THEY SAY WE SUCK: THE FAILURE OF IPEDS GRADUATION RATES TO FULLY MEASURE STUDENT SUCCESS

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Jennifer Kathryn Weber

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SUPERVISORY COMMITTEE:

Dr. Christopher Ray
Chair

Dr. Brent Hill

Dr. Pamela Emanuelson

Dr. Lisa Feldner

Approved:

10/10/2017
Date

Dr. Christopher Ray
Department Chair

ABSTRACT

IPEDS graduation rates have become de facto means for higher education accountability in the United States, used by the federal government, state and local agencies, non-profits and media to compare and rank institutions. IPEDS uses a limited subset of students, as well as an institutional perspective to measure graduation rate. Under this model, the 40% of college students who transfer during their college career are counted as failures because they opt to take alternative, multi-institutional pathways to completion. Failure to consider all student pathways misrepresents actual student outcomes, and represents a flawed system of accountability. This study introduces a student outcome model that distinguishes between institutionally-focused graduation rates and student-focused completion rates. This model was applied to a sample of first-time, full time students from eleven public institutions in the North Dakota University System. Research showed that an alternative student-centric model can successfully measure student outcomes. Consideration of alternative pathways to completion increased the mean measure of positive student outcomes by 20%, ranging from 15-30% across institutions. This research provides theoretical, research, and practical implications for reconsideration for how student success is measured, reported, and studied. An alternative student-focused model of completion offers better research outcomes for studies that were previously limited as they were based on an inadequate definition of student success. Research and theories regarding how factors influence student outcomes can be reframed to include alternative pathways to completion, providing a more comprehensive understanding of students who matriculate and graduate from a single institution, those who transfer and graduate from other institutions, and those who fail to persist to degree. When consideration for alternative pathways to degree is measured and valued, it has potential to affect higher education practice by creating a focus on

not only attempting to ensure student fit within an institution, but if fit is lacking, ensuring that the practices, policies, and other supports are in place so that students can transfer and complete at another institution.

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Many other family, friends, and classmates have supported me in this process, and space limits my ability to thank them all by name. There are two, however, who I would be remiss not to mention, and they are my daughters, Katelyn and Zoe Randazzo, who were my personal cheerleaders during this long process. You both make me very proud, and I hope I do the same for you.

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DEDICATION

This dissertation is dedicated to Mildred I. Weber (1936-2015) and Robert H. Weber (1935-),

aka, Mom and Dad.

You both taught me more than any classroom ever could.

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LIST OF ABBREVIATIONS

FAFSA .....Free Application for Federal Student Aid.

FTE .....full-time equivalent.

FTFT .....first-time, full-time.

HEA .....Higher Education Act.

HEGIS.....Higher Education General Information Survey.

I-E-O .....input-environment-output.

IPEDS .....Integrated Postsecondary Education Data System.

NCAA .....National Collegiate Athletic Association.

NCES .....National Center for Education Statistics.

NDUS.....North Dakota University System.

NSC.....National Student Clearinghouse.

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CHAPTER 1: INTRODUCTION

This is about accountability. Specifically, this is about accountability in higher education. They say we suck, yet the conventional standard they use to determine our levels of success is flawed. In the context of this argument, "they" are the agencies, profits and non-profits, and media who use federally reported post-secondary education data as a measure to evaluate the effectiveness of higher education institutions. "We" in this context, are the post-secondary institutions of learning.

On February 12, 2013, President Barack Obama spoke to the nation in his annual state of the union address. Midway through his address he began to speak on higher education as an entry into the middle class, the need for young people to attain degrees, and the need to hold higher education institutions accountable. After stating that colleges must do their part to maintain high standards and keep cost down, he followed by stating it was "our job" to make sure that they do:

> So tonight, I ask Congress to change the Higher Education Act so that affordability and value are included in determining which colleges receive certain types of federal aid. And tomorrow, my administration will release a new "College Scorecard" that parents and students can use to compare schools based on a simple criteria -- where you can get the most bang for your educational buck (The Whitehouse, 2013).

The 2013 creation of the *College Scorecard* website by the U.S. Department of Education is a federal level example of the use of reported higher education data for institutional accountability. Institutional accountability is the process of evaluating institutional performance based on student performance measures (Hanushek, Welch, Machin, & Woessmann, 2011), and President Obama clearly states in his 5th State of the Union Address that colleges must be held accountable and implied that the *College Scorecard* will enable that to happen. Accountability has become a more visible policy focus for higher education in the latter half of the twentieth

century (Bogue & Bingham Hall, 2003), and the creation of the *College Scorecard* website, which publicly displays institutional data regarding student performance and outcomes, is an example of this.

It makes fiscal sense for the federal government to takes steps to hold postsecondary institutions accountable for student outcomes. Currently, over 27 million students attend more than 7,000 post-secondary degree granting institutions. Of those who attend college, the National Center for Educational Statistics (NCES) indicates that only 54% of bachelor seeking and 31% of associate seeking students graduate from the institution where they began their college education (National Center for Educational Statistics, 2016). The federal government annually provides more than $133 billion to nearly 13 million students in federal student college loans (*Federal student aid annual report FY 2014*, 2016), and aside from student loans, also invests nearly $76 billion annually in post-secondary education. This investment in higher education is supplemented by state governments, who together appropriate nearly $73 billion to public colleges and universities (The Pew Charitable Trusts, 2015). Thus, millions of students and billions of dollars are annually invested in a system that is considered a means to financial security, yet the statistics for reported college graduation rates are unimpressive. Holding institutions accountable for outcomes, therefore, seems to be appropriate. However, the current standard of citing IPEDS graduation rates as a measure of institutional accountability is not only flawed, but as will be described, is a relatively new practice in American higher education, where accountability has evolved from a system of adherence to established standards to one that focuses primarily upon a federal definition of institutionally focused graduation rates.

Accountability in American higher education has its roots in the creation of accrediting associations that began establishing standards for higher education as early as 1885 (Cohen &

Kisker, 2010). The establishment of accrediting agencies was grassroots, as without a ministry of education or other centralized federal body to oversee education in the United States, the process of accreditation became the channel by which higher education ensured a basic level of institutional quality through a peer review process (U.S. Department of Education, 2017). Accrediting agencies operated without interference of the federal government until 1965, at which time the Higher Education Act (HEA) expanded the role of accreditors by tying the award of federal student aid dollars to accredited institutions. As a means to check and balance, the HEA also added federal oversight into the accreditation process by mandating that all accreditors be recognized by the Department of Education (U.S. Department of Education, 2017). As such, by the 1960's, the federal government had injected itself into the higher education accountability process.

In 1985 another grassroots accountability movement of was established, this time by the National College Athletic Association (NCAA) which was attempting to insure accountability for the educational outcomes of student athletes. During that year, NCAA began requiring member schools to report the academic standing and graduation rates of athletes versus non-athletes. Similar to the federal takeover of control for accreditation, in 1988 a new federal law based on the NCAA reporting model, the *Student Athlete Right to Know Act*, was passed which set graduation rate reporting requirements for institutions receiving federal student aid (Title IV) funds (United States General Accounting Office, 1989). Subsequently, an amendment to the Higher Education Act known as the *Student Right to Know and Campus Security Act of 1990* (PL 101-542), modeled on the 1988 *Student Athlete Right to Know Act*, set forth the requirement that all higher education institutions participating in federal student aid (HEA Title IV) report the graduation rates of first-time, full-time degree and certificate seeking students. Within a century,

accountability in higher education had shifted from a peer created accreditation process to a federal mandate of reporting of graduation rates.

While federal reporting for Title IV institutions includes data sets other than graduation rates, the definition of graduation as set forth in the *Student Right to Know Act* has evolved into one of the most common standardized measures of higher education accountability (Cook & Pullaro, 2010). Used with other sets of data, graduation rates become the proxy measure for the success of an institution. Graduation rate as defined by IPEDS is calculated as "the total number of completers within 150% of normal time divided by the revised adjusted cohort" (IPEDS, 2016). Under this definition, the normal time to completion is considered the amount of time necessary for students to complete all requirements for a degree, which is four-years for a bachelor's degree and two-years for an associate's degree (IPEDS, n.d.).

Currently, postsecondary institutions receiving Title IV monies use IPEDS - operated under the umbrella of NCES - to federally report data used for accountability measures. Institutional reporting to IPEDS began in the mid-1980s, and grew out of the prior Higher Education General Information Survey (HEGIS) that began in the 1960s, however, graduation rates were not part of the data collected until the 1997-1998 data collection year (National Postsecondary Education Cooperative [NPEC], 2011). Today, the IPEDS datacenter website displays data collected from higher education institutions back through the 2001-2002 academic year. Hence, in the landscape of American higher education, the most recognized measure of accountability – the IPEDS graduation rate – has existed for barely twenty years.

With the evolving trend toward reporting graduation rates in higher education (Scott, Bailey, & Kienzl, 2006) as well as the increased publication and use of graduation rates for institutional comparison, recent events provide evidence that these rates are becoming

increasingly high stakes for institutions. For instance, at the federal level, graduation rates have been used in conjunction with data collected on student loan debt and job placement as evidence to force the shutdown of private, for-profit institutions Corinthian Colleges and ITT Technical Institutes. In both cases, it was determined that these institutions were misleading students and profiting at students' expense, leaving them with high student loan debt, little chance of graduating, and poor job placement opportunities. Therefore, at the federal level, the outcomes for Corinthian Colleges and ITT Technical Institutes provide evidence that the ready availability of collected higher education data over the past two decades goes beyond providing data for *Student Right to Know*, and has moved into the arena of high stakes decision making based on the collected data.

Agencies, media, and private organizations have likewise picked up on the use of federally reported graduation data as an easily accessible and standardized data source for their own purposes. In many cases, it is used in conjunction with other collected data to compare and rate higher education institutions. For instance, *U.S. News and World Report* releases annual college rankings based on data primarily collected by federal reporting. The ranking weights information provided by *U.S. News* indicates that of the seven ranking criteria used, graduation rates account for the largest weighted category accounting (22.5%) of an institution's ranking score (U.S. News and World Report, 2016).

So, it can be observed that there are many instances of graduation rates being used to assess, evaluate, and rank institutions. Nevertheless, while graduation rates may be factually correct, their appropriateness to make these evaluations can be called into question because these rates fail to tell the whole story of student outcomes and success. While federally-collected data is touted by many as a fair means of comparisons for higher education institutions because it

compares “apples to apples” - i.e., rates are for students classified as first-time, full-time (FTFT) degree seeking students - counterarguments exist that proffer that this is a flawed system. Critics state that cohorts used in calculation of graduation rates vary widely, and that the rates fail to consider the differences in institutions’ characteristics (Kalsbeek & Zucker, 2013) as well as fail to include alternate pathways to student degree completion (Etlinger, 2014). A consideration of each of these criticisms follows.

One criticism of using IPEDS graduation rates as an accountability model is that it considers only FTFT students, ignoring other student groups such as transfer students, part time students, non-degree students, and graduate students (Student Achievement Measure, 2017). Additionally, the percent composition of FTFT students varies widely among institutions. In some cases, the FTFT cohort may compose the majority of incoming students while in other cases it may compose the minority, and therefore comparisons among student bodies based on the comparison of FTFT cohorts can be misleading. Similarly, it is much easier for institutions with low population cohorts to exhibit wider ranges of variability in graduation rates from year to year due to a smaller count of students accounting for a single percent of the cohort. When these variabilities in FTFT cohorts are multiplied across the more than 7,000 institutions reporting to IPEDS, it becomes apparent that the single graduation rate measure is limited as a comparison tool for higher education institutions.

The second criticism is that graduation rates fail to consider the differences in institutions’ characteristics. The implied argument within this criticism is that postsecondary institutions have varied missions, academic foci, and serve different groups of students. This argument of institutions’ varied characteristics is supported by the Carnegie Classification system. The Carnegie Classification of Institutions of Higher Education (2016), considered the

standard of higher education classification, recognizes 33 different types of institutions, each classified based on the type and level of student served, the amount of research conducted, and the primary source of institutional funding. For instance, the Carnegie Classification allows easy distinguishment between a four-year, private, high research university as compared to a two-year, public, highly technical associate degree granting institution (Carnegie Classification of Institutes of Higher Education, 2016). This classification difference indicates that these two institutions have very different characteristics and serve different types of students, yet ironically, both are measured by the same, single, IPEDS definition of graduation rate. While the existence of the Carnegie Classification system is not evidence that the use of a single metric to compare institutions is inappropriate, it does certainly call it into question.

A third – and perhaps the strongest - criticism of the current IPEDS model for graduation rate is that it fails to include all pathways to college completion and as such, is institutionally focused rather than student focused (Student Achievement Measure, 2017). Graduation rates measure as completers only those students who graduate from the same institution where they first matriculated, and count as non-completers those students who take the non-traditional path and attend two or more institutions prior to attaining their degree. The concept of counting as completers only those students who graduate from their first matriculated college is based upon an outdated stereotype of the traditional college student. A 2013 Wall Street Journal analysis of data from the Department of Education reports that only 29% of undergraduate students in the U.S. meet the definition of the traditional college student (Casselman, 2013). Additionally, the National Student Clearinghouse (NSC) reports that nearly 40% of all college students transfer at least once during their college career (National Student Clearinghouse [NSC], 2016), and in which lies the brunt of the criticism. In our current higher education system, 40% of the students

are counted as failures because they opt to take an alternative pathway to completion. By counting these 40% of students who transfer as non-graduates rather than graduates by alternative pathways, graduation rates for institutions are artificially deflated, even when these students attain successful outcomes. This failure to consider the outcomes of all students misrepresents actual student outcomes, which in turn misrepresents institutional output (graduation rate), which is consequently used to hold institutions accountable and make evaluative judgments. Institutions are disparaged for unimpressive graduation rates, but the deck is stacked against them.

If one accepts the arguments presented above and allows the consideration that the use of graduation rates for accountability and institutional comparison is not appropriate, one is left with the question of how to address the need for a measure that can account for non-traditional pathways to college completion and still hold institutions accountable. One means to do so would be to pair or replace the current standard of institutional graduation rates with a *completion rate* that considers additional pathways to degree completion that are considered as non-completers under the traditional IPEDS model. The accounting for non-traditional path takers, or transfer students, within a completion rate calculation, allows for accountability of nearly 10 million additional students to be more accurately reflected (NSC, 2016). The inclusion of more completion pathways in higher education would still allow for institutional accountability, and could additionally increase accountability as institutions adapt practices to ensure students continue their college career to the successful completion of a degree regardless of whether they continue where they began or transfer.

Statement of the Problem

Higher education accountability focuses on student outcomes as a measure of success, particularly emphasizing graduation rates as reported by IPEDS. This IPEDS model uses an institutional perspective when measuring student outcomes, that is, a student is counted as a success only when matriculating and subsequently graduating from the same institution within a 150% time period. This institutional perspective results in assumptions of both institutional effectiveness and student success based on not only a limited subset of college attending students but within the limited framework of the institution. Alternative perspectives exist through which student outcomes and thus institutional accountability can be measured, among which include a student-centric perspective that considers alternate pathways to college completion. Since alternative perspectives have not been fully developed, standardized, or tested, as such it cannot be determined that the traditional institutional approach provides the most accurate and complete picture of college student success.

Statement of the Purpose

The purpose of this research is to test an alternative student-centric outcome model that considers alternate college completion pathways to determine its effectiveness in providing a student outcome measurement. This alternative model will be tested by measuring outcomes of a convenience sample of students who initially enroll within a single university system.

Research Questions

In order to achieve the purpose of this study, the following research questions will be explored:

1. Can student success be reasonably measured using an alternative, student centric model that is more inclusive of student pathways to degree attainment as opposed to

the traditional IPEDS institution centered model that considers only a single pathway?

2. When considering alternate pathways to degree completion, which model is most inclusive while still providing standardization of measurement?
3. How does the most inclusive, alternative, student centric model compare to the IPEDS institution centered model?

