an immediate need to respond more critically to the impact of globalization, especially in our higher education institutions. Instead of being invisible, the international dimension of the content should be more explicit in the syllabus and curriculum. Similarly, it should be our goal to improve the quality of STEM education as we prepare graduates to meet the global demands through internationalization of the STEM curriculum. Scholars in adult and higher education must also take a more critical stance on engaging in conversations beyond the local.

This research study was theoretically grounded in the key concepts of internationalization and globalization, against a background of neoliberalism, with a focus on human capital theory and systems thinking. The study was framed through these intersecting frameworks, and the following four intersecting theoretical and practical implications emerged from the literature and
the findings discussed in this chapter: making vivid the neoliberal underpinnings of an internationalist agenda; increasing the support of faculty in their internationalizing efforts; fostering internationalization from a more comprehensive perspective; and finding ways to promote internationalization as a shared vision.

**Making vivid the neoliberal underpinnings of internationalist agendas.** While none of the faculty in the study specifically discussed neoliberalism per se, they were clearly aware that part of the push for internationalization at their universities related to the need to promote revenue. For the most part, this was not their own personal reasons for wanting to internationalize their own curricula. They were more interested in promoting diversity and more global perspectives in a changing world, but they understood the economic agendas of their own universities, living under the umbrella of neoliberalism and global capitalism. STEM faculty are not economists; they are more concerned with teaching the science, technology, engineering, or mathematical concepts in a global world, but clearly, they understand the economic agendas of internationalization. So, one theoretical implication is that it is helpful to make the neoliberal underpinnings of global capitalism apparent in theoretical and practical discussions. Faculty needs to be aware of the neoliberal economic agenda to better implement internationalization, or to fight the effects of neoliberalism if they choose to do so. Whether or not one agrees with the premises of neoliberalism or human capital theory, these are influential economic influences in Western education, which have been setting the framework of government policies since the early 1960s (Fitzsimons, 2015). If STEM faculty primarily emphasize increasing their students’ level of technical skills, these investments will lead to greater economic outputs based on the economic self-interest of individuals operating within freely competitive markets (Almendarez, 2013). However, most faculty in this study, are not primarily interested in serving the
universities’ economic interests; rather they are also interested in preparing STEM graduates for the 21st century by imparting global perspectives to their students and helping them think through values and ethics. Becoming more aware of the neoliberal underpinnings of internationalization gives faculty a tool to discuss and more directly deal with internationalization in theoretical and practical discussions. It is important to focus on the educational content, especially dealing with the curriculum perspective in internationalizing higher education. There needs to be a conscious effort from the university administration and faculty to develop curricula rationales, in addition to the campus-wide objectives informed by intercultural knowledge. Developing greater awareness can also relate to the development of a more shared vision of internationalization, as well as a more comprehensive approach to its development, one that also offers critique of some underlying perspectives of globalization and internationalization.

**Supporting faculty internationalization efforts.** Internationalizing a university can require significant change and is certainly systematically complex (Coryell et al., 2012). Boucouvalas contends that international adult education efforts must be concerned with the individual adult, as well as development of the greater context in which adults find themselves, whether it is the nation, society, community, organization, or group (as cited in Coryell et al., 2012). Moreover, Green (2003) argues that the responsibility of internationalizing higher education lies with faculty, yet it necessitates significant support from institutional administrators. The findings indicate that most faculty were internationalizing on their own due to their personal interest or because their course lent themselves to international content. Stohl (2007) makes the point that “[I]f we want to internationalize the university, we want to internationalize the faculty” (p. 367). Without the institutional support of a formalized international framework for the faculty, some of the participants in this study struggled in trying
to figure out how to internationalize their curriculum; while they figured out some steps on their own through their own interest or international connections, they clearly would have benefitted by more support and direction from their respective universities. Hence, a theoretical implication of increasing faculty support for internationalization is creating an idea where the primary focus would be to facilitate and support faculty in implementation of global concepts for the curriculum. This is a systems thinking approach to actively work with other actors, such as faculty, to promote internationalization. A practical implication to support faculty must include having an institutional structure where the faculty are supported every step of the way. An effective communication between the administration and faculty can result in motivating and training faculty in internationalizing their curriculum. For novice faculty with limited international experience, international seminars can be effective in broadening their perspectives. Faculty that are doing so already help in shifting the culture of the institution, and can work with administrative offices that deal with internationalization issues, and can serve as resources to others who are trying to internationalize their curricula.

