Influence of Academic Integration, Social Integration, and Finances on the Persistence of International Graduate Students at a Mid-Western University

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Abstract

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Influence of Academic Integration, Social Integration, and Finances on the Persistence of International Graduate Students at a Mid-Western University

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Student persistence, which is student's progress towards graduation through achieving or meeting educational goals, is widely studied. The focus of a majority of the studies on student persistence is on students at the K-12 and undergraduate levels. Furthermore, while persistence of graduate student population was studied, such studies focused on domestic student, and not international students. International graduate students are important for educational institutions. The pedagogical and financial impact of international graduate students on educational institutions is significant, yet their retention and persistence is understudied. The current study was an attempt to enhance our understanding surrounding student retention and persistence.

Research on student retention and persistence is greatly influenced by the works of Vincent Tinto, one of the earliest researchers to incorporate sociological research into their work on student persistence and, who in the early 1970s, developed what is probably the very first predictive model of student persistence. Tinto's (1993) model of student persistence, known as *Tinto's Institutional Departure Model* (TIDM), suggests that a student's integration into the academic and social fabric of the educational institution (i.e., academic integration and social integration) predicts their persistence. Subsequent research, across different student populations and at different levels of

education, has shown that academic integration and social integration play an important role in determining persistence of students, validating the core finding of Tinto's model.

Student persistence decisions are complex and are influenced by a variety of factors. For example, finance plays an important role in not only access to education but also influences academic integration and social integration. This was highlighted by the works of Pascarella and Terenzini (2005), and Cabrera and colleagues (Cabrera, Nora, & Castañeda, 1992; Nora, Cabrera, Hagedorn, & Pascarella, 1996) who have shown that while financial aid can help, the effectiveness of the assistantship varies, depending on the type of financial aid awarded to individual students.

This was a quantitative study using a correlational research design approach. The sample of participants for the current study consisted of international graduate students from Ohio University. The data was collected using a Qualtrics survey. The survey instruments were tested and validated using exploratory factor analysis and confirmatory factor analysis, respectively. Robust statistical analyses of the data were performed using approaches such as descriptive statistics, frequency distribution, correlation, ANOVA, regression analysis, path analysis, and structural equation modeling.

Results of regression, path analysis, and structural equation modeling showed that academic integration, social integration, finances, and GPA were statistically significant predictors of persistence. The results also showed that academic integration was a mediator variable for social integration. These results confirmed the findings in the literature and showed that these variables are important to understanding the persistence of international graduate students.

Dedication

Dedicated to my parents and to my husband

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Chapter 1: Introduction

International students provide various benefits to their host institutions in the US. For example, "according to the U.S. Department of Commerce, in 2018 international students contributed $45 billion to the US economy and supported 458,000 American jobs" (Congressional Budget Justification, 2020, p. 31). International students bring their own perspectives, influenced by their culture and traditions, with the resulting diversity benefitting the domestic students, broadening their knowledge, and making them more attractive to future employers. In addition, the faculty are provided with various viewpoints and ideas for future research and collaboration. This asset to the faculty can be coupled with the possibility that it can build life-long friendships (Luo & Jamieson-Drake, 2013). Finally, such people-to-people contact can improve relationships between countries, with the students being ambassadors of friendship and mutual respect. Considering the vast benefits of having international students, it is important to understand factors that influence the persistence and retention of these students.

In general, the terms persistence and retention refer to "the continued enrollment of students, usually fall to fall re-enrollment" (Braxton, Brier, & Steele, 2007, p. 378). While these terms are often used interchangeably, the National Center for Education Statistics "differentiates [between] the[se] terms by using 'retention' as an institutional measure and 'persistence' as a student measure" (Hagedorn, 2012, p. 85). Thus, it can be summarized that an increase in student persistence may result in corresponding improvement in student retention.

Background

Education is an important tool for both social and economic development. An educated population can drive the growth of a nation and education helps in improving an individual's socioeconomic status (Hannum & Buchmann, 2005). There is a great emphasis on education in both the developed and under-developed regions of the world. Consequently, these nations have dedicated increased resources to education. In addition, students and their families are also taking on additional financial burdens to improve their own chances for upward mobility - with students tending to move in search of countries and institutions that are intellectually worthwhile - under the assumption that such an environment would be conducive for their future career prospectus.

The history of educational policies in the US indicates that they are predominately a domain for individual states – albeit with guidance from the federal government. The first major initiative was the passage of the Morrill Acts in the 19th century that led to the establishment of land-grant universities - most of which have turned public while a few remain private non-profits (Brunner, 1962). Subsequent initiatives include the G.I. Bill (Altschuler & Blumin, 2009), the Elementary and Secondary Education Act (Skinner, 2019), and the Higher Education Act (Hegji, 2014). These initiatives have led to federal expenditures on higher education exceeding $75 billion in 2013 (Stauffer & Oliff, 2015). The federal funds supplement state and local sources - which in 2013 exceeded $90 billion, which was in addition to over $240 billion in state funding for elementary and secondary education (Stauffer & Oliff, 2015).

The increased resource allocation by federal and state governments has brought into focus the need for policy makers to understand and address factors that affect educational outcomes. An important factor that affects the educational outcomes and policies is student dropout, i.e., students quitting their education before they graduate. Over the last 70 years, researchers have conducted several studies in their attempts to better understand the factors that affect student dropout. For educational institutions, it is important to understand the factors that affect student decisions regarding dropping out and/or persisting, so that appropriate retention policies can be formulated because institutions and society as a whole, in addition to the individual student, are affected by student attrition (Tinto, 1993).

Students' persistence is one of the major concerns of educational institutions because it is directly related to the graduation rates – an index widely used as a measure of the institution's success (Zhang, 2009). One of the most widely used theories of student persistence is Tinto's model of college student attrition (Tinto, 1975). The core concept of the Tinto's model is that students' persistence rates are determined by the level of their integration into the institution's social and academic systems (Mannan, 2007). The term integration refers to "the social and academic adjustments of a student to an academic institution" (Jean-Francois, 2019, p. 1071), a definition that will be used in this study.

The concepts of academic and social integration were first formulated by Spady (1970, 1971). Tinto (1975, 1993) investigated their importance in understanding and predicting college students' decision to persist or leave. These concepts form the core of

Tinto's Institutional Departure Model (TIDM); (Tinto, 1975, 1993), which have subsequently been validated by other researchers, including studies investigating attrition issues faced by a wide range of student populations (Aljohani, 2016; Ashar & Skenes, 1994; Strauss & Volkwein, 2004; Terenzini & Pascarella, 1980). Hence TIDM can be considered as one of the finest models and could be used to examine students' persistence.

Persistence decisions are complex, and research has shown that factors such as goal commitment, sense of belonging, family background, and finances also play an important role in determining student dropout (Hausmann, Schofield, & Woods, 2007; Pantages & Creedon, 1978; St. John, Cabrera, Nora, & Asker, 1997). While multiple theories of student attrition have been proposed (Bean, 1982; Metz, 2004), Tinto's TIDM (1993) is one of two theories providing a comprehensive framework (Cabrera, Nora, & Castañeda, 1993). TIDM is based on the concepts of academic and social integration and forms the core of the framework used in this study.

Due to the vast differences in cost of living (and consequently income levels) between the US and most nations the relative cost of education in the US can be orders of magnitude higher for international students. This phenomenon might consequently limit the financial support that could be available from family and other sources in the student's home country, potentially making finances an important factor in determining persistence of international students. Financial support, through scholarship, assistantship, or other means, from the US institution can mitigate the financial needs of international students. However, this is an additional load on the resources of the

educational institution, hence the influence of finances on persistence of international graduate students will also be considered in this study, in addition to academic and social integration.

Problem Statement

Following the economic recession in 2008 there has been a decrease in state support for higher education in the US., with an average of 13% decrease in spending per student between 2008-2018, resulting in tuition rates at four-year public colleges increasing by 37% (Mitchell, Leachman, & Saenz, 2019). In an attempt to generate revenue and limit tuition increases, educational institutions are attempting to recruit international students using the long history of cutting edge research, rigorous scholarly work and intellectual openness in the US (Cantwell, 2015; Hegarty, 2014). International students generally pay full tuition and thus contribute to the finances of educational institutions in the US, in addition to their pedagogical contribution.

Institutions of higher education can devote considerable resources to recruiting and supporting their international students. Thus, when an international student drops out of an institution it is not just a social loss but also an economic loss, and such attrition can affect the recruitment of new international students. While both undergraduate and graduate international students help pedagogically, those at the graduate level (along with their domestic peers) play an important role because graduate students are actively involved in advancing their fields through research with faculty members, particularly their faculty mentors. Considering the pedagogical and financial advantages of having international students and the resources devoted to recruit and subsequently support them,

it is important for institutions of higher education to better understand the factors that affect the persistence of their international students. And, a better understanding of the factors can enable them to increase their international student retention rates. Further, during the present uncertainty and disruptions caused by COVID-19, with a forecast of decreasing international student enrollment (Blagg, 2020; Dennis, 2020; Turk, Soler, & Ramos, 2020), understanding and addressing factors affecting retention and persistence of international students is imperative.

Students' persistence and eventual graduation are major concerns for educators and policy makers (Bailey & Alfonso, 2005). Research has shown that academic and social integration are critical factors in determining academic achievements and persistence and retention of students (Mannan, 2007; Strage, 1999; Terenzini & Pascarella, 1977). Research has also shown that finances can affect persistence both directly and through their effect on academic and social integration (Cabrera, Nora, et al., 1992; Nora, 1990; St. John et al., 1997).

Significant research exists regarding the persistence and retention of domestic students in institutions of higher education in the U.S. However, limited studies have been completed to understand the persistence and retention of international students (Mamiseishvili, 2012). At a time when there is an increased demand for graduates with international experience among employers (Rienties, Luchoomun, & Tempelaar, 2014) this limitation appears to need attention. Also, the focus of research on student persistence and retention has generally been on undergraduate students. Cooke et al. (1995) suggested that the relative paucity of research on attrition of graduate students can

be explained by “the smaller number of graduate students makes them less important strategically to universities overall” (p. 678). Hence this study represents an attempt to address the gap in knowledge and to help gain a better understanding of the factors affecting international graduate student persistence.

Purpose of the Study

The purpose of this study was to explore the influence of academic integration, social integration, and finances on the persistence of international graduate students at a mid-western university using a quantitative research approach. Research over the last few decades has shown that students’ persistence is influenced by their academic integration, social integration, and finances. In this research, academic integration and social integration were defined as students’ perceptions of their assimilation into the academic and social environment of the university and/or community. The focus of persistence research is generally on domestic high-school, two-year college, and undergraduate students. Researchers have also focused on specific subsets of these populations, such as first generation, minority, women, and non-traditional students. However, the focus on graduate international students is generally lacking, with studies generally focusing on undergraduate students. This study was an attempt to address this limitation. More specifically, this study: a) examined the levels of academic integration, and social integration; b) examined the levels of academic integration and social integration based on gender, level of education, and program type (STEM/non-STEM); and c) determined the associations between academic integration, social integration, finances, and persistence of international graduate students at a mid-western university. Note that

science, technology, engineering, and mathematics, including computer science, disciplines are collectively known as STEM ("Science, Technology, Engineering, and Math, including Computer Science (U.S. Department of Education, n.d.).

Research Questions

The main focus of the current study was to address the limitations in the existing literature and fill in the gaps in the current knowledge about the factors that influence persistence and retention of international graduate students. This research area is very broad and was certainly difficult, if not impossible, to address in a single study. Considering the challenges, this study was limited to broadly addressing the question: how do academic integration, social integration, and finances influence the persistence of international graduate students at a mid-western U.S. university? The university selected was Ohio University, a R2 doctoral university (About Carnegie Classification, n.d.). The Carnegie classification of institutions of higher education defines a doctoral university as one that "conferred at least 20 research/scholarship doctorates … and reported at least $5 million in total research expenditures" (Carnegie Classifications, n.d., para. 4). And, it uses two measures, namely aggregate level of research activity and per-capita research activity, to further categorize the doctoral universities. A doctoral university is categorized as R2, or a high research activity institution, if it scored "high on at least one (but very high on neither) [measures]" (Carnegie Classifications, n.d., para. 5).

The specific research questions formulated to address these issues were:

1. What are the levels of academic integration and social integration of international graduate students at Ohio University?

2. Are there differences in the levels of academic integration, social integration, and persistence among international graduate students based on their gender Graduate Program Classification (GPC), STEM Program Orientation (SPO), and world regions?
3. Are there predictive associations or relationships between academic integration, social integration, finances, and the persistence of international graduate students at Ohio University?

Significance of the Study

A long history of cutting edge research, rigorous scholarly work, and intellectual openness in the United States (US) has attracted students from around the world to its institutions of higher education (Altbach, 2004). In the present global order, US is one of the top choices for international students seeking higher education in the western world (OECD, 2020). On a parallel note, institutions of higher education in the US are also actively trying to attract such students and enroll them in an attempt to increase their own academic, intellectual, and cultural diversity (Andrade & Evans, 2009; Wildavsky, 2010).

Educational institutions, like all organizations, have finite resources and unfortunately during times of economic challenges investment in education is decreased because the *returns* that society observes on such investment is not immediate and is hard to quantify. Hence, educational institutions would prefer to allocate resources in a manner that minimizes *waste*. Students dropping out and not graduating is one mode that causes waste of resources, and leaders in educational institutions are interested in knowing,

understanding, and appropriately addressing the factors that affect student persistence and retention so as to minimize, if not eliminate, student dropout.

Using a framework grounded in models that were rigorously tested, this study attempts to determine relationships between academic integration, social integration, finances, and persistence of international graduate students. The results of this study can help stakeholders understand the factors that affect persistence and retention of international graduate students and holistically address them. The results can also act as a basis for other researchers to further develop the field.

Potential Audience

Research has shown that institutional climate influences student persistence and retention (Oseguera & Rhee, 2009), consequently lower student retention rates can lead to an institutional climate unconducive to student persistence and subsequently causing a spiral down of student persistence and retention rates. Hence, the potential audience for this study are the stakeholders such as faculty, administrators, parents, students, and the broader community. The significance of this study lies in its attempt to understand factors that affect persistence of international graduate students, a population that is not adequately studied. The results of this study have the potential to both provide a pathway for future studies and to help inform decision makers in planning and implementing efficient strategies and policies to improve persistence and retention of international graduate students. In the present environment, due to disruptions caused by COVID-19, most colleges foresee falling international enrollment (Redden, 2020), with surveys pointing to both decreased enrollment (Martel, 2020) and financial losses of up to $3

billion (NAFSA, 2020). Due to the projected decreased enrollment and resulting decreases in revenues, it is important for higher educational institutions to address in a better and more efficient manner the factors affecting persistence and retention of their students because such efforts can represent the framework to attract new students.

Significance for Educational Leaders

Student persistence and retention are of importance to educational leaders because of their moral commitment and responsibility to the students and the community, and not just due to the financial and accountability issues (Braxton, Hirschy, & McClendon, 2004). Hence, institutions need to follow best practices and create effective student retention programs using principles proposed and recommendations made by researchers. For example, Tinto (1993) has proposed three guiding principles for successful student retention based on study of retention programs at different colleges and universities, while Braxton and Mundy (2001) provide a list of 47 recommendations made by researchers that flow from the principles proposed by Tinto (1993) or from theory and practice.

Research has shown that classroom experiences (Braxton, Milem, & Sullivan, 2000) play an important role in determining student retention and persistence. This was empirically observed in studies by Nora et al. (1996), Hurtado and Carter (1997), and Tinto (1997). Educational leaders have the responsibility to formulate and implement suitable policies in furthering the mission and goals of their institutions. Thus, studies such as this are important for educational leaders because existing retention programs need to be tested. The results of this study will help educational leaders in their decision

making through providing them with both a better understanding of the efficiency of retention programs presently implemented and ideas for future studies. The results will also help educational leaders in lobbying other stakeholders such as policy makers and the community for support.

Assumptions

The following assumptions were made in conducting this study:

1. That international students are an asset to educational institutions.
2. That international graduate students would be willing to participate in the study and will answer the survey questionnaire accurately based on their real-life experiences.
3. That data collected and results obtained in studies regarding the conceptual framework and the variables upon which it is based are accurate.
4. That the conceptual framework model developed for this study captures the variables of interest with respect to higher education.

Delimitations and Limitations of the Study

Identifying limitations and delimitations of the study will help guide the readers to appropriately place the results in the broader context and to draw conclusions. The major limitations have to do with the sample size, and the non-longitudinal nature of the study. The quantitative nature of the study is another limitation, because the survey allowed participants to provide limited and pre-determined responses to the questions, wherein the results may lack the depth that a qualitative study can provide. The disruptions caused by the COVID-19 illness are another major limitation, with educational institutions abruptly

closing for in-person instruction in March 2020 (Sahu, 2020) and with closure continuing to end of summer 2020, if not longer, (Paltiel, Zheng, & Walensky, 2020). The data for this study was collected during late summer/early fall of 2020, during a period of uncertainty for students.

The delimitations are a result of the target population and the site selected for the study. That is, the research was focused on international students pursuing graduate degree at institutions of higher education and the study was conducted at a single institution. Other delimitations are a result of the variables chosen. While persistence is a consequence of complex interactions among multiple factors, only three factors, namely academic integration, social integration, and finance were being considered in this study.

Researcher Bias

The focus of this study is on international graduate students. The study site is Ohio University. Currently, I am an international graduate student at Ohio University. This overlap, between my study, its setting, and my personal characteristics can potentially introduce some bias. The various means through which bias can seep into this study are bias in instrument design; cultural bias; and confirmation bias.

While bias in a research study probably cannot be eliminated completely, steps can be taken to minimize the effects of the same. In this study I have attempted to suitably address and minimize the bias. The items used in this study were obtained from instruments that were designed, tested, and validated by other researchers in multiple studies involving diverse populations. Further, though not all items from the original instruments were used, the order of the questions and the scale used were similar. Thus,

no researcher bias was involved in designing the items. With regards to the instruments, the major source of bias was in selecting the source of the original instruments. Considering the potential for bias in self-designed items, any resulting bias in this situation is unquestionably lower.

Rigorous statistical analyses were performed, and the results obtained analyzed through comparison with results from literature, including many that were replicated in multiple studies. This should minimize, if not eliminate, confirmation bias. With regards to cultural bias, the rigorous statistical analyses performed and the selection of items from instruments validated by others should minimize the bias.

Motivation for the Study and Disclaimer

As an international student I experienced some challenges integrating into the community, both academically and socially. Further, I observed friends facing challenges and dropping out either due to lack of academic integration (i.e., inadequate academic performance) or lack of social integration. Due to this I developed interest in understanding factors affecting persistence of international students. This interest led me to explore the literature on student persistence during various courses. The study of the present literature highlighted the gaps existing in the understanding of student retention and persistence, especially as they relate to international graduate students. Hence, I chose to study this topic in the present study.

While the data for this study was collected during summer/fall 2020, a period of uncertainty and disruptions caused by COVID-19 (Martel, 2020; Paltiel et al., 2020), the study started before these disruptions occurred. The COVID-19 disruptions forced

universities to cancel in-person or face-to-face classes and move to online only classes, with restrictions on physical contact. These changes, a move towards online only classes, was sudden and occurred in March 2020, in the middle of Spring semester (Sahu, 2020). Hence, it is possible that the students' perceptions of the sudden change and any difficulties they faced as their educational institutions rushed towards addressing the fast-changing situation may have influenced their responses to the survey used in this study. Due to the quantitative nature of this study, the potential effects of COVID-19, if any, on the participant responses cannot be fully captured in this study.

Definitions of Terms

The following glossary of terms was defined for this study and is used throughout. The definitions are included for clarification and to help provide the reader with an understanding of the terms as applied to this dissertation.

Academic Integration – a student's integration or connection with the academic structures/life of an educational institution (Jean-Francois, 2019).

Departure – defined as leaving the institution without a degree and not returning/transferring (Hagedorn, 2012).

Enrolled – a student enrolled/registered for one or more course(s).

Finances – Financial resources that a student has access to during their program (St. John et al., 1997). This includes financial aid (scholarship / assistantship / loans) and financial abilities (personal / family resources).

Financial Aid - money to help pay for education, e.g., grants, assistantship, loans, and scholarship ("Types of Financial Aid | Federal Student Aid," n.d.).

Financial Attitude – an individual's state of mind, opinion, or judgement about finances (Cabrera et al., 1993).

Graduate Student – a student "who has earned a bachelor's degree and is pursuing additional education in a specific field" (EducationUSA, 2020, para. 1).

Graduate Program Classification (GPC) – graduate programs categorized along masters' (STEM), doctoral (STEM), masters' (Other), and doctoral (Other).

Gender – male or female. Gender is frequently used as a binary variable (male/female or boy/girl) in social science research, especially when studying gender differences in education. For example, see Penner and Paret (2008), Smith et al. (2002) , and Subrahmanian (2005). Hence, it is appropriate to use a binary option for gender in this study.

International Student – "students who left their country of origin and moved to another country for the purpose of study" (OECD, 2020, p. 207).

Major – the student's educational program of study.

Persistence – the progressive college reenrollment of student from one academic term to the next academic term (Pascarella & Terenzini, 1980).

Social Integration – a student's integration or connection with the social structures/life of an educational institution (Jean-Francois, 2019).

STEM - science, technology, engineering, and mathematics, including computer science, disciplines are collectively known as STEM ("Science, Technology, Engineering, and Math, including Computer Science (U.S. Department of Education, n.d.).

STEM Program Orientation (SPO) – graduate programs categorized along STEM and Other (i.e., non-STEM).

Organization of the Dissertation

Following a brief introduction to the problem, the purpose of the study, the research questions, the delimitations, and the limitations of the study in this chapter a review of relevant literature is provided in Chapter 2. Chapter 2 also includes a description of the theoretical/conceptual framework used in this study and the model(s) upon which the study is based. In Chapter 3, a description of the methodology, including the population, data collection and data analysis procedures, is provided. Chapter 4 presents the study findings along with a detailed account of the analyses performed. Finally, Chapter 5 discusses the results of the study followed by implications for practice, recommendations for future research, and the conclusions.