Proposed Student Persistence Model

The framework under which this research will be conducted is a redesigned model for student persistence that was developed by this researcher. This model, discussed further in Chapter 2, offers an alternative perspective through which to examine student college completion. A student-centered approach to college completion is presented in the model alongside the traditional institutional centered approach. This proposed model will guide this research, and by determining both the proposed cohort completion rate in addition to the traditional cohort graduation rate, will allow for the determination of whether an alternative framework of student persistence offers significantly different outcomes for student success, which in turn will offer an alternative perspective for consideration of institutional accountability.

Theoretical, Statistical, and Practical Significance

Much research has been conducted that considers factors impacting college completion. Current studies of factors impacting student college completion are flawed, or at least severely limited, because they are based on an inadequate definition of success that considers only a single pathway to completion. This research study offers an alternative student persistence model which provides a more pathway-inclusive definition of college completion, reflecting

actual student outcomes. The theoretical significance of this model is that it re-authors the definition of successful college outcomes so that it more accurately reflects actual student outcomes rather than a subset of successful outcomes that are currently limited to those that occur within a single institution. If considered in research that considers factors impacting college completion, research outcomes may differ under the re-authored definition, providing evidence for revised or alternative student persistence theories.

This research study seeks to determine whether there is a statistical significance between traditionally measured IPEDS graduation rates and actual cohort completion rates. If a statistical significance does exist, it would provide further evidence that institutional comparisons based upon comparisons of graduation rates is in some instances inappropriate, as well as offer a measure of completion rate as a more appropriate for measure for institutional comparison.

The use of student cohorts within the framework of a single university system as the subject for testing the alternative model described above will also provide a practical significance to this research. Research on the outcomes of students within the university system, and the ability to expand the study to future examination of the outcomes of high school graduates from within the state, has potential to affect institutional, university system, and state legislative policy and practice. By providing a more complete picture of student outcome data, decisions can be more fully informed and data driven.

Definitions

Throughout this paper, the following definitions will be used for the terms listed below:

150 percent normal time - three years for students enrolled in associate degree programs and six years for students enrolled in bachelor degree programs.

Completion - the student act of degree completion, having attended as an undergraduate any number of post-secondary institutions in order to attain the degree. Completion is a student-centered phenomenon that is held in opposition to student *graduation*.

Completion rate - the number of students in the cohort who completed a degree within six years at any institution divided by the total number of students in the FTFT cohort.

Graduation - the student act of degree completion, having as an undergraduate matriculated and attended only one post-secondary institution in order to attain the degree. Graduation is an institutional phenomenon that is held in opposition to student *completion*.

Graduation rate - the number of students in the cohort who completed a degree within 150 percent normal time at the institution where they are identified in a FTFT cohort divided by the total number of students in the FTFT cohort.

NDUS institution - the eleven institutions that comprise the public higher education system within North Dakota, and include five community colleges (Bismarck State College, Dakota College at Bottineau, Lake Region State College, North Dakota State College of Science, and Williston State College), four regional universities (Dickinson State University, Mayville State University, Minot State University, and Valley City State University) and two research universities (North Dakota State University and the University of North Dakota).

NDUS student - any student who began an undergraduate program at one of the eleven NDUS institutions as a full-time, first-time freshman.

Persistence - the student act of continued college enrollment – at any institution of higher education - from year to year with the eventual goal of completing a college degree. Persistence is a student-centered phenomenon that is held in opposition to student *retention*.

Retention - the student act of continue college enrollment at the institution to which they first matriculated from year to year with the eventual goal of completing a college degree. Retention is an institutional phenomenon that is held in opposition to student *persistence*.

CHAPTER 2: LITERATURE REVIEW

During the 1970s, academic research on college retention and graduation gained foothold in the United States. Prior to that time, research that did exist tended to focus on a relationship between persistence and personal student characteristics. Students who persisted were college ready, motivated, and committed, and those who failed to persist were unprepared, unmotivated, and lacked the proper academic disposition (Tinto, 2006). Beginning in the 1970s, however, research began to consider that environment played an important role in student retention and the institution, as the primary student environment, became the focus of much study. Research emphasizing student connection with the college was a large contributor to student persistence and when students failed to persist, colleges were blamed for failing to properly support and integrate students into the college environment (Tinto, 1975). In the 40 years that have followed, retention has been among the most studied topics in higher education, however, the focus has continued to remain on the higher education institution's role in student retention.

This focus became particularly evident in the early 1980s, after the peak of enrollment of the baby boom generation passed and the less populous Generation X began to come of college age. While initially institutions invested in recruitment campaigns to draw more students through their doors, it soon became apparent that there were not enough potential college students to recruit and institutions in turn began to focus on retention of their currently matriculated students to keep enrollment high (Tinto, 1987). Thus, in the 1980s the purpose of refocusing on retention of students was not to increase institutional accountability, nor even an effort to become more student-centered, but a means to maintain tuition dollars at the same rate experienced during the baby boom generation's college era. In other words, this natural ebb of

college attending students was a financial threat to institutions, and a focus on retaining the students who came to an institution was seen as the means to survival.

It was out of this focus on the institutional role in student retention that the current model of higher education accountability grew. Accountability, a current buzzword of 21st century education, is the process of evaluating institutional performance based on student performance measures (Hanushek, Welch, Machin, & Woessmann, 2011). Higher education accountability in its present form of graduation rates was introduced by the 1990 *Student Right to Know and Campus Security Act* (PL-101-542). This act sought to inform students and families about the conditions of education within the higher education system, and thus mandated the collection and public reporting of institutional student characteristics, attendance and graduation patterns to the National Center for Education Statistics (NCES).

As the requirement for this reporting of higher education data coincided with the advent of the world-wide web, data collection and subsequent public reporting became easier and faster than ever before. The web also allowed for easier and quicker public access to this data, and it did not take long for other government and non-government agencies, non-profits, for-profits, and media to make use of NCES data. For example, *U.S. News and World Report* releases annual college rankings based on NCES data, and *College Measures*, a private company that seeks to inform public education policy, incorporates NCES data into their own online data tool. The ubiquitous usage of this federally collected data by so many agencies, companies, media, and their websites has helped drive the issue of educational accountability to the forefront. Indeed, in 2016, 76% of surveyed Americans agreed that it is desirable for postsecondary institutions to publicly report their graduation rates and 47% feel that punishing schools for low graduation or job placement rates is a good idea (Public Agenda, 2016).

While the public perceives a problem in higher education performance, many in higher education see the problem as a gap between research and practice (Tinto, 2006). That is, higher education has a perception that if better interventions, practices, and policies can be put in place that are supported by research, then more students will persist to graduation. Another view, which will be the focus of this research, is that it is not the gap between research and practice, but that the traditional institutional model of retention fails to reflect the reality that completion of a degree is a student-centered process. That is, models are based on the concept that institutions award degrees, however, the focus should primarily lie in the student attainment of these degrees and secondarily on the institutional role in supporting student persistence to degree attainment.

The remainder of this literature review will provide a description of the current federal accountability model, the landscape of graduation data, and a review of relevant literature in college persistence. This background will then be used to present a critique of current persistence models, and offer an alternative way that persistence can be measured that is student rather than institutionally focused. As this research will be conducted using a cohort sample from within the North Dakota University System (NDUS), background information and data for the eleven NDUS institutions will also be included in this review.

Why Accountability?

Social, economic, and political factors all play a role in the desire to hold higher education accountable for student outcomes. Three of these factors are considered here. These include the belief that a college degree provides a higher level of financial security and quality of life, the time and financial cost burden of higher education on students and their families, and the high federal and state financial investment in education. When taken either individually or in

conjunction with the other factors, they support the argument that the overall time and financial cost of college is so high to families, taxpayers, and government that it is expected that students who attend college should graduate in high rates, and that institutions be held responsible for providing services and qualified staff who support this expectation.

Coinciding with the late 20th century focus on accountability is evidence that the United States is fast approaching universal participation in higher education. In fact, today over 75% of high school graduates get some postsecondary education within two-years of receiving their high school diplomas (Association of American Colleges and Universities, 2002). Since 1949, the number of students attending post-secondary institutions has increased tenfold, from 2 million to 20 million. During this same timeframe, the U.S Census Bureau population estimates show the national population to have doubled, from 150 to 324 million (U.S. Census Bureau, n.d./2016). This growth of higher education attendance that outpaces the growth of the general population has been spurred by a number of factors, including the baby boom generation coming of age, the growth in the number of postsecondary institutions, GI bills, civil rights legislation, the establishment of federal work study programs, Title IX, and the growth in distance education (Association of American Colleges and Universities, 2002). Most of this extraordinary growth has occurred in the public sector, including growth in the sizes of four-year universities and the establishment of two-year colleges (Astin, 1982). A modern-day factor driving the increased enrollment of students in higher education is the estimation that by 2020, 65% of all job openings will require some level of postsecondary education (Carnavale & Hanson, 2015). This view is supported by the Lumina Foundation, which seeks to ensure that by 2025, 60% of Americans will hold a postsecondary credential of some form (Lumina Foundation, 2016).

While these statistics make it clear that more students than ever are participating in higher education, college graduation rates – the gold standard in accountability - still fall below expectations. What these expectations are is questionable, however, because there is currently no common standard for what "successful" means in terms of degree attainment rates. However, there is support for the notion that the attainment of a college degree is beneficial to both the individual as well as society. *The President's Budget*, documentation provided by the White House on President Obama's 2017 federal budget for education, states "higher education is one of the clearest pathways to the middle class" (The White House, 2016a). Research has also shown that individuals with a college degree have higher labor market earnings than non-degree holders, and workers who are higher paid will create more tax revenue for federal, state, and local governments, have higher standards of health, and will be less reliant on governmental social service programs (Carnevale, Smith, Melton, & Price, 2015; Baum, Ma, & Payea, 2013; Lotkowski, Robbins, & Noeth, 2004; Ramist, 1981).

Some of the desire for accountability is driven by the high financial costs invested toward a college degree. In terms of cost to students and their families, the price of a college education has increased dramatically over the past four decades. From an inflation adjusted standpoint, by 2016 the mean cost of tuition and fees relative to 1986 had increased by a factor of 3.1 and 2.4 for four-year and two-year public institutions respectively (The College Board, 2016). This increase in tuition costs has subsequently driven increases in both the number of students who borrow for college, and the average amount that is borrowed per student (Pew Research Center, 2010).

While students and their families incur the direct effect of college tuition costs, American taxpayers are not immune to college costs as part of their tax dollars are likewise directed at

higher education. At the federal level, approximately $200 billion dollars are invested annually in higher education (*Federal student aid annual report FY 2014*, 2016). The federal budget includes line items for providing federal assistance for student financial aid (FAFSA), student Pell grants, reducing costs of college for students, supporting development of community and technical colleges, and education tax benefits, among other items (The White House, 2016b). In total, $133 billion or 65% of the total federal expenditures on higher education go directly to students to assist with payment of college expenses. In addition to federal expenditures, states together budget approximately $73 billion to support higher education (The Pew Charitable Trusts, 2015).

The combination of all these factors - a college degree providing a higher level of financial security and quality of life, the cost burden of higher education on students and their families, and the federal and state investment in education - creates a social, economic, and political environment that seeks a high return on investment in higher education. A system of accountability for student outcomes, therefore, is warranted. The challenge is to determine an accountability measure that appropriately measures the desired outcomes.

Statistics on investments of time and finances show that accountability is necessary to determine whether there is a reasonable return on investment for students and stakeholders. In higher education, the return on investment is the completed degree, which enables the student to advance into a job with higher pay and benefits. Higher education institutions, as the deliverers of the degree, seem to be the natural entities to hold accountable for student outcomes. IPEDS, the current federal model for accountability, considers completed degrees awarded by institution using the standard measure of institutional graduation rate.

The term "graduation rate" is sometimes used interchangeably with "completion rate". Likewise, the related term "retention" is sometimes used interchangeably with "persistence". For the purposes of this research, these terms will be differentiated from this point forward. As described by Reason (2009a), retention and graduation are institutional phenomena, and persistence and completion are individual student phenomena. Students persist and complete higher education degrees, however, they are retained and graduate from a single institution. While it is the ultimate goal of the student to complete, it is the ultimate goal of the institution to graduate students. Henceforth, retention and graduation and their word forms will be used when referring to students who attend and attain a degree at one single institution, and persistence and completion and their word forms will be used to refer to all students who continue their higher education career at any institution and eventually attain a certificate or degree.

The History and Current Status of Accountability in Higher Education

The current standard of using graduation rates for institutional accountability was defined federally by the NCES department of the Integrated Postsecondary Education System (IPEDS). The IPEDS definition arose in the late 1990s and was born out of the 1990 *Student Right to Know and Campus Security Act* (PL-101-542), which required all higher education institutions that participated in any federal assistance program authorized by Title IV of the Higher Education Act of 1965 (which authorized federal student loans), as amended, report graduation rates for first-time, full-time (FTFT) degree seeking cohorts (IPEDS, n.d.). The enactment of this law further required that graduation rates be made publicly available to current and potential students. While not specifically stated, there is an implication that students and their families can use these publicly available graduation rates as a proxy measure of college effectiveness, and as such, higher graduation rates are taken to be a sign of a more successful institution.

IPEDS defines graduation rate as "the number of students entering an institution as full-time, first-time students in a particular year (cohort) who complete their program within 150 percent of normal time to completion" (IPEDS, n.d.). The normal time to completion is the time considered average or normal for a student to complete all requirements for a degree, which is four-years for a bachelor's degree and two-years for an associate's degree (IPEDS, n.d.). Thus, the 150 percent completion rate is six years for a bachelor's degree and three years for an associate's degree. What is included in this definition but is not explicit to the reader is that the IPEDS rate defines graduation rate for students entering "an institution". That is, the rate is based on the outcome at the level of a single institution, and under this definition, students who transfer or stop out of an institution are considered non-completers regardless of whether they graduate from another institution or beyond the 150 percent timeframe. Carnevale and Hanson (2015) note that this graduation metric was originally intended to measure the outcomes of what were considered "traditional" college students, or those who enter college within three years of high school graduation and attend as full-time students. Under this definition, the assumption is that the number of non-traditional students attending college is non-significant.

With the advent of online IPEDS data collection in the 2001-2002 academic year, the IPEDS data center portal (https://nces.ed.gov/ipeds/datacenter/) and the *College Navigator* website (http://nces.ed.gov/collegenavigator/) were subsequently created for the allowance of public access to the reported IPEDS data. Both websites allowed for users to view and compare institutions, and the IPEDS data center also has the added ability for datasets to be downloaded. The availability of these IPEDS datasets created for the first-time an easily accessible and publicly available at no cost data source for higher education metrics, which have been quickly adopted by other federal and state agencies, organizations, and media.

According to IPEDS, the current average graduation rate for the more than 2,400 four-year institutions who report is 54.4% and the average rate for the more than 2,000 reporting two-year institutions is 30.7%. While IPEDS has been available for reporting of institutional graduation rates for only the past two decades, there is some evidence to suggest that rates have remained somewhat constant over the past century. The earliest IPEDS 150% graduation rate reported in 1995 for four-year institutions indicates a 55% graduation rate (Lotkowski et al., 2004). According to Cope and Hannah (1975), data collected in the 1930's indicates that 60% of students who enter four-year colleges did not graduate in four-years, and 1960's data showed that more than 50% of four-year college students failed to graduate on time. 1980's data indicate that 30-40% of bachelor degree seeking students graduated within four years, and another 30-60% graduated or completed in more than four years (Ramist, 1981). While prior 1995 data is not directly comparable to IPEDS data of today, it does support that on time college graduation rates for American institutions has persistently been lower than desired for many decades.

Before moving on to an analysis of what works and what doesn't work in the current IPEDS accountability model, one needs to consider exactly what the IPEDS graduation rate does and does not tell about student outcomes. Measured institutionally, what they do tell are the rate at which FTFT students matriculate and subsequently graduate – within a 150% timeframe - from a single postsecondary institution. What they fail to tell are the outcomes of students in the same FTFT cohort who leave the institution, whether to stop out, drop out, or transfer to another institution. Additionally, the way in which graduation rate is currently reported (as a single institutional percentage rate) implies that students who fail to matriculate and graduate from a single institution also fail to complete a degree. This grossly misrepresents the outcomes of

transfer students, and since those students are tied to an institutional FTFT cohort, likewise negatively misrepresent the completion rates actually achieved by the FTFT cohort.