This brings us to another implication for practice. Some faculty in the study complained about not being compensated for their internationalization efforts. Hence, another practical implication as Backman (1981) suggested a long time ago is to develop a faculty reward system for their works in internationalizing their curriculum. The compensation can be in the form of tenure, promotions, or funding for faculty so that they can conduct international research. Overall, institutions need to provide faculty with targeted, well-planned, professional development opportunities, both on-campus and abroad (ACE, 2011) that will support them in their internationalization efforts. Faculty will be more likely to participate in internationalization when institutional policies assist in their involvement through strategic reinforcements.
**Fostering a more comprehensive approach to internationalization.** Just as there is a need for greater support for faculty in their internationalization efforts, there is also a need for a more comprehensive approach among faculty. As the findings of the study show, many internationalization efforts of STEM faculty have been based on their own interests and experiences, which is clearly a good starting point. However, universities could also benefit from developing a more comprehensive approach.

The growing importance of internationalization coincides with the decline of public funding for higher education in many parts of the world (Vavrus & Pekol, 2015). If institutions of higher education did not need to be as concerned about economic viability, they would not be dependent on additional revenue supplied by international students. Given that concern for economics is a reality for all higher education institutions, a theoretical implication is that universities might consider a comprehensive approach to internationalization that tends to promote economic concerns, while also promoting significant and meaningful learning opportunities for both students and faculty. A more comprehensive approach would tie internationalization to diversity and inclusion efforts, which could be embedded into the culture of universities garnering inclusive values. A practical implication is a campus-wide dialogue about internationalization in local and global university communities that could help facilitate a paradigm shift involving all levels of administration, faculty, students, and staff.

This paradigm shift relates to helping faculty become more conscious of the neoliberal underpinnings discussed above. Most faculty do not think about the fact that as neoliberal policies took root in the 1980s and early 1990s, many governments drastically reduced public funding for higher education, forcing universities to compete for private funding and student tuition (Torres & Schugurensky, 2002). This led universities to adjust their financing and
governance structures, as well as their activities. Many universities in North America responded to these neoliberal pressures by adopting marketing strategies, especially recruiting international students for higher student fees (Stromquist, 2007). Most faculty in the study shared the increasing desire of their universities to recruit international students, who are seen as valuable economic assets. Hence, higher education internationalization is a set of concepts and a series of operational programs (Altbach & de Wit, 2017) that deal with harsh economic realities while providing meaningful educational opportunities and cross national/cultural dialogue among faculty and students. The concepts include a recognition of the positive elements of globalization and an understanding that it is a permanent element of the world economy; a commitment to global understanding; respect for diverse cultures; and an open society welcoming cooperation between different political, cultural, and economic partners.

Institutions need a holistic or comprehensive approach to internationalization across all areas of activity, along with active involvement of faculty. A comprehensive internationalization strategy views internationalization as a process that is deeply intertwined with the teaching, research, and outreach missions of the university, rather than just as a set of discrete activities like study abroad and international student recruitment (Hudzik, 2011). Comprehensive internationalization integrates international, global, and comparative content and perspective throughout the teachings, research, and service missions of higher education. On the other hand, comprehensive internationalization could be seen as a method that infringes on faculty’s academic freedoms. These can be seen as tensions in internationalization and higher education. Leask (2015) suggests that the internationalization of the curriculum lies at the intersection of policy and practice. Internationalization of the curriculum has the potential to connect broader institutional agendas focused in internationalization with student learning (Leask, 2014).
Unfortunately, the focus of internationalization of the curriculum in policy and practice is more on what some students will experience than on what all students will learn. An internationalized curriculum focused on student learning is defined by two main characteristics. First, it will be connected to the different cultures and practices of knowing, doing, and being in the disciplines through the active engagement of internationalizing the curriculum. Second, faculty who do not have the experience, skills, or knowledge required to internationalize the curriculum will be supported by expert facilitators in the process of defining intended internationalized learning outcomes and assisting all students to achieve them. This is part of the process of providing a more comprehensive approach to internationalization which also relates to the idea of developing a vision of internationalization that can be shared by most faculty and students.