Chapter 2: Literature Review and Conceptual Framework

The purpose of this study, as discussed in Chapter 1, is to explore the influence of academic integration, social integration, and finances on the persistence of international graduate students at a mid-western university using a quantitative approach. Research over the last few decades has shown that students' retention and persistence are influenced by their academic integration, social integration, and finances. In this chapter a broad overview of the literature on retention and persistence, especially as it relates to the purpose of this study, will be provided. This overview will also include the necessary background for the discussion of the conceptual framework used in this study.

This chapter is arranged as follows. First, it includes a short introduction and historical overview of student persistence research. The next section discusses some of the major theories and theoretical frameworks developed to study student retention, with a focus on those that are relevant to this study. Then, the literature on academic integration, social integration, and finances in relation to student retention and persistence is discussed. In addition, an overview of studies on various student populations is provided. Finally, the theoretical/conceptual model developed for this study is described.

Introduction

Education is critical for development, because it provides both economic and social benefits, through boosting productivity and earnings in the labor market and creating a better society (Behrman & Stacey, 1997; Lance, 2011; McMahon, 2010). Understanding the importance of education in the development of society is critical for leaders and policy makers. Societies from ancient times were investigated with a focus on

the support and emphasis placed on education (Marrou, 1982). For example, some of the earliest laws on support for public education in the US were passed during the colonial times, and while secondary schools were rare, most towns attempted to provide elementary education to their citizens (Axtell, 1974; Cremin, 1974). Laws and policy initiatives to support education in the US have not been limited to the local or state governments. The first major federal initiative was the passage of the Morrill Acts in the 19th century that led to the establishment of land-grant universities, most of which have turned public while a few have remained private non-profits (Brunner, 1962). Subsequent initiatives include the G.I. Bill (Altschuler & Blumin, 2009), the Elementary and Secondary Education Act (Skinner, 2019) and the Higher Education Act (Hegji, 2014). These initiatives have led to federal expenditures on higher education exceeding $75 billion in 2013 (Stauffer & Oliff, 2015). The federal funds supplement state and local sources, which in 2013 exceeded $90 billion, in addition to over $240 billion in state funding for elementary and secondary education (Stauffer & Oliff, 2015). This funding is in addition to personal (or family) resources, in the form of loans, primarily at the post-secondary levels.

With such vast resources allocated to education, student dropout has both individual and social costs, making it a substantive concern of stakeholders. Stakeholders are concerned due to both the loss of public resources expended and the potential costs related to loss of opportunities to the individuals and their families. However, institutions of higher education are especially concerned because they devote considerable resources to recruit students, and subsequently provide support and services to them, sometimes

even aid. Consequently, when institutions of higher education are unable to retain students, they lose potential revenue. And, lower rates of student retention can negatively influence the decisions of potential student recruits. Thus, there is considerable interest among the various stakeholders to understand the factors that affect student persistence/retention and graduation. The need to address all these issues has made research on student retention "one of the most widely studied areas in higher education" (Tinto, 2006, p. 1).

While there exists a long history of public support for education (Axtell, 1974; Cremin, 1974), the focus on students' retention is more recent, with some of the earliest works done in 1920s (Braxton, 2000). It was only in the 1960s that enquiry into factors affecting student retention started to grow into a robust field of its own. The early researchers examined issues affecting student retention through the departure lens, i.e., in terms of factors leading to students dropping out, and referenced their studies as either mortality or departure studies and focused on causes of students not graduating and / or dropping out of educational institutions (Berger, Ramírez, & Lyons, 2012). The early works on student retention were theoretical and descriptive (Bean, 1980; Tinto, 1975) and frequently claimed that departures were a result of personality issues due to students being deficient and unsuited for higher education (Majkowski, 2019). The early works also showed that factors such as being older, male, and studying in institutions far from home, in addition to academic failure and financial concerns, were associated with student departures (Majkowski, 2019).

Following World War II there was a major increase in federal involvement, both in terms of financial allocation, e.g. the GI Bill (Altschuler & Blumin, 2009), and policy changes, e.g. the Elementary and Secondary Education Act (Skinner, 2019) and the Higher Education Act (Hegji, 2014). This combined with the social changes during, and following, the civil rights movement bought about increased focus on student departure and retention, especially among stakeholders (Berger et al., 2012, p. 21; Majkowski, 2019). Studies on student retention during this period, 1960s, could be characterized into six major categories: philosophical and theoretical, descriptive, predictive/prediction, census, autopsy, and case but lacked analytical exploratory studies, i.e., investigative studies (Spady, 1970). Spady (1971) designed a process model, the first such model to address students' retention through investigative / analytical studies. Subsequently new theories and theoretical frameworks, built upon the works of Spady (1971) and other early researchers such as Tinto (1975), were developed to address various limitations and gaps in the understanding of factors affecting student retention.

Historical Overview

There are two major concerns of stakeholders in education: ensure students "remain and successfully complete their studies, and that they get as much out of [their education] as they can [i.e., student retention and engagement]" (Tight, 2020, p. 689). While research on student retention has a long history, with some of the earliest works done in the 1920s (Braxton, 2000; Edgerton & Toops, 1929), the field itself can be divided into three broad times periods according to the terminology used to address the issue of students not completing their studies. During the early period of research student

retention was often known by negative synonyms such as mortality (McNeely, 1938), elimination (Hanna, 1930), withdrawal, attrition, and dropout. During this period while there was some acknowledgement of the possible effect of pedagogical factors on student retention (Lemieux, 1954), the widespread belief in the field was that student attrition was caused by psychological factors, such as individuals attributes (Tinto, 2006) or even mental health (Ryle, 1969). And the focus of early works was generally on determining the individual demographical factors (Grace, 1957; McNeely, 1938) or tests/exams (Malloy, Wysocki, & Graham, 1955) that predicted student attrition.

The focus of early research on student retention/attrition generally was on factors that were predictors of future attrition to enable institutions to admit students likely to continue and eventually graduate (Scales, 1960). In contrast, the focus of research during the second phase, starting around the 1970s, was on addressing factors leading to attrition in students admitted, in order to help them complete their education (Astin, 1975). An important factor possibly influencing this shift towards a recognition that the institution itself played a major role in ensuring student retention was the recognition that with tuition forming an increasing percentage of the budget it was important for the institutions to decrease student attrition as much as possible (Astin, 1975b; Spady, 1970, 1971; Tinto, 1975). A major feature of this period was the development of process models (Spady, 1971) and theoretical formulations (Tinto, 1975) to account for student attrition and a movement away from *blaming the victim* and a recognition that the environment, especially in the institution and its broader community, played an important role in students' decision to continue (Tinto, 2006).

A common theme underlying student retention research during the 1970s and 1980s was on helping students better adapt to the particular institution's environment. Starting in the 1990s a new theme begins to emerge, the institution adapting to its students:

> We accept that many teachers and institutions already do their utmost to integrate students. But is this enough? Central to the emerging discourse is the idea that students should maintain their identity in their culture of origin, retain their social networks outside the institution, have their cultural capital valued by the institution and experience learning that fits with their preferences. Content, teaching methods and assessment, for example, should reflect the diversity of people enrolled in the course. This requires significant adaptation by institutional cultures (Zepke & Leach, 2005, p. 54).

A major criticism of this approach it that it is not possible, especially in first-year undergraduate courses with large class sizes, to provide regular and meaningful attention to individual students, and consequently lower retention rates are to be expected. Hence, this theme has not quite gained wide unconditional acceptance. Another theme that has started to gain support during this period is the influence of student engagement, which is what students' gain out of their education, on student retention rates.

Theoretical Models of Persistence

Early theorists conducting pioneer studies on student retention frequently viewed student departure through psychological perspectives and opined that student departure was primarily influenced by individual students' attributes, skills, and motivation. These

studies were more philosophical, descriptive, and predictive, i.e., “grounded in psychology rather than sociology” (Berger et al., 2012, p. 22). Another major drawback of these early works was that they lacked a theoretical underpinning, i.e., theoretical models or frameworks. During the 1950s and 1960s increased understanding of the importance of education in addressing issues highlighted during the civil rights movement and increased dependence of educational budgets on tuition made student retention significant to various stakeholders leading to demand for solutions to address student departure. The limitations of this early research are the lack of theoretical underpinning, a lack of systematic approach towards research and understanding, and limited use of results of studies in formulating policies to address issues.

These concerns provided an impetus to the development of systematic and theoretical studies addressing student departure. During the 1950s and 1960s significant work on student departure was performed and theories were developed (Feldman & Newcomb, 1969; Malloy et al., 1955; Marsh, 1966; Panos & Astin, 1968; Summerskill, 1962), but these studies focused on individual student characteristics and overlooked the effects of students’ college experiences.

Spady: Model of the Undergraduate Process

Starting in the 1970s, various models and frameworks focused on the interaction relationship between the students and the college systems were formulated and tested. The first researcher to provide a theoretical link addressing relationship between students and college systems was Spady (1970), who applied Durkheim’s (1951) work on social factors involved in suicide to the study of student departure. A core finding of Durkheim

(1951) was that insufficient integration, specifically insufficient moral integration and collective affiliation, into social fabric was more likely to lead to an increase in the likelihood of an individual's decision to commit suicide (Durkheim, 1951). It is understood that these forms of insufficient integration, insufficient moral and collective affiliation, are a result of an individual's values being highly divergent from and having insufficient personal interaction with other members of their social group.

Spady (1970) theorized that there was a parallel between sociological factors affecting suicide, an individual's lack of integration and insufficient affiliation with his or her society can affect suicide decisions, and student departure. Spady (1971), incorporating sociological research, subsequently developed the first process model of student departure and provided an analytical lens to better understand student departure (Spady, 1971). Spady's (1971) model of student departure hypothesized the existence of two distinct systems, namely academic and social, in colleges. He further suggested that academic and social factors, namely grades and intellectual development and normative congruence and friendship support respectively, influenced student's persistence decisions (Spady, 1971).

Tinto: Student Integration Model and Institutional Departure Model

While Spady (1970) was the first to incorporate Durkheim's (1951) work this into his descriptive theory on student departure, Tinto (1975) further built upon this and developed a predictive model of student departure. The core idea of social integration in education, analogues to that in the wider society in relation to suicide, is that a student's inadequate interactions with others and inadequate congruity with the institution's

principal values, due to lower commitment to its social structure, will lead higher probability of the student's departure from the institution (Tinto, 1975). Tinto (1975) based his concept of social integration, and its effect on persistence, on Durkheim's suicide theory as modified by subsequent research in social psychology on individual suicide.

Since withdrawal from educational institutions can be voluntary or involuntary, which primarily occurs due to academic issues, the analogous concept of academic integration can be envisioned because educational institutions consist of two distinct systems, academic and social, and it is important to distinguish between these as an individual might be integrated into one and not the other system (Tinto & Cullen, 1973). Tinto's (1975) model of student departure is founded on the concept of academic and social integration variables (Tinto & Cullen, 1973) and Durkheim's theory (Durkheim, 1951).

Tinto's (1975) theory suggests that students who enter an institution with an initial commitment to the institution and goal for successful graduation will tend to persist. Studies have shown that when students' joins a new institution, they come with certain individual characteristics that they might have developed over time, either from family, friends, community, previous institution etc., these characteristics may have positive or negative influence on students when they are trying to blend in into the new institution. There are research studies indicating that freshman year is more challenging for students and this is the period when student attrition rate is high. Researchers have observed that students' commitments towards the institution is highly affected by their

subsequent academic and social experiences within the institution. The main perception in Tinto's (1975) model is that integration into the academic and social dominions of the institution strengthens students' commitment to the institution and increases the probability of persistence and eventual graduation.

The conceptual usefulness of Tinto's (1975) model was shown by Terenzini and Pascarella (1980). The results showed that students' persistence decisions were influenced by the quality of their informal contacts, especially intellectual and course related, with faculty members. Supporting Tinto's (1975) hypothesis, the study showed that student's background characteristics influence their persistence decisions, not directly but through their interaction with the student's experiences at college. Terenzini and Pascarella (1980) while stressing the usefulness of Tinto's (1975) model in helping focus the "thinking of researchers and administrator" note the need for "specifying the variables and relations more precisely so that more crisply focused research may proceed" (p. 281).

Over time Tinto's model of student departure (Tinto, 1975) was extensively used, extended, and tested by other researchers (Astin, 1984; Bean & Metzner, 1985; Cabrera, Castañeda, Nora, & Hengstler, 1992; Pascarella & Chapman, 1983; Pascarella & Terenzini, 1980), and its core features were found to be valid.

Criticisms of Tinto's Student Integration Model. Bean (1980) criticized Spady (1971) and Tinto (1975) for their use of Durkheim's (1951) due to the insufficient evidence available. Severiens (2008) criticizes Tinto for "not provid[ing] clear operational definitions of integration" (p. 255). Further, Spady (1971) and Tinto (1975)

were criticized due to their lack of details on the relative importance of variables constituting the various factors in their models, making them unsuitable for path analysis. A related criticism is the lack of details on the relation between students' integration and their institutional experiences, i.e., whether students' integration influences or is influenced by their experiences. In a subsequent work, Bean (1982), further criticized Tinto (1975) due to its placement of goal commitment and institutional commitment twice in the model, once before and once after joining the institution. Braxton (2000) criticizes Tinto (1975) for suggesting that student-institution interaction being critical for persistence while simultaneously suggesting that "much remains unknown" (Tinto, 1975, p. 89) about the process.

Other criticisms of Tinto (1975) include its focus on traditional 4-year undergraduate students (Bean & Metzner, 1985), its lack of distinction between students transferring and withdrawing permanently for higher education (Tinto, 1982), and not addressing the role of finance (Tinto, 1982).

Tinto's Institutional Departure Model (TIDM). Over time, in response to emerging findings and criticisms, Tinto has expanded on his 1975 work through inclusion of "additional ethnographic information as background variables and to assess the role academics and social integration factored into his conceptual model of persistence" (Metz, 2004, p. 195). In 1993, Tinto came up with a modified final version of his student departure mode, *Tinto's Institutional Departure Model* (TIDM) (Tinto, 1993). TIDM (Tinto, 1993) states that the educational system consists of academic and social systems and student integration into both systems is essential for students' persistence in

academic institutions. Assessing students' academic performance (grades) and their intellectual development could help predict academic integration. Similarly, assessing students' interaction with college peers, faculties, and community members can help predict social integration of the students (Tinto, 1993).

In addition to Spady (1970) and Durkheim (1951), Tinto's (1993) updated model adopted elements from several other theories. One such theorist was Gennep, whose work dealt with integration into a new setting or environment and was influenced by Durkheim's theory. Tinto extended Gennep's (1960) seminal work on rites of passage in tribal societies to explain a student's departure. Tinto's (1993) hypothesis was that transition to an educational institution's environment occurred in three stages: separation, transition, and incorporation. Student's inability to navigate the system and failure to adapt to the institution's environment could affect the student's departure (Metz, 2004).

An important change from Tinto (1993) was that TIDM acknowledges that students who dropped out of an institute of higher education might return in future, move to a different institution, or might have reached their goals (i.e., they have not failed). Another important modification that was included in Tinto's new model was student's external commitments, such as family and job. Research studies have proven that family and job responsibilities can have significant influence on students' initial and subsequent goals and commitments to institution (Pascarella, Terenzini, & Wolfle, 1986).

Influence of Tinto on Other Models. Tinto's (1975, 1993) models are widely used as a fundamental framework to develop different conceptual framework for studies by a variety of researchers. Tinto's (1975, 1993) framework is extensively used to

examine student persistence in postsecondary institutions (Taplin, 2019). New conceptional frameworks that are developed included diverse variables along with basic variables that are part of Tinto's (1975, 1993) framework. The choice of variables differs based on the contextual situation that need to be studied. Bean (1980) implied that the theories and factors developed from studies of employee departure could be applied to model student departure. Bean's (1980) model is an expanded version of Tinto's and Astin's work that integrates "academic variables, student intent, goals, expectations, and external and internal environmental factors into a revised model of persistence" (Metz, 2004, p. 194). Bean (1985) observed the influence of academic, social-psychological, and environmental factors on sense of belonging variables in his model of student persistence and retention. In another study validating Tinto's theoretical model, Pascarella and Terenzini (1980) showed the direct and indirect effects of student-faculty relationship on student persistence and retention. Thus, there exists considerable literature, in the form of multiple theories and studies focused on a wide variety of student populations in different contextual situations, evidencing the role of social integration and academic integration in predicting student persistence and retention.

Bean: Causal Model of Student Attrition

Bean (1980) used theories from studies on employee attrition to address student retention and persistence, claimed to be consistent with Tinto (1975). The theories of employee turnover (Farris, 1971; Price & Mueller, 1981) suggest that an employee's job satisfaction and organizational commitment, influenced by their background and

organizational variables, affect their decision to persist in their jobs. Bean (1980) draws a parallel between employee persistence and student persistence decisions.

The results showed that while there were differences between male and female students, institutional commitment was the most important factor in determining retention. Further the results showed that membership in campus organizations was an important factor, especially for women, providing support for the structural integration concepts from Spady (1970, 1971) and Tinto (1975). While Bean (1980, 1982) generally agreed with Spady (1971) and Tinto (1975) that persistence decisions were longitudinal in nature, the variables affecting student retention and persistence were categorized into four categories: background, organizational, environmental and attitudinal and outcome in Bean's model (1982).

Bean and Metzner: Model of Nontraditional Student Attrition. A major criticism of the models of Spady (1971), Tinto's (1975), and others, was their focus on traditional students. Hence, these models tended to emphasize both academic and social integration. For nontraditional students, broadly defined as older, part-time, and commuter students, the focus of college education is on education, in contrast to traditional students who see college as both educational and social (Bean & Metzner, 1985). Pascarella and Chapman (1983) observed that college environment had a relatively stronger effect on the persistence of students at residential institutions in comparison to commuter institutions. This is because external factors are more influential than social integration in determining the retention or persistence nontraditional students', limiting the applicability of Tinto's model. Intuitively this observation is valid

because the social and academic lives of residential students is deeply integrated into the institution's community, whereas for commuter students its primarily only their academic lives that are integrated. To address this Bean and Metzner (1985) developed a model for nontraditional student attrition, derived from (Bean, 1982). The model uses four sets of variables, namely: academic performance, intent to leave, background and defining variables, and environmental variables to determine student persistence.

Pascarella: Student Faculty Informal Contact Model

A notable finding of Spady (1971) was that, after controlling for freshman year experiences and student pre-enrollment characteristics, informal student-faculty interactions significantly influenced student persistence decisions. Such significance of informal student-faculty interactions on student retention and persistence, after controlling for student characteristics, was found in other studies (Pascarella & Terenzini, 1979b, 1979a; Pascarella, Terenzini, & Hibel, 1978; Terenzini & Pascarella, 1977). Further, the positive influence of informal student-faculty interactions on student perceptions of the educational institution was also observed (Pascarella, 1976; Pascarella & Terenzini, 1976; Wilson, Woods, & Gaff, 1974). This led Pascarella to develop the *Student Faculty Informal Contact Model* (Pascarella, 1980), based on the hypothesis that informal student-faculty interactions have a positive correlation with student persistence and educational outcomes.

Cabrera, Nora, and Castañeda: Integrated Model of Student Retention

Tinto (1975) and Bean (1982) are two comprehensive models of student retention that are widely used, tested, and validated (Cabrera, Castañeda, et al., 1992). While Tinto

and Bean are built upon different theories, they both share some features, such as persistence decisions as complex and longitudinal processes and student pre-enrollment characteristics affect persistence. In addition, the models are complementary in certain aspects. Tinto (1975) suggested that academic integration, social integration, and institutional and goal commitment are the most influential factors affecting student retention and persistence, whereas Bean (1982) suggested that intent to persist, attitudes, institutional fit, and external factors are the most influential factors. Cabrera, Castañeda, et al. (1992) was an attempt to "simultaneously testing the predictive validity of the two models [Tinto (1975) and Bean (1982)]" (p. 146). The results indicated that the two models were complementary and not mutually exclusive. Further, the results indicate that Bean (1982) bought to fore the explicit role of external factors in determining student retention and persistence.

The results of Cabrera, Castañeda, et al. (1992) motivated Cabrera et al. (1993) to create and empirically test an integrated model of student retention, using Tinto and Bean, with modifications.

Academic Integration, and Social Integration

While it is widely accepted that academic integration and social integration are an integral part of students' retention and persistence process, there exists no widely agreed upon definitions for these terms and these terms are defined differently in various studies. For example, while Terenzini and Pascarella (1977) suggested informal integration with faculty as measure of social integration, Wolfe (1993) defined the same as measuring academic integration. To further confuse the matter, Terenzini and Pascarella (1978)

stated: “particular attention needs to be given to the nature of informal student-faculty contact and its influence in facilitating the academic and social integration of students. What kinds of contact promote what kinds of integration?” (p. 365). This apparent contradiction is addressed by Pascarella and Terenzini (1978), which suggested that informal student-faculty interaction in relation to course work influences academic integration whereas interactions in relation to career influences social integration. Consequently, Davidson and Wilson (2013) suggested that the definitions have become confusing and need to be clarified.

Compensatory Relationship Between Academic Integration and Social Integration

According to Tinto (1975) attrition is a process of “series of changing commitments and experiences that affect students' integration and, ultimately, decisions to withdraw from or to continue in the institution” (Stage, 1988, pp. 344–345). Tinto (1975) argues that academic and social integrations are necessary factors for a student to persist, where academic integration refers to the students’ academic persistence required for graduation and social integration refers to their involvement, both within and outside the classroom learning context, in the campus culture.