Current Accountability Models – What Works

It should be noted that since graduation rates were first defined by IPEDS in the late 1990s, there have been no modifications to the definition. This allows researchers to look back over the past twenty years and make some judgement about the strengths and weaknesses of the current accountability model that uses graduation rates. Among the strengths of the model is that the IPEDS definition creates a standardized cohort among all the 7000 plus post-secondary institutions (IPEDS, n.d.). This assures comparison of like groups of students, eliminating part time, transfer students, non-degree seeking, and graduate students from the cohort.

The definition of FTFT degree seeking students has also allowed for the identification of a specific student population that has been consistently studied by researchers. This group, in fact, has been identified by researchers as early as half a century ago (Cope & Hannah, 1975; Tinto, 1987), thus as the IPEDS definition came into being it was consistent with prior research. In other words, by IPEDS using an already existing and studied group of students, the research that has been conducted over the past fifty years aligns in such a way that it builds upon the work of prior researchers in the field. It can be argued that we know more about FTFT degree seeking students than any other student classification.

Current Accountability Models – What Doesn't Work

While providing some common basis for research that does inform us about the staying and leaving patterns of FTFT degree seeking students, there are some limitations to the current model of accountability. One primary criticism of the accountability model is that the FTFT degree seeking cohort, while providing a basis of comparing like groups of students, is not

consistent in the percentage among the cohort groups compared, and thus leads to inaccurate comparisons of the institutions as a whole (Cook & Pullaro, 2010). The point driven by this argument is that depending upon the characteristics of an institution, the IPEDS FTFT cohort could consist of a minority, a majority, or any percent in between of the total new incoming students for a given year, and thus a comparison of FTFT cohorts among institutions could be comparing a majority of one incoming class to a minority of another. The comparison of graduation rates, it is argued, is an apples-to-apples comparison of students but not institutions, and since IPEDS graduation rates are an institutional phenomenon it is inappropriate to use them for institutional comparisons.

Another critique of the current use of graduation rates as an accountability measure is that institutions serve very different sets of students, and that the characteristics of these sets of students can vary so vastly that it is inappropriate to compare institutional outcomes. As early as ten years ago, there was already evidence that there are core differences in the factors that affect student retention in private versus public institutions. Scott, Bailey, and Kienzl (2006) examined student and institutional characteristics at both public and private institutions to determine whether there was a significant relationship to student retention and graduation. In private institutions, higher rates of positive outcomes were found to significantly relate to higher selectivity rates for college admissions, increased numbers of full-time students in attendance, higher numbers of traditional college age students, and institutions that were exclusively female, religiously affiliated, and larger. In public institutions, the factors that significantly associated with positive student outcomes were instructional expenditures and number of full-time students. The authors state that one way to interpret the findings of this study is that the success of private

colleges is primarily driven by larger numbers of more traditionally aged and academically prepared students (Scott, Bailey, Kienzl, 2006).

More recently, Kalsbeek and Zucker (2013) examined higher education outcomes from a business approach, which they referred to as a marketplace model. By examining the institution through the lens of the marketplace, and comparing the outcomes of categories of differing institutions, it became clear that what many in higher education have suspected about student retention is true. That is, all one really has to do to predict the student graduation rates of an institution is to look at where it is positioned in the higher education marketplace. An institution that attracts the best student and is highly selective in its admissions process will produce higher retention rates (and eventual graduation rates) than less selective colleges. This idea that college admissions selectivity is directly correlated to college retention and graduation is not new, as Willingham (1985) stated that "the best way to predict a student likelihood of persistence is to know where the student enrolled" (p. 108). However, the Kalsbeek and Zucker study also notes that generally non-traditional students are attracted to the convenient/user friendly institutions, which are also institutions that are less selective in their admissions process. Marsh (2014) supports Kalsbeek & Zucker with his conclusion that comparing very different institutions is in essence comparing very different types of students because of the types of students these different institutions attract. Therefore, the use of a single metric to compare across all types of institutions is seemingly inappropriate.

A third critique of the current model is that it does not measure what we value. As mentioned earlier, current models look at student graduation through the lens of the institution, counting students as a success only if they begin and graduate at a single institution. While this tells us something about the efficiency of the institution to graduate students, it fails to show the

complete picture of the cohort of students being studied. Returning to the research of Cope and Hannah (1975), even in this earliest research there was recognition that students learn in various ways, which in some cases include students transferring or stopping out of college. Academic researchers continue to recognize that students, not institutions, ultimately control academic outcomes, with more recent literature providing similar themes of students choosing their own academic priorities, as well as acknowledging that there is no single path to success in college (Cuba et al., 2016). The discouragement of students from withdrawing and reentering college by the institution is counter to the way in which some students learn. As noted by Cope and Hannah (1975) and still evident today is that many students who withdraw from an institution do transfer, or stop out and eventually return.

The concept that students are valued over institutions is readily supported by federal expenditures on higher education. As noted earlier, the federal budget allocates $133 billion of the total $209 billion higher education expenditures directly to nearly 13 million students in federal student college loans (*Federal student aid annual report FY 2014*, 2016). In other words, 63% of federal higher education expenditures go directly to students as opposed to institutions of higher education. Thus, there seems to be contradictions between actions and measures in that at the federal level higher education accountability is institutionally focused, yet funding is student focused. Determination of a more appropriate metric of institutional effectiveness, therefore, should include a measure that is student rather than institutionally focused.

A final critique of the current model is that it fails to consider alternate degree pathways by counting students who transfer as non-completers and additionally underestimates the extent to which students do transfer. The historical view of student transfer has been that it primarily occurs as students move from two year to four year institutions (American Association of

Colleges and Universities, 2015), and while historical transfer data is not readily available, as early as the 1930s, it was estimated that one in ten students attended two-year institutions, and 25-35% of these students subsequently transferred to a four-year institution (Handel, 2013), providing early estimates for student transfer rates somewhere in the range of less than 5%. A better understanding of the degree to which students transfer occurred in the 2010s when the National Student Clearinghouse (NSC) started reporting on college student transfer and mobility. The most recent NSC study of student transfer shows that contrary to the historical view, students currently transfer among as well as between both two-year and four-year institutions, and that nearly 40% of FTFT college students transfer at least once during their college career (National Student Clearinghouse, 2016).

The New "Traditional Student"

The term "traditional college student" was born out of what was considered typical in the early 20th century, a student who first enrolls in college at age 19 or younger, attends full-time, and graduates within 4 to 5 years (National Center for Education Statistics, n.d.). By definition, all other types of students were categorized as "non-traditional" – students who delayed attending college, who attended part time or as commuters, or had outside responsibilities such as a job or dependent children. Bean and Metzer (1985) provide an alternate definition that distinguishes the two by degree of duration and intensity of student interaction with primary agents of socialization. Under this definition, the traditional student is principally influenced by the social environment of the institution, whereas the non-traditional student is principally influenced by social environments outside the institution. While Bean and Metzer's definition offers and alternative way to define the traditional student, it supports the NCES definition in that students who attend college part time, live off campus, work, or have other outside

commitments will also have less exposure to the social environment of the institution, which in turn defines them as non-traditional students.

Using both the historical as well as Bean and Metzer's definitions, evidence today shows that a majority of college students are reflecting characteristics that a century ago were considered to be non-traditional. Data shows two important trends. First is that the demographics of students attending college has changed significantly. As compared to college students of even a half century ago, students today are increasingly older than average, work while attending college, commute to campus, and have dependent children (Shapiro & Dundar, 2016). Additionally, many participate in coursework online or via some other distance education delivery, which a half century ago was non-existent. The second is that the expected time to complete a degree among students at all college levels has increased, from 2 to 3 years for two-year degrees, and 4 to 5 years for four-year degrees (Shapiro & Dunbar, 2016). Shapiro notes that these two factors are assumed to be inter-related, understanding that as students take on more increasingly non-traditional characteristics, they carry less credits, move between full-time and part time status, and stop out or transfer more frequently.

It is also notable that while federal accountability has failed to address the changing demographics of traditional college students, postsecondary institutions have taken note and are adapting to meet students' changing needs. This trend is observed in anecdotal evidence as well as policy and practices of institutions. According to Deborah Seymour of the *American Council on Education's Center for Education Attainment and Innovation*, in many cases, institutions have adapted their policies and practices to better serve students (Westervelt, 2016). Seymour states that better service means providing access and support for remedial courses so that students can catch up on missed or forgotten content, and providing alternatives to courses that are offered

face to face during the 8 to 4 school day. It is important to mention because these institutional adaptions to support the changing demographics of students are student-centered, as opposed to institutionally focused, and as such they can work counter to the desired IPEDS outcome goal of graduation, while supporting the end student goal of completion. This evolution, namely in college policies and practices, has enabled students to more easily attend, and it has also made it easier for them to stop out or transfer among colleges. And while it has been noted earlier that stopping out and transferring fits with the ways that some students learn, it also works counter to the current student accountability model that seeks to graduate students from the college where they first enrolled. In other words, these adaptations focus on institutional effectiveness, in regards to supporting the needs of students, at the cost of institutional efficiency, in regards to graduating students "on-time" or at the institution at which they first enrolled.

It is interesting to note that these changes in student demographics were observed and predicted to continue to change long before the current standards of IPEDS cohorts were established:

> Obviously, full-time for four-years is far from true today and will be even less true by the turn of this century when learners will be freer to learn in ways, settings, and time periods more suited to their individual needs (Cope & Hannah, 1975, p.103).

It causes one to pause and consider whether Cope and Hannah had any vision of the upcoming invention and ensuing explosion in the use of personal computers and the world-wide web and how the use of these technologies would radically change our world. Young students entering college today are members of "Generation Z", or those born after 1995. Having grown up in a world where technology was always ubiquitous, Generation Z is native to the online and digital world, and is used to having access to it 24/7 (Seemiller & Grace, 2016). Making up one-quarter of the American population, Generation Z is the most racially diverse generation in

American history, and also have expectations of learning and higher education unlike those of previous generations. For example, Generation Z students are more fluid in the aspects of their day to day lives, and are not tied to specific times or locations for work and education. They seek flexibility in their programs of study, in terms of offerings, locations, times and modes of delivery. They also prefer college a la carte, or the limited college experience of having access to programs and professors but not necessarily to other high price tag items such as residential living and athletic programs (Seemiller & Grace, 2016). Additionally, unlike previous college attending generations who did not have access to modern social media, today's college students do not disconnect from prior social groups when they begin a new life on the college campus (Reason, 2016). These changing characteristics of young college age students argue the point as to whether even today's young FTFT students can be considered "traditional", for their characteristics and expectations are unlike those ever seen in any prior generation.

Another aspect supporting the changing characteristics of college students is national studies showing that much of the growth in college attendance has been among working and older than 25-year-old learners. In fact, 70 to 80 percent of all undergraduate students are active in the labor market, and one-third of these working students are age 30 or older (Carnevale, Smith, Melton, & Price, 2015). This can be seen as a natural evolution of our American work-based economy, however, it flies in the face of the popular conception that college students are primarily post high school students attending full-time. While the purpose of this research is not to determine the effect of working while attending college, it is relevant in that based on the historical definition of "traditional college student" this 80% of students who are working while attending college would be considered non-traditional. Also, it has been shown that the stress of working while going to school is among the top reasons provided by former students for

dropping out, and that students who work have different priorities when choosing which college to attend (Johnson & Rochkind, 2009).

According to Johnson and Rochkind (2009), the top factors that influence where students choose to attend are financial aid, convenience or location to where they live or work, class schedules, and family commitments. Similarly, Noel-Levitz conducted a 2011 national study to identify what factors influence college choice, presenting results of traditional aged students as well as adult, graduate, and on-line learners. Analysis of the Noel-Levitz study reveals that traditional aged undergraduate students rated the top three influences of college choice as cost, financial aid, and college reputation. This ranking was consistent among four-year private, four-year public, and community colleges. Undergraduate students over the age of 25 rated the top three considerations for choosing a college as institutional reputation, availability of weekend/evening courses, and cost of attendance (Noel-Levitz, 2012b). The top three considerations for graduate students were institutional reputation, availability of weekend/evening courses, and future employment opportunities. The top three considerations for both undergraduate and graduate online learners were convenience, flexible pacing for completing a program, and work schedule (Noel-Levitz, 2012a). Through an institutional lens, it is apparent that colleges must be many different things to many different students in order to create an environment that supports the eventual degree attainment of all.

It has already been stated that the expected time to complete a degree has increased, from 2 to 3 years at two-year institutions and 4 to 5 years at four-year institutions. In addition to time expected to complete a degree, time to degree – the period of time from when a student first matriculates until degree completion – is also increasing. 2016 data from the NSC confirms that time to degree has increased among college students over the last 30 years (Shapiro & Dundar,

2016). Much of this increase can be attributed to students taking the "non-traditional path" to graduation, which includes attending multiple institutions and/or "stopping out". Forty percent of FTFT students transfer at least once during their college career, and at public four-year universities, 35% of traditional college aged students and 65% of older college students stop out of college at least once (National Student Clearinghouse, 2016).

For those who do persist to completion at public institutions, the mean time to degree for both two-year and four-year students is 5.6 years. The elongated time to degree, especially at two-year colleges, is attributed to reduced resources to students, rising college costs which cause students to work during college or carry smaller course loads, taking more courses than required by a degree program, difficulty in getting into required courses, and changing majors (Shapiro & Dundar, 2016). This delayed time to completion also holds for students who attended a public two-year school and then transfer to a public four-year institution, as their mean time to bachelor's degree is 2.8 years longer than for those students who began at the four-year institution. Considering the data presented by NSC, which includes over 2 million students, it is apparent that the IPEDS definition of what is considered normal time to graduation – two-years for an associate's degree and four-years for a bachelor's degree – is no longer accurate.

Student Retention and Persistence Factors

From an institutional standpoint, students who fail to reach the institutional goal of on-time graduation include stop-outs, dropouts, failures, and transfers (Willingham, 1985). Even though these four groups are very different sets of students, for the most part, research combines all of these student groups into a single non-graduate category. In higher education research, most focus on student graduation is proxied by studies on student retention. While graduation is closely tied to student retention, that is, a student must be retained in order to graduate, most

research on student persistence focuses specifically on student retention between freshmen and sophomore years. This research has been valuable in developing a profile of students who fail to persist and informing institutions in how to structure retention interventions and initiatives that will assist the student to eventual graduation (Cueso & Farnum, 2011).

Some common explanations for why students choose to leave include flunking out, not being adequately prepared for college level work, inability to adapt to college life, financial issues, lack of commitment to complete, and interference of life issues. One study of student departure indicated that the top three reasons students provided for leaving were that school conflicted with work, the courses were not available at a convenient time, and managing the financial cost of attending college (Tom, 1999). The choice to leave is important, because only a very small number of students flunk out or are forced to leave (Tom, 1999; Tinto, 1988; Willingham, 1985). The bottom line is that students leave college for a variety of reasons, and research on student departure has allowed a greater understanding of what these reasons are.

Literature often credits Vincent Tinto as the first researcher to develop theory that sought to explain why students leave. Tinto framed his 1975 model from an institutional orientation and thus became one of the first to focus on the institutional responsibility for student departure. In the same year, other research was supporting this model by indicating that the fit between the individual student and the institution was the primary determinant of student retention (Cope & Hannah, 1975). Known as the "college fit theory," the theory notes that the greater the congruence between the student's background, goals, attitudes, interests, and values and those of their college peers, the greater the likelihood that the student will persist (Ramist, 1981). The concept of "fit" between student and institution has evolved to include both a social and academic aspect, where the student has both a social network that includes sustained connections

that support the student, and engagement in the curriculum and programming that the institution provides (Cuba, Jennings, Lovett, & Swingle, 2016). Improvement of student fit within the institution has been a continual focus of subsequent research since the 1970s, including student transition to college and the role played by the institution in creating an environment that supports student transition and incorporation into the college. Four constructs that have emerged from the research on college fit theory include student traits, college experiences which are influenced by institutional characteristics, student commitment, and the effect of external influences.