**Promoting internationalization as a shared vision.** The study shows that STEM faculty support internationalization and there is an increasing relevance of the topic. Most faculty understand this and would agree with this as a fact. While they might understand the reality, they might not necessarily share a common view of internationalization or share a vision of what the university should be doing. This aligns with the findings of the study since each STEM faculty was internationalizing their curriculum as they saw fit. Even at the institutional level, internationalization was implemented as it best suited the needs of the institution as evidenced by the sudden increase and desire for international students. A more comprehensive approach can benefit from a vision of internationalization that can be shared by most. If internationalization brings diversity to the institution, then being diverse and inclusive must be that shared vision that the institution should move towards, where internationalization can have a positive impact.

The research points to the need for an institution to identify contextually influenced grounding in which faculty, students, administrators, and staff can come together to work toward
consensus (Coryell et al., 2012). A theoretical implication here is tied to comprehensive internationalization and systems thinking, where all actors in an institution help shape the higher education enterprise to be more inclusive. Moreover, there needs to be an overarching understanding of internationalization, as a concept, so that there is a central interest in the internationalization of higher education and it is commonly understood across the institution. The institutions need to engage in a thoughtful internationalization process, instead of responding to the pressure of decreased funding and globalization. As a practical implication, the institution must be operationalized within and across academic programs and administrative functions. An ongoing commitment to internationalization should lend itself to an action-oriented approach that impacts external and internal aspects of campus life, that faculty and students can generally support and buy into. This may include establishing internationalization goals by institutional leadership influencing all faculty, staff, and students in all disciplines. Once the goals are set, the administration must carefully add some incentives for the faculty to get interested in the internationalization efforts. It is clear from the participants’ comments that there is no well-defined campus vision on most of their campuses that they can identify as they internationalize their curriculum. Of course, this is partly due to the fact that this is an ongoing process, but one that needs to be attended to so that faculty can get involved and take more part in developing and buying into a vision of what internationalization might mean for their institutions. This idea of a shared vision must be promoted by honestly admitting internationalization as a source of funding, and also engaging in a complete, transparent, and considerate process of internationalization that brings diversity to the institution through student recruitment, international research collaboration, engaging students in international projects, and study abroad.
Limitations and Suggestions for Future Research

The study offers some important insights for how STEM faculty are dealing with internationalization. Nevertheless, there are several limitations to this study that are important to address. This section describes the limitations identified in the study, along with associated recommendations for further exploration. The first limitation of this study is the fact that there are only eight participants in the study. I contacted many faculty for the study this past year and a half, but was only able to secure eight in the STEM discipline who agreed to be interviewed. I am not sure if many STEM faculty are not internationalizing their curriculum or the faculty are just busy and did not have time to participate in the study. While it is difficult to know whether added participants to the study would have changed the qualitative finding, surely additional participants would add more detail about their perspectives, roles, and strategies that help to internationalize their curriculum. Hence, one suggestion for further research is to develop a quantitative survey based on the findings of this qualitative study to see how findings hold up across STEM faculty in different types of institutions. This as a next step would make this study in combination with this quantitative follow-up, a type of mixed methods study what Creswell and Creswell (2018) refer to as an exploratory mixed methods study.

A second limitation of the study pertains to the limitations of language and what people really when they use the terms internationalization or globalization. The fact that I offered the participants a choice of definitions of the terms, given that the participants were using the two terms globalization and internationalization interchangeably, could be seen as a limitation of the study. I was intrigued by this confusion in use of the terms among the participants, and decided to include this in my findings, even though they were not explicitly answering the same question about this aspect. In retrospect, I could have asked my participants to define the two terms
themselves, rather than offering them a choice of definitions. Even if the faculty did not know the precise definition of internationalization, I could have insisted that they define it in their own words and what the term means to them. In other words, I am making an educated assumption in the study about the interchangeable use and confusion about the terms internationalization and globalization. Thus, another recommendation for the future research is to give the participants a specific question to differentiate the two terms.