Likewise, students’ assurance towards the process of socializing through peer group interactions will develop sense of integration (Milem & Berger, 1997). Students enter an institution with an initial commitment to it and with a goal to be successful. Scholars conducting studies using Tinto (1975, 1993) framework have found compensatory relationship between the academic and social integration variables (Pascarella & Terenzini, 1980, 1983). Researchers have observed that while academic

and social integration have a positive influence on persistence, their influence is strongest at relatively low levels of social and academic integration respectively, becoming less pronounced as the levels of social and academic integration increased (Stage, 1989). Similar compensatory results were observed between goal commitment and institutional commitment, suggesting that student persistence is influenced by combinations or patterns of experiences (Stage, 1989).

Research studies have shown that students' persistence decisions are influenced by numerous factors. Even with variety of factors influencing students' persistence, Mannan (2007) strongly indicates that academic integration and social integration are more likely to be the core components that influence students' persistence. The greater the degree of students' integration into the institutional system, the more likely they are committed to the institution and to the goal of completion (Mannan, 2007). As per Astin (1984), students' willingness to persist depends on students' integration into the institution and their level of involvement in the institutional environment (Kwai, 2010). A significant relationship between measures of academic and social integration and student persistence was observed among students at community colleges (Bers & Smith, 1991; Pascarella et al., 1986). Several researchers who used Tinto's framework have stated that academic and social integration are important factors for persistence (Braxton et al., 2000; Nora, Attinasi Jr, & Matonak, 1990; Terenzini & Pascarella, 1977).

Evidence of compensatory effects between academic and social integration was observed in multiple studies. Spady (1971) observed that interaction with the faculty increased both social integration, and therefore institutional commitment, and students'

intellectual development. Pascarella and Terenzini (Pascarella & Terenzini, 1979a) observed a compensatory relationship between measures of social and academic integration, namely peer group relations and intellectual discussions with faculty members or "informal relations with faculty" and "faculty concerns for teaching and student development" (p. 207). Berger and Milem (Berger & Milem, 1999; Milem & Berger, 1997) in their studies observed that first-year students with high involvement behaviors showed greater success in academic and social integration and more institutional commitment. Tinto's (1975, 1993) theory also infers "that a sense of belonging, as determined by social and academic integration, is a central feature of student persistence" (Hausmann et al., 2007, p. 805).

Finances

It has long been recognized that financial abilities play an important role in access to education and student persistence. The initial research, during the early decades of 20th century, was focused on the role that financial abilities played in access to education. Following World War II there was an increase in federal involvement in education, especially postsecondary. One of the earliest federal involvement was in the form of GI Bill, subsequently the National Defense Education Act, that increased funding for research and provided for loans to college students, and Elementary and Secondary Education Act were passed ("Federal Role in Education," 2020). Understanding the role that finances played in determining access to education, especially higher education, the federal government started to play an increasing role in financing education through grants, loans, and work-study. Also, following the civil rights movement of the 60's there

was an increased interest in understanding both the effect of financial ability on persistence and relative impact of different forms of financial aid on persistence. While researchers such as Tinto (1975, 1993) focused on linking institution related factors to student characteristics, they have generally failed to account for or test the role of financial factors in student persistence. For example, Tinto's (1993) focus has been on "integration":

> Individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and dispositions (intentions and commitments) and other members of the academic and social systems of the institution. The individual's experience in those systems, as indicated by his/her intellectual (academic) and social (personal) integration, continually modifies his or her intentions and commitments. (pp. 114-115)

With financial consideration being a sort of secondary factor:

> Their citing of financial reasons for leaving is simply another way of stating their view that the benefits of continued attendance do not outweigh the costs of doing so. Conversely, when students are satisfied with their institutional experience, they often are willing to accept considerable economic hardships in order to continue. For them the benefits of attendance more than justify costs. (pp. 88)

Considering the various financial assistance programs established by the institutions, and federal and state governments, scholars understood that stakeholders have a critical interest in knowing relationship between financial aid and persistence (Porter, 1991), and

consequently this lacuna in scholarship is critical (Lewis, 1989) and needed to be addressed. Note that while there exists substantial research on effect of financial aid/ability on access to education, because the focus of this work is on persistence/retention only literature relevant to this will be discussed here.

As the sizes of the various financial assistance programs started to grow, especially following the passage of various federal bills during the 1960s, interest among stakeholders to understand the relationship between various forms of aid and persistence among different groups started to grow. One of the earliest works regarding the effect of financial aid on persistence was performed by Astin (1975b, 1975a). An outcome of the study was that federal work-study programs and scholarships/grants had a positive impact on persistence, with federal work-study having a higher impact. However, reliance on loans and saving or other assets had a negative impact. In addition, support from parents generally had a positive impact on persistence and eventual graduation. Subsequently, for many years, especially during the 1970s, Astin's work (Astin, 1975b) was highly influential and was the conventional wisdom. Over time as the levels and types of federal financial aid increased (Jensen, 1981) it was observed that few studies examined combination of various forms of financial aid (Hood & Maplethorpe, 1980).

Consequently, studies into relationship between student persistence and financial aid, especially combinations of multiple aid programs, gained momentum in the 1980s. Studies on persistence and aid during the 1980s can generally be divided into three streams (Cabrera, Stampen, & Hansen, 1990): a) effect of financial aid alone; b) comparison of effect of individual financial aid programs; and c) effect of individual

financial aid packages on persistence of minority students. Studies on persistence and financial aid till late 1980s rarely examined the role of financial aid in the overall persistence process, which is the relationship of these studies to any attrition theory (Cabrera et al., 1990). A notable exception was Baum (1987) who, using fairness theory, showed that while increasing financial aid could increase choices it had a limited role increasing enrollment. Baum (1987) also argued that it might be better to spend more financial resources on students already attending low-cost colleges than to try enroll more students in low-cost colleges. A limitation of this study (Baum, 1987) is that fairness theory did not sufficiently account for inequalities in opportunities.

Some of the earliest works on integrating financial factors into student-institutional fit models (St. John et al., 1997) were performed by Voorhees (1985) and Nora (1990). Examining the relationship between federal aid programs and the persistence of high-need college students during their first year, Voorhees (1985) suggested that the type of financial aid students received, their academic performance, and persistence were determined by their financial resources, demographic characteristics, and academic ability. Studying the relationship between campus-based aid programs and persistence of Hispanic students Nora (1990) modeled students' persistence decisions as a consequence of the complex interaction between their academic abilities when entering college, their financial needs, various forms of financial aid, and their academic performance during the first year. Subsequently, Cabrera, Stampen, and Hansen (1990) hypothesized a new approach, the ability-to-pay approach (St. John et al., 1997), to persistence modeling postulating that ability-to-pay played a

critical in conditioning students' participation in the social and academic life of their institution (i.e., social and academic integration) and reasoned that merging economic theory to persistence theory could lead to a more comprehensive model of student persistence.

Building upon the idea that ability-to-pay had a positive influence on students' aspirations and persistence (Cabrera et al., 1990), Cabrera, Castañeda, et al. (1992) postulated that finances, in addition to facilitating social and academic integration, increased cost-benefit analysis leading to increased persistence and eventual graduation. Cabrera, Castañeda, et al. (1992) showed that while finances play a role in persistence decisions, the decisions themselves result from complex processes in which finances play an indirect role. The results also showed that ability-to-pay affect a students' academic and intellectual development, and that financial aid both enhanced students' academic performance and their intent to persist. These results have generally been replicated, with Cabrera, Nora, and Castaneda (1992; 1993) showing finances directly influence academic integration and student performance (St. John et al., 1997) and Cabrera, Nora, and Castaneda (1993) showing that students' social and academic integration are influenced by their financial attitudes, i.e., their perceptions of their ability-to-pay.

Subsequent works have continued to highlight the core idea of these studies, students' persistence decisions result from complex processes involving a variety of factors, including finances. These results were validated through studies on students' from a variety of backgrounds, with recent works showing that financial considerations play an important role in determining persistence of students from socio-economically

disadvantaged backgrounds (Pascarella & Terenzini, 2005; Paulsen & St. John, 2002), especially in the developing and underdeveloped regions of the world. For example Breier (2010) suggests that finances play a very important role in student departure decisions, either due to unexpected financial demands or underestimation of financial requirements, in addition to determining choice of institution and program, especially among those from socio-economically disadvantaged backgrounds in South Africa.

Persistence Studies on Diverse Student Population

It is widely believed that students are most at risk of failure during their first-year of college, hence the focus of most research on social and academic integration of college students is focused on their experiences during this period (Jean-Francois, 2019). In the United States a lot of research has been done on attrition of undergraduate students, very little is research has been conducted on attrition of graduate students. Due to the numerous differences between undergraduate and graduate students, it is difficult to generalize research on undergraduate students for application to the graduate student population (Cooke et al., 1995). Cooke et al. (1995) suggest that graduate student populations, due to their smaller size relative to undergraduate student populations, are strategically less important to universities and consequently the research on their attrition has "tended to be within college rather than university wide" (p. 678).

Quality teaching and collaborative classrooms are some of the key factors that help students get deeply engaged in academia and have a positive influence on their retention. It has been argued that a key factor influencing student retention during the first year is quality of teaching (Zimitat, 2006). Other factors that influence student

retention and persistence are the cultural differences and stereotyping because institutions have their own cultures and it can be challenging for new students to transition into the institution's culture. This can especially be difficult for international students who additionally might experience discriminatory treatments (Almurideef, 2016). Hence, cultural difference and stereotyping make integration difficult between students, and this can eventually lead to students' voluntary withdrawal from the program. A recent study revealed that cultural stereotyping by other students allows deprecation of international students (Jean-Francois, 2019).

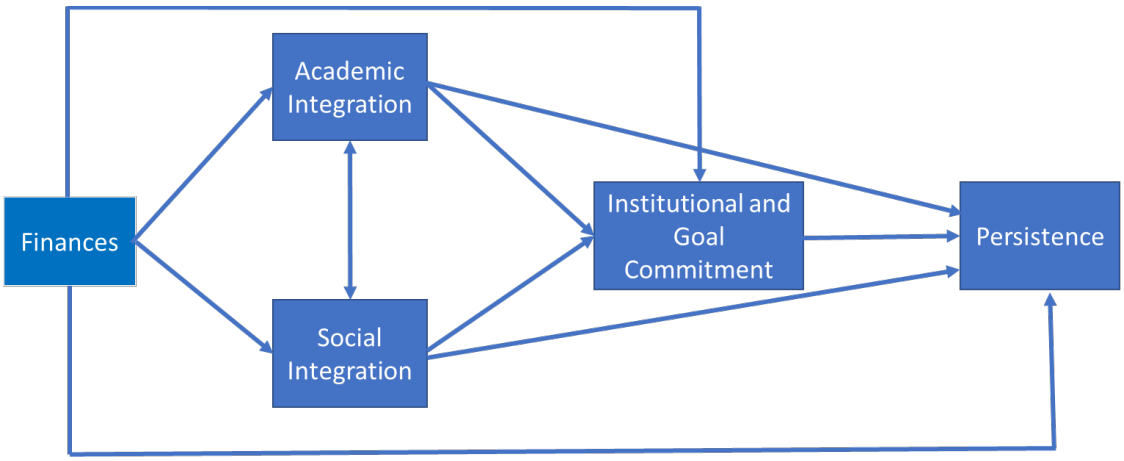
The Non-Traditional Undergraduate Student Attrition Model (Bean & Metzner, 1985) study focuses on the persistence of non-traditional commuter student. Woodford and Kulick (2015) investigated the academic and social integration of sexual minority students by studying "the association between multiple dimensions of psychological and experiential campus climate for sexual minorities on academic disengagement, GPA, institutional satisfaction, and acceptance on campus" (p. 14) . While it is difficult to pinpoint experiences that are the most appropriate and important facilitators of persistence for any one student, researchers have had some success with student groups based on their background characteristics (Stage, 1989). Jean (2010) conducted a study focusing on the retention of first-generation college students. Earlier research has reported that the dropout rates or attrition is high during the first semester of the first year. Jean (2010) used Tinto's student departure theory to better understand the first-semester transitional issues.

Conceptual Framework

Researchers and scholars have focused on the development of frameworks to understand the influence of academic integration, social integration, and finances for diverse student population on persistence to complete their studies. Qualitative research method is widely used to understand this concept. There is very limited research done focusing on international graduate students' issues in relation to persistence. This study intends to examine the influence of academic integration, social integration, and finances on international graduate students' persistence. This research study is based on the conceptual framework shown in Figure 1. Social integration, academic integration, finances, and persistence are the primary variables of this study and the conceptual framework is built around these variables.

Figure 1

Conceptual Framework Used in This Study



The concepts of social integration and academic integration are based on Durkheim's (1951) work on social factors involved in suicide (Durkheim, 1951), i.e., an individual's suicide can be attributed to the their lack of social and intellectual integration into the social life of their society. Spady (1971), applying Durkheim's (1951) work to student retention, proposed that educational institutions consisted of two systems: social and academic, and students' integration into these systems affected their persistence. Building upon the work of Spady (1970, 1971), and theorists like Van Gennep (1960), Tinto (1975) developed his explanatory, theoretical model of the persistence/departure process in post-secondary institutions called Tinto's Institutional Departure Model (TIDM, Tinto, 1975, 1993). The social integration and academic integration variables from Tinto's 1973 work (Tinto & Cullen, 1973) formed the foundation for TIDM (Tinto, 1975, 1993).

TIDM (1975, 1993) proposes that institutions consist of social and academic systems, and students' integration into both these systems is crucial for their persistence. The student's academic integration can be observed through their intellectual development and academic performance, with higher academic integration a predictor of higher expectation of persistence. Similarly, social integration is also a predictor of persistence, with higher social integration leading to higher commitment and higher persistence. In a manner similar to academic integration, social integration is influenced by a student's interactions with their faculty and peer-group, both in and out of the classroom. A difference between social integration and academic integration, with regards to interactions with faculty and peer-group in and out of the classroom, lies in

their content. Generally, interactions out of the classroom, and in a non-academic context, have higher influence on social integration, whereas interactions in the classroom, and in an academic context, have higher effect on academic integration. The core idea of Tinto's (1975, 1993) model was validated by various researchers (Elkins, Braxton, & James, 2000; Hausmann et al., 2007; Hoffman, Richmond, Morrow, & Salomone, 2002; Metz, 2004; Nora et al., 1990; Pascarella & Chapman, 1983; Pascarella & Terenzini, 1983; Pascarella et al., 1986; Stage, 1989; Terenzini & Pascarella, 1977; Titus, 2004).

It has long been understood that finance plays a role in determining access to, and subsequently persistence (Hanna, 1930; McNeely, 1938). Following increased resource allocations by the federal government through various financial-aid programs, researchers have recently attempted to better understand the role that financial-aid programs play on student persistence decisions (Astin, 1975b; Baum, 1987; Cabrera et al., 1990; Heller, 2003; Jensen, 1981; Murdock, 1987; Voorhees, 1985). Student persistence decisions are complex and the result of interactions between multiple variables, one of which is finance. Hence, scholars have attempted to hypothesize frameworks that attempt to model the role of finance in the persistence decision of students. Some of the early works modeling this role were performed in the late 1980s and early 1990s (Cabrera, Castañeda, et al., 1992; Cabrera et al., 1993; Cabrera, Nora, et al., 1992; Nora, 1987, 1990; Nora et al., 1990; St. John, Kirshstein, & Noell, 1991).

The finance variable incorporated into the framework used in this study is based upon the full structural model (FSM) from (Cabrera, Castañeda, et al., 1992). FSM proposes that finance variable comprises of two interrelated elements, financial attitude,

and financial aid. Financial aid generally incorporates all forms of non-family or personal sources such as loans, scholarship, assistantship, and grants. Financial attitude refers to students' opinion about their ability (or inability) to pay for their education, it is influenced by the financial aid they receive, in addition to their personal and family sources of finance. It was generally observed that the higher a students' opinion about their ability to pay for their education the higher is their expectation of persistence. In addition, financial aid in the form of scholarship, assistantship, and even work-study aid are generally better at increasing persistence than loans.

The Institutional and Goal Commitment variable is motivated by the idea that students' commitment to the institution and goal (here, to graduate) influences their persistence. This variable has a basis in the student-institutional fit approach to persistence. The purveyors of student-institutional fit approach such as Tinto and others hypothesize that when students encounter a new system during their entrance into a new institution they pass through stages of transition, a separation from their previous institution followed by an integration into their new institutional environment and subsequently a commitment to it. A student's pre-entry qualities, such as prior schooling, abilities, skills, and family background help shape and determine their initial goals and commitment to the new institution. Consequently, a student's goal commitment, and persistence decision, can be predicted through their social integration and academic integration.

Researchers attempting to understand persistence as economic decisions have used the economic impact approach, applying price-response and targeted subsidies

theories from economics, to understand and model student persistence. These researchers modeled students' persistence decisions using those students' perceptions of the net social and economic benefits of attending college (Manski & Wise, 1983), which is moderated by their perception of ability to afford college (Becker, 1993). The research has shown that finances affect social integration, academic integration, and institutional and goal commitment (Breier, 2010; Cabrera, Nora, et al., 1992).

Chapter 3: Methodology

This chapter discusses the overall methodology used in this study. First, the purpose of the study and research questions are restated. This is followed by a description of the research design, the variables, the study setting (i.e., location), the population, sampling, and inclusion and exclusion criteria. Next the instruments used, their validity and reliability, and the ethical considerations of this study will be discussed. Finally, the chapter will conclude with a discussion of the methodology for data collection and analysis. A discussion of the limitations resulting from the choice of data analysis techniques is also provided.

Purpose of the Study

The purpose of this study was to explore the influence of academic integration, social integration, and finances on the persistence of international graduate students at a mid-western university using quantitative approach. Research over the last few decades has shown that students' persistence is influenced by their academic integration, social integration, and finances. In this research academic integration and social integration are defined as the student's perception of their assimilation into the academic and social environment of the university and/or community. The focus of persistence research is generally on domestic high-school, two-year college, and undergraduate students. Researchers have also focused on specific subsets of these populations, such as first generation, minority, women, and non-traditional students. However, the focus on international students is lacking, with studies generally targeting undergraduate students. This study is an attempt to address this limitation. More specifically, this study: a)

examined the level of academic integration, and social integration; and b) determined the associations between academic integration, social integration, finances, and persistence of international graduate students at the mid-western university.

Research Questions

This research is an attempt to address the limitations in the existing literature and fill in the gaps in the existing knowledge about the factors that influence persistence of international graduate students. This research area is very broad and certainly difficult, if not impossible, to address in a single study. Considering the challenges, this study was limited to an investigation of the question: how do academic integration, social integration, and finances influence the persistence of international graduate students at a mid-western U.S. university? The university selected was Ohio University, a R2 doctoral university ("About Carnegie Classification," n.d.). The specific research questions formulated to address these issues were:

1. What are the levels of academic integration and social integration of international graduate students at Ohio University?
2. Are there differences in the levels of academic integration, social integration, and persistence among international graduate students based on their gender, Graduate Program Classification (GPC), STEM Program Orientation (SPO), and world regions?
3. Are there predictive associations or relationships between academic integration, social integration, finances, and the persistence of international graduate students at Ohio University?

Research Design

This study was conducted using a quantitative research approach and the study used a correlational research design. Qualitative and quantitative research are both important and useful, but while the results of a qualitative study are valid only for the cases studied and any generalizations are hypotheses only, a quantitative study is required to validate these hypotheses (Creswell & Creswell, 2017). This is due to the emphasis on objective measurements, and use of statistical, mathematical, or computational techniques to analyze the data collected through questionnaires, surveys, polls, or similar measures used in quantitative research (Muijs, 2004). Quantitative analysis allows the researcher to review numerical summaries and make predictions based on causal relationships (Creswell & Creswell, 2017). The assumption for a quantitative research approach is that the variables can be quantified and that relationships are measurable.

Correlational research design is a non-experimental research type which "involves collecting data to determine whether, and to what degree, a relationship exists between two or more quantifiable variables" (Johnson, 2001, p. 4). It can be observed that a significant amount of research done in the field of education is non-experimental; this is because the non-experimental study helps in keeping important variables of interest unchanged or manipulated (Johnson, 2001). More specifically, correlational research design is a type of non-experimental study in which relationships are assessed without manipulating independent variables (Creswell & Creswell, 2017). While a correlational study can provide insight about the variables or groups of variables that are related, the existence of correlation does not imply causation. Since the primary focus of this study

was on analyzing the relationship among the variables in a non-experimental method, correlational research design is suitable to conduct the study.

There are two types of correlation research designs: explanatory and predictive. While an explanatory design attempts to determine the extent to which two or more variables co-vary, predictive design attempts to determine if the predictor variables can determine the outcome variables, i.e., if outcome can be predicted. The focus of this study was on prediction of persistence by academic integration, social integration, and finances (see Research Question 3), hence the predictive approach of correlational design was used in this study.

Several studies were done using Tinto's Institutional Departure Model (TIDM) and full structural model (FSM) theoretical models. Tinto (1975) hypothesized that student retention rates were related to the integration of the student into the educational institution. Later empirical works have shown this to be true for various classes of domestic students, such as high school, minority, and nontraditional students. Tinto's (1975) studies observed and provided empirical evidence about the "implicit role of finances in the persistence process in studies relying on the student integration model" (Cabrera, Nora, et al., 1992, p. 574). Most of the studies using these models were focused on undergraduate students and researchers have pointed out the lack of research on graduate students, especially international students. Thus, this quantitative approach will help in refining the hypotheses so that they can be tested. The participants for this study were graduate international students at Ohio University (who had completed at-least 1 semester of graduate education at Ohio University).

The research site for this study was Ohio University. I chose this university because it has a diverse international student population, with students from more than 100 different countries enrolled in over 60 different majors (Office of Institutional Research and Effectiveness, 2019), and is facing financial challenges and decreasing enrollment ("State of the Budget | Ohio University," n.d.). Further, I am a student at Ohio University, and this would ease me in finding participants. In the future, if suitable collaborations can be made then it might be repeated at a different university. This study was an attempt to understand students' experience related to academic integration, social integration, and finances leading to their persistence.