Student Traits

One construct that recurs in early literature as a primary influence upon student retention is the individual student characteristics, or traits. As noted earlier, early research on student persistence assumed a correlation between retention and student characteristics (Tinto, 2006) and blamed failure to complete a degree on the shortcomings of the individual student. While 1980s research turned the focus of student persistence to the institution (Tinto, 1987), research has indicated that student characteristics formed from personal traits and pre-college experiences do influence individual student persistence. Astin clearly identified student traits in his 1993 I-E-O model, in which the inputs (I) of student characteristics operating within the college environmental characteristics (E) produce outputs (O) of college completion. The general popularity of Astin's model created a focus on both the (I) and (E) constructs that continues today (Marsh, 2014). Research by Marsh (2014) utilized multiple regression analysis to study student and institutional variables as suggested by Astin and their correlation to student retention. Marsh concluded that although institutional factors had some influence on student retention, individual student factors had a much higher influence on whether a student would be retained.

Student factors with the highest positive correlation to retention were higher standardized high school test scores, attending college as a full-time student, and lower levels of financial aid need. Marsh's research is worthy of note because it shows that while both student and institutional characteristics play a part in student persistence, it is student characteristics that hold the most influence.

College Experiences

Both Astin's and Marsh's research considered the influence of the college environment on student persistence, called *environmental characteristics* by Astin (1991), and *institutional factors* by Marsh (2014). Marsh identified two institutional factors that correlated with student retention - higher admissions standards and larger counts of full-time equivalencies (FTE), which can be interpreted as "larger institutions". Regarding these two institutional factors, higher admissions standards operated to improve student retention, while larger institutions operated to worsen it (Marsh, 2014). Marsh's research supports Astin's most comprehensive research which analyzed 146 input variables (student characteristics) and 196 environmental characteristics among 500,000 students in the late 1980s (Astin, 1993). Astin concluded that student retention is associated with student peer groups and student involvement in the institution, which both were highly correlative with student self-reported satisfaction with the institution.

Student involvement falls under the construct of college experiences, and Astin defined involvement as the total exposure that students had to institutional peers and faculty, with exposure being cumulative in terms of both time and intensity (Astin, 1993). Astin observed an inverse relationship between student involvement at an institution and the diversity of the student body. That is, as the student body becomes increasingly diverse in terms of age, social

background, interests, commitments, and attendance patterns it becomes more difficult for students to form peer bonds that support involvement (Astin, 1993). Counter to this, institutions with more homogeneous student bodies show higher rates of student involvement. Astin points out that this pattern is readily observable in our highly stratified higher education system, where students attending small private colleges are more involved than those who attend large, public institutions. Cuba et al., (2016) research conducted on how students make decisions in college supports Astin's student involvement theory. Studying the dimension of student engagement and the varying ways in which it is encountered, Cuba called it "particularistic" in nature, noting student engagement is related to specific experiences, classes, instructors, pedagogies, etc. Engagement can be sustained throughout the college experience, or more episodic, however, regardless of how it presents it is positively correlated to student persistence.

Reason's Model – an Integration of Student Traits and College Experiences

Both student traits and college experiences were studied in more detail by Reason offering a framework for understanding what he refers to as persistence through the college experience (Appendix A). Reason (2009a) examined many prior research studies on retention and proposed a comprehensive conceptual framework for student persistence that considers multiple factors that affect college student outcomes. This model proposed that a student comes to college with a set of *precollege characteristics and experiences* which include such constructs as sociodemographic traits, academic preparation and performance, and student dispositions. A student brings these traits and experiences to what Reason labels as *the college experience*, which presents the organizational context of the college, the student peer environment, and individual student experiences. It is each of these contexts - student precollege characteristics and experiences, college organizational context, student peer environment, and individual

student experiences - as well as their complex interaction, which contribute to the subsequent retention of students. Like other models, this framework is offered through an institutional lens, yet it is comprehensive in incorporating prior research on student retention and shows a clear relationship between student persistence, student traits, and college characteristics. Connecting the concept of student engagement to earlier research, it seems that the *college experience* factor described in Reason's research is a primary determinant of the degree to which engagement is present or absent for a student. For it these interactions and experiences with the college environment which either engage or disengage a student, and subsequently provide the fodder for student decisions to retain or withdraw from a particular institution.

Commitment

Student commitment is another construct that recurs in research on student retention and persistence. Student commitment to goal can be defined as an individual's intent to persist to degree completion. While it is not necessarily clear how commitment-making works, there is evidence that it is an effective means for influencing outcomes. It has been found that individuals who made a commitment, either alone or along with another treatment, had significantly more effective outcomes than control groups (Lokhorst, Werner, Staats, Dijk, and Gale, 2011). The concept of commitment was also considered in research by Tinto (1975, 1987), Pascarella and Terenzini (1980), and Bean and Metzer (1985), however, these researchers limited commitment to an institutional lens for the purpose of studying student retention. Thus, commitment is an important factor to consider when predicting whether students will complete a degree, and while a student must be committed to both educational goal and institution in order to graduate, student commitment to an educational goal alone can still result in completion.

Students come to college with their own set of intentions and purposes, and while these may align to persistence, they may not align with the goals of the institution (Willingham, 1985).

Pascarella and Terenzini's 1980 theoretical model on freshmen persistence and voluntary drop out decisions assumes that students come to college with a range of background characteristics and goal commitments that affect their ability to retain at an institution. Thus, their model for predicting freshmen retention also incorporated the concept of student goal commitments. This characteristic of student commitment, however, still operated within the institutional model, and a student had to be committed both to their educational goal as well as the institution in order to graduate (Pascarella & Terenzini, 1980).

Tinto (1988) studied patterns of student departure from college and determined it is highest during the first year, with the first six weeks being especially critical. In terms of departure patterns, students who persist from freshmen to sophomore year have nearly half the rate of departure during their sophomore year, and the same pattern persists through subsequent college years. Variances in pattern of withdrawal from college would imply that the reasons why students leave college vary widely depending on how many semesters they have already completed. While much of Tinto's research offers insight and the ability to differentiate among students at risk for departure during various stages of their college career, Tinto also notes that there will continue to be reasons why students leave college that cannot be altered by any institutional action. Tinto (1988) states that "some students are unwilling to put up with the stresses of transition because they are not sufficiently committed either to the goals of education and/or to the institution in which entry is first made (p. 444)." Further support for this is research on intentions leading to behaviors by Bean & Eaton (2001) show that if students have intent to persist, it can play out in their behavior to graduate.

External Influences

Bean & Eaton (2001) also studied the effects of external influences on student retention and persistence, and developed a psychological model of student retention that studied how particular retention programming affected the psychological constructs of self-efficacy, locus of control, and coping strategies. Included in this model is the aspect of external influences, explaining that students continue to interact with others outside the institution and that these interactions have psychological influences that can affect student decisions. Further research by Braxton, Hirschy, & McClendon (2004) on reducing institutional rates of departure focused on the influence non-institutional individuals have on the decision making of students. Recognizing that the support or lack of support from significant others, spouses and parents is related to the stress or lack of stress on students, the authors recommend that colleges find ways to ensure that these people are somehow made part of the college. This research corresponds to Ramist's (1981) observation that any college, parental, or peer group interaction has potential to affect satisfaction or dissatisfaction with college, and therefore the motivation to continue.

Redesigning the Student Persistence Model

The definitions, data and academic literature presented up to this point were intended to provide evidence that the current institutional model used to measure graduation rates has failed to adapt to current realities and falls short of providing a full picture of student outcomes. Under these conditions, it seems appropriate to propose that rather than research continue to look for the silver bullet for improved graduation rates, instead the paradigm of outcome rates change to additionally define success through the lens of the student. Student persistence is a multi-dimensional problem, and when we remove the student behavior out of the domain of the individual student and into the domain of the institution, we further complicate the issue by

making institutions responsible for all student behaviors, including those out of the purview of the institution. As stated by Reason, "the need for more complex thinking about persistence holds for both research and practice" (2009b, p. 675).

Research supports that institutional admissions practices are the best predictors of graduation rates (Kalsbeek & Zucker; 2013, Marsh, 2014). However, institutional missions, admissions policies, and characteristics of student populations served vary widely, and the current definition of graduation rates has been shown to best serve those institutions that are highly selective in their admissions policies. A modification to the current model to include an additional completion rate for the FTFT cohort would allow the inclusion of outcomes for the 40% of college students who transfer at least once during their academic career (Shapiro et al., 2015). It could also be designed to better reflect the outcomes of students who attend two-year institutions, who take longer to complete both two-year and eventual four-year degrees. This type of model would add a student-centered focus to the outcome measures, and can still provide a completion rate at the institutional level. Used in conjunction with the current institutionally focused graduation rate, a more complete picture of student outcomes can be revealed.

Additionally, a completion rate would allow for accounting for the current mobility of the 21st century student. Mobility rate, defined by the National Student Clearinghouse (2016), is the rate of students who attend two or more institutions of higher education during one academic year. The national mean mobility rate for college students in 2014-2015 academic year was 9.4%. Mobility can occur for a couple of reasons, including students who transfer, and students who take coursework at institutions other than their primary or home institution.

Willingham noted in 1985 that if an institution has multiple desirable outcomes, there must be multiple outcome measures as well (Willingham, 1985, p. 3). Astin states that any

system of outcome measure should be at least partially responsive to the student perspective (Astin, 1991, p 40). What this author is proposing is the use of an additional metric of completion rate to be used in conjunction with graduation rate, which is believed to be an insufficient stand-alone measure of student success. Thus, while graduation rates measure students who begin and graduate from a single institution, a completion rate would measure the degree attainment rate for the same cohort, independent of degree granting institution. Under this design, the rate of completion would include not only those students who begin and graduate from the same institution, but also those who transfer and graduate from other institutions within six years. Using a six-year timeframe for all institutions would allow for the accommodation of what NSC data tells us – that the average time to degree for both associate and bachelor seeking students is between 5-6 years. Thus, any institution reporting on outcomes would use a combination of graduation and completion rates. The graduation rate would reflect institutional efficiency in graduating students with a timeframe, and the completion rate would reflect institutional effectiveness in supporting students to an eventual certificate or degree. By providing both rates on the student cohort, any current perceptions that a 54% graduation rate means that only 54% of the FTFT cohort obtained a degree would be summarily dismissed, as the actual completion rate of the cohort would be provided as well.

Theoretical Framework

This research study is conducted within the theoretical framework presented in this literature review. This model is put forth here as an untested alternative to the current models. Labeled as "A Proposed Redesign of the Student Persistence Model", this framework is based on Robert Reason's (2009a) model of student persistence presented in Appendix A, and modified based on other academic literature on student retention and how this previous research relates to

student persistence to degree completion. Modifications include the additional dimension of the student perspective that incorporates *student commitments* and *external influences* of students who transfer.

The proposed theoretical model is presented below as Figure 1. As can be seen in this model, two possible outcomes exist where a student may ultimately complete a postsecondary degree. These outcomes differ primarily in the perspective in which they are viewed. In the student perspective, the student seeks to persist in the higher education environment and complete the degree. From an institutional perspective, the institution seeks to retain and graduate the student from a single institution – their own. The institutional perspective is the one which has been used for IPEDS reporting for the past two decades, and looks at student graduation as an institutional outcome. In this perspective, only students who begin and graduate at the same institution are considered in the numerator of graduation rate. Alternatively, the student perspective considers that students take varied paths on their way to a degree, and attending one institution may or may not have been part of this path. This perspective values completion, and provides a more accurate picture of the outcomes for a cohort. Using these perspectives, graduation is seen as an institutional phenomenon and completion is seen as a student phenomenon.

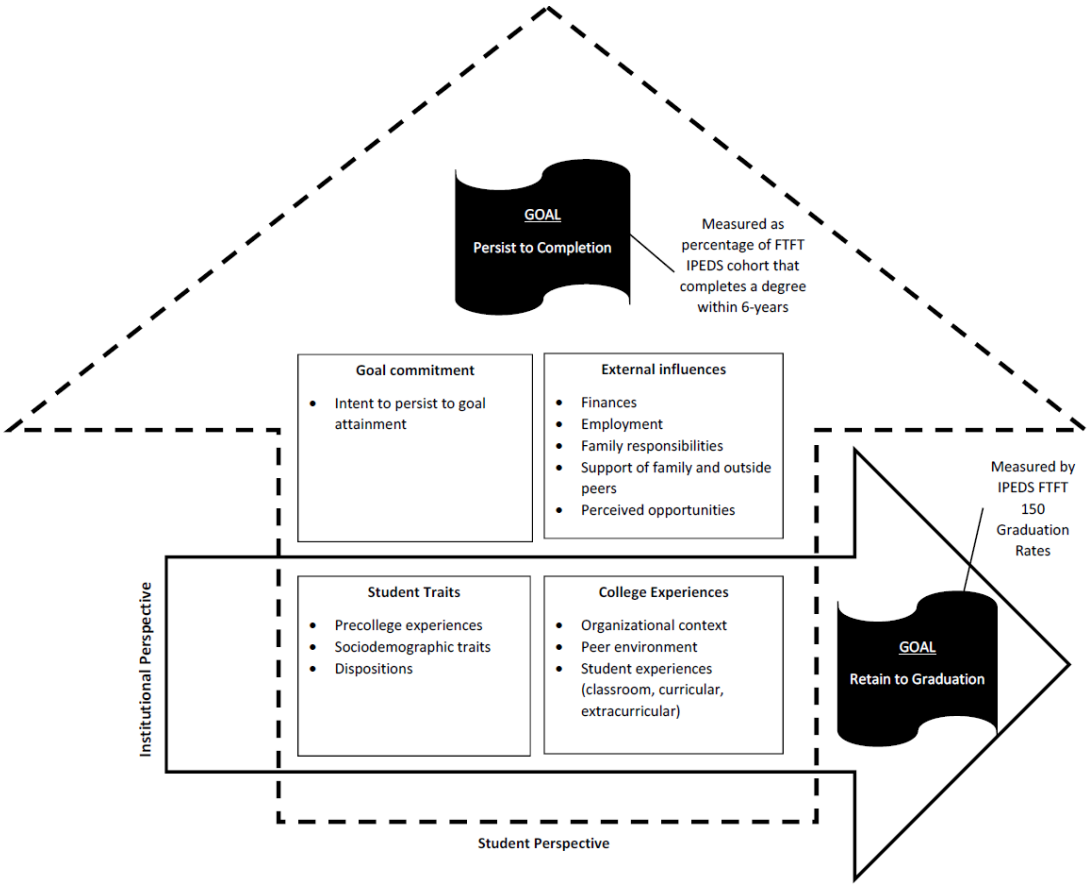

Figure 1. Proposed Redesign of the Student Persistence Model.

Within this model there are four factors that research has determined to influence student persistence. Discussed earlier, student traits include high school achievement variables such as grade point average and standardized test scores, course experiences, sociodemographic characteristics, and student disposition (Reason, 2009a; 2009b). College experiences are all interactions that a student has within an institution, including peer relationships, academic experiences, and interactions within the domain of the behavior of the organization. The two factors of student traits and college experiences are located within both institutional and student perspectives, as research has shown them to be factors that correlate with student outcomes. That is, when specific characteristics within these two domains fall within what is determined to be a positive scale, they contribute positively to student outcomes of graduation and completion.

However, if these same characteristics contribute in a way seen as negative, they can negatively affect both student graduation and completion rates. An example of this would be the student trait of high school GPA, where higher high school GPAs are predictive of higher rates and lower GPAs are predictive of lower rates of college graduation and completion.

The two factors of goal commitment and external influences are shown outside the institutional perspective and inside the student perspective because they have the ability to act positively and negatively at the same time yet still result in a positive outcome for a student. For instance, goal commitment has been shown to contribute positively toward student outcomes, that is, students who are committed to educational goals are more likely to achieve them. However, it is possible for a student to be committed to an educational goal in the absence of being committed to a particular institution, which allows for a student to a complete a degree (completion) but not necessarily at the institution at which they started (graduation).