The third limitation of the study is related to gathering data, which is a vital part of the research process. Due to distance and time constraints, the interviews were conducted on the telephone. Although a good rapport was established during the course of each interview, I feel that I would have been able to personally connect better with my participants in face-to-face interviews. This was a less personal way to collect information because the visual communication was missing. Future research could include face-to-face interviews, where the interviewer will have a better opportunity to make that personal connection with participants, as well as be able to easily probe for explanations of responses. I also felt that if I was interviewing them in person, they might have felt safer and be more willing to share some of the more controversial topics. Face-to-face interviews could have led to deeper discussions on globalization and current neoliberal times. On the other hand, the anonymity of telephone interviews may have been a reason why the participants were forthcoming with their experiences.

Fourth, while the STEM disciplines were well represented, half the faculty were still from the Engineering field. Only four participants were from other fields: Computer Information Systems, Chemistry, Health Sciences, and Earth Sciences. Future research should examine a more diverse selection of STEM discipline fields. If such a study were done from a quantitative
perspective, it might be possible to see if there are any statistically significant differences among STEM disciplines. In terms of future research, keeping ethos and values in mind, more research is needed in the internationalization of the curriculum.

Next, while it may seem in the study that all faculty were involved in internationalization, it is important to remember that this study only chose to interview select faculty in the STEM disciplines who were internationalizing their curriculum. Since the priority on global and international issues has grown in recent years, it is my hope that others will continue to expand on findings to create a deeper and more meaningful learning experience for our students. Finally, the timing of the research with the rise of neoliberal globalization and economic nationalism now sweeping across many countries warrants new research drawing on faculty’s perspective on this phenomenon.

In spite of these limitations, the study makes an important contribution to the area of globalization and internationalization in lifelong learning and adult education particularly among STEM faculty in a higher education context. The study made use of a rigorous methodology. While further research needs to be done, this is an important first step.

**Conclusion and Final Reflections**

This study was about examining how STEM faculty are internationalizing STEM curricula. As such the study was conducted partly to find meaningful and practical insight for internationalizing the curriculum, in order to bridge the gap between rhetoric and practice by not just seeing the international students as revenue generators, but including and valuing their contributions. The findings of the study suggest that the faculty included in the study believe the focus should be such that STEM graduates demonstrate an international perspective as global professionals and citizens. The internationalized STEM curriculum should broaden the scope of
the subject such as Science, Technology, Engineering, and Math by including international content assisting the graduates in the development of cross-cultural communication skills. This qualitative research study focused on STEM faculty’s roles and perspectives in preparing undergraduate students for today’s workplace, within the theoretical underpinnings of globalization. As de Wit (2018) notes, the global landscape for higher education internationalization is changing dramatically due to forces that gave rise to Trump and Brexit; however, globalization and internationalization will continue in one form or another beyond how the world deals with either Trump or Brexit.

U.S. higher education has an important role to play, where it connects the United States with the rest of the world, and where it helps people cultivate critical thinking skills that can relate to globalization and internationalization and move it to more democratic ideals, rather than a focus on economic interest. The participants in the study see a sense of relevancy of the topic as they shared their perceptions and several student benefits of internationalizing students in a way that promotes diversity and cultivates critical thinking. While there are increasingly robust political, economic, and academic challenges to the internationalization process, there is an increasing interest in internationalization worldwide (de Wit, 2018). This study keeps in mind and to some extent validated, the increasing commercialization of internationalization, the one-sided focus on mobility, and recruitment and the related loss of the ethical values that are at the core of internationalization (Brandenburg & de Wit, 2011). But the concern that faculty had for issues of diversity were palpable.