While case studies have been traditionally associated with qualitative methods, they can be either quantitative, qualitative, or a combination of these (Gerring, 2007). Further, Willig (2008) suggests that case study is not a research method but,

> constitutes an approach to the study of singular entities, which may involve the use of a wide range of diverse methods of data collection and analysis. The case study is, therefore, not characterized by the methods used to collect and analyse data, but rather by its focus upon a particular unit of analysis: the case. A case can be an organization, a city, a group of people, a community, a patient, a school, an intervention, even a nation state or an empire. It can be a situation, an incident or an experience. (p. 74)

Hence this study, because it is conducted at a single university, can be considered as a case study, with Ohio University as the case.

Variables

Based on the conceptual framework developed for this study three variables were used to analyze the predictive relationship between the independent variables (IV) and the dependent variable (DV). While an independent variable is defined as an attribute or characteristic that influences or effects the outcome, the outcome that is dependent or influenced by the independent variable is call as dependent variable (Creswell & Creswell, 2017, pp. 115–116). Also, some demographic variables were used to obtain basic demographic information about the participants. Demographic variables are the sample characteristics or attitudes that are collected to describe the sample. Demographic variables also help in determining if the sample is representative of the population. Even though demographic variables cannot be manipulated, researchers can explain relationships between demographic variables and dependent variable (Kaur, 2013).

The independent variables that were analyzed in this study are social integration (SI), academic integration (AI), and finances (FI). The social integration and academic integration variables were assessed using the scales developed by Pascarella and Terenzini (Pascarella & Terenzini, 1980). The SI instruments examined peer-group interaction and interaction with faculty and were used to understand the relationship between the variables and to help predict the DV. Likewise, the AI instruments examined the role of academic and intellectual development, institutional and goal commitment, and grade point average in understanding the relationship between the variables and in predicting the DV. Finances examined the influence of financial attitude and financial aid in predicting student persistence/DV.

Student persistence was used as the dependent variable in this study. The persistence was examined based on student's enrollment for the next semester and also measured if students would be graduating in the current semester. This would help in measuring the relationship between IV and would also help in examining which ones are good predictors of the DV.

The demographic variable used in this study examined sample characteristics and was collected using questions focusing on participants' age, gender, marital status, graduate program classification, STEM program orientation, parents' education levels, and nationality.

A codebook was developed to code the participant responses for the instrument. Creswell and Creswell (2017) define codebook as "a list of variables or questions that indicates how the researcher will code or score responses from instruments or checklists" (p. 176). Hence a codebook that was developed for the instruments that were used in this study is attached in Appendix D.

Study Setting

The study was conducted at a midwestern university. The university selected was Ohio University and it is classified as R2 doctoral university. Student to faculty ratio is 17:1. As per Ohio University office of institutional research during the Fall 2019 term there were 2,285 graduate students, including 773 international graduate students (Office of Institutional Research and Effectiveness, 2019). Hence, international students represented 34% of the total graduate students enrolled at Ohio University. A total of 108 countries were represented at Ohio University making it a diverse university ("Ohio

University," 2020). Based on this data, Ohio University, with international students constituting over a third of its graduate student population, was an excellent location to conduct this study.

Population/Participants

The target population/participants for this study were international graduate students who were perusing graduate degree (Doctoral and Master Program). International students are those students who have crossed a national or territorial border for the purpose of education and are now enrolled in educational institutions outside their country of origin (UNESCO/UIS, 2020). To be eligible participant, international graduate students needed to be current students who have completed at least one semester at the Midwestern university. Domestic U.S. undergraduate and graduate students were excluded in this study. International undergraduate students were also not eligible to participate in this study.

Sampling

The validity of survey research results depends on a variety of issues. Some of the most important issues that can affect the validity of results are a) sample size: what percentage of the population responds to the survey; and b) representativeness of the sample. In cases where the potential survey population, international graduate students in this study, is large, it is not easy to study the entire population. Factors such as time, cost, and accessibility can hinder a researcher's ability to study a whole population. Hence, researchers attempt to study samples of population rather than the complete population. An advantage of such sampling is that it can help save time and money because the

samples are generally smaller in size. The aim of many quantitative studies, including this one, is to be able to generalize the results to the entire population. Such generalizations are possible if the sample selected is representative of the entire population and is large enough to be statistically significant.

There exist multiple techniques to obtain a representative sample depending on the context of the study. For this study voluntary response sampling, a non-probabilistic sampling method using harvested e-mail list, was used. The study collected data via a survey questionnaire, a link to which was emailed to the students. In the email the students meeting the inclusion criteria (i.e., current international graduate students at Ohio University who have completed one or more semesters at Ohio University) were invited to complete the linked survey.

To obtain a representative sample, as previously discussed, two factors need to be addressed: a) the size of sample, and b) representativeness. For a study in which a survey questionnaire approach is used for data collection, the size of the sample required is determined by the number of questions. The questionnaire used in this study had a total of 26 questions addressing academic integration (10 questions), social integration (10 questions), finances (3 questions), and persistence (3 questions). Existing literature suggests that while large samples are better, a minimum N:p (sample size: variables or number of questions) ratio of 3-6 is required (MacCallum, Widaman, Zhang, & Hong, 1999) for the results to be valid. Hence, for this study a N:p ratio of 5 was desired leading to a sample size of 130. With a population of 773 international graduate students a sample size of 130 required a response rate of about 17%. The questionnaire also

includes demographic questions, but these are not the variables of the study (i.e., they are exogenous variables) and need not to be included in the count.

A random, or some form of probabilistic, sampling is ideal, especially when the goal, as in this study, is to generalize the results of the study. Considering the diversity of the international graduate student body at Ohio University, the diversity between countries represented by these students (and the diversity between students from the same country), and the requirement of nearly 17% response rate, it can safely be assumed that the sample so obtained was representative of the population.

Inclusion and Exclusion Criterion

The inclusion and exclusion criteria used were as follows:

Inclusion criteria:

a. Student at a mid-western university (Ohio University)

b. Being an international graduate student

- International student (student who has completed their K12 education outside US)

c. Age: 21-65

Exclusion criteria:

a. Not a student at a mid-western university (Ohio University)

b. Undergraduate domestic and international students.

c. Age: less than 21 or greater than 65

Instruments Used

This was a quantitative research study which used a survey design to collect the data. Muijs (2004, p. 1) says that "quantitative research is essentially about collection of numerical data to explain a particular phenomenon". And, Creswell and Creswell (2017) suggest that a survey design provides quantitative or numeric description of trends, attitudes, or opinions of a sample and can be used to generalize or draw inference about a population.

In this study three measures from different studies were selected, assembled, and used as survey instruments for data collection. The social integration and academic integration instruments were obtained from the International Integration Scaled (IIS); (Pascarella & Terenzini, 1980). Permission for the utilization of these was obtained from the publisher of the journal and is included as Appendix G. Similarly, the question for the finance variable were obtained from Cabrera, Nora, et al. (1992). Demographic information was also collected.

The social integration and academic integration scales are based on Tinto's theoretical framework, i.e., Dropout from higher education (Tinto, 1975) and were developed by Pascarella and Terenzini (1980) to assess the students' self-reported levels of social and academic integration. A total of 23 items were selected for the proposed study and the items selected had reliability of the scale (Cronbach's alpha) ranging between 0.5 and 0.8. Of the 23 items, 19 used a 5-point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). These 23 items formed the a) social integration, b) academic integration, and c) persistence scales in this study. The scale and its items are

provided in Appendix A. The codes used to identify the individual items in the subsequent sections are included in Appendix A. They are in the first column. The Cronbach's alpha values for the same are provided in Appendix B. The reliability and validity of these instruments are discussed in the Validity and Reliability section of this chapter. Note that any changes made to the items original wording will not affect their content validity. The item on Grade Point Average (GPA) was measured using multiple choice option ranging from 4 to less than 3, and persistence was measured as Yes = 1 or No = 0.

Finance was measured by using 3 items. Item 1 under finances asks about the major source of tuition and living expenses and was measured by using a multiple-choice format. Items 2 and 3 were measured as Yes = 1 and No = 0, and were borrowed from a study that used finances as a variable, in addition to social integration and academic integration, to predict student persistence (Cabrera, Nora, et al., 1992).

The demographic items were designed to collect information about the overall report of the sample in the study. The demographic section asked questions related to age, sex, and graduate degree (Masters or PhD). Consequently, in the survey participants were asked to provide answers for questions on demographic, social integration, academic integration, finances, and persistence. The complete questionnaire used is included in Appendix A.

Validity and Reliability

Validity and reliability are the measures used by the researchers to enhance the quality of their study (Creswell & Creswell, 2017). Validity is defined as the extent to

which a concept is accurately measured in a quantitative study. Reliability is the extent to which a research instrument consistently has the same results if it is used in the same situation on repeated occasions. This study used instruments that were previously used to study similar variables. Since previous studies provided validity for the instruments, they could be considered to be valid. But considering the modifications made, rewording of instruments, and combining instruments from different scales, statistical tests of validity and reliability were performed for thoroughness.

The study used voluntary response sampling for data collection. Due to the diversity of the target population and the response rate required it can be assumed, as described in the Sampling section, that the resulting sample was unbiased and the data valid. The instruments have a valid Cronbach's alpha. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability (Creswell & Creswell, 2017). Pascarella and Terenzini (1980) found the alpha coefficients for the scales for social integration, academic integration, and persistence to range from 0.71 to 0.84. Subsequently, Terenzini, Lorang, and Pascarella (1981) found all the scales to be internally consistent with the alpha coefficients ranging from 0.71 to 0.84. Finally, the reliability and validity for IIS scale was explained by Fox (1984), who found that the scales were internally consistent and had alpha coefficients ranging from 0.72 to 0.82. These studies validating the scales show that they are reliable, and the scales can be used in this study.

Ethical Consideration

The participants of the study were graduate students at a mid-western university in the age group of 21-65 years, and their participation was voluntary. The participants also had the ability to quit any time during the survey without penalty. The data collected was recorded with a code replacing identifiers and a master list connecting the code and the identifier was used. The master code list was saved on a password protected computer file. The master code list will be deleted by the end of August 2022.

Consent was obtained electronically. Participants were presented with an online consent form, shown in Appendix E, and needed to confirm their consent before continuing. In addition, data collection commenced only after approval for the study was obtained from Ohio University's Institutional Review Board (IRB), which was obtained on 5/8/2020. The IRB approval letter for this study is provided in Appendix C.

Data Collection

The quantitative data was collected using a Qualtrics survey questionnaire. The survey was submitted to the Office of Information Technology at Ohio University. Since this unit has the necessary access to students' contact information, they sent these surveys to the students through email. Further the survey was also sent using email list harvested from personal sources. Students who received the survey were requested, if they met the inclusion criteria, to provide consent and participate in the survey. The email sent provided sufficient information about the research to the participants. Students were allowed to opt out anytime during the survey for any reason whatsoever. Students were asked, depending on the question, to either provide answers on a numerical scale, yes/no,

or select an option from a list. In addition, demographic questions related to age, sex, and graduate degree (Masters or PhD) were asked. Data with participants' information was coded replacing identifiers and a master list connecting the code and the identifier was used. The master code list was saved on a password protected computer file. The master code list was deleted at the end of data collection. The survey response was collected through Qualtrics. Subsequently, software tools such as IBM SPSS v27, IBM AMOS v27, and R x64 4.0.2 were used to perform analyses. Obtained statistics was used to describe the demographic profile of the participants, their social and academic integration. Next, suitable analysis was used to assess the association between social integration, academic integration, finances, and persistence of international graduate students.

Confounding Variable

A confounding variable is a factor associated with the independent variable(s) that can affect the dependent variable (Snyder, de Brey, & Dillow, 2019). It can be considered as an independent variable that the researcher did not account and/or control for (Muijs, 2004). This study was conducted during summer/fall 2020, a period of uncertainty and disruptions, including in higher education, caused by COVID-19 (Paltiel et al., 2020; Sahu, 2020; Turk et al., 2020). Thus, while the results of this study might potentially be affected by COVID-19 uncertainty and disruptions, it is not possible to credibly determine the actual effects of the same on the results of this study. Furthermore, while this can be considered as a limitation of this study, as mentioned in the Delimitations and Limitations of the Study section of Chapter 1: Introduction, it should be noted that the

purpose of this study is not to understand the effects of COVID-19, which can be a potential topic of future research and is mentioned in the Recommendations for Future Research section of Chapter 5: Discussion.

Data Analyses

Numerical data obtained from the Qualtrics survey was categorized based on the levels or scales of measurement (nominal, ordinal, interval or ratio). The instruments used in this study were borrowed from a previously developed instrument which was used and tested for reliability and validity in several studies. Hence a reliability measurement using methods such as factor analysis was not needed but was performed for thoroughness.

The data obtained was first screened for missing values and data with missing values was discarded. Subsequently, the remaining data was appropriately organized, and the participant information was coded. Once the data was organized, appropriate descriptive statistical analyses (frequency, mean, and percentage) was conducted to summarize the data and understand the characteristics and distribution of the sample. The mean, median and mode are measures of central tendency and they were used to examine the center position of a distribution for a dataset or an average of the dataset. The variability in the data set was measured using measures of dispersion/variability (standard deviation, and variances) which provided information about the distribution/ spread of data within the dataset.

In the next step, correlation, analysis of variance (ANOVA), and regression analyses were conducted to examine the relationship between the variables. Linear

correlation was performed to analyze the relationship between the variables (social integration, academic integration, finance, and persistence). This would also help in studying the magnitude and direction of the relationship, if it exists. Subsequently, testing for significance was done to determine whether the correlation observed in the sample is present in the population from which the sample was obtained. A hypothesis was developed and tested using .05 level of significance. Three assumptions, i.e., homoscedasticity (homogeneity of variance), linearity, and normality were used to test the significance of linear correlation. Q-Q plots and scatter plots were used to determine the relationship. ANOVA was performed to observe the variance between groups (gender, GPC, SPO, and regions) for academic integration, social integration, and persistence.

Then multiple linear regression analysis was conducted to study whether social integration, academic integration, or finances can, individually or in some combination, predict student's persistence, and what is the variance between their predictions. This was done to see if the prediction model was statistically significant. Mahalanobis distance was used to check for outliers. Standardized residual plots were used to examine (a) homoscedasticity, (b) linearity, and (c) normality of the residuals. Variance inflation factor (VIF) and tolerance were analyzed to check for multicollinearity. Finally, R squared, and adjusted R squared were used for predicting goodness of model fit.

Confirmation of model fit was first conducted using path analysis. Path analysis was performed to observe the relationships between academic integration, social integration, finances, GPA, and persistence. Further confirmation about the model fit was

performed by conducting Structural Equational Modeling (SEM). The maximum likelihood method was used and assumed for multivariate normal distribution. Discriminant Validity was done to observe the minimum covariance between the latent variables. Beta weights were used to determine the effects and significant relationship between variables.

Structural equation modeling (SEM) was performed to study the goodness of fit of the proposed framework. Goodness of fit of the overall model was examined using indicators such as goodness of fit index (GFI) which needed to be ≥.95. GFI is the proportion of explained variance and usually produces results between 0.0 and 1.0, with 1.0 representing a perfect fit between the data and the model and numbers approaching zero suggesting a very poor fit (Brown, 2007). Adjusted goodness of fit index (AGFI) needed to be ≥.95, normalized fit index (NFI) needed to be ≥.95, non-normalized fit index (NNFI) needed to be ≥.95, comparative fit index (CFI) needed to be ≥.95, root mean squared residual (RMR) needed to be ≤.08, root mean squared error of approximation (RMSEA) needed to be ≤.06, chi-square, degree of freedom and p-value were the other criterion for model good fit. A model is considered a good model if it satisfies the majority of the model good fit criterion (Brown, 2007).

Structural equation modeling helped in estimating the measurements and structural models, examining the direct, indirect and total effects among the constructs, assessment of the goodness of fit of the conceptual model.

The use of structural equation modeling (SEM) is appropriate for validating conceptual models like the one proposed in this study. Several models predicting

students' persistence using student integration variables were developed and studied using SEM. This study used convenience sampling for data collection. Cabrera et al. (1993) used SEM to study models of student persistence on convenience samples. They used SEM to test their model of student persistence, including the role finances in the student persistence process. The use of SEM is appropriate because it "is analogous to performing simultaneous factor analysis and path analysis, validating both the structural and measurement components of the model" (Brown, 2007, pp. 70–71).

Limitations and Assumptions Regarding SEM

Methodological choices made during a study can introduce limitations because statistical techniques have some built-in assumptions and limitations (Hoekstra, Kiers, & Johnson, 2012; Xie, 2011). An understanding of the same is helpful to place the research findings in their proper context. SEM is a confirmatory technique; hence it is required to specify a full model a priori and test that model based on the sample and variables included in the measurements. The number of parameters needed to be estimated – including covariances, path coefficients, and variances, need to be known. All relationships needed to be specified. Then, the analyses can begin.

Like other multivariate statistical methodologies, most of the estimation techniques used in SEM require multivariate normality. Transformations on the variables can be made. However, there are some estimation methods that do not require normality. SEM techniques only look at first order (linear) relationships between variables. Linear relationships can be explored by creating bivariate scatterplots for all variables. Power transformations can be made if a relationship between two variables is quadratic.

Multicollinearity among the IVs for manifest variables can be an issue. Most programs will inspect the determinant of a section of the covariance matrix, or the whole covariance matrix. A very small determinant may be indicative of extreme multicollinearity. Finally, the residuals of the covariances (not residual scores) needs to be small and centered about zero. Some goodness of fit tests (like the Lagrange Multiplier test) remain robust against highly deviated residuals or non-normal residuals.

Summary

This study used a correlational research approach that can also be considered a case study, due to its focus on student population from a single university. The study used convenience sampling and the instruments used were borrowed from previous studies and had been validated by other researchers. The data was systematically analyzed using appropriate statistical techniques. Analysis for research question 1 was conducted using descriptive statistics, while those for research question 2 was conducted using ANOVA, chi-square, and Tukey's HSD, when required. Regression analysis was used to answer research question 3. Further, path analysis and SEM were used to confirm the prediction model.

Chapter 4: Results

The three previous chapters presented an introduction to the study, including problem statement and research questions, a review of the relevant literature, the conceptual framework, and finally the methodology that guided the inquiry process. This chapter starts with a brief review of the background of the study, including the purpose and research questions. Subsequently, it presents the data collected for the study, the analyses performed on the data, and the results obtained. The chapter will conclude with a short summary of the results.

Student retention and persistence are issues of concern to various stakeholders such as faculty, administrators, parents, students, and the broader community. However, decisions to persist are the outcome of complex processes. In addition, the relative importance of factors affecting the decisions vary between populations and educational levels. Note that while there exist variations between individuals with similar background (i.e., part of the same population group) and across time periods (even at the same educational level), such variations are impossible to model due to the infinite variations possible and are not addressed in this study. As discussed in Chapter 1: Introduction, this study was limited to examining the effects of three factors, academic integration (AI), social integration (SI), and finances (FI), on the persistence of international graduate students at a mid-western university (i.e., Ohio University) in the U.S. In other words, the purpose of this study was to examine the influence of academic integration, social integration, and finances on the persistence of international graduate students at a mid-western university. A quantitative approach was used. A correlational research design

was applied to analyze the relationship between the variables. The analysis was done to address three research questions:

1. What are the levels of academic integration and social integration of international graduate students at Ohio University?
2. Are there differences in the levels of academic integration, social integration, and persistence among international graduate students based on their gender, Graduate Program Classification (GPC), STEM Program Orientation (SPO), and world regions?
3. Are there predictive associations or relationships between academic integration, social integration, finances, and the persistence of international graduate students at Ohio University?

Unless stated otherwise, the analyses shown in this chapter were performed using IBM Statistical Package for the Social Science (SPSS v27).

Sample

The research study was focused on international graduate students at Ohio University. The survey was sent to all graduate students. Of the 173 who consented to the survey, 7 students did not continue further, and 2 students did not complete the survey. A total of 164 students responded to all non-demographic questions in the survey and were considered. Participant responses with missing values for demographic questions were removed from the data.

Nine of the 164 students who completed the survey entered *US* or *United States* as their home country, and hence their responses were removed from the analyses.

Furthermore, 12 responses were not included in the analyses for potentially questionable responses. They responded *Yes* to the instruments *Will enroll next semester* and *Graduating this semester*. While a student might enroll in classes after graduating from a program, for example if they are starting a different program or getting a certification, the issue raises some potential questions requiring respondent specific enquiry, especially if the level of current study was indicated as *Doctoral*.

Thus, responses from 143 participants remained after cleaning the data and these were used for further analyses. The 143 participants represent 18.5% of the international graduate students enrolled at Ohio University in Fall 2019 (Office of Institutional Research and Effectiveness, 2019).

Characteristics of the Participants

The survey responses were first analyzed to obtain an overview of the participant characteristics. The data was analyzed using the demographic information (age, gender, and marital status) of the participants. Subsequently, it was analyzed using the academic information (programs enrolled, and number of years in the program) of the participants. The result of this analyses is presented in this section.

Demographic Characteristics of the Participants

The demographic characteristics of the sample were studied using descriptive statistics, and frequency distribution. International graduate students from different nationalities responded to the survey. Table 1 describes the demographic characteristics of the participants (n = 143). The demographic data indicated that approximately 58% of the students that responded were from Asia, 28% from Africa, 7.2% from Europe, 5%

from South America, 1% each from North America and Australia. Turkey is in the Eurasia region, and is an applicant to join the European Union. Costa Rica is in Central America but is part of the Latin American region and shares the Hispanic culture of South America. Hence, for this analysis, Turkey and Costa Rica were respectively included in Europe and South America. Ideally, the demographical division based on geography should be suitably fine-grained and group participants either nationally or regionally (e.g. east Asia, South Asia, and Eurasia). Considering the small sample sizes per nation, and the difficulty of creating regional groupings that account for the cultural differences between different regions of a country, it was decided that a continental division was sufficiently meaningful for the purpose of this study and the same was used.