External influences are those that the institution has no control over, yet they can influence the student decision to retain, transfer, or drop out. External influences include factors such as finances, employment, outside encouragement, parental expectations, family responsibilities, and perceived opportunities (Bean & Metzer, 1985; Ramist, 1981; Tinto, 1987). External influences can also include processes and procedures put in place by higher education organizations to promote easier transfer among institutions. Like student commitments, external influences can work in a way that discourages graduation, yet promotes completion. For example, the stress of family commitments may cause a student to withdraw from college, yet family support encourages the student to instead enroll in a local community college to complete a degree.

While this model has not been tested, as this review of literature has shown, it is supported by research that goes as far back as forty years ago, and while primarily based on Reason's model of student persistence, it is worthy of mention that other research by Reason (2009b) recognizes the rapidly changing demographics of college students. Reason also suggests a need to change our understanding of the variables that are used to predict student retention, and identifies a need to redefine college outcomes to match student intent, noting that graduation may no longer be an appropriate measure of a successful student outcome.

North Dakota University System

Even though North Dakota is one of the most sparsely populated states, it has the highest rate of college continuance after high school in the country, at 68.5% (Postsecondary Education Opportunity, 2016). Within the state, the North Dakota University System (NDUS) is a microcosm of the greater United States higher education system. In terms of the high costs invested, the North Dakota legislature expends approximately $1 billion biennially (North Dakota Century Code- Title 15, 2015), while holding the public university system to expectations of high rates of student graduation. The NDUS also reflects greater American higher education in its varied composition of FTFT IPEDS cohorts, changing student demographics, and the implementation of system wide policies and practices that promote fluid student movement through the system as opposed to retention at a single institution.

In terms of changing student demographics, and in particular the argument provided earlier that the number of college students that exhibit "traditional" college student traits is decreasing, NDUS reflects these national higher education patterns. An example of this is noted in a recent statement by President Thomas Mitzel of Dickinson State University:

> Many students entering higher education directly out of high school exhibit characteristics often used to define non-traditional students. Many of these

> "traditional students" have family obligations, must work off campus to reduce the amount of loan debt, and have life obligations unknown to previous generations of students (Mitzel, 2016, p.28).

In addition to traditional aged college students having non-traditional characteristics, there are also observable differences within NDUS in the number of non-traditional students enrolling. Fall 2016, NDUS census reporting showed that 28% of undergraduate students are enrolled part time, 24% have entered the system as transfer students, 39% participate in some form of online learning, 7.5% are high school students taking college coursework, and 3% are co-enrolled in two or more NDUS institutions during the same term (NDUS, 2016a). Past NDUS reports do not report out on all these subgroups of students, however, a 1970 NDUS enrollment report does show 89.6% of students were enrolled full-time (North Dakota Higher Education Facilities Commission, 1970). With a nearly 20% change in the percentage of part time students in the NDUS system, and an awareness that forty years ago distance education was limited to correspondence courses, and dual credit for high school students was not available, it is clearly observable that student characteristics have changed.

The high mobility rates among NDUS students provide additional evidence of the changing student demographics where traditional college students are shown to be more non-traditional in nature. The national mean mobility rate for college students in 2014-2015 academic year was 9.4%. Among North Dakota public and private institutions, the mobility rate for the same time period was 17.1%, or nearly double, and was the highest mobility rate of any state in the country (National Student Clearinghouse, 2016). When broken down, the 17.1% mobility rate consists of 6.2% mobility among North Dakota institutions, 10.6% mobility among in state and one out of state institution, and 0.3% mobility among in state and more than one out of state institution (National Student Clearinghouse, 2016). While mobility can mean either that

a student transfers to another institution or concurrently enrolls in more than one institution during a term, the implication is that nearly one in five North Dakota students attended more than one institution during the one-year snapshot of the data collection. The bottom line, however, is that there is not currently a good understanding of what this high mobility rate means to college completion rates for North Dakota students.

As a response to changing student demographics, NDUS has implemented system-wide policies and practices to create a university system that removed barriers for students and created a system students can more fluidly move through. The success of these changes is evidenced in the fact that North Dakota institutions of higher education have the highest rate in the country of students taking courses from more than one institution during an academic year (National Student Clearinghouse, 2016). Some examples of changes include the system-wide adoption of common course numbering, increased course and program offerings through distance education, a realigned remedial education program, and adoption of common system databases and software across all eleven NDUS institutions.

The adoption of common course numbering across the eleven college campuses has allowed for easier and more efficient transfer of college credit, and works in a twofold fashion. First, those students who transfer from one institution to another are guaranteed that if the equivalent course is offered at the transfer institution then the credit from the previous institution will be honored. Secondly, students have the flexibility to take general coursework from another NDUS institution if the course offering is more accommodating to the student schedule. An example of this would be a student who may choose to take their introductory math requirement at the local community college over summer break when they are living at home rather than at the research college they attend during the academic year. Another example would be a student

who takes a general English online via another NDUS institution because it accommodates their schedule. The outcome of this change is that students can move more fluidly within NDUS, taking coursework at multiple institutions, and easily transferring among them.

The North Dakota University System has also greatly increased courses offered via distance education, and in the process, has also added options for some programs to be offered entirely via online or distance delivery. Distance education options for coursework have made classes offered at all NDUS institutions more accessible to students. Programs offered via distance education have enabled students, who are unable to relocate for school (including this author) to enroll in degree programs. In 2014, Integrated Postsecondary Education Data System (IPEDS) data collected on distance education students ranked North Dakota second in the nation for percentage of students taking at least one distance education course (Hill, 2014). An interesting note to this data is that North Dakota is second only to Arizona, the home of the University of Phoenix, recognized as the largest online university in the country.

Another NDUS adaption has been the restructuring of remedial coursework within the system. This restructuring has removed the majority of remediation from the four-year campuses, and placed it in in the two-year institutions. Students attending four-year institutions in need of remedial coursework take courses collaboratively with the two-year provider schools. This shared service within the system has allowed for the strengthening of the remedial program in general, as resources are now focused on the five providing institutions rather than duplicated among all eleven institutions.

Least apparent to the student, yet maybe the most effective practice that has been put in place by NDUS is the system-wide implementation of the student information system and other web-based software. The system-wide use of a common student information system allows for a

single student record to be created for a student attending multiple institutions. A single student record system means that students have a single student identifier (student number) and do not need to complete documentation or re-enroll in services every time they enroll in another NDUS institution. The use of common web-based software such webmail services and a course content management system means that students attending one or more NDUS institutions do not have to be familiar with multiple types of software or remember multiple usernames and passwords.

Like other U.S. institutions of higher education, institutions within the NDUS vary in their missions and serve different types of students, and as such NDUS is a good example of the "apples to apples" comparison argument for FTFT cohorts mentioned earlier in this chapter. A wide variation among institutions in the percentage of incoming freshmen that make up the IPEDS cohort can be readily seen by examining IPEDS data for the set of North Dakota institutions. Table 1 shows the make-up of IPEDS cohort as a percentage of the incoming class for NDUS institutions. The range of percentages of students included in these cohorts range from 18% at Lake Region State College to 74% at North Dakota State University, representing a difference in representation of the incoming class of 56%. This data provides evidence that direct comparisons of institutions based on graduation rates of FTFT cohorts is inappropriate as it would be comparing 18% of the incoming students at the small, two-year vocational college of Lake Region to 74% of the incoming class at the large, research university of North Dakota State, both of which serve very different types of students with different educational outcome goals. Even when limiting comparisons to institutional tiers, differences still range to 32% within two-year community colleges, 14% within regional universities, and 12% within research universities.

Table 1

Percentage of Incoming Students included in IPEDS Cohorts for Graduation Rates for NDUS Colleges and Universities

NDUS Institution	Percentage of Freshmen included in the IPEDS cohort
Two-year Community Colleges	
Bismarck State College	47%
Dakota College at Bottineau	41%
Lake Region State College	18%
North Dakota State College of Science	41%
Williston State College	50%
Four-year Regional Universities	
Dickinson State College	42%
Mayville State College	28%
Minot State College	34%
Valley City State College	39%
Research Universities	
North Dakota State University	74%
University of North Dakota	62%

Subsequent graduation rates in public colleges and universities in North Dakota shows similar patterns among its two-year and four-year institutions as observed in the rest of the nation. As measured by IPEDS, graduation rates for the eleven NDUS institutions range from 25% to 54%. Also, like the rest of the nation, while there is no agreed upon graduation standard in North Dakota, there is consensus that these public institutions should be performing better. The IPEDS graduation rates of NDUS institutions are shown in Table 2.

Table 2

IPEDS 150 Graduation Rates for NDUS Institutions

NDUS Institution	IPEDS Graduation Rate
Two-year Community Colleges	
Bismarck State College	46%
Dakota College at Bottineau	28%
Lake Region State College	37%
North Dakota State College of Science	43%
Williston State College	41%
Four-year Regional Universities	
Dickinson State College	32%
Mayville State College	25%
Minot State College	43%
Valley City State College	41%
Research Universities	
North Dakota State University	54%
University of North Dakota	53%

As can be observed, the pattern of graduation at the NDUS level shows higher overall graduation rates being observed at the four-year universities than at two-year colleges. When rates are averaged, which is a method used by IPEDS but not considered statistically accurate by this researcher, the mean graduation rate for four-year NDUS institutions is 41% and for two-year NDUS institutions is 37%. Thus, under IPEDS methodology, it can be deduced that in general two-year public institutions in North Dakota are exceeding national graduation rate (41% vs 30.7%), while the four-year institutions fall below (41% vs 54.4%).

An interesting note on the NDUS IPEDS data provided above is how it is not necessarily consistent with data on student outcomes from other data sources. For example, a National Student Clearinghouse report shows that for the 2009 freshman bachelor seeking cohort in North Dakota, 81% attained a bachelor's degree by 2015 (Shapiro et al., 2016). The same dataset

showed 73% of the associate degree seeking cohort attained an associate's degree or higher. The IPEDS FTFT graduation rates for this same North Dakota freshmen cohort, show graduation rates for bachelor seeking students at 51% and 43% for associate seeking (IPEDS, n.d.). Differences can be explained in methodologies used, for instance, with NSC a student must attend full-time all semesters to be considered part of a full-time cohort, while with IPEDS a student need only be full-time during the term of initial entry. These differences in rates reported, however, are large enough to warrant further research into the outcomes of North Dakota students so that college attendance patterns are more fully understood. Further research while providing additional insight to the persistence and college migratory patterns of students, can additionally help to inform discussion and policy for North Dakota higher education.

The changing demographics and expectations of college students in North Dakota combined with the system-wide changes that promote fluid movement through the system, allow for students to readily transfer into and out of the system's institutions. While national data indicates that nearly 40% of students transfer during their college career, transfer rates for students in the NDUS are not completely identified. In NDUS, it is known that currently 24% of students who enter the system do so as transfer students. What is not known, is the percentage of students who transfer out, and their outcomes. Consideration of the proposed redesigned student persistence model within the limited sample of the North Dakota University System would create a more complete picture of the pathways and outcomes of transfer students. It would additionally provide indirect evidence of how well institutions support the transfer out process of students, and if included in high stakes reporting, would create an environment where this support becomes an institutional area of focus. This is important because as discussed prior, lack of student fit with an institution is considered the overarching reason for why students leave, and

institutional focus on transfer out students to an institution that better fits them could provide additional resources to these students.

CHAPTER 3: METHOD

The research questions being addressed in this study include: (1) Can student success be measured using an alternative, student centric model that is more inclusive of student pathways to degree attainment as opposed to the traditional IPEDS institution centered model that considers only a single pathway? (2) When considering alternate pathways to degree completion, which model is most inclusive while still providing standardization of measurement? and (3) How does the most inclusive, alternative, student centric model compare to the IPEDS institution centered model? To address these research questions, the following methods will be used:

Sample Frame, Sample, and Data Sources

The sample frame, sample, and data sources all reside within the confines of the North Dakota University System or as in the case of data sources, within the access of the NDUS.

Sampling Frame

The sampling frame for this study was limited to the NDUS, and included students from all eleven NDUS institutions. The eleven NDUS institutions are Bismarck State College, Dakota College at Bottineau, Dickinson State University, Lake Region State College, Mayville State University, Minot State University, North Dakota State College of Science, North Dakota State University, University of North Dakota, Valley City State University, and Williston State College.

Sample

The selected sample of study is a census sample of all students included in the 2009 and 2010 fall IPEDS cohorts at the eleven NDUS institutions. The fall 2009 and fall 2010 cohorts were selected because they are the two most recent cohorts which can be measured against a six-year outcome time period. Two fall cohorts were used to increase sample size, and the initial

cohort dataset extracted from the student information system included 15,294 students. The submission of the dataset to the National Student Clearinghouse as a Subsequent Enrollment query returned enrollment and graduation results for 15,239 students, a 99.6% record match and return rate. Table 3 displays by institution the distribution of these 15,239 distinct students among the eleven NDUS institutions:

Table 3

Distinct Count of Students in each Institutional First-time, Full-time Cohort

NDUS Institution	Distinct count of Students
Bismarck State College	1,870
Dakota College at Bottineau	314
Lake Region State College	441
North Dakota State College of Science	1,305
Williston State College	307
Dickinson State College	616
Mayville State College	278
Minot State College	880
Valley City State College	371
North Dakota State University	4,810
University of North Dakota	4,047
NDUS TOTAL	*15,239*

As shown in Table 4, the total count of students in the two cohorts is 4,237 and 11,002 for the associate and bachelor respectively:

Table 4

*Distinct Count of Students in each first-time, Full-time Cohort Leve*l

Cohort Level	Fall 2009	Fall 2010	Total
Associate	2,138	2,099	4,237
Bachelor	5,436	5,566	11,002
NDUS TOTAL	*7,574*	*7,665*	*15,239*

Data Sources

Research on completion rates of college students has been too unwieldly in prior decades due to the lack of resources available to researchers. As years have progressed, however, resources have become increasingly available to help with this task. NDUS has available to it today access to data resources that were not available a decade ago, and these data resources have evolved into tools that have become easier to access and use. Data used for this research exists *a priori* and resides in two data systems. Data systems are described below.

Campus Solutions Student Information System

Campus Solutions is the common student information system that is used by all eleven NDUS institutions and system office and is the primary source for identification of cohorts. This system is used annually by the university system to "tag" or identify by campus each first-time full-time (FTFT) cohort group that is used for IPEDS reporting. Within the student reporting module of Campus Solutions, the *IPEDS Degree Completion Report* can be run to generate a comma separated value file of all students included in a particular IPEDS cohort. Therefore, identification of cohort 2009 and 2010 individuals was conducted using the student information system. As the current system allows for running the *IPEDS Degree Completion* report for one institution and one cohort year at a time, a total of 22 files (11 institutions X 2 cohorts) was run and aggregated.

National Student Clearinghouse Student Tracker

The National Student Clearinghouse (NSC) is a non-profit organization that acts as a data clearinghouse for educational institutions in the United States. Established in 1993, membership in the clearinghouse is voluntary, however, participation in the clearinghouse is nearly universal among higher education institutions (National Student Clearinghouse, 2016). All NDUS institutions participate in NSC, and as such, the ability to track potential, current, and past students for past and future enrollments and degree completions is available by use of the NSC query tool, *Student Tracker*.

Thus, any properly formatted query to the NSC system produces a resulting file that lists any higher education institutions attended after enrollment in the North Dakota University System with terms of attendance, and if applicable, any certificates or degrees obtained and the term they were awarded. This resulting file provided the base data file for cohort 2009 and 2010 outcomes.

Procedure

Data collection and analysis commenced immediately upon the approval of the doctoral student supervisory committee and after IRB approval was obtained. Data collection and analysis was completed in a series of steps described below.