During the research project, I often wondered about the direction of higher education internationalization in light of the current political environment. With Donald Trump becoming president in the United States and Brexit happening in the United Kingdom, there has been the
rise of nationalist and anti-immigration politics in the Western world (Altbach & de Wit, 2018). The success of right-wing nationalist and populist forces will probably have a significant impact on higher education policy and internationalization, but the specifics are not yet clear. However, the good news is that knowledge remains international and most universities recognize that providing an international perspective to students is central in the 21st century. Further good news is, despite Trump’s policies, the numbers of international students to the United States continue to grow, albeit slowly (Usher, 2018). The December 2017 SEVIS release indicated there were 1.21 million international students in the country, compared to 1.16 million 18 months earlier, in May 2016. Hence, most relevant concerns are academic freedom, quality, and ethics (Altbach & de Wit, 2018).

As the journey of internationalization continues, we must ensure there are values of cooperation, mutual understanding, exchange and partnerships among nations. van der Wende (2018) rightly suggests, internationalizing the STEM curriculum should not be undertaken by international officers or experts in isolation from the academics working in the subject fields. The alternative approach to international student recruitment and other forms of economic rationales needs to be based on a stronger emphasis on comprehensive internationalization and internationalization at home. Keeping in mind that no institution can undertake all the suggestions, but each institution can further develop their internationalization efforts at the campus and curriculum level. The findings indicate that the internationalization of the curricula should be encouraged if the quality and competitiveness of higher education is to be maintained in an increasingly globalized neo-liberalized market. It is crucial that we take the lead in helping our educational institutions to internationalize in ways that are consistent with the core values of higher education.
In coming to conclusion of the study, I’d like to offer some final reflections on the journey of completing this doctoral degree. Initially, choosing a topic for my research was daunting, given that when I chose the topic I was still in the midst of coursework. The field of lifelong learning and adult education recognizes that we can gain knowledge from a whole variety of settings. While formal education institutions are important learning centers, we also gain knowledge from non-formal and informal settings (Merriam, Caffarella, & Baungartner, 2007). My interest in conducting a study about the internationalization and globalization of higher education stemmed from my informal learning setting. My immigrant background, former adjunct faculty status, and the desire to adopt a career in higher education in the future helped me veer in this direction. My pursuit to learn and understand the world as an immigrant today played an important role in finally deciding on my topic. Besides the topic, I also learned through the help of librarians how to research and some valuable searching techniques. I certainly had some challenging moments during this process, including finding STEM faculty who were internationalizing and were willing to participate in the study. I emailed hundreds of faculty, before I was able to acquire eight for this study. Nevertheless, having the opportunity to interview these eight participants yielded some interesting insights related to the study.

I saw myself in the growing number of adult students on college campuses. My main reason for continuing my doctorate degree in my late forties was because I took care of my family when my children were young. After taking a break, it was difficult to keep up with the rapid pace of technological change and my masters in Management Information Systems was not easily applicable as we also chose to stay in a small town. Hence, I got my teaching certification to be able to teach Business Studies as my daughters were getting older. During the time I was done, the teaching jobs were also not readily available. While I was an adjunct faculty at a local
community college and always had the desire to be a lifelong learner, I decided to pursue my doctorate in Adult Education. My aim is not just to be able to experience academic success in higher education to obtain economic and personal benefits, but also to provide social and economic benefits for my community and the broader society.

The Adult Education Doctoral Program at Penn State was an enriching experience for me as I was able to bring my past life experiences to my courses and coursework. I felt like I was ready to learn about adults as I was dealing with them in my personal and professional life. This continued involvement with academics has given me more confidence and belief in myself that I can learn successfully throughout my life. I have been fortunate to be have been involved in various projects in my residential community. I am also internally motivated to contribute socially in organizing some social and educational events with the local Young Women’s Christian Association. This past year, I helped arrange a variety of forums on several topics such as: racial profiling, immigration, human trafficking, and women in the STEM field. Currently, we are working with the local community theatre to put together a show on diversity monologues. As a lifelong learner, I have learned that my motive for participating in adult learning is the desire to contribute to the community, promote social change, and be a responsible global citizen. Because of this, I am hopeful that my future years will provide me with a rewarding career and life by further enhancing my understanding of the world.
APPENDIX A

Interview Guide

1. How did you come to teach here? What kinds of students take your class?
   (Prompt) What background do your students predominantly come from—what majors?