The data showed that approximately 54% of the participants were male, 44% were female, and 2% preferred not to answer. Approximately 77% of the participants were in the age range of 22 to 35, 20% were in the age range of 36 to 50, and 3% were in the age range of 51-65.

The marital status data showed that approximately 41% of the participants were married, 45% were never married, 8% preferred not to answer, 1% separated, 2% divorced, and 3% widowed. Further analysis of this data indicated that out of 52% of the male participants, approximately 24% were married, 20% were never married, 4% preferred not to answer, 3% widowed, and 1% divorced. Out of 46% of the female participants approximately 16% were married, 24% never married 1% divorced, 1% widowed, and 4% preferred not to answer.

Academic Information of Participants

The academic characteristics of the sample was studied using descriptive statistics, and frequency distribution. As mentioned earlier, approximately 54% of the participants were male, 44% were female, and 2% preferred not to answer. The data for GPC showed that approximately 12% of the participants were enrolled in a masters (STEM) program, 30% were enrolled in a doctoral (STEM) program, 21% were enrolled in a masters (other) program, and 37% were enrolled in a doctoral (other) program. Table 1 provides information on participant distribution based on gender and GPC.

Table 1

Distribution of Participant – Gender and Graduate Program Classification (GPC) (n=143)

Variables	n	%
Gender		
Male	76	53.1
Female	63	44.1
Prefer not to answer	3	2.1
Missing	1	.7
Program Enrolled		
Masters (STEM)	17	11.9
Doctoral (STEM)	42	29.4
Masters (other)	30	21
Doctoral (other)	58	37.1
Missing	1	.7

Note: n = Frequency, % = Percentage

This data was further evaluated to examine the percentage of male and female students' enrollment in different program types. The results indicated that out of 54% of male participants, 6.3% were enrolled in a masters (STEM) program, 13.4% in a doctoral (STEM) program, 11.3% in a masters (other) program, and 22.5% in a doctoral (other) program. Out of 44% of female participants, 5.6% were enrolled in a masters (STEM)

program, 15.5% in a doctoral (STEM) program, 9.9% were enrolled in a masters (other) program, and 13.4% were enrolled in a doctoral (other) program. Further analysis showed that 65% of the students (37.3% female, 33.1% male) reported having GPA greater than 3.75. Table 2 shows information on gender-wise GPC distribution of participants.

Table 2

Gender-Wise Graduate Program Classification Distribution of Participants (n = 143)

Variables	n	%
Male		
Masters (STEM)	9	6.3
Doctoral (STEM)	19	13.4
Masters (Other)	16	11.3
Doctoral (Other)	32	22.5
Female		
Masters (STEM)	8	5.6
Doctoral (STEM)	22	15.5
Masters (Other)	14	9.9
Doctoral (Other)	19	13.4
GPA		
Greater than 3.75	102	70.4

Note: n= Frequency, % = Percentage

The data was also analyzed to examine participants information regarding the number of years they were enrolled as graduate student at Ohio University. The majority of the respondents or 38.3% of the sample, were in the 1st year of their program, 25.5% were in their 2nd year, 15.6% were in their 3rd year, 13.5% were in their 4th year, 3.5%

were in their 5th year, and 2.1% were in the 6th year. Table 3 provides information on the number of years participants were at OU.

Table 3

Number of Years Participants Were at Ohio University (n = 143)

Years at OU	n	%
1 Year	54	38.3
2 Year	36	25.5
3 Years	22	15.6
4 Years	19	13.5
5 Years	5	3.5
6 Years	3	2.1
7 Years	1	.7
8 Years	1	.7
Total	143	99.9

Note: n = Frequency, % = Percentage

Reliability Analysis of the Scale

The items in the instrument (see Appendix A: Instruments), were drawn from two previously used, tested, and validated instruments (Cabrera, Nora, et al., 1992; Pascarella & Terenzini, 1980). The changes made, combining items from two instruments, and their use on different populations, demanded a reliability analysis of the scale. Hence such an

analysis was performed. First, an exploratory factor analysis of the items was performed. This was followed by a confirmatory factor analysis. Subsequently, the correlation between the variables and Cronbach's alpha were calculated.

Endogenous Variable

Persistence is the dependent variable, i.e., endogenous variable, in this study. In the subsequent discussion it is referred to using the code PA3. This was obtained by combining the three items, namely a) Enrolled previous semester; b) Will enroll next semester; and c) Graduating this semester.

A participant who answered "Yes" to both (a) and (b), or to both (a) and (c) was coded as PA3 = 1 (i.e., persisting), else was coded as PA3 = 0.

Exploratory Factor Analysis (EFA)

The data was screened for missing values, and interitem correlations. An exploratory factor analysis (EFA) of the 26 items in the instrument using data obtained from 143 responses was performed. EFA was performed using Promax rotation. The factor loadings obtained from this analysis provided factor structure for 20 items. The results indicated that the measure for sampling adequacy, Kaiser-Meyer-Olkin (KMO), was .810 and Bartlett's test for sphericity was statistically significant ($\chi 2$ (210) = 1306.823, $p < .001$). The sampling adequacy (KMO) result indicates that the data had a significant sample size for component analysis, and Bartlett's test results indicates sufficient correlation between the variables to continue with further analysis. Hence, the reliability of the scales was significant.

Based on a review of the relevant literature (Cabrera, Nora, et al., 1992; Fox, 1984; Terenzini et al., 1981), six components/factors were requested in the extraction method. These six factors accounted for a cumulative 67.88% of total variance. The factor loadings and average variance extraction (AVE) for all the items that were analyzed are shown in Table 4. Several research studies indicate that .40 is the most commonly used cutoff criterion level for factor loading (Hinkin, 1998; Howard, 2016).

Factor 1 contained 6 items, 5 of which were related to *academic and intellectual development* and 1 item addressed *institutional goal and commitment* (IGC2). Factor 1 explained 30.98% of the variance and had factor loadings ranging from .6 to .8. Item AI5 had the lowest factor loading. Factor 2 contained 5 items; all items were questions addressing *interaction with faculty*. Factor 2 explained 11.34% of variance and had factor loadings ranging from .5 to .9. Items IF4 and IF5 had the lowest factor loading among these 5 items. Factor 3 contained 4 items that addressed questions related to *peer group interaction*. It explained 8.74% of variance with the factor loadings ranging from .6 to .8. Factor 4 was comprised of 3 items and consisted of items addressing *institutional goal and commitment*. Factor 4 explained 7.16% of variance with factor loadings ranging from .6 to .8. Factor 5 and Factor 6 contained 1 item each, addressing question related to *persistence* and *finances,* respectively. Factor 5 explained 4.77% of variance.

The discriminant validity was met because the factor correlation matrix indicated that the correlation between factors was less than 0.7. and there were cross loadings, but they were greater than 0.2. The findings obtained from EFA confirm that further analysis can be conducted.

Results from EFA indicate that item AI5 and IF4 had a low-level correlation with items RIGC3, and SI1, SI2, SI3, and SI4, respectively. Results of EFA further indicate that item IF4 and item IF5, though part of Factor 2, were also cross loaded as an independent factor, indicating strong correlation between them. Further, AI5 had a cross-loading with RIGC3 and RIGC4.

Table 4

Exploratory Factor Analysis (EFA) for Students Integration and Finance scale

Variables	Code	Factor Loadings	Average Variance Extracted (AVE)
Factor 1			
	AI1	.836	
	AI2	.825	
	AI3	.887	.617
	AI4	.808	
	AI5	.633	
	IGC2	.694	
Factor 2			
	IF1	.882	
	IF2	.908	
	IF3	.838	.594

Table 4 (continued)

	IF4	.604	
Factor 3			
	SI1	.725	
	SI2	.824	.637
	SI3	.842	
	SI4	.795	
Factor 4			
	IGC1	.492	
	IGC 3	.829	.486
	IGC 4	.728	
Factor 5			
	PA3	.827	
Factor 6			
	RF	-.727	
Total items	20		

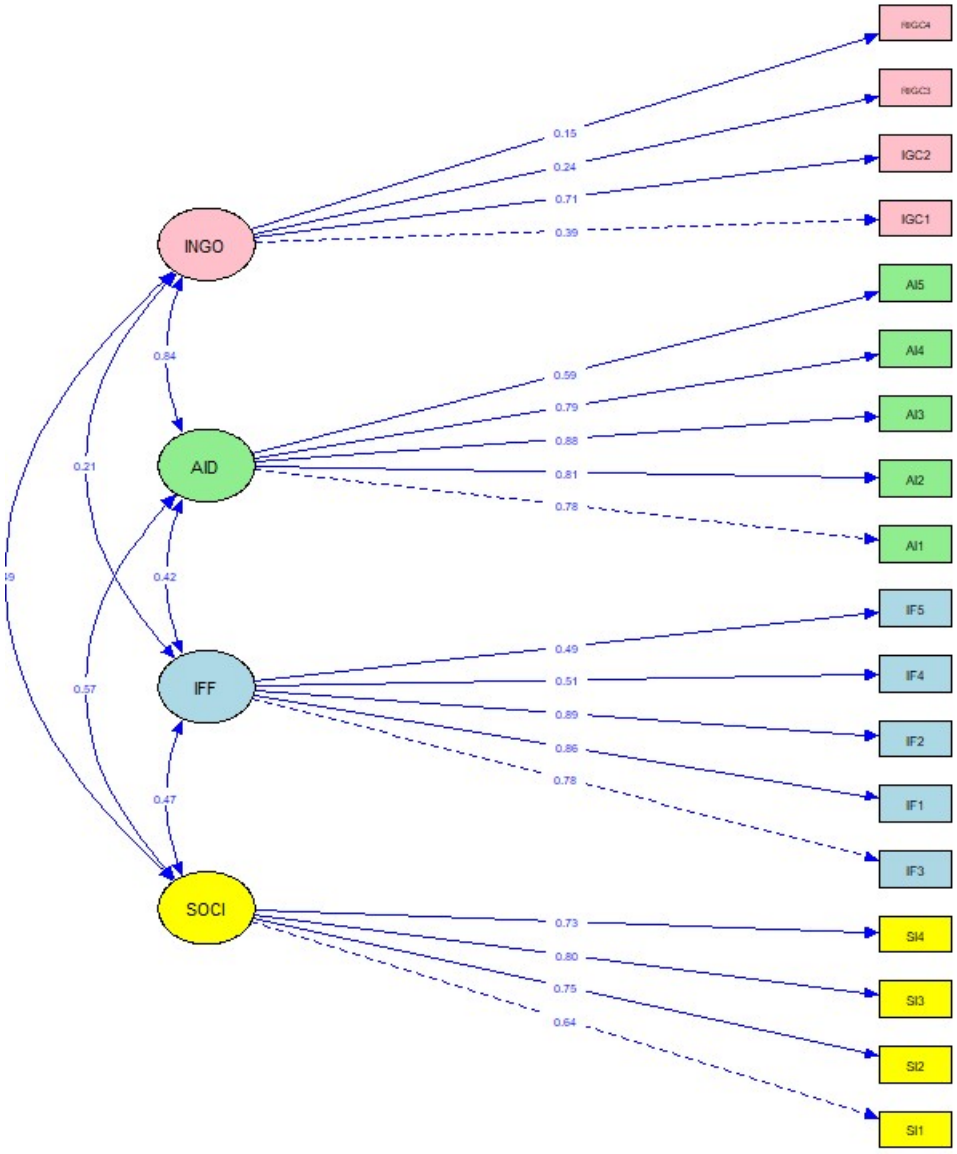
Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted to test the viability of a hypothesized factor structure, using responses from the survey. The Rx64 4.0.2, R studio programs were used to analyze CFA. R studio was used because the functionality

required to perform this analysis was not available in SPSS and further, I had experience using R to perform the required analysis. Based on the results of EFA, a CFA model, Model-1, was developed and analyzed for good model fit. As per the literature the model needs to satisfy good model fit measures/criterions (Meyers, Gamst, & Guarino, 2016). The good model fit criterions are: χ^2 should have p >.05, CFI ≥ .95, NFI ≥ .95, TLI ≥ .95, RMSEA ≤ .06, SRMR ≤ .08 (Meyers et al., 2016). The analysis showed that Model-1 had statistical significance for chi square test with a value of χ^2 (129) = 291.263, p < .001, RMSEA = .094, SRMR= .088, CFI = .860, TLI = .834. Studies have reported that chi square is very sensitive to sample size and will often yield a statistically significant result despite the model exhibiting a good fit (Meyers et al., 2016). Based on the literature even if we ignore the chi-square value being statistically significant p <.05, Model-1did not satisfy most of the other criteria of good of fit. Hence, Model-1 was not a good model. Figure 2 presents diagrammatical information about the coefficients value between individual items and factors of Model-1. In the figure, factors were labeled as Factor 1 - AID, Factor 2 – IFF, Factor 3 – SOCI, Factor 4 – INGO. In this analysis Factors 5, and 6 were not included because they were single item variables. Model-1 items had coefficient values ranging from .148 to .878.

Figure 2

Confirmatory Factor Analysis Model-1



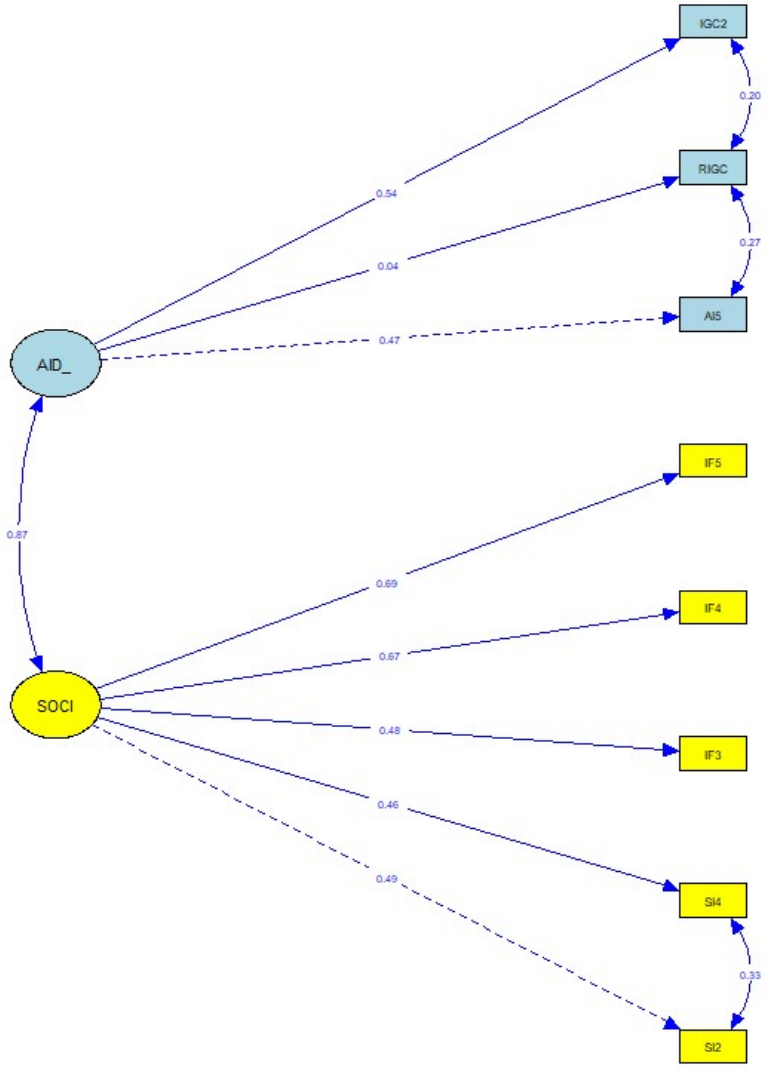
A second CFA model, Model-2, was designed by making essential modification to Model-1. The modifications were made based on the modification indices report generated for Model-1. As mentioned earlier, Factor 2 (IFF), and Factor 3 (SOCI) were

elements of social integration, hence significant items from these factors were combined into one factor (social integration). Similarly, Factor 4 (IGC) and Factor 1 (AID) were elements of academic integration. Their significant items were combined, and an academic integration factor was created.

The correlations added SI2 ~~ IF2, and RIGC3 ~~ AI5 and RIGC3~~ IGC2 were respectively within their proposed social integration and academic integration factors. Figure 3 presents the diagrammatical representation of Model-2. When these items were correlated, there was a statistically significant improvement in the model. The good model fit criterion for Model-2 were $\chi 2$ (16) = 16.599, p = .412, RMSEA = .016 CI 90% [.000, .080], SRMR = .047, CFI = .997, TLI = .994, NFI = .919. These values satisfied the good model fit criterion for Model-2. The chi square p value was greater than .05, not statistically significant, thus making Model-2 a good fit model.

Figure 3

Confirmatory Factor Analysis Model-2



Finally based on the above analyses, 2 factors were created, namely social integration/*SI* (SI2, SI4, IF3, IF4, IF5), and academic integration/*AI* (AI5, IGC2, RIGC3).

Correlation between the Variables

Bivariate correlation analysis was conducted to observe the Pearson correlation between the exogenous and endogenous variables. The variables, social integration, academic integration, and finances were treated as exogenous variables, while persistence was treated as endogenous variable. The Pearson pairwise correlation analysis showed the direction and magnitude of the product-moment correlation between the factors/variables studied. *SI* had a statistically significant correlation with *AI* (r =.252, p < .001) and had the largest positive magnitude compared to other variables. Finances variable had (r = -.029, p = .729) the smallest negative magnitude among all the factors. Table 5 provides the results of the bivariate correlation between variables.

Table 5

Correlation between Social Integration, Academic Integration, Finances, and Persistence

	SI	AI	FIN	PER	GPA
Social Integration (SI)					
Academic Integration (AI)	.252**				
Finances (FIN)	-.029	.023**			
Persistence (PERSIS)	-.165*	.195**	-121*		
Grade Point Average (GPA)	.060	.075	-.072	.189*	

Note: **p < .001, *p < .05

Cronbach's Alpha

The factors/variables were further analyzed to measure the internal consistency of the questionnaire used in this study. The Cronbach's alpha was used to examine the scale's reliability of social integration, and academic integration factors. Table 6 presents the Cronbach's alpha. The Cronbach's alpha for social integration was .710 and for academic integration it was .547. Gliem and Gliem (2003) indicated that Cronbach's alpha does not provide reliability estimates for single items. Since the finance and persistence factors had single items in them, they were not tested for Cronbach's alpha.

Table 6

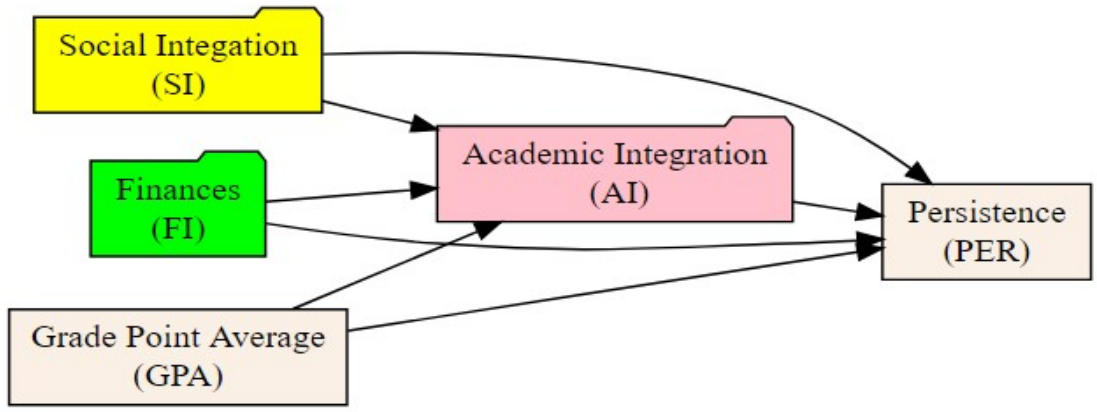
Cronbach's Alpha for Social Integration, and Academic Integration Scales

Variable	Number of items	Cronbach's alpha Coefficient
SI2		.671
SI4		.670
IF3		.696
IF4		.629
IF5		.631
Social Integration	5	.710
AI5		.512
IGC2		.541
RIGC3		.354
RIGC4		.458
Academic Integration	4	.547

The conceptual framework proposed in Chapter 2 was modified based on the aforementioned results obtained from the analyses performed to test the reliability of the instruments. The modified framework is shown in Figure 4.

Figure 4

Conceptual Framework



Analysis of Research Questions

The results of the reliability analysis showed that 4 factors, namely social integration, academic integration, finances, and persistence are suitable for further analysis. Several studies have shown that GPA is a good predictor of persistence (Cabrera et al., 1993; Pascarella & Terenzini, 1983), hence it was also included in the subsequent analyses to answer the research questions.

The subsequent analyses were performed using the 11 items obtained from EFA and CFA. These items, and the factors they belong to, are listed in Table 7.

Table 7

Factors and Items Used to Answer Research Questions

Factors (social integration)	CODE
1. The student friendships I have developed at this university have been personally satisfying.	SI2
2. My interpersonal relationships with other students have had a positive influence on my intellectual growth and interest in ideas.	SI4
3. My non-classroom interactions with faculty have had a positive influence on my career goals and aspirations.	IF3
4. Since coming to this university, I have developed a close, personal relationship with at least one faculty member.	IF4
5. I am satisfied with the opportunities to meet and interact informally with faculty members.	IF5
Factors (academic integration)	CODE
1. I have performed academically as well as I anticipated.	AI5
2. I am confident that I made the right decision in choosing to attend this university.	IGC2
3. It is not important to me to graduate from this university .	RIGC3
4. Getting good grades is not important to me.	RIGC4

Table 7 (continued)

Factor (Finances)	CODE
Received funding.	FINANCES
Factor (academic performance)	CODE
What is your GPA?	GPA

Findings of Research Question 1

The first research question was: what are the levels of academic integration and social integration of international graduate students at Ohio University?