Summary of Data Collection Steps

Datasets used for this study were collected in a series of three steps. First, the 2009 and 2010 FTFT IPEDS cohorts were extracted from the NDUS Campus Solutions system using the *IPEDS Degree Completion Report* which produced a comma separated value file. This process was run once for each institution for each term, resulting in 22 files. Files were merged into one dataset. Second, the aggregated data file was formatted into the appropriate NSC file format and

submitted to NSC *Student Tracker* for addition of data fields for post-NDUS enrollments and degree completions. Third, the returned NSC data file was manually cleansed to ensure that each individual student within the sample has one unique record. Additional fields were added to tag students who fit specific criteria and to add calculated fields based on entry and graduation dates.

Summary of Data Cleaning and Addition of Indicator and Calculated Fields

The NSC file returned contained one record for each student enrollment reported to NSC after the initial student enrollment in NDUS, which was subsequently manipulated to contain one outcome record per student. This single outcome record kept was the NSC record that indicated initial student graduation and the institution from which the degree was awarded, or in the case where there is no evidence of student graduation, the student record was the most recent enrollment record. The NSC returned datafile showed 10,548 students obtained 13,808 certificate or degrees. Degrees awarded were at a variety of levels including apprenticeship, diploma, undergraduate certificate, associate, bachelor, post bachelor certificate, master, and doctor. There was a total of 424 graduation records where the student was indicated as having graduated and graduation date was indicated, however the degree level was blank. Table 5 below shows the total count of degrees awarded and the distinct count of students receiving the degrees by the originating cohort institution.

Table 5

Total Degrees Awarded and distinct Student Count Receiving Degrees, by Originating Cohort Institution

Institution	Total Degrees Awarded to Cohort	Distinct Count of Students Receiving Degrees
Bismarck State College	2,058	1,328
Dakota College at Bottineau	269	175
Lake Region State College	445	293
North Dakota State College of Science	1,176	849
Williston State College	282	180
Dickinson State College	373	306
Mayville State College	150	127
Minot State College	593	482
Valley City State College	259	206
North Dakota State University	4,412	3,596
University of North Dakota	3,791	3,006
Total	*13,808*	*10,548*

To analyze student pathways to degree, additional data fields were added so that in cases where students earned more than one credential, the single student record reflected these multiple certificates and degrees. Up to three institutions and/or degree outcomes were recorded per student. Each of these events included a separate field for graduation date, degree level, and institution awarding degree. In total, the cohort attended a total of 609 institutions including the eleven NDUS institutions. Table 6 examines the institutional data from an associate/bachelor cohort level, showing students who began in the associate cohort level attended a total of 217 institutions, and those who began in the bachelor level cohort attended a total of 478 institutions. In terms of degrees awarded, a total of 355 institutions, or 58.3% of all institutions attended, eventually awarded some level of degree to a student in this cohort.

Table 6

Total Institutions Attended and Total Number of Institutions Awarding degrees

Cohort Level	Total Institutions Attended	Total Institutions Awarding Degrees
Associate	217	112
Bachelor	478	321
Combined Cohorts	*609*	*355*

Note: the combined cohort total does not equate to the sum of the two cohorts because there is some cross-over in institutions between the two cohort groups.

The range in the number of institutions attended by students in the cohort is 9, with the minimum being 1 and the maximum 10. The mode number of institutions attended is 1, and the mean is 1.76. Table 7 shows the breakdown by count and percentage of the number of institutions attended by each student in the cohort:

Table 7

Total Institutions Attended by Count and Percentage of Total Cohort

Number of Institutions Attended	Count	Percent of Total
1	7,692	50.4%
2	4,779	31.3%
3	1,918	12.5%
4	618	4.1%
5	169	1.1%
6	38	0.2%
7	16	0.1%
8	6	<0.1%
9	1	<0.1%
10	2	<0.1%

The final data set was checked for data integrity, and once data integrity was insured all personally identifiable information was removed from the data set. Additional data fields were

added to the dataset to allow for further data disaggregation. Additional data fields added include:

Cohort Level - indicates whether the student entered as part of a first-time, full-time associate or first-time, full-time bachelor cohort.

Cohort - indicates whether the student is part of the Fall 2009 or Fall 2010 cohort.

Cohort begin date - the date when the cohort of students first began courses. Cohort begin date is used to calculate of time to degree. Since all student in the cohorts attended an NDUS institution during their initial enrollment year, and all NDUS institutions share a common academic calendar, the cohort begin dates for both cohort years will be the first day of scheduled classes in NDUS in fall 2009 and 2010.

Graduated in cohort - field used to indicate whether student received the degree level that corresponds to their cohort level.

Graduated within 6 Years - field used to indicate whether cohort level degree was obtained within six years of initial entry date.

Graduated within 150% - field used to indicate whether cohort level degree was obtained within 150% time of initial entry date.

Cohort degree from matriculating Institution - field used to indicate whether the cohort degree was awarded by the institution where the student initially matriculated.

Institution awarding degree - A field added to indicate the category of where degree was obtained. The possible entries for this field are: Initial NDUS institution (SAME); Another NDUS institution (NDUS); Another North Dakota college (ND); Minnesota institution (MN); Another out of state institution (OOS); No degree evidenced (No Degree).

Time to Degree - Two separate variable fields measuring time to first degree obtained and time to cohort degree level. Time to degree was measured in months. The begin date for each time to degree is the designated first day of classes in the fall 2009 term (for the fall 2009 cohort) and the first day of classes in the fall 2010 term (for the fall 2010 cohort). The North Dakota University System maintains a single system-wide academic calendar for all institutions allowing for a single begin date for each fall term. calculated field that will determine the timeframe in months for student degree completion. This will be a date difference calculation between begin date and graduation date shown in Equation 1:

= **(**DATEDIF(begin date, graduation date, "m")) (1)

Table 8

Time to Degree for First Degree Obtained and Cohort Degree Level Obtained

Cohort Level	Time to degree for first degree obtained (months)	Time to degree for cohort level degree obtained (months)
Associate	25.2	24.2
Bachelor	49.9	51.0

Degree pathway - a degree pathway is a concatenation of initial and subsequent graduation events. The degree pathway tells the order in which a student received their degrees, and which degrees were received.

Degree and institution pathway - a degree and institution pathway is a concatenation of initial and subsequent graduation events and the institution from which the degree was awarded. The coding used in the *institution awarding degree* field (SAME, NDUS, ND,

MN, OOS, No Degree) is used to minimize the total number of pathways yet still provide information regarding the institutional path taken by a student.

Still Enrolled - indicates whether the student was currently enrolled at the time the dataset was run against the NSC. The term the dataset was submitted was Spring 2017, thus allowing for determination of students from the 2009 and 2010 cohorts who were still enrolled in an institution of higher education 7.5 years and 6.5 years respectively after their initial enrollment as a first-time, full-time student in NDUS. In total, 2,053 students in the initial cohort were still enrolled 6.5-7.5 years after their initial enrollment in a first-time, full-time cohort, representing 13.5% of the original cohort. Of those still enrolled, 1,421 had been awarded a prior degree (246 of the original associate cohort and 1,175 of the original bachelor cohort), representing 69.2% of those still enrolled and 9.3% of the original cohort. In total, only 632, or 4.1%, of the students still enrolled had not yet received any degree from an institution of higher education.

Table 9

Students Still Enrolled in any Institution of Higher Education during Spring 2017 Term

Beginning Cohort Institution	Fall 2009 Cohort (TOD= 7.5 yrs)	Fall 2010 Cohort (TOD= 6.5 yrs)
Bismarck State College	73	88
Dakota College at Bottineau	16	11
Lake Region State College	18	24
North Dakota State College of Science	35	56
Williston State College	14	13
Associate Cohort Total	*156*	*977*
Dickinson State College	28	38
Mayville State College	10	24
Minot State College	55	68
Valley City State College	11	33
North Dakota State University	292	415
University of North Dakota	332	399
Bachelor Cohort Total	*728*	*977*
Total	***884***	***1,169***

Note: TOD = time to degree. Still enrolled designates enrollment in *any* institution of higher education

Data Analysis

Degree pathways as well as degree and institution pathways were analyzed using frequency tables. The total number of pathways and the top ten pathways were determined, and percentages of students who fell into each pathway were calculated. The intent of this analysis was to determine what percentage of students are completing college degrees yet are not being counted in the IPEDS graduation rate because they fail to follow the IPEDS defined pathway of matriculating to and graduating from a single institution.

Alternative definitions of student success were considered and the count of students who fell into each alternative definition was determined by institutions. The six categories of student success used include:

1. Graduated with same degree as cohort, within 150% time, at institution first matriculated (traditional IPEDS 150 criteria).

2. Graduated with same degree as cohort, within 150% time, at any institution.
3. Graduated with same degree as cohort, within 6 years, at any institution.
4. Completed with associate degree or higher, within 6 years, at any institution.
5. Completed certificate, diploma, or higher degree, within 6 years, at any institution.
6. Completed any type of certificate, diploma, or degree from any institution at time data was collected for study.

The definitions above become increasingly more inclusive of student outcomes as they progress from Condition 1 through Condition 6. Figure 2 below visually represents the increasing inclusivity of each definition of completion as well as the percentages of students in the sample that meet each definitional criterion.

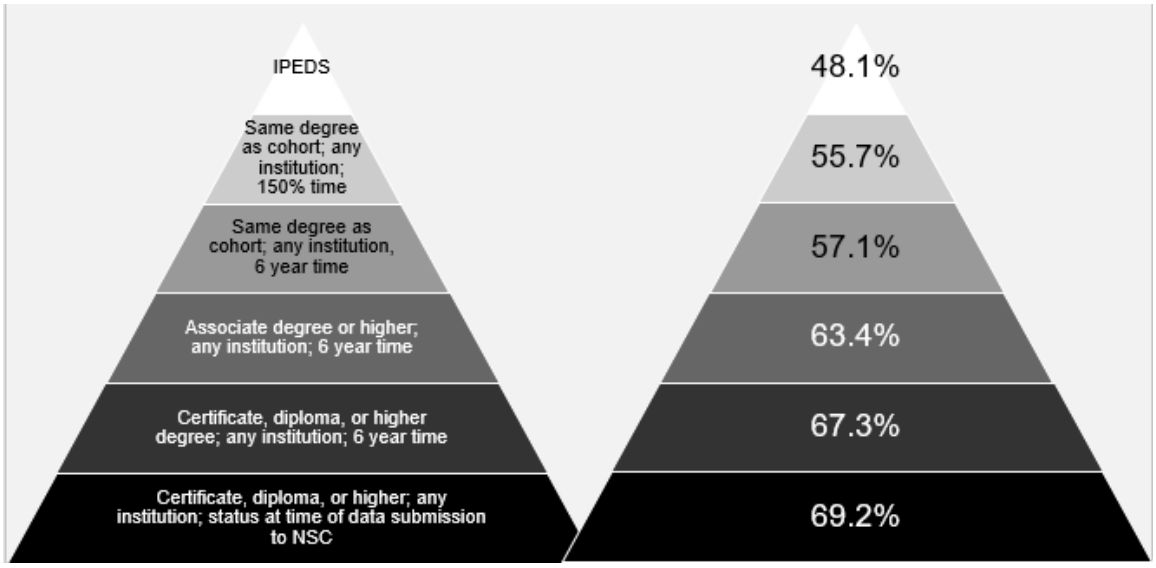

Figure 2. Pyramidal Representation of Increasing Inclusivity of Definition of Completion (conditions) and Percentage of Students Meeting each Definitional Criterion.

A repeated measures ANOVA was used to determine whether the differences in related means among the various definitions was significant. Significance was determined at a 5%

significance level ($\alpha = 0.05$), and a post hoc analysis using Sidak's adjustment was conducted to determine which means were significantly different from each other.

CHAPTER 4: RESULTS

The research questions being addressed in this study include: (1) Can student success be measured using an alternative, student centric model that is more inclusive of student pathways to degree attainment as opposed to the traditional IPEDS institution centered model that considers only a single pathway? (2) When considering alternate pathways to degree completion, which model is most inclusive while still providing standardization of measurement? and (3) How does the most inclusive, alternative, student centric model compare to the IPEDS institution centered model? These research questions were addressed by an analysis of pathways taken by students after they first enrolled in NDUS, and a statistical analysis of alternative definitions of success by repeated measures ANOVA and post hoc analysis.

Pathways to Degree Attainment

Analysis was conducted to examine the variety of pathways taken by students as they navigate their way through higher education. For this path analysis, when multiple degrees were obtained on a graduation date, only a single degree level was used (highest degree obtained). Up to three graduation events were recorded for each student, each event indicating the date of graduation, degree level, and institution awarding the degree. The institution awarding the degree was categorized as the first attended institution (SAME), another NDUS institution (NDUS), another private or tribal North Dakota institution (ND), a Minnesota institution (MN), or another out of state institution (OOS). Minnesota was specifically broken out into its own category because 27.5% of all NDUS undergraduates are Minnesotans (North Dakota University System, 2016a).

Pathways to degree attainment were examined on two levels. First, only by the degrees attained and secondly by both degrees attained and institutions awarding the degree. The data

was concatenated in a spreadsheet to create a degree path. The list of all produced pathways can be found in Appendix B. Examples of the produced pathways to degree for each pathway analyzed are as follows:

Table 10

Pathway Types, Examples, and Interpretation

Pathway Type	Example	Interpretation
Degree path	Certificate--	Student received a single degree.
	Associate-Bachelor-	Student received associate at first graduation date and bachelor on subsequent graduation date
	Bachelor-Master-Master	Student received bachelor at first graduation, master as second graduation date, and an additional master at third gradation date.
Degree and institution path	Associate(SAME)--	Student received an associate degree at the institution where they first began.
	Certificate(SAME)-Diploma(OOS)	Student received certificate at institution where they first began, and a subsequent diploma at an out of state institution
	Bachelor(MN)-Master(MN)-Doctor(OOS)	Student received bachelor at a Minnesota institution, then a master at a Minnesota institution, followed by a doctor at an out of student institution.

Note: Coding for institutional pathways are (SAME) = degree from institution of initial matriculation; (NDUS) = degree from another NDUS institution; (ND) = degree from a private or tribal North Dakota institution; (MN) = degree from a Minnesota institution; (OOS) degree from out of state institution (OOS).

When examining degree path only, students who originated in the associate cohort navigated 55 total different pathways through higher education, and those who originated in the bachelor cohort navigated 65 different pathways. Table 11 below shows the top 10 degree paths taken by associate and bachelor cohorts and the percentage of the original cohort who navigated each path.

Table 11

Top 10 Degree Pathways for Associate and Bachelor Cohorts

Associate	Percentage of Cohort who took path	Bachelor	Percentage of Cohort who took path
1. No Degree - -	33%	1. Bachelor- -	53%
2. Associate- -	31%	2. No Degree - -	30%
3. Associate-Bachelor-	11%	3. Associate- -	5%
4. Certificate- -	6%	4. Bachelor-Master-	4%
5. Bachelor- -	6%	5. Bachelor-Doctor-	1%
6. Associate-Associate-	3%	6. Associate-Bachelor-	1%
7. Certificate-Associate-	2%	7. Unknown- -	1%
8. Diploma- -	2%	8. Certificate- -	1%
9. Associate-Unknown-	1%	9. Diploma- -	1%
10. Unknown- -	1%	10. Associate-Associate-	<1%

Note: "No Degree - -" indicates that no degree was awarded; "Unknown" means that NSC data indicated a degree was awarded on a specific date, but the level of degree was not indicated.

When examining the same dataset for the degree and institution awarding degree path, the associate cohort navigated a total of 147 different pathways, and the bachelor cohort navigated a total of 194 different pathways. Table 12 shows the top 10 degree and institution paths taken by associate and bachelor cohorts and the percentage of the original cohort who navigated each path.