2. Please tell me some basic information about yourself (age, education, and occupation)?
   (Prompt) What classes do you teach? Students from which majors take your classes?

3. i) Either share your own definition of internationalization or ask them to define it.

   **Internationalization of higher education** is defined as the variety of policies and programs that universities and governments implement to respond to globalization (Altbach, Reisberg, & Rumbley, 2009). Knight (2004) defined it as the process of integrating an international, intercultural and/or global dimension into the goals, functions (teaching/learning, research, service and delivery of higher education).

   ii) How do you perceive that internationalization is impacting higher education in the current global knowledge economy?

4. i) In what ways does your institution encourage or discourage internationalization?

   (Prompt) Can you describe specific internationalization initiatives, operations, etc. at your institution? ii) Which ones of these internationalization strategies are the most effective at your institution? Why?

   (Prompt) How do you think they are productive in terms of fitting in the curriculum design, as well as meeting other needs of the institution?

   What more can your institution do in terms of internationalization that can help your curriculum?
5. i) What most excites or frustrates you about internationalization in your institution?  
   
   ii) How have the internationalization efforts in your discipline enhanced or hindered your academic program/discipline?

6. i) How do you describe your institution from a “highly internationalized” to “lowly internationalized” among the higher education institutions in the U.S?  

(Prompt) On a scale of 1-5, how internationalized do you think your program and institution are? Why do you rate your program and institution in such a way?

7. What do you think is the real purpose that your institution chooses to internationalize? Do they align with your purpose and how?

8. What drew you to the internationalization aspect? Have other faculty in your discipline been as supportive and enthusiastic about internationalization? Do you think it is possible to internationalize any program?

9. In your opinion, how should global competence be taught in the STEM academic disciplines such as Science, Technology, Engineering, and Mathematics?

10. How do you view your role as STEM faculty in preparing students for the globalized workplace?

11. Can you describe some specific internationalization strategy(ies) you use in your teaching of technical (STEM) courses to instill global perspectives in your students and respect cultural differences in others?

12. This is a qualitative research study, can you please share some stories in depth, where you thought the internationalization strategies you used in your classes helped your students in creating a global mindset?
13. Do you think that your syllabus or your curriculum show that you internationalize your curriculum? Can you please share your syllabus and curriculum with me?

14. Do you think we should be striving to increase internationalization and global engagement? What are your thoughts as you see in many countries the escalating trend towards isolationism and inward-looking nationalism?

Do you have anything else you would like to add to this topic? Do you have any questions for me?
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Vita

Monica Lamba Bajaj

Monica Bajaj was born in India, where she completed her under graduation in Business studies from Delhi University. She moved to the United States in 1991 and received her Masters in Management Information Systems from Penn State, Harrisburg. Monica taught Computer Information Systems at the Harrisburg Area Community College for seven years as an adjunct faculty, simultaneously working from time to time in the public-school system. She has a teaching certification and currently teaches Business classes at the Conewago Valley School District. She decided to pursue her doctorate in Adult Education at Penn State Harrisburg from 2013-2019 under the mentorship of Dr. Elizabeth J. Tisdell, Dr. Edward W. Taylor, and Dr. Robin Redmon Wright.

As a doctoral student, Monica has been participating in planning various community forums aligned to the mission of the YWCA: eliminating racism, empowering women and promoting peace, justice, freedom and dignity. She helped in planning the following activities and forums with the local YWCA: International Day, Racial Profiling, Immigration, and Children’s Trafficking. She was also part of the Adams County Human Relations Council and is currently involved in a grassroots campaign to reduce plastics in our lives. She wants to continue to volunteer to create real change for women and families in our community. In her free time, Monica also enjoys to play league tennis, swim for a masters team, ski for fun, and read.