Mean and standard deviation of the 143 responses used for this study were calculated and used to answer this research question.

Levels of Academic Integration

The levels of academic integration were analyzed using 4 items. The academic integration scale involves 2 elements, academic and intellectual development (AID) and institutional goals and commitment (IGC). One item (AI5) focused on AID and the other 3 items focused on IGC. The items that addressed student's attitude towards their academic integration were presented on a 5-point Likert scale (1 = strongly disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, and 5 = strongly agree). The responses to the negative statement questions were reverse coded. IGC3 (It is not important to me to graduate from this university) and IGC4 (Getting good grades is not important to me), were the 2 negative statements in the IGC instrument. These two

items, IGC3 and IGC4, were reverse coded as RICG3 and RIGC4, respectively. GPA was measured using an interval scale.

The mean and standard deviation scores for the individual items in academic integration are shown in Table 8. The mean and standard deviation of the various items were: AI5 (M = 4.26, SD = 0.90), IGC2 (M = 4.32, SD = 0.87), IGC3 (M = 4.37, SD = 1.17), and RIGC4 (M = 4.31, SD = 1.19). The mean ranged from 4.37 to 4.26. RIGC3 reported the largest mean of 4.37 with SD = 1.17. Whereas AI5 reported lowest mean of 4.26 with SD = 0.90 among all the academic integration items. The academic integration factors reported a mean = 4.21 and SD = 0.739.

Table 8

Mean and Standard Deviation – Academic Integration of International Graduate Students (n=143)

Items	M	SD
1. I have performed academically as well as I anticipated (AI5).	4.26	.90
2. I am confident that I made the right decision in choosing to attend this university (IGC2).	4.32	.87
3. It is not important to me to graduate from this university (RIGC3).	4.37	1.71
4. Getting good grades is not important to me (RIGC4).	4.31	1.19
Factor-Academic Integration	4.21	.739

Note: M = Mean, SD = Standard Deviation.

Levels of Social Integration

Levels of social integration were measured by analyzing data from 5 items. The social integration scale comprises 2 elements, namely peer-group interactions, and interactions with faculty. Two of these 10 items focus on examining peer-group interactions and the other 3 focus on interactions with faculty. The questions that focused on examining student's attitude towards their social integration were measured on a 5-point Likert scale (1 = strongly disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, and 5 = strongly agree).

The mean and standard deviation scores of the social integration items are shown in Table 9. The mean and standard deviation of the various items were: item SI2 (M = 4.19, SD = 0.86), SI4 (M = 4.17, SD =0.88), IF3 (M = 4.01, SD = 0.95), IF4 (M = 3.92, SD = 1.18), IF5 (M = 3.86, SD = 1.13). The mean ranged from 4.19 to 3.86. SI2 reported the largest mean of 4.19 with SD = 0.86. Whereas IF5 reported lowest mean 3.86 with SD = 1.13 among social integration items. The social integration factors reported a mean = 4.20 and SD = 0.689.

Table 9

Mean and Standard Deviation – Social Integration of International Graduate Students (n = 143)

Items	M	SD
1. The student friendships I have developed at this university have been personally satisfying (SI2).	4.19	.86
2. My interpersonal relationships with other students have had a positive influence on my intellectual growth and interest in ideas (SI4).	4.17	.88
3. My non-classroom interactions with faculty have had a positive influence on my career goals and aspirations (IF3).	4.01	.95
4. Since coming to this university, I have developed a close, personal relationship with at least one faculty member (IF4).	3.92	1.18
5. I am satisfied with the opportunities to meet and interact informally with faculty members (IF5).	3.86	1.13
Factor- Social Integration	4.20	.689

Note: M = Mean, SD = Standard Deviation

The finance factor consists of 1 item (Received funding) measured on a binary scale (Yes = 1, and No = 0). The data indicated that approximately 87.4% (*n* =125)

students received funding while studying at Ohio University and 12.6% (*n* =18) did not receive funding.

All academic integration and social integration items are ordinal. It is widely understood and accepted that while parametric tests can be, and are frequently conducted on ordinal data (Carifio & Perla, 2008; Norman, 2010), normality cannot be assumed for such ordinal data (Jamieson, 2004; Norman, 2010). Hence, a test for normality was not performed.

Findings of Research Question 2

The second research question was: are there differences in the academic integration, social integration, and persistence among international graduate students based on their gender, Graduate Program Classification (GPC), STEM Program Orientation (SPO), and world regions? Analysis of variance (ANOVA) and chi-square were used to answer this research question. In ANOVA the following factors were used as dependent variables: social integration (*SI*), academic integration (*AI*), and persistence.

Gender, Social Integration, Academic Integration, and Persistence

ANOVA was performed to examine if there exists any statistically significant difference among genders (male/female) for social integration factor. Gender was used as independent variable and social integration was used as dependent variable in the analysis. The analysis reported the levels of social integration for gender, male ($n = 76$, $M = 4.10$, $SD = 0.667$), and female (n =63, $M = 3.99$, $SD = 0.671$). The analysis of variance was not statistically significant, $F(1,137) = .923$, $p = .338$. In other words, there is no

statistically significant difference for social integration between male and female international graduate students.

Next, ANOVA was performed to examine the difference for academic integration among gender. The analysis reported the levels of academic integration, male (n = 76, M =4.12, SD =0.790) and female (n = 63, M=4.31, SD =0.686). The analysis of variance was not statistically significant, F (1,137) = 2.267, p = .134. There is no statistically significant difference for academic integration between male and female international graduate students.

Persistence is a binary variable and hence, the difference in gender for persistence was observed using factorial ANOVA. The analysis of variance was not statistically significant, F (1,137) = 1.674, p = .198. In other words, there is no statistically significant difference for persistence between male and female international graduate students. In addition, chi-square test of independence analysis was performed for persistence among gender. The analysis also reported no statistically significant difference in persistence between male and female international graduate students, $\chi\text{^}2(1) = 1.678$, p = .195. The results of analysis of variance among gender are shown in Table 10.

Table 10

Mean Score and Standard Deviation of SI, AI by Gender (n = 139)

Variable	Gender	n	*M*	*SD*
Social Integration	Male	76	4.10	.667
	Female	63	3.99	.671
Academic Integration	Male	76	4.12	.790
	Female	63	4.31	.686

Note: Social Integration factor, F (1,137) = .923, p = .338. Academic Integration factor, F (1,137) = 2.267, p= .134. Persistence factor, F (1,137) = 1.674, p = .198; $\chi^2(1) = 1.678$, p = .195.

Graduate Program Classification (GPO), Social Integration, Academic Integration, and Persistence

ANOVA was performed to determine if there exists any statistically significant difference in social integration among graduate program classification (GPC) groups. GPC was used as independent variable and social integration was used as dependent variable in this analysis. The GPC consisted of four levels, 1) masters (STEM), 2) doctoral (STEM), 3) masters (other), and 4) doctoral (other). The analysis reported that the levels of social integration for GPC groups was: masters (STEM) (n =17, M = 4.31, SD = 0.544), doctoral (STEM) (n =42, M = 3.92, SD = 0.763), masters (other) (n =30, M = 4.03, SD = 0.682), doctoral (other) (n =53, M = 4.02, SD = 0.669). The analysis of variance was not statistically significant, F (3,138) = 1.276, p = .285. There is no statistically significant difference for social integration between GPC groups.

Next, ANOVA was performed to examine the difference for academic integration among GPC groups. The analysis reported that the levels of academic integration for GPC groups was, masters (STEM) (n = 17, M = 3.87, SD = 0.724), doctoral (STEM) (n =42, M = 4.26, SD = 0.717), masters (other) (n =30, M = 4.47, SD = 0.629), and doctoral (other) (n =53, M = 4.13, SD = 0.787). The analysis of variance was statistically significant, F (3,138) = 2.755, p = .045. In other words, there is a statistically significant difference for academic integration between GPC groups. A Tukey HSD post-hoc test revealed that masters (STEM) and masters (other) had a mean difference that was statistically significantly with a p <.05.

Persistence is a binary variable and hence the difference among GPC for persistence was observed using factorial ANOVA. The analysis of variance was not statistically significant, F (3,138) = .193, p = .901. In other words, there is no statistically significant difference for persistence between GPC groups for international graduate students. Further, chi-square test of independence was performed for persistence among GPC groups. The analysis also reported no statistically significant difference in persistence among GPC groups, $\chi^2(3) = .594$, p = .898. The results of analysis of variance for GPC are shown in Table 11.

Table 11

Mean Score and Standard Deviation of SI, AI by Graduate Program Classification (GPC) (n = 142)

Variable	GPC	n	*M*	*SD*
Social Integration	Masters (STEM)	17	4.31	.544
	Doctoral (STEM)	42	3.92	.763
	Masters (other)	30	4.03	.682
	Doctoral (other)	53	4.02	.669
Academic Integration	Masters (STEM)	17	3.87	.724
	Doctoral (STEM)	42	4.26	.717
	Masters (other)	30	4.47	.629
	Doctoral (other)	53	4.13	.787
Persistence	Masters (STEM)	17		
	Doctoral (STEM)	42		
	Masters (other)	30		
	Doctoral (other)	53		

Note: Social Integration factor, F (3,138) = 1.276, p = .285. Academic Integration factor, F (3,138) = 2.755, p = .045. Persistence factor, F (1,138) = .193, p = .901; $\chi^2(3) = .594$, p = .898.

STEM Program Orientation, Social Integration, Academic Integration, and Persistence

ANOVA was conducted to examine the difference in SI, AI, and persistence among STEM Program Orientation (SPO). SPO consists of 2 groups, STEM

(masters/doctoral), and Other (masters/doctoral). For this analysis SPO was used as independent variable. One respondent had not answered the question relating to SPO, and data for that response was removed from consideration for this analysis. The analysis reported the levels of social integration for SPO groups, STEM (masters/doctoral) (n = 59, M = 4.03, SD = 0.724), and Other (masters/doctoral) (n = 83, M = 4.02, SD = 0.669). The analysis of variance was not statistically significant, F (1,140) = .003, p = .957. In other words, there is no statistically significant difference for social integration between SPO groups of international graduate students.

Next ANOVA was performed to examine the difference for academic integration among SPO. The analysis reported that the levels of academic integration for SPO groups was, STEM (masters/doctoral) (n = 59, M=4.25, SD =0.747) and Other (masters/doctoral) (n = 83, M = 4.14, SD =0.734). The analysis of variance was not statistically significant, F (1,140) = 743, p= .390. In other words, there is no statistically significant difference for academic integration between STEM (masters/doctoral) and Other (masters/doctoral) international graduate students.

Persistence is a binary variable and hence the difference among SPO for persistence was observed using factorial ANOVA. The analysis of variance was not statistically significant, F (1,140) = .302, p = .583. In other words, there is no statistically significant difference in persistence among SPO groups of international students. Chi-square test of independence was performed for persistence among gender. The analysis also reported no statistically significant difference in SPO for persistence, χ^2(1) = .306, p = .580. The results of analysis of variance for SPO is shown in Table 12.

Table 12

Mean Score and Standard Deviation of SI, AI by STEM Program Orientation (SPO) (n = 142)

Variable	SPO	n	*M*	*SD*
Social Integration	STEM (masters/doctoral)	59	4.03	.669
	Other (masters/doctoral)	83	4.02	.724
Academic Integration	STEM (masters/doctoral)	59	4.25	.747
	Other (masters/doctoral)	83	4.14	.734
Persistence	STEM (masters/doctoral)	59		
	Other (masters/doctoral)	83		

Note: Social Integration factor, F (1,140) = .003, p = .957. Academic Integration factor, F (1,140) = 743, p = .390. Persistence factor F (1,140) = .302, p = .583*;* $\chi^2(1) = .306$, $p = .580$.

Regions, Social Integration, Academic Integration, and Persistence

ANOVA was performed to examine if there exists any statistically significant difference among regions and social integration factor. The countries were grouped into six different geographical regions (i.e., continents or sub-continents), namely: 1) North America, 2) South America, 3) Europe, 4) Asia, 5) Africa, and 6) Australia. Four respondents had not answered the question relating to nationality and data for those responses were removed from consideration in this analysis. Further, there were 1 case each from North America (Canada) and Australia, hence the responses for these cases were also removed from consideration in this analysis.

Regions were used as independent variable and social integration was used as dependent variable in the analysis. The analysis reported the levels of social integration for different regions, South America (n = 7, M = 4.23, SD = 0.509), Europe (n = 10, M = 4.00, SD = 0.525), Asia (n = 81, M = 3.99, SD = 0.691), and Africa (n = 39, M = 4.08, SD = 0.782). The analysis of variance was not statistically significant, F (3,133) = .373, p = .772. There is no statistically significant difference for social integration between international graduate students from different regions.

Next, ANOVA was performed to examine the difference for academic integration among regions. The analysis reported the levels of academic integration for regions, South America (n = 7, M = 4.46, SD = 0.728), Europe (n = 10, M = 3.70, SD = 0.896), Asia (n = 81, M = 4.10, SD = 0.721), and Africa (n = 39, M = 4.48, SD = 0.667). The analysis of variance was statistically significant, F (3,133) = 4.467, p = .005. In other words, there is a statistically significant difference for academic integration between international graduate students from different geographical regions. A Tukey HSD post-hoc test revealed a statistically significant difference, with $p < .05$, for academic integration between international graduate students from the regions Africa-Europe/Asia (i.e., Africa and Europe, and Africa and Asia). Further, the results reported a larger mean difference between students from Europe and Africa in comparison to the mean difference between students from Asia and Africa.

Persistence is a binary variable (Yes = 119, No = 18) and hence the difference among regions for persistence was observed using factorial ANOVA. The analysis was not statistically significant, F (5,133) = 1.862, p = .065. In other words, there is no

statistically significant difference for persistence among international graduate students from different geographical regions. Chi-square test of independence was performed for persistence among regions. The analysis also reported no statistically significant difference for persistence, χ^2(5) = 9.096, p = .105. The results are shown in Table 13.

Table 13

Mean Score and Standard Deviation of SI, AI by Regions (n = 142)

Variable	GPC	n	*M*	*SD*
Social Integration	South America	7	4.23	.509
	Europe	10	4.00	.525
	Asia	81	3.99	.691
	Africa	39	4.08	.782
Academic Integration	South America	7	4.46	.728
	Europe	10	3.70	.896
	Asia	81	4.10	.721
	Africa	39	4.48	.667
Persistence	South America	7		
	Europe	10		
	Asia	81		
	Africa	39		

Note: Social Integration factor, F (3,133) = .373, p = .772. Academic Integration factor, F (3,133) = 4.467, p = .005. Persistence factor, F (5,133) = 1.862, p = .065, p = .583; $\chi^2(5) = 9.096$, p = .105.

Findings of Research Question 3

The third, and final, research question was: are there predictive associations or relationships between academic integration, social integration, finances, and the persistence of international graduate students at Ohio University?

Multiple linear regression was used to examine the relationship between academic integration, social integration, finances, and persistence of international graduate students, and to determine if a predictive association existed between them. First, the factors in the study, namely academic integration, social integration, finances, and persistence were analyzed to check the assumption of regression. For this, the data was checked for outliers, linearity, correlation, and multicollinearity between the factors. Mahalanobis distance indicated that case no.100 was an outlier. Taking it out did not make any significant difference in the outcome. Hence, it was included in the analysis. The results of scatter plot indicated linear relationship between the variables. As Table 5 indicates, bivariate correlation analysis indicated significant correlation among all the factors. The data was checked for multicollinearity. The tolerance was less than "1" for all the predictors, indicating very low relationship between predictors. The variation inflation factor was < 5, indicating no multicollinearity between the predictors. All the assumptions of regression were met before conducting regression analysis. (The use of Likert scale does not permit a test for normality; hence it is not considered.)

Linear regression was used for the binary dependent variable, i.e., persistence. Hellevik (2009) states that:

> the statistical arguments against the use of linear regression with a binary dependent variable are not as decisive as it is often claimed. Even if the homoscedasticity assumption is violated, this in practice has little effect on the outcome of significance tests. The results for linear and logistic significance probabilities as we have seen turn out to be nearly identical, even with small samples and skewed distributions on the dependent variable. (p. 73)

Therefore, in this study, it is appropriate to use linear regression for the binary dependent variable persistence.

Regression Analysis

Multiple linear regression analysis was conducted using academic integration, social integration, finances, and GPA as predictor variables, and persistence as dependent variable. A statistically significant regression model was obtained. The predictors (*SI, AI, finances,* and *GPA*) account for 14.9% of the variation in persistence F (4,138) = 6.057, p <.05, R^2 = .149, Adj R^2 = .125. The results are shown in Table 14.

Table 14

Multiple Linear Regression (n = 143)

Predictor	B	SE B	β	t	p
Constant	.764	.255		3.00	.003
Social Integration	-.104	.041	-.205	-2.524	.013*
Academic Integration	.113	.038	.239	2.938	.004*
Finances	-.221	.082	-.211	-2.677	.008*
GPA	.077	.036	.168	2.126	.035*

Note: R^2 = .149, Adj R^2 = .125 F (4, 138) = 6.057, p <.05,
* = p<.05

The β coefficient values for each individual predictor for the regression equation were obtained. All factors, namely social integration (β = -.205, p <.05), academic integration (β = .239, p <.05), finances (β = -.211, p <.05), and GPA (β = .168, p <.05), were statistically significant predictors of persistence. The β results indicated that *AI* was the best predictor of persistence among the factors tested in this study. The regression equation is:

$$\hat{Y} = .764 + (-.104)SI + (.113)AI + (-.221)Finances + (.077)GPA.$$

Regression analysis indicated that academic integration variable has a significant effect on improving the statistical significance of the other independent variables. The regression model and the direct effect was not statistically significant F (1,141) = 2.375, p = .126, R^2 = .017 when only social integration was used to predict persistence. When academic integration was added as covariate to social integration the model significantly

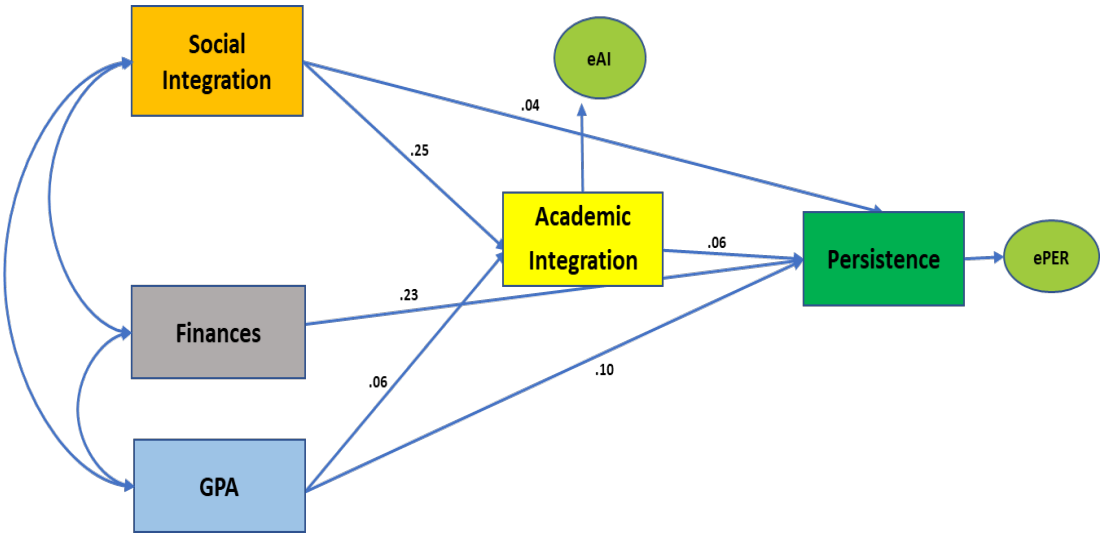
improved F (2,140) = 5.415, p <.05, R^2 = .072. Similarly, GPA became significant only when academic integration was added to the model. However, finance was significant on its own for predicting persistence. Based on the effect of *AI* on other predictors it can be assumed that *AI* can be a mediator variable. Path analysis was performed to test this hypothesis, i.e., *AI* can be a mediator variable.

Path Analysis

Path analysis was conducted to observe the relationship among the exogenous and endogenous variables, and to test the hypothesis that *AI* could be a mediator variable. Figure 5 presents a diagrammatical information of the path analysis. Path analysis was performed using IBM AMOS v27. The results of path analysis showed that when *AI* was used as a mediator variable, the standardized regression weight of *SI* increased from .038 to .248, which was the strongest regression estimate weight compared to other relationships among the variables. The weakest relationship was between *SI* and persistence at .038. The model reported $\chi^2(1)$ = .178, p = .673. Since the model had non-significant chi square it was a good fit model. The good model fit criterion NFI = .991, RMSEA = .000, CFI = 1.00, RMSEA 90% CI [.000, .167]), GFI = .999 were satisfied. Hence, path analysis showed that the revised conceptual model shown in Figure 5 was a good prediction model. It also indicated that *AI* was a mediator variable.

Figure 5

Path Analysis



Structural Equation Modeling (SEM)

The results of path analysis showed that the prediction model is a good fit model. Subsequently, structural equation modeling (SEM) was performed to obtain additional confirmation of the prediction model good fit. SEM was performed using R x64 v 4.0.2. SEM model was designed based on the results obtained from previous analyses. Preliminary SEM analysis indicated that items RIGC4 had high multiple correlations with error terms and factors had significant negative impact on the model. Hence, it was excluded from further analyses.

The first SEM model, Model-1, was created using 11 items, of which 2 (persistence and finance) were binary and others were 5 point-Likert scale. Social integration factor was comprised of 5 items, academic integration factor was comprised of 3 items, whereas GPA (academic performance) and finances contained 1 item each.