Table 12

Top 10 Degree and Institution Pathways for Associate and Bachelor Cohorts

Associate	Percentage of Cohort who took Path
1. No Degree - -	33%
2. Associate(SAME)- -	29%
3. Associate(SAME)-Bachelor(NDUS)-	7%
4. Certificate(SAME)- -	6%
5. Bachelor(NDUS)- -	3%
6. Certificate(SAME)-Associate(SAME)-	2%
7. Associate(SAME)-Associate(SAME)	2%
8. Associate(SAME)-Bachelor(MN)-	1%
9. Diploma(SAME)- -	1%
10. Bachelor(OOS)- -	1%
Bachelor	**Percentage of Cohort who took Path**
1. Bachelor(SAME)- -	45%
2. No Degree- -	30%
3. Bachelor(MN)- -	4%
4. Associate(MN)- -	3%
5. Bachelor(SAME)-Master(SAME)-	2%
6. Bachelor(OOS)- -	2%
7. Bachelor(NDUS)- -	2%
8. Associate(NDUS)- -	1%
9. Bachelor(SAME)-Doctor(SAME)-	1%
10. Bachelor(SAME)-Master(OOS)-	1%

Note: "No Degree- -" indicates that no degree was obtained.

Several observations are worthy of note from the data shown in Table 12. First, data shows that for both associate and bachelor cohorts, the largest percentages of students either complete the cohort degree in which they began at the institution to which they matriculated as first-time, full-time students, or they fail to complete a degree, and these two pathways account for a total of 62% of the associate cohort and 75% of the bachelor cohort. Second, this data shows that 67% of all associate cohort and 70% of all bachelor cohort did eventually complete a degree through some pathway.

Analysis of Varying Definitions of Completion Rate

An analysis of varying definitions of completion rate was conducted to determine if alternate definitions produce significantly different results in outcomes. To accomplish this, six varying levels of completion (conditions) were defined and the total number of students who met the completion definition were determined. The six definitional conditions were:

1. Graduated with same degree as cohort, within 150% time, at institution first matriculated (traditional IPEDS 150 criteria).
2. Graduated with same degree as cohort, within 150% time, at any institution.
3. Graduated with same degree as cohort, within 6 years, at any institution.
4. Completed with associate degree or higher, within 6 years, at any institution.
5. Completed certificate, diploma, or higher degree, within 6 years, at any institution.
6. Completed any type of certificate, diploma, or degree from any institution at time data was collected for study.

Note that by these definition, Condition 1 is the traditional IPEDS definition of graduation used in the IPEDS 150% graduation rate. The counts of students that fit each category of completion and the overall NDUS completion counts for each category are displayed in Table 13, and the same data represented as rates is displayed in Table 14.

Table 13

Student Counts for Varying Definitions of Completion

Institution	Cohort Size	(1)	(2)	(3)	(4)	(5)	(6)
Bismarck State College	1,870	878	900	995	1,137	1,312	1,328
Dakota College at Bottineau	314	111	119	137	155	174	175
Lake Region State College	441	156	164	187	235	290	293
ND State College of Science	1305	606	625	685	734	842	849
Williston State College	307	111	121	133	163	179	180
Dickinson State College	616	179	230	230	282	297	306
Mayville State College	278	77	100	100	117	120	127
Minot State College	880	333	409	409	452	468	482
Valley City State College	371	130	179	179	195	203	206
ND State University	4,810	2,591	3,078	3,078	3,387	3,485	3,596
University of ND	4,047	2,155	2,561	2,561	2,809	2,885	3,006
Total	*15,239*	*7,327*	*8,486*	*8,694*	*9,666*	*10,255*	*10,548*
Overall Percentage of Cohort	*100.0*	*48.1*	*55.6*	*57.1*	*63.4*	*67.3*	*69.2*

Note: Conditions (1) through (6) are defined in paragraph that precedes table.

Table 14

Student Rates (%) for Varying Definitions of Completion (condition)

Institution	(1)	(2)	(3)	(4)	(5)	(6)
Bismarck State College	47.0	48.1	53.2	60.8	70.2	71.0
Dakota College at Bottineau	35.4	37.9	43.6	49.4	55.4	55.7
Lake Region State College	35.4	37.2	43.4	53.3	65.8	66.4
ND State College of Science	46.4	47.9	52.5	56.2	64.5	65.1
Williston State College	36.2	39.4	43.3	53.1	58.3	58.6
Dickinson State College	29.1	37.3	37.3	45.8	48.2	49.7
Mayville State College	27.7	36.0	36.0	42.1	43.2	45.7
Minot State College	37.8	46.5	46.5	51.4	53.2	54.8
Valley City State College	35.0	48.2	48.2	52.6	54.7	55.5
ND State University	53.9	64.0	64.0	70.4	72.5	74.8
University of North Dakota	53.2	63.3	63.3	69.4	71.3	74.3
Overall Percentage of Cohort	*48.1*	*55.7*	*57.1*	*63.4*	*67.3*	*69.2*

Note: Conditions (1) through (6) are defined in paragraph that precedes Table 13

Analysis of Variance for Various Definitions of Completion

A one-way repeated measures ANOVA was conducted using the data presented on Table 14 to compare the institutional rates of student success under the effect of the six various

definitions of completion. Mauchly's test indicated that the assumption of sphericity had been violated as $\chi^2(14) = 70.53$, $p < 0.005$, therefore the degrees of freedom were corrected using Greenhouse-Geisser adjustment for lack of sphericity ($\varepsilon = .26$). The results show that there was a significant effect among the various definitions of completion, $F(1.28, 12.80) = 87.26$, $p < 0.005$, $\eta_p^2 = .897$. The descriptive statistics for the ANOVA are shown in Table 15. Table 16 shows Mauchly's test for sphericity, and Table 17 shows the test of within-subjects effects with the Greenhouse-Geisser correction.

Table 15

Descriptive Statistics of Tested Conditions

Condition	Mean	Standard Deviation	N
1	.397	.090	11
2	.460	.099	11
3	.482	.093	11
4	.550	.088	11
5	.597	.098	11
6	.611	.099	11

Table 16

Mauchly's Test of Sphericity

Within Subjects Test	Mauchly's W	Approx. Chi Square	df	Sig.	Greenhouse-Geisser
Condition	.000	70.553	14	.000	.256

Table 17

Test of Within-Subjects Effects with Greenhouse-Geisser Correction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Condition	.386	1.280	.301	87.263	.000	.897
Error(Condition)	.044	12.798	.003			

Post hoc comparisons using the Sidak Test of Estimated Marginal Means indicated that all pairwise comparisons of completion definitions (shown in Table 19) had a significant difference in the mean scores except for the single comparison of Condition 2 (graduated with same degree as cohort, within 150% time, at any institution) and Condition 3 (graduated with same degree as cohort, within 6 years, at any institution), in which Mean Difference = 0.022, Standard Error = 0.008, and p = 0.231. Since considering that Condition 2 and 3 are the same definition for four-year institutions where 150 percent time and six years are the same period of time, but different for two-year institutions where 6 years represents a 300 percent time, further analysis was indicated to determine whether the presence of the four-year institutions in the dataset was masking any significance between Condition 2 and 3 for the two-year institutions.

When specifically looking at the pairwise comparison between Condition 6 (graduated with same degree as cohort, within 150% time, at institution first matriculated) which is the current IPEDS definition of completion, all five alternative definitions had a significant difference in mean score. Sidak's mean estimates are shown in Table 18, and pairwise comparisons produced by Sidak's post hoc testing are shown in Table 19.

Table 18

Sidak Estimates

Condition	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
1	.397	.027	.337	.458
2	.460	.030	.393	.527
3	.482	.028	.420	.545
4	.549	.027	.490	.609
5	.597	.030	.532	.663
6	.611	.030	.544	.677

Table 19

Sidak Pairwise Comparisons

Condition (I)	Condition (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
1	2	-.063	.013	.010	-.112	-.013
	3	-.085	.006	.000	-.108	-.061
	4	-.152	.007	.000	-.180	-.125
	5	-.200	.013	.000	-.248	-.152
	6	-.213	.011	.000	-.257	-.172
2	3	-.022	.008	.231	-.052	.008
	4	-.090	.012	.000	-.135	-.044
	5	-.138	.022	.002	-.223	-.052
	6	-.151	.021	.000	-.229	-.072
3	4	-.067	.007	.000	-.093	-.042
	5	-.115	.016	.000	-.175	-.055
	6	-.128	.014	.000	-.183	-.074
4	5	-.048	.011	.028	-.092	-.004
	6	-.061	.010	.002	-.099	-.023
5	6	-.013	.003	.014	-.024	-.002

An additional independent samples t-test was conducted to compare Conditions 2 and 3 for the group of two-year institutions only. Even when considering only the two-year institutions, there was no significant difference in the means for 2 (M = .42, SD = .05) and 3 (M

= .47, SD = .05); t(8) = -1.434, p = .190. These results indicate that statistically there is no significant difference in the means for Conditions 2 and 3 for two-year institutions, however, when considering the difference in mean accounts for a 5% difference in reporting of completion rates at the two-year institutions, there may be a meaningful difference to be considered when determining a final model.

Figure 3 below shows the estimated marginal means of the six varying definitions of completion for the ANOVA analysis. As can be observed, the mean of completion rate increases with each subsequent definition, which were purposely designed to be more inclusive as they progressed from Condition 1 through 6.

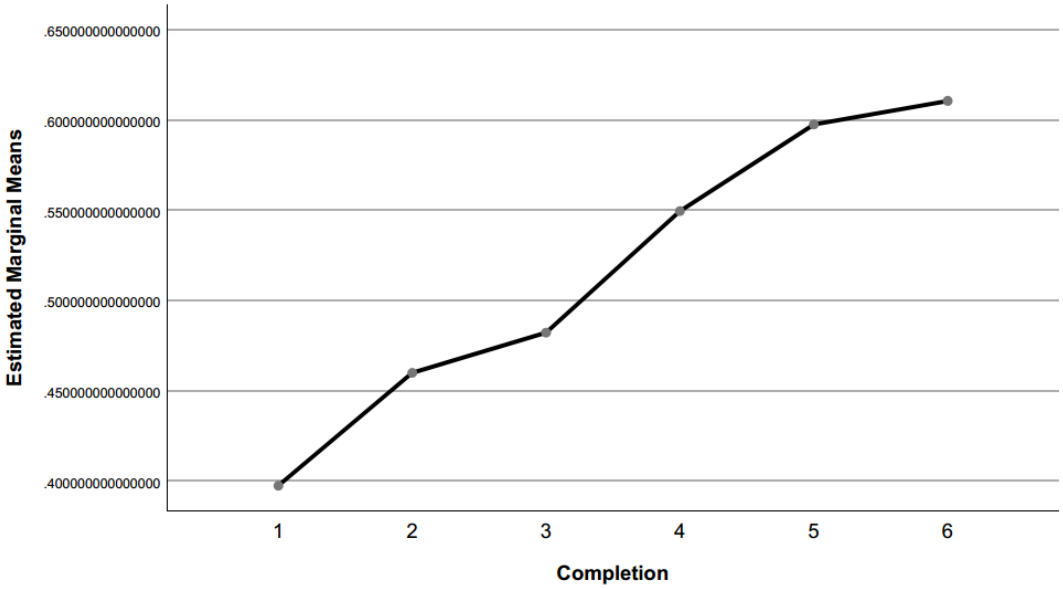

Figure 3. Estimated Marginal Means of Various Definitions of Completion.

Application of Results to Research Questions

The results presented above are sufficient to address the three research questions presented in this study: (1) Can student success be measured using an alternative, student centric model that is more inclusive of student pathways to degree attainment as opposed to the traditional IPEDS institution centered model that considers only a single pathway? (2) When

considering alternate pathways to degree completion, which model is most inclusive while still providing standardization of measurement? and (3) How does the most inclusive, alternative, student centric model compare to the IPEDS institution centered model? Each research question is addressed in its own subsection below.

RQ1: Can student success be measured using an alternative, student centric model that is more inclusive of student pathways to degree attainment as opposed to the traditional IPEDS institution centered model that considers only a single pathway?

This research presented five alternative, student-centric models that are more inclusive of student pathway to degree for the measurement of student completion rates. The application of research methods produced measurable results for all alternative definitions of completion, substantiating that student success can be effectively measured with a student centric model.

RQ2: When considering alternate pathways to degree completion, which model is most inclusive while still providing standardization of measurement?

This research question deals with the interaction of two individual requirements, that is, being most inclusive of student pathways to degree, yet standardized. The inclusion of standardization allows for results to be reproducible as well as applicable to all institutions, and as such would be a practical application of outcome measurement in the institutional research field.

Of the five alternative completion definitions presented, the one that produced the largest difference from the traditional IPEDS definition of completion (Condition 1) was Condition 6, which measured all certificate, diploma, and degree completions at any institution as measured at the time the data was collected for this study. Condition 6 produced a completion result 21.3% higher than Condition 1. However, Condition 6 violates the requirement for standardization, in that the timeframe used was “at the time the dataset was submitted to NSC”. Conditions 2

through 5, however, do provide a standardized timeframe measure, or either 150% (Condition 2) time or 6 years (Conditions 3,4,5).

Therefore, the condition that fulfills both research question criteria is Condition 5, which includes all students completing a certificate, diploma, or degree within six years from any institution. For the institutions within the North Dakota University System, Condition 5 produced a mean completion rate nearly 20% higher than the traditional IPEDS graduation rate, the completion outcome is reproducible, and the method used to determine the outcome is practical.

RQ3: How does the most inclusive, alternative, student centric model compare to the IPEDS institution centered model?

As noted above, for the institutions within the North Dakota University System, Condition 5 produced a mean completion rate nearly 20% higher than Condition 1, the traditional IPEDS completion rate. When the difference in outcome is measured at the institutional level for the eleven NDUS institutions, the range of the increase in completion outcome is from 15.4% to 30.4%. The Condition 1 versus Condition 5 difference in completion outcome is presented in Table 20.

Table 20

Difference in Completion Rate (%) Outcomes for Condition 1 versus 5

Institution	(1)	(5)	% Difference
Bismarck State College	47.0	70.2	23.2
Dakota College at Bottineau	35.4	55.4	20.0
Lake Region State College	35.4	65.8	30.4
ND State College of Science	46.4	64.5	18.1
Williston State College	36.2	58.3	22.1
Dickinson State University	29.1	48.2	19.1
Mayville State University	27.7	43.2	15.5
Minot State University	37.8	53.2	15.4
Valley City State University	35.0	54.7	19.7
ND State University	53.9	72.5	18.6
University of North Dakota	53.2	71.3	18.1
Overall Percentage of Cohort	*48.1*	*67.3*	*19.2*

Note: Numbers have been rounded.

Therefore, it is reasonable to assume that a modification of the definition of completion to include all certificate, diploma, or degrees competed within a six year timeframe at any institution would result in completion rates 15-30% higher, with a mean of a 20% increase in outcomes.

CHAPTER 5: DISCUSSION

Research on college student retention and completion indicates that students attend and leave college for a variety of reasons (Tinto, 1988), many factors interplay that affect the degree to which a student "fits" within an institution (Cope & Hannah, 1975; Ramist, 1981; Astin, 1991; Marsh, 2014), and students take many pathways through higher education (Cope & Hannah, 1975; Bean & Eaton, 2001; Cuba et al., 2016). With the intersection of so many factors and conditions, there is a need for complex thinking about student persistence and outcomes (Reason, 2009b).

Higher education accountability focuses on student outcomes as a measure of success, and in particular, graduation rates as reported by IPEDS, which provide only an institutional perspective when measuring student outcomes. This institutional perspective results in assumptions of both institutional effectiveness and student success based on not only a limited subset of college attending students but within the limited framework of the institution. While IPEDS 150% graduation rates have become the de facto measurement of accountability in the United States, these rates fail to provide consistency and meaning. IPEDS fails to provide consistency in that among institutions, percentages of incoming students who are included in the IPEDS FTFT cohort vary widely across institutions (Kalsbeek & Zucker, 2013). IPEDS fails to provide meaning in that rates lead to inaccurate comparison of institutions as a whole when it is intended to only compare outcomes of a particular type of student, thus misrepresenting outcomes for institutions that have higher numbers of transfer, part time, and non-traditional students (Scott, Bailey, & Kienzl, 2006). Therefore, accountability in higher education requires an accepted standard of measurement that can be consistently applied across institutions and has meaning to those who evaluate based on the standard measure (Hanushek, Welch, Machin, &

Woessmann, 2011). As noted earlier, Astin (1991) avers that any system of outcome measures should be at least partially responsive to the student perspective. Alternative models that include a student perspective do exist, and while not fully developed, provide a means through which student outcomes and thus institutional accountability can be measured.