SEM Model-1was analyzed to observe the direct relationship among the exogenous and endogenous variables. For this model, persistence was used as endogenous variable, and *AI*, *SI*, finances, and GPA were used as exogenous variables. In SEM, endogenous variables are associated with their own residual variable. In the model single head arrow indicates path and direction, while double heads indicate correlation among exogenous variables. The information on the direct effect among the variables is shown in Table 15. Model-1 analysis reported $\chi^2(44) = 44.040$, p = .0344, GFI = .967, IFI = .988, CFI = .988, RMSEA = .023, 90% CI [.000, .063]). The chi square (χ^2) was not statistically significant; hence Model-1 is a good model fit and good model fit criterion were also satisfied for Model-1. Model-1 is shown in Figure 6.

Table 15

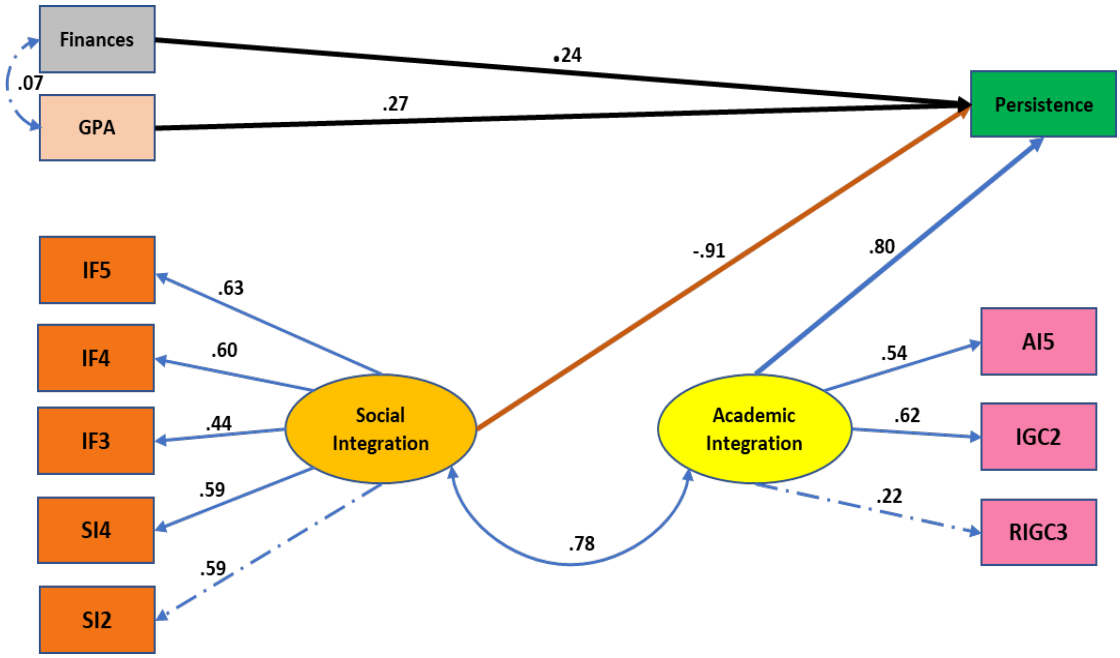
SEM Model-1 (Direct effect) (n = 143)

Variables (modified model)	Regression estimates	Standard error	*p*
SI ~ Persistence	911	.981	.049*
AI ~ Persistence	.797	2.031	.133
Finances ~ Persistence	.237	.331	.023*
GPA ~ Persistence	.273	.198	.050*

Note *= p<.05

Figure 6

SEM Model-1 (Direct Effect)



Subsequently another model, SEM Model-2, was developed. This model included a mediator variable and was developed to observe indirect effect between exogenous variables and the endogenous variables. During the regression analysis, and path analysis it was observed that *AI* had a significant influence on *SI*, Finances, and GPA in predicting persistence. Therefore, in SEM Model-2, variable *AI* (Academic Integration) was used as endogenous variable along with persistence, while social integration, finances, and GPA were used as exogenous variables. The results from SEM Model-2 indicate no change in direct effect path coefficient value between *AI* and persistence, whereas the standardized regression coefficient/path coefficient for *SI* and persistence changed from -.911 to .782 when the path was mediated by AI. An interesting fact observed in this analysis was that

the magnitude and direction of the regression coefficient value for *SI* changed. Likewise, when the effect of *AI* as mediator variable was examined for finances and GPA, it was observed that the path coefficient for finances to persistence decreased from .191 to .057 when the path was mediated through *AI* and the same effect was seen with GPA. Its path coefficient to persistence decreased from .216 to .071. Since finances and GPA did not indicate significant improvement in the path effect, Model-2 was finally developed using only one Indirect path that reported noticeable change i.e., *SI*-*AI*-persistence. Table 16 presents information of SEM Model-2 estimates.

The SEM Model-2 reported chi-square $\chi^2(41) = 44.040$, p = .344, GFI = .967, IFI = .988, CFI = .988, SRMR = .071, RMSEA = .023, = 90% CI [.000, .063]), TLI = .990. The chi square value was not statistically significant making SEM Model2 a good fit. Figure 7 presents the diagrammatical information of SEM Model-2. Table 17 provides model fit information for SEM Model-2. Figure 7 shows the diagrammatic representation of SEM Model-2. The SEM analysis confirms that the prediction model is significant and academic integration variable is a mediator variable and it influenced every predictor in the model. Social integration reported the most important and significant improvement. Overall based on the results of the regression coefficients, chi square value, and good model fit criterions it can be said that the developed prediction model is a good fit model.

Table 16

Estimates of SEM Model-2 (n = 143)

Variable Path	Regression Estimates SEM Model-2	Std Error	*p*
SI ~ Persistence	-.911	.981	.049*
AI ~ Persistence	.797	2.031	.133
Finances ~ Persistence	.237	.331	.020*
GPA ~ Persistence	.273	.198	.050*
AI ~ SI	.782	.222	.050*

Note: *p <.05

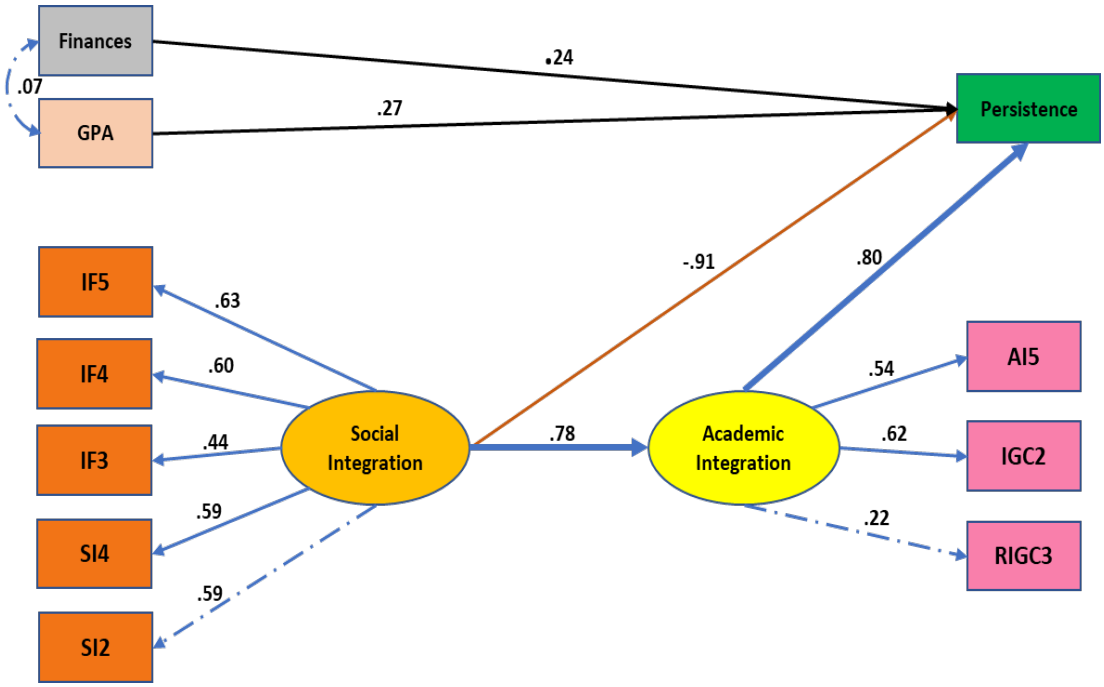
Table 17

Goodness of Fit – SEM Model-2 (n = 143)

Model	**df**	χ^2	**SRMR**	**RMSEA**	**GFI**	**IFI**	**CFI**
Model 2	41	44.040	.071	.023	.967	.988	.988

Figure 7

SEM Model-2



Summary

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed. The results of EFA and CFA were used to obtain a factor structure which consisted of 11 items grouped into four factors. These items and factors were subsequently used to revise the conceptual framework proposed in Chapter 2.

The analyses performed to answer research question 1 showed that the academic integration and social integration factors reported a mean = 4.21 and *SD* = 0.739, and a mean = 4.20 and *SD* = 0.689, respectively. It further showed that approximately 87% of the participants received funding.

ANOVA was performed to answer research question 2. The results of this showed no statistically significant difference in academic integration, social integration, and persistence among participants across male/female, and SPO groups. It also showed that differences existed in academic integration among participants across GPC and geographical regions, especially Africa and Asia.

Finally, regression, path analysis, and SEM were performed to answer research question 3. The results of the regression analysis showed that all factors, namely Social Integration (β = -.205, p <.05), Academic Integration (β = .239, p <.05), Finances (β = -.211, p <.05), and GPA (β = .168, p <.05), were statistically significant predictors of persistence. The β results indicate that *AI* was the best predictor of persistence among the factors tested in this study. The predictors (*SI*, *AI*, *finances*, and *GPA*) account for 14.9% of the variation in persistence F (4,138) = 6.057, p <.05, R^2 = .149, *Adj* R^2 = .125.

Results of the path analysis showed that *AI* was a mediator variable and had significant influence on *SI*. The path analysis also showed that the revised conceptual framework was a good prediction model. These results were confirmed using SEM.

Chapter 5: Discussion

The four previous chapters introduced the study, including the problem statement and research questions, a review of the relevant literature, the conceptual framework, the methodological procedures of data collection and analysis, and the findings. This chapter first provides a short introduction to the study, including highlighting the purpose and research question. Subsequently, the findings of this study are discussed. Next, the implications of the results obtained are discussed, followed by a short discussion on the possible directions for future research.

Student retention and persistence are issues of concern to various stakeholders such as faculty, administrators, parents, students, and the broader community. However, decisions to persist are the outcome of complex processes. In addition, the relative importance of factors affecting the decisions vary between student populations and educational levels. Note that while there exist variations between individuals with similar background (i.e., part of the same population group) and across time periods (even at the same educational level), such variations are impossible to model, due to the infinite variations possible, and were not addressed in this study. As discussed in Chapter 1: Introduction, this study was limited to examining the effect of academic integration (AI), social integration (SI), and finances (FI) on the persistence of international graduate students at a mid-western university (i.e., Ohio University) in the United States.

As previously indicated in Chapter 4, this is a quantitative study that was used a correlational research design to analyze the relationship among the variables. The analysis was done to address the three research questions that guided the inquiry:

1. What are the levels of academic integration and social integration of international graduate students at Ohio University?
2. Are there differences in the levels of academic integration, social integration, and persistence among international graduate students based on their gender, graduate program classification (GPC), STEM Program Orientation (SPO), and world region?
3. Are there predictive associations or relationships between academic integration, social integration, finances, and the persistence of international graduate students at Ohio University?

Summary of Findings

This study was undertaken to determine the influence of academic integration, social integration, and finances in predicting the persistence of international graduate students at Ohio University. The study attempted to do this through answering three research questions, discussed in Chapter 1: Introduction, and restated in the introduction to this chapter. The results, provided in Chapter 4: Results, show that academic integration, social integration, and finances can help predict the persistence of international graduate students.

Overview of Results

The results showed high levels of academic integration and social integration among international graduate students at Ohio University. The results showed there are significant differences in academic integration among participants across GPC, and geographical regions. The results also showed that while academic integration was the

best predictor of persistence, social integration, finances, and GPA were also good predictors of persistence.

Sample vs Population. It is well known that a representative sample is required for generalizability of social science research (Engel & Schutt, 2017). Hence, it is important to compare the sample and the population of this study to understand the limitations of the generalizability of the results of this study. The population for this study were international graduate students at Ohio University who had completed one or more semesters of graduate education at Ohio University. An overview of the population characteristics are available from the Office of Institutional Research and Effectiveness at Ohio University (Office of Institutional Research and Effectiveness, 2019).

A comparison of the population and sample characteristics showed that the distribution of the population and sample along geographical regions and SPO (STEM vs Other) is similar but not exact. Population characteristics regarding GPC (masters' vs doctoral), gender, age, and marital status are not known. Thus, limited but important generalizations can be made about the results of this study.

Reliability Analysis of the Instruments

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to test the reliability of the instruments used. The results of these showed that among academic integration items, those relating to *institutional and goal commitment* were significant compared to those relating to *academic and intellectual development* in influencing persistence. The results further showed that items relating to *student- faculty interactions* had more influence on social integration than those relating to *student*

interactions. The results of social integration show that faculty are available to students for informal discussions and are helping create a welcoming environment. In addition, the results showed a statistically significant correlation between the academic integration and social integration variables. This result confirms multiple studies showing a correlation between academic integration and social integration (Braxton et al., 2000; Cabrera et al., 1993; Terenzini & Pascarella, 1980; Tinto, 1975).

Levels of Academic Integration and Social Integration

Research has shown that academic integration and social integration are important predictors of student retention and persistence (Braxton et al., 2007; Cabrera et al., 1993; Terenzini & Pascarella, 1980; Tinto, 1975). Here, the results showed high levels of academic integration and social integration among international graduate students at Ohio University. Further, the findings revealed that the academic integration and social integration items with the highest means are RIGC3 (*It is not important to me to graduate from this university*) and SI2 (*The student friendships I have developed at this university have been personally satisfying*) respectively. These results indicate that students are committed to graduating from Ohio University, and *feel welcomed and part of the community*. These results suggest potentially high levels of persistence among international graduate students.

The results further show that the mean values are higher for social integration items addressing *peer-group* interactions in comparison to those addressing *faculty interactions*.

Group Level Differences in Academic Integration, Social Integration, and Persistence

The group-wise comparison of academic integration, social integration, and persistence generated some interesting results. The findings showed that there are no statistically significant differences in academic integration, social integration, and persistence between male and female students. An interesting observation was that, female students had higher values of academic integration, but lower values of social integration in comparison to male students. These differences in academic integration, and social integration between male and female students could be due to various factors. For example, in many countries, especially in Asia and Africa, the social mixing between males and females is less than in the United States. Hence, female students from such backgrounds might not find the available socialization options *convenient* or *natural*. In addition, it is possible that the female students focus more on academic activities to demonstrate their capabilities and to gain the respect of their peers and family. The causes of these differences between genders can be understood through suitable qualitative studies, and this can indeed be an excellent topic for future research.

Similarly, there are no statistically significant differences in the academic integration, social integration, and persistence of students across STEM Program Orientation (SPO) groups (STEM or other). The levels of social integration among students across SPO groups (STEM and Other) was about the same, but the level of academic integration was higher for STEM students. However, there was statistically significant difference in academic integration between students from different geographical regions of the world. Students from Asia and Africa had a statistically

significant difference in academic integration and persistence. There was also statistically significant difference in academic integration between students from Africa and Europe. Students from South America had the highest mean value of social integration whereas those from Asia had the lowest. Students from Africa had the highest mean values of academic integration while those from Europe had the lowest mean value.

Further, there was statistically significant difference in academic integration between students in masters - STEM and masters (other) in the various GPC groups. A notable finding here was that masters - STEM had the lowest mean of academic integration value, but the highest mean of social integration value. While studies comparing integration among SPO groups, and among STEM have been performed, the focus has generally been on undergraduate students (Dika & D'Amico, 2016). Hence, to the best of my knowledge, this study is probably the first to compare integration among GPC groups at the graduate level.

Predictive Abilities of Academic Integration, Social Integration, Finances, and GPA

Academic integration, social integration, finances and GPA are statistically significant predictors of the persistence of international graduate students at Ohio University. Academic integration is a mediator variable. This result validates one of the core tenets of Tinto's theory: classroom experiences play an important role in influencing social integration (Tinto, 1975, 1997). In addition, similar results were observed in multiple subsequent studies (Davidson & Wilson, 2013; Strauss & Volkwein, 2004).

Implication of Confounding Variable

The data for this study was collected during late summer/early fall of 2020, a period of uncertainty (Paltiel et al., 2020) following sudden campus closures starting in early March 2020 (Sahu, 2020), due to the global pandemic novel corona virus (COVID-19). While the impact of these issues on the present study are difficult to quantify, personal communication from some participants who reached out to me via email, point to the possibility of such effect. The sentiment of these communications is best captured by an unsolicited personal email from one of the participants:

> I just took the survey and I think with the current developments surrounding COVID[-19] and the corresponding partial closure of campus make it hard to properly answer many questions regarding interactions with faculty members. While I do spend time with students in my class outside the classroom or online lectures, it is almost impossible to meet with faculty members outside class time. While many professors have office hours and such and make themselves available for us to talk about any concerns or problems, it is hard to develop a proper connection with a faculty member, unlike what would have happened if this was a normal semester. From second or third years, I have heard that our professors love to have us drop in whenever and have a chat about anything really, topics do not need to have to do with school but can be really anything. However, I have not experienced this yet, as all campus offices for our faculty are closed (Email message to author, August, 31, 2020).

This should be a matter of concern for educators and should be considered not only during the current uncertainty but also when planning for online classes in general. This is important because there is evidence to support the influence of informal student-faculty interactions on student retention and their persistence (Braxton, 2000; Braxton et al., 2000; Cabrera et al., 1993; Pascarella & Terenzini, 1978, 1979b). In addition, multiple researchers argued that social integration is influenced by classroom experiences (Strauss & Volkwein, 2004; Tinto, 1975, 1997). Thus, it is possible that the changes made to address COVID-19 may have affected the academic integration, and consequently the social integration and persistence of international graduate students.

Implications of the Study

The results of the study confirm the core findings of previous studies, which showed that academic integration and social integration are important predictors of student persistence, and that academic integration has a positive effect on social integration. Although this was not a central part of this study (being a quantitative study), the unsolicited personal communication from students during this study suggests that informal student-faculty and student-student interactions play an important role in determining student persistence and their perceptions of *intellectual and personal development*. Faculty and administration may need to consider these issues and appropriately address them in their plans for continued online coursework.

Implications for Faculty

Results of the study showed that the majority of the items that were significant indicators of social integration for the target population were those addressing *student-*

faculty interactions. The results also showed that the participants reported a lower level of satisfaction on items addressing *student-faculty interactions* in comparison to those addressing *peer-group interactions*. While the results could have been influenced by students' recent experiences during disruptions caused by COVID-19, the results of this study cannot categorically attribute this finding to COVID-19 related changes. A future study might be able to determine that one way or the other. Regardless of the cause, the lower level of student satisfaction with *student-faculty interactions* is still a matter of potential concern. Student-faculty interactions are important for student persistence. Research has shown that student-faculty informal interactions are most influential at low levels of integration (Stage, 1989). Pascarella and Terenzini (1979a) observed a compensatory relationship between measures of social and academic integration, namely "informal relations with faculty" and "faculty concerns for teaching and student development" (p. 207).

Options to address this issue are presently limited, due to continuing COVID-19 related disruptions. However, there are possible short-term solutions. Faculty can have regular electronic communications with their students, preferably live, through audio if not video. Such discussions can be either one-on-one or in small groups, with discussions not limited to core academic issues. Another option is to have virtual open-office hours wherein students can drop-in to chat with the faculty and their peers on various issues, both academic and non-academic (e.g., everyday topics, such as a movie or a recent game). An additional factor that faculty need to account for in their actions is the cultural differences. International students are, in general, aware of the open and friendly nature

of student-faculty interactions in the United States. Yet, they might not be comfortable, or sure about how it's going to work for them, especially during the early period of their stay in the United States.

Implications for Student Affairs

Several studies reported that student integration is conducive to student retention, and that social integration starts from academic integration via classroom activities (Terenzini & Pascarella, 1980; Tinto, 1975). A large part of the graduate student life revolves around research activities, interacting mostly with a small group of individuals working on similar issues. Hence, options for social interactions for graduate students might be limited. Further, due to cultural differences, international students might feel unsatisfied with available socialization options, especially during the early part of their program or when sudden disruptions occur.

Under these circumstances, student affairs professionals play an important role in helping building camaraderie among members of the university community. Their core principle, "student learning doesn't only happen in a classroom. Opportunities for teaching and development exist everywhere on campus, and it is the responsibility of student affairs professionals to seize these moments and promote positive interactions" (NASPA, n.d., para. 2), is especially apt during the current uncertainty. Student affairs professionals can directly, or in support of faculty efforts, create opportunities for informal social interactions. Some simple options include organizing viewing parties to watch games or movies, or picnics and potlucks. Further, while sports such as football and basketball are widely followed and have large audience in the United States, they are

not necessarily the top preferences in other parts of the world. Hence, considering the diverse population at their institution they might consider organizing a viewing of a different sport, such as soccer, rather than only football or basketball.

Implications for Educational Leaders

The study revealed that there is statistically significant difference in the levels of academic integration among students from Africa and Europe/Asia in the target population. Educational leaders can use these results to guide their actions in addressing student retention. It has been observed that successful student retention programs share a few features, such as, they are systematic, clear, and focus on student development and engagement (Tinto, 2012). A study of retention programs has shown that a holistic and multi-disciplinary approach, all-round engagement of students, is needed for programs to succeed (Levitz, Noel, & Saluri, 1985; Tinto, 1993). Further, some studies found that educational leadership and the campus climate they create influence student retention (Love, Trammell, & Cartner, 2009; Wild & Ebbers, 2002). Hence, educational leaders have an important role to play in addressing student retention and persistence issues. Educational leaders can use the results of this study to guide their actions to address student retention.

Educational leaders have a responsibility to formulate and implement suitable policies in furthering the mission and goals of their institutions. The results of this study will help the educational leaders in their decision making. The results will help in both assessing the utility and performance of the existing policies in either modifying them or

formulating new ones. The results will also help educational leaders in lobbying other stakeholders such as policy makers and the community at large.

Implications for Socially Distanced, Online Only Education

This study considered student-faculty interactions in general, but for international graduate students such interactions are critical. In the period before campuses were closed or limited, starting in March 2020, due to COVID-19, informal student-faculty interactions quite often were unplanned and unexpected. Who among us does not fondly remember running into a fellow student, mentor, faculty, or colleague and having a discussion, intellectual and /or personal? Such interactions not only help in scholarship, but they also help develop a better understanding of each other and help in *breaking the ice* between individuals. While, hopefully, the changes caused by COVID-19 will soon end, it is important for all concerned to proactively take steps to reconnect with each other and keep the spirit of such informal and unplanned interactions during these challenging times.

Further, the initial analysis showed that while academic integration questions relating to the *institutional and goal commitment* were influential, those relating to *academic and intellectual development* were relatively less influential. While this can potentially be a result of temporal disruptions caused by COVID-19, it could still point to some potential issues that need to be studied and addressed. And, in light of some of the unsolicited personal communications, it is important for administrators and faculty to consider means of increasing student engagement during online courses. In addition, colleges and departments, or even individual faculty, can consider having either virtual or

physically distanced in-person activities, especially with their graduate students to help develop a sense of belonging and community.

Recommendations for Future Research

The results of this study are important and can provide impetus for some important research studies. A criticism of researchers studying student retention and persistence is the lack of precise definitions. This criticism extends to even terms or phrases used in survey instruments, Davidson and Wilson (2013) ask: "an item like 'few of my courses have been intellectually stimulating this year' …. How do students understand a phrase like 'intellectually stimulating?' Do faculty members understand the word similarly?" (p. 340). Qualitative studies may need to be conducted to both develop instruments suited for international graduate students and to tease out the understanding of terms used in the instruments by the said international students. Further, are there differences among international students regarding their understanding of these terms/phrases based on their background characteristics? Additional research topics could include conducting studies to understand the differences between students based on their duration of studies and/stay in the United States, their previous experiences (e.g., post-undergraduate work experience), and various demographical characteristics such as age, gender, and marital status.

A second stream of future research could focus on comparing domestic and international students, both in general and across student characteristics such as gender, and major/program of study. Comparisons can also be conducted between student populations at universities in different regions, different sizes, and characteristics of

university locations (urban/rural/college-town). The challenges that students face in US university are influenced both by their own background characteristics and the characteristics of the university community. The characteristics of the university community result from the interaction between the characteristics of the university's location and its size. Hence, such comparative studies will provide a better understanding of the factors affecting student retention and persistence at different institutions.

A limitation of this study was the possible effects of COVID-19 on the results obtained. A future topic of research could be to understand the effects of COVID-19, if any, on social integration, academic integration, and persistence. This research need not to be limited to international graduate students, but may involve various student populations. While such studies can be either qualitative or quantitative, a qualitative study would be preferable. In a quantitative study, such as this, it is difficult to account for and address the *context of crisis* issues, such as COVID-19. Only a qualitative study may adequately address such issues.

While the above topics are solid areas of research for understanding retention and persistence of all international students, not just those in graduate programs, there are some topics that could benefit from improved understanding. For example, how to define persistence for not only graduate students, but also all international students. Theses/dissertations are typically the cumulation of graduate work, with students often completing their *coursework* long before graduation. Hence, are traditional methods of determining persistence, such as continuous registration for coursework, suitable for graduate students? Further, it is requirement for international students to take a full-

course load (or equivalent) in order to legally maintain their student status. In addition, how do financial resources affect the retention and persistence of international students? Research has shown that financial resources can affect student retention and persistence (Cabrera, Burkum, LaNasa, & Bibo, 2012; St. John et al., 1997). Financial resources are also a consideration in both obtaining the documentation required to show offer of admission when applying for a visa (i.e., Form I-20 - Certificate of Eligibility for Nonimmigrant (F-1) Student Status-For Academic and Language Students), and to subsequently obtain a visa (U.S. Department of State - Bureau of Consular Affairs, 2020). Thus, what is the appropriate means of addressing influence of finance on retention and persistence of international students?

Conclusions

International graduate students play an important role in higher education. They not only help the institutions where they study but can play an important role in improving relationships between people across nations. Neglecting or disregarding issues affecting international students can be detrimental to not only the institution and the individual student, but it can also negatively influence the opinions regarding both the institution and the nation. Hence, it is important to understand factors that influence persistence of international graduate students. Further the results of studies, such as this, undertaken to answer questions regarding international students can highlight/bring into focus issues that affect other groups of students.

An improved understanding of the factors affecting the persistence of international graduate students can help the institutional stakeholders, e.g., faculty and

administrators, attract the best and brightest from around the world to their institution. It can also help develop and build international collaborations, helping make the institution a leading center for learning and excellence.

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Appendix A: Instruments

Table A.1

Qualtrics Survey Questionnaire

Code	**Social Integration** (Pascarella & Terenzini, 1980)	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neither agree nor disagree (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
SI1	Since coming to this university, I have developed close personal relationships with other students					
SI2	The student friendships I have developed at this university have been personally satisfying					
SI3	My interpersonal relationships with other students have had a positive influence on my personal growth, attitudes, and values					
SI4	My interpersonal relationships with other students have had a positive influence on my intellectual growth and interest in ideas					
RSI5	It has been difficult for me to meet and make friends with other students					
IF1	My non-classroom interactions with faculty have had a positive influence on my personal growth, values, and attitudes					
IF2	My non-classroom interactions with faculty have had a positive influence on my intellectual growth and interest in ideas					

IF3	My non-classroom interactions with faculty have had a positive influence on my career goals and aspirations					
IF4	Since coming to this university, I have developed a close, personal relationship with at least one faculty member					
IF5	I am satisfied with the opportunities to meet and interact informally with faculty members.					
	Academic Integration (Pascarella & Terenzini, 1980)	**Strongly Agree (5)**	**Somewhat Agree (4)**	**Neither agree nor disagree (3)**	**Somewhat Disagree (2)**	**Strongly Disagree (1)**
AI1	I am satisfied with the extent of my intellectual development since enrolling in this university					
AI2	My academic experience has had a positive influence on my intellectual growth and interest in ideas					
AI3	I am satisfied with my academic experience at this university					
AI4	My interest in ideas and intellectual matters has increased since coming to this university					
AI5	I have performed academically as well as I anticipated					
IGC1	It is important for me to graduate on time					
IGC2	I am confident that I made the right decision in choosing to attend this university					

IGC3	It is not important to me to graduate from this university					
IGC4	Getting good grades is not important to me					
	Academic Performance (Pascarella & Terenzini, 1980)					
GPA	What is your GPA?	4	Greater than 3.75	Greater than 3.5	Greater than 3	Less than 3
	Finances (Cabrera, Nora, et al., 1992)					
MST	Major source of tuition and living expenditure	Dropdown Menu: 1. Personal and family 2. Current employment 3. U.S. college or university 4. Foreign government or university 5. Foreign private sponsor 6. U.S. private sponsor 7. U.S. government 8. International organization Other				
RF	Received funding	Yes	No			
SFS	I am satisfied with the amount of financial support (grants, loans, personal, family, other) I have received while attending the University.	Yes	No			

	Persistence (Pascarella & Terenzini, 1980)					
1	Enrolled previous semester	Yes	No			
2	Will enroll next semester	Yes	No			
3	Graduating this semester	Yes	No			
	Background Information questions					
Gender	What is your gender?	Male, Female, Prefer not to answer				
AGE	What is your age?	Dropdown menu				
GPC	What is your program?	Masters (STEM), Doctoral (STEM), Masters (Other), Doctoral (Other),				
4	What is the typical length of your program?	Text Box				
5	How many years have you been in this program?	Text Box				
Nationality	What is your home Country?	Text Box				
7	Marital status	Married, Unmarried, Prefer not to answer				
8	Please indicate the primary language you speak at home.	Text Box				
9	Please select the highest level of education completed by your mother. If you are not sure, please take your best guess.	Dropdown Menu: 1. No schooling 2. Grades 1 through 11 3. graduated high school 4. trade/technical/vocational training 5. some undergraduate education (college or university) 6. Bachelor's degree (e.g.: BA, BS) 7. Master's degree (e.g.: MA, MS, MBA) 8. Professional degree (e.g.: MD, DDS, LLB, JD) 9. Doctorate degree (e.g.: PhD, EdD)				

10	Please select the highest level of education completed by your father. If you are not sure, please take your best guess.	Dropdown Menu: 1. No schooling 2. Grades 1 through 11 3. graduated high school 4. trade/technical/vocational training 5. some undergraduate education (college or university) 6. Bachelor's degree (e.g.: BA, BS) 7. Master's degree (e.g.: MA, MS, MBA) 8. Professional degree (e.g.: MD, DDS, LLB, JD) 9. Doctorate degree (e.g.: PhD, EdD)

Appendix B: Cronbach Alpha and Scale Loading for Instruments from Appendix A

Table B.1

Cronbach Alpha and Scale Loading for Qualtrics Survey Questionnaire

	Social Integration (Pascarella & Terenzini, 1980)	**Cronbach's Alpha = 0.88**
1	Since coming to this university, I have developed close personal relationships with other students	Scale loading = 0.84
2	The student friendships I have developed at this university have been personally satisfying	0.85
3	My interpersonal relationships with other students have had a positive influence on my personal growth, attitudes, and values	0.81
4	My interpersonal relationships with other students have had a positive influence on my intellectual growth and interest in ideas	0.76
5	It has been difficult for me to meet and make friends with other students	-0.69
6	My non-classroom interactions with faculty have had a positive influence on my personal growth, values, and attitudes	0.81
7	My non-classroom interactions with faculty have had a positive influence on my intellectual growth and interest in ideas	0.78
8	My non-classroom interactions with faculty have had a positive influence on my career goals and aspirations	0.74
9	Since coming to this university, I have developed a close, personal relationship with at least one faculty member	0.71
10	I am satisfied with the opportunities to meet and interact informally with faculty members.	0.64
	Academic Integration (Pascarella & Terenzini, 1980)	**Cronbach's Alpha = 0.84**
1	I am satisfied with the extent of my intellectual development since enrolling in this university	Scale loading = 0.84
2	My academic experience has had a positive influence on my intellectual growth and interest in ideas	0.84
3	I am satisfied with my academic experience at this university	0.81
4	My interest in ideas and intellectual matters has increased since coming to this university	0.57
5	I have performed academically as well as I anticipated	0.51
6	It is important for me to graduate on time	-0.71

7	I am confident that I made the right decision in choosing to attend this university	0.60
8	It is not important to me to graduate from this university	0.57
9	Getting good grades is not important to me	0.54
	Academic Performance (Pascarella & Terenzini, 1980)	
1	What is your GPA?	0.99
	Finances (Cabrera, Nora, et al., 1992)	**Cronbach's Alpha**
1	Major source of tuition and living expenditure	
2	Received funding	Scale loading = 0.80
3	I am satisfied with the amount of financial support (grants, loans, personal, family, other) I have received while attending the University.	Cronbach's Alpha = 0.53
	Persistence (Pascarella & Terenzini, 1980)	0.9
1	Enrolled previous semester	
2	Will enroll next semester	
3	Graduating this semester	

Appendix C: IRB Approval

Project Number	17-E-187
Project Status	APPROVED
Committee:	Office of Research Compliance
Compliance Contact:	Robin Stack (stack@ohio.edu)
Primary Investigator:	Preeti Basavaraj Patil
Project Title:	Relationship between social and academic integration of international graduate students at Ohio University and their sense of belonging
Level of Review:	EXEMPT

The Ohio University Office of Research Compliance reviewed and approved by exempt review the above referenced research. The Office of Research Compliance was able to provide exempt approval under 45 CFR 46.104(d) because the research meets the applicability criteria and one or more categories of research eligible for exempt review, as indicated below.

IRB Approval:	05/08/2020 1:47:45 PM
Review Category:	2

Waivers: Waiver of signature on consent document.

If applicable, informed consent (and HIPAA research authorization) must be obtained from subjects or their legally authorized representatives and documented prior to research involvement. In addition, FERPA, PPRA, and other authorizations / agreements must be obtained, if needed. The IRB-approved consent form and process must be used. Any changes in the research (e.g., recruitment procedures, advertisements, enrollment numbers, etc.) or informed consent process must be approved by the IRB before they are implemented (except where necessary to eliminate apparent immediate hazards to subjects).

It is the responsibility of all investigators and research staff to promptly report to the Office of Research Compliance / IRB any serious, unexpected and related adverse and potential unanticipated problems involving risks to subjects or others.

This approval is issued under the Ohio University OHRP Federalwide Assurance #00000095. Please feel free to contact the Office of Research Compliance staff contact listed above with any questions or concerns.

The approval will no longer be in effect when the Primary Investigator is no longer under the auspices of Ohio University, e.g., graduation or departure from Ohio University.

Appendix D: Codebook

Variable	Instrument	code
Social Integration		
1	Since coming to this university, I have developed close personal relationships with other students	Strongly agree = 5 Strongly Disagree = 1
2	The student friendships I have developed at this university have been personally satisfying	Strongly agree = 5 Strongly Disagree = 1
3	My interpersonal relationships with other students have had a positive influence on my personal growth, attitudes, and values	Strongly agree = 5 Strongly Disagree = 1
4	My interpersonal relationships with other students have had a positive influence on my intellectual growth and interest in ideas	Strongly agree = 5 Strongly Disagree = 1
5	It has been difficult for me to meet and make friends with other students	Strongly agree = 5 Strongly Disagree = 1

6	My non-classroom interactions with faculty have had a positive influence on my personal growth, values, and attitudes	Strongly agree = 5 Strongly Disagree = 1
7	My non-classroom interactions with faculty have had a positive influence on my intellectual growth and interest in ideas	Strongly agree = 5 Strongly Disagree = 1
8	My non-classroom interactions with faculty have had a positive influence on my career goals and aspirations	Strongly agree = 5 Strongly Disagree = 1
9	Since coming to this university, I have developed a close, personal relationship with at least one faculty member	Strongly agree = 5 Strongly Disagree = 1
10	I am satisfied with the opportunities to meet and interact informally with faculty members.	Strongly agree = 5 Strongly Disagree = 1
Academic Integration		
1	I am satisfied with the extent of my intellectual development since enrolling in this university	Strongly agree = 5 Strongly Disagree = 1

2	My academic experience has had a positive influence on my intellectual growth and interest in ideas	Strongly agree = 5 Strongly Disagree = 1
3	I am satisfied with my academic experience at this university	Strongly agree = 5 Strongly Disagree = 1
4	My interest in ideas and intellectual matters has increased since coming to this university	Strongly agree = 5 Strongly Disagree = 1
5	I have performed academically as well as I anticipated	Strongly agree = 5 Strongly Disagree = 1
6	It is important for me to graduate on time	Strongly agree = 5 Strongly Disagree = 1
7	I am confident that I made the right decision in choosing to attend this university	Strongly agree = 5 Strongly Disagree = 1
8	It is not important to me to graduate from this university	Strongly agree = 5 Strongly Disagree = 1

9	Getting good grades is not important to me	Strongly agree = 5 Strongly Disagree = 1
Academic Performance		
1	What is your GPA?	4 = 5 Greater than 3.75 = 4 Greater than 3.5 = 3 Greater than 3 = 2 Less than 3 = 1
Finances		
1	Major source of tuition and living expenditure	Personal and family =1 Current employment = 2 U.S. college or university = 3 Foreign government or = 4 university Foreign private sponsor = 5 U.S. private sponsor = 6

		U.S. government = 7 International organization = 8 Other = 9
2	Received funding	Yes = 1 No = 0
3	I am satisfied with the amount of financial support (grants, loans, personal, family, other) I have received while attending the University.	Yes = 1 No = 0
Persistence		
1	Enrolled previous semester	Yes = 1 No = 0
2	Will enroll next semester	Yes = 1 No = 0
3	Graduating this semester	Yes = 1 No = 0
Background Information questions		

1	What is your gender?	Male = 1 Female = 2 Prefer not to answer = 3
2	What is your program?	Masters (STEM) = 1 Doctoral (STEM) = 2 Masters (Other) = 3 Doctoral (Other) = 4
3	What is the typical length of your program?	1-2 years = 1 2-4 years = 2 4-6 years =3 6 years and above = 4
4	Marital status	Married = 1 Unmarried = 2 Prefer not to answer = 3
5	Please select the highest level of education completed by your mother. If you are not sure, please take your best guess.	No schooling = 1 Grades 1 through 11 = 2 Graduated high school = 3

		Trade/technical/vocational training = 4 Some undergraduate education (college or university) = 5 Bachelor's degree (e.g.: BA, BS) = 6 Master's degree (e.g.: MA, MS, MBA) = 7 Professional degree (e.g.: MD, DDS, LLB, JD) = 8 Doctorate degree (e.g.: PhD, EdD) = 9
6	Please select the highest level of education completed by your father. If you are not sure, please take your best guess.	No schooling = 1 Grades 1 through 11 = 2

		Graduated high school = 3 Trade/technical/vocational training = 4 Some undergraduate education (college or university) = 5 Bachelor's degree (e.g.: BA, BS) = 6 Master's degree (e.g.: MA, MS, MBA) = 7 Professional degree (e.g.: MD, DDS, LLB, JD) = 8 Doctorate degree (e.g.: PhD, EdD) = 9

Appendix E: Online Consent Form

Title of Research: : **Social and Academic Integration of International Graduate Students at Ohio University**
Researchers: **Preeti Patil, and Emmanuel Jean Francois**
IRB number: **17-E-187**

You are being asked by an Ohio University researcher to participate in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks of the research project. It also explains how your personal information will be used and protected. Once you have read this form and your questions about the study are answered, you will be asked to participate in this study. You may print a copy of this document to take with you.

Summary of Study

This study is being conducted to understand the factors that influence the integration of international graduated students into the broader community at Ohio University. You are kindly requested to participate in this online survey for the study. Your participation can help better inform the decision-making process for the benefit of the entire Ohio University community and is greatly appreciated.

Explanation of Study

This study is being done to better understand the factors affecting the social and academic integration of international graduate students at Ohio University.

If you agree to participate, you will be asked to provide responses to a set of questions regarding your opinions about experiences at Ohio University. You will also be asked demographical questions.

You should not participate in this study if:

a) You are not an Ohio University student, or
b) You are an in-state or out-of-state domestic student (i.e., U.S. Citizen or permanent resident), or
c) You are an undergraduate student.

Your participation in the study will last approximately 15-25 minutes but no more than 30 minutes.

Risks and Discomforts

No risks or discomforts are anticipated.

Benefits

The results of this study can help faculty, staff, and the wider community to help international students improve their educational outcomes. You may not benefit, personally by participating in this study.

Confidentiality and Records

Your study information will be kept confidential by the researchers. Data will be recorded with a code replacing identifiers and a master list connecting the code and the identifier will be used. The master code list will be saved on a password protected computer and will exclusively be used to discard multiple responses, if provided, by a single participant. The master code list will be deleted by the end of August 2022.

For maximum confidentiality, please clear your browser history and close the browser before leaving the computer.

Additionally, while every effort will be made to keep your study-related information confidential, there may be circumstances where this information must be shared with:

* Federal agencies, for example the Office of Human Research Protections, whose responsibility is to protect human subjects in research;
* Representatives of Ohio University (OU), including the Institutional Review Board, a committee that oversees the research at OU;

Future Use Statement

Identifiers will be removed from data/samples collected, and after such removal, the data/samples may be used for future research studies or distributed to another investigator for future research studies without additional informed consent from you or your legally authorized representative.

Contact Information

If you have any questions regarding this study, please contact the investigator ***Preeti Patil (pp187610@ohio.edu)*** or the advisor ***Emmanuel Jean Francois (jeanfran@ohio.edu)***.

If you have any questions regarding your rights as a research participant, please contact Dr. Chris Hayhow, Director of Research Compliance, Ohio University, (740)593-0664 or hayhow@ohio.edu.

By agreeing to participate in this study, you are agreeing that:

- you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions and have them answered;
- you have been informed of potential risks and they have been explained to your satisfaction;
- you understand Ohio University has no funds set aside for any injuries you might receive as a result of participating in this study;

- you are 18 years of age or older;
- your participation in this research is completely voluntary;
- you may leave the study at any time; if you decide to stop participating in the study, there will be no penalty to you and you will not lose any benefits to which you are otherwise entitled.

Appendix F: Recruitment Email to Students

Dear student,

My name is Preeti Patil, a graduate student in the Educational Administration Program at Ohio University. I am conducting a research study (IRB number: 17-E-187) on *Social and Academic Integration of International Graduate Students at Ohio University*. This study aims at examining factors surrounding international students' social and academic integration during their graduate studies at Ohio University.

You are kindly requested to participate in an anonymous and confidential online survey **if you are:**

a) **an international student currently enrolled in a graduate level academic program and have completed at least one semester of academic study at Ohio University; and**
b) **between the ages of 21-65 years.**

Your participation in the study is voluntary and will last approximately 15-25 minutes.

Please use the following link to access and complete the survey

Link to qualtrics survey here

If you have any questions, feel free to contact me at pp187610@ohio.edu.

Appendix G: Permission to Use Instruments

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Taylor & Francis Group

Permissions

T & F Reference Number: P041217-05

4/12/2017

Preeti Patil
Graduate Student
Ohio University
Athens, OH 45701
pp187610@ohio.edu

Dear Sir or Madame,

We are in receipt of your request to reproduce the survey instrument from the following article

Pascarella, E. T., & Terenzini, P. T. (1980)
Predicting freshman persistence and voluntary dropout decisions from a theoretical model
The Journal of Higher Education, 51 (1): 60-75.
DOI: 10.2307/1981125

for use in your dissertation

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