The limiting nature of the current IPEDS 150% graduation rate which measures only FTFT students who matriculate and graduate from a single institution in the rate numerator implements a practice that is counter to what research has shown to be a complex nature of college student attendance, that is, it accommodates only a single path to college completion. This research has shown that an alternative student centric model that accounts for multiple pathways to student completion can also be used to provide an outcome rate for college student outcomes. This student centric model being more inclusive of pathways to completion produces a college completion rate that is more reflective of the outcomes of the FTFT cohort considered.

The purpose of this research was to test an alternative student-centered outcome model to determine its effectiveness in providing a measurement, and to determine whether any resulting measurement provided a more accurate and complete picture of student outcomes. The 2009 and 2010 first-time, full-time incoming freshmen in the eleven public institutions that comprise the North Dakota University System was the sample used for this study.

The research questions explored were threefold, and included: (1) Can student success be measured using an alternative, student centric model that is more inclusive of student pathways to degree attainment as opposed to the traditional IPEDS institution centered model that considers only a single pathway? (2) When considering alternate pathways to degree completion, which model is most inclusive while still providing standardization of measurement? and (3)

How does the most inclusive, alternative, student centric model compare to the IPEDS institution centered model?

These research questions were addressed by analyzing the outcomes of all students included in the sample. Outcomes were determined by submission of a data file to the National Student Clearinghouse, which returned enrollment and graduation data for subsequent terms in which each student was enrolled in a higher education NSC-participating institution. Student data was aggregated into counts for each of the following outcome categories: (1) graduated with same degree as cohort, within 150% time, at institution first matriculated (traditional IPEDS 150 criteria), (2) graduated with same degree as cohort, within 150% time, at any institution, (3) graduated with same degree as cohort, within 6 years, at any institution, (4) completed with associate degree or higher, within 6 years, at any institution, (5) completed certificate, diploma, or higher degree, within 6 years, at any institution, and (6) completed any type of certificate, diploma, or degree from any institution at time data was collected for study. Once counts were determined for each of the 6 outcome categories, an analysis of variance was conducted to determine whether there was any significant difference in category means, and a post hoc analysis was conducted to determine among which outcome pairs significance existed.

Discussion of Findings

Primary among the findings from this research is that student success can be effectively measured using an alternative, student centric model as opposed to the traditional IPEDS institution centered model. Secondarily, four of the five alternative model definitions are reproducible over time and practical for institutional researchers to implement. Thirdly, the alternative definition that was most inclusive of student outcomes provided a completion rate that on average was 20% higher than the traditional IPEDS 150% graduation rate.

While determining a mean difference between completion rates and the traditionally measured graduation rates is problematic in its dramatic misrepresentation of actual student outcomes, more problematic is the range in differences of rates among institutions, which was determined to be between 15 to 30% for the NDUS institutions. Thus for NDUS, these results imply that not only are the current IPEDS rates dramatically underreporting positive student outcomes, but that also those rates unequally misrepresent these outcomes, making comparisons among institutions faulty.

Recognizing that four of the five alternative outcome definitions offered in this research are reproducible and practical for institutional researchers to implement, the alternative student-centric model offers alternative means for measurement of student outcomes that address consistency and meaning. Consistency is addressed in that by widening the definition of a successful student outcome to include degrees awarded at non-initially matriculated institutions as well as degrees awarded at levels other than the initial cohort of the first-time student, more student degrees representing a successful outcome are included in the completion rate numerator. Thus, successful student outcomes are not limited to a narrow range of students, and are more inclusive of all outcomes that result in a degree. Likewise, as the completion rate more closely resembles the actual degree attainment rate of all students in the beginning cohort, and not just those who matriculated and graduated at a single institution, the extrapolation of the rate to the institution as a whole is more accurate and provides for a more meaningful comparison among institutions.

The current IPEDS definition of graduation rate is based upon research done by Tinto (1987) in the 1980s, as institutions of higher education identified the retention of students as the surest means to maintain college student enrollment after the baby-boomers had moved beyond

traditional college age. IPEDS graduation rate was also adopted prior to the establishment of the National Student Clearinghouse, which tracks student enrollment and completion across the nation (National Student Clearinghouse, 2016). By applying Reason's (2009b) affirmation that there is a need for complex thinking about student persistence and outcomes, part of that complex thinking should include whether the current IPEDS model is still relevant. This study has shown that by altering the definition of student success to be more inclusive, mean outcomes are measured at rates up to 20% higher than the traditional IPEDS model. Additionally, the databases and tools needed by an institution to determine outcomes for students who have transferred or stopped out are readily available to the institutional researcher.

Implications for Theory

This study provides the evidence that alternative student-centric approaches to measurement of student completion outcomes for accountability are realistic. It provides this evidence in a framework that is neutral to a specific alternative definition, offering five alternatives to the traditional IPEDS model and showing that four of the five are reproducible and practical to implement. Since this research was limited within the frame of the North Dakota University System, it is realistic to think there are additional alternative definitions for completion that were not considered as part of this study.

The determination of the" best" definition for completion rate – whether to consider any degree obtained or only that of equivalent level as initial cohort as well as the timeframe allow for degree completion – is a debate uniquely suited to the higher education community. Additionally, it may be considered that there are multiple definitions of "best", each uniquely suited to specific conditions of accountability measurement.

While IPEDS reports what rate of incoming first-time, full-time cohorts graduate from the first matriculated-to institution, the completion rate reveals that on average another 20% of students complete a degree and are unaccounted for under IPEDS. Under the IPEDS model, one in five students were counted as non-completers when they did in fact attain a degree. Therefore, regardless of definition, the significant difference of the completion outcomes over the traditional IPEDS graduation rates indicate that prior theories on factors impacting student college completion (as measured by IPEDS graduation rate) are flawed, or at least severely limited, because they are based on an inadequate definition of success that considers only a single pathway to completion.

Implications for Research

This study provides rich fodder for future research. Research questions that immediately arise as a result of this study revolve around the degree of similarity that institutions within NDUS may have in completion rates to (1) private or tribal colleges within North Dakota, or (2) institutions or university systems in other states. In other words, are the large differences in positive student outcomes observed within the institutions of the NDUS characteristic of other institutions of higher education, or are they an anomaly? Further research of this question would determine whether the use of an alternative definition of positive student outcomes would better represent actual outcomes for all institutions of higher education, or only a limited subset, accordingly testing the merit of an alternative model.

At the national level, it provides a framework for how to alternatively measure completion rates, and by additionally including demographic data in the dataset, allows for further study of the outcomes of subgroups. This research was conducted at the topmost level of data disaggregation, accounting for all FTFT students in the cohort group. Current federal

reporting further disaggregates student data into categories based on gender, ethnicity, Pell or other financial aid status, part time attendance, and age. The determination of completion rates as opposed to the current IPEDS graduation rates for these subgroups has ability to provide previously unknown characteristics of the varying subgroups, and thus has the potential to inform federal reporting and policy. Particularly, future research on completion outcomes of federal aid recipients can inform best practices and policies related to the $133 billion that is annually provided to nearly 13 million students (*Federal student aid annual report FY 2014*, 2016).

This research provides a more realistic measure of the number of FTFT students who complete a degree within six years than provided by IPEDS. One unexplored demographic in this research are the pathways of the non-completers. This study has shown that by using National Student Clearinghouse data, it is feasible to analyze subsequent enrollments of students who eventually attain degrees. Just as important as completers, however, is the study of subsequent enrollments for non-completers, as understanding the pathways and enrollment patterns of non-completers has the potential to inform higher education practices for student advisement and support.

Finally, the consideration of pathways to completion allows for a reframing of the research questions that surround student retention, and rather than studying how factors affect college graduation, analysis can be conducted on how these same factors affect student pathways.

Implications for Practice

When looking specifically at the North Dakota University System, this study provides a baseline for college completion of students who begin as FTFT students in one of the eleven

NDUS institutions. With minimal work, this research can also be additionally disaggregated to determine attendance pathways and college outcomes for subgroups of interest to North Dakota, thus informing data driven decisions for student support.

Current university system, North Dakota Department of Public Instruction, and state legislative interest in outcomes specific to North Dakota high school graduates warrants future research specific to the pathways and outcomes of this subset of college students. Research outcomes from study specific to North Dakota high school graduates would inform practice, policy, and century code for North Dakotans.

At a national level, establishment of an alternative measure for accountability could potentially level the playing field for higher education institutions, as institutions would need to reconsider where they focus energy and resources for student completion. For instance, if desirable completion rates can be obtained by an institution by assisting students to transfer and graduate from another institution, across higher education resources could be refocused on student advisement and assistance for those who seek to transfer out, whereas in the current environment these resources are focused on retaining the currently enrolled students. Thus, an institution that matriculates, advises, and supports students until degree completion – regardless of where the degree is obtained – can be seen to be as successful as a highly selective college which has a high traditional IPEDS graduation rate.

The implication of this study upon the practice of accountability in higher education is that there are alternatives to the traditional IPEDS 150% graduation rate for measuring the successful outcomes of students, and that these alternatives, which are founded on a student-centric approach, offer more information about student outcomes. Additionally, the transition to

an alternative student-centric model can be immediately implemented by using resources that are well established in the higher education data arena, namely the National Student Clearinghouse.

Conclusion

While taken out of context, the statement that best describes the approach of this study was made by William Pinkey in a speech delivered to the U.S. Senate on February 15, 1820. Pinkey said, "A definition is not proof". This research offers a critical analysis of the current definition of college graduation as measured by the federal government and adopted by other agencies, organizations, and media. This research seeks to show that the current definition of higher education accountability as measured by the IPEDS graduation rate is not proof of accountability, but merely a definition, among which alternative definitions exist. In other words, they say we suck, but they have stacked the deck against us by using a definition of student success that does not adequately reflect the outcomes of all students.

While ideally this researcher would desire to transplant the current IPEDS graduation rate with an alternative, student centric definition that is more inclusive of college outcomes, it is understood that it is often difficult to give up the familiar. A median ground could be found in establishing a co-reporting of the traditional with the new as a means for introducing an alternative reporting method.

For reporting purposes, a completion rate, complementing the current graduation rate, could be reported for each IPEDS reporting institution. This completion rate would apply to the same IPEDS first-time, degree seeking cohort, and include in the numerator all students who complete their college degree at any institution regardless of where they first matriculated. This approach would tie completion rates of transfer students back to the institution where they first matriculated, and while this seems to credit the wrong institution with the completion of the

individual student, this method does add value in three ways. First, as previously mentioned, is the inclusion of the outcomes of nearly 40% or over 10 million students who are currently included in the non-completer category because they transfer among institutions. Second, while some may argue that the completion of the transfer student being tied back to the initially matriculated institution rather than where the student completes credits the wrong institution, it does account for the completion rate of the entire cohort, and as shown by this study, includes on average an additional 20% of FTFT cohorts. In other words, the outcome of students who leave an institution is not simply unknown, but is further defined, allowing for a more comprehensive picture of student completions. Finally, by considering transfer students who complete degrees at other institutions within the completion rate of the initially matriculated institution, the initial institution is credited for the investment made in those particular transfer students, and if institutions choose to focus resources on assisting student transition, this rate could subsequently be increased for institutions who provide student support and advisement to students who transfer out.

Another way of considering this is to think of the two types of outcomes – graduation rates and completion rates – as a mean to determine two different but important factors of an institution, efficiency and effectiveness. Graduation rates, which measure the rate of students who begin and finish their degree at a single institution, reveal the efficiency of an institution, or how quickly an institution can intake students and output graduates. In the high stakes world of college education, efficiency is important because students who graduate quicker will save time, save money spent on college tuition and expenses, and can enter the job market sooner. Completion rates, which measure the rate of students who finish their college degree, reveal the effectiveness of an institution, or whether the institution is successfully providing resources to

students that allow them to eventually complete their degree. Effectiveness balances efficiency in an arena where the natural resources used to produce an outcome are human beings, thus recognizing that college students are not cogs on the assembly line who follow a set schedule and pattern of college entry and completion.

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APPENDIX A. ADDITIONAL FIGURES

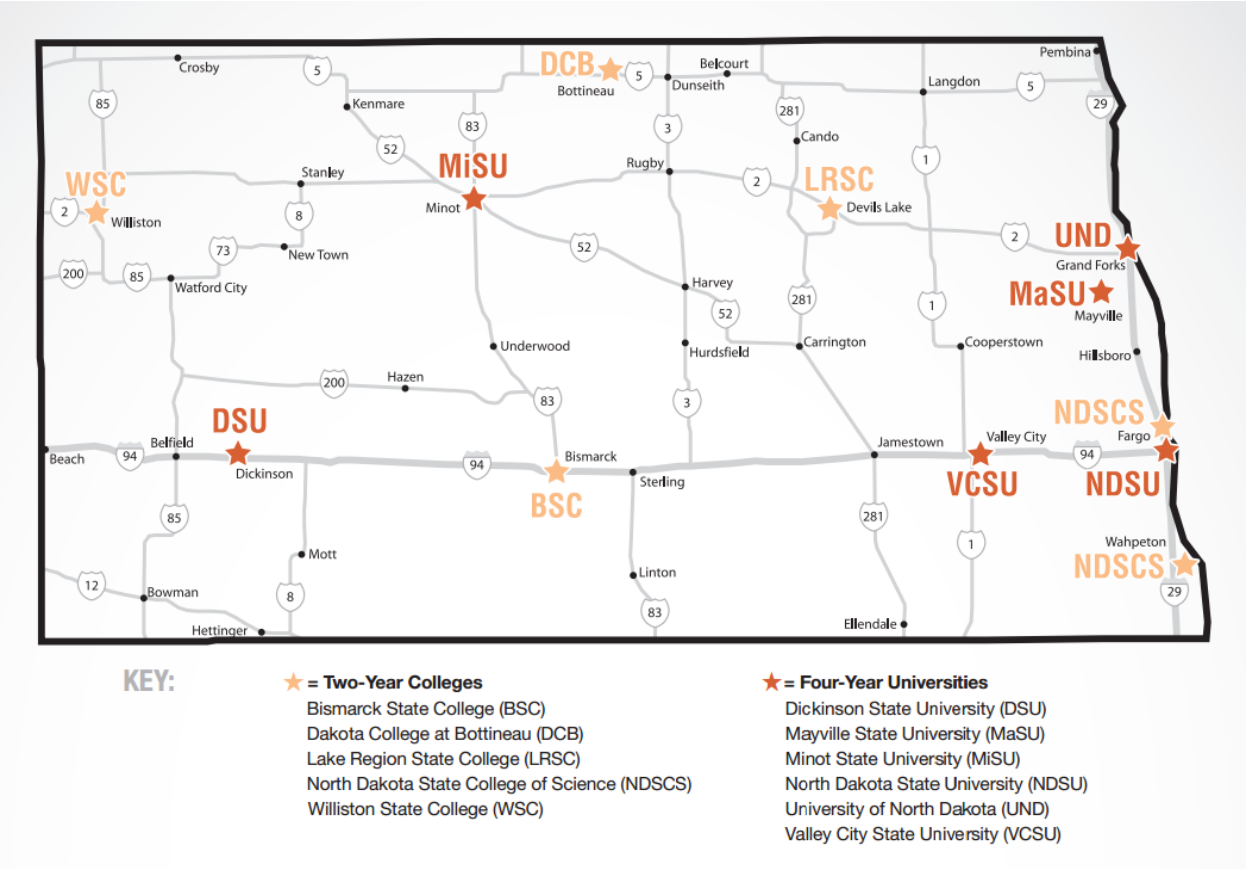

Figure A1. Identification and location of NDUS institutions on a map of North Dakota (North Dakota University System, 2016b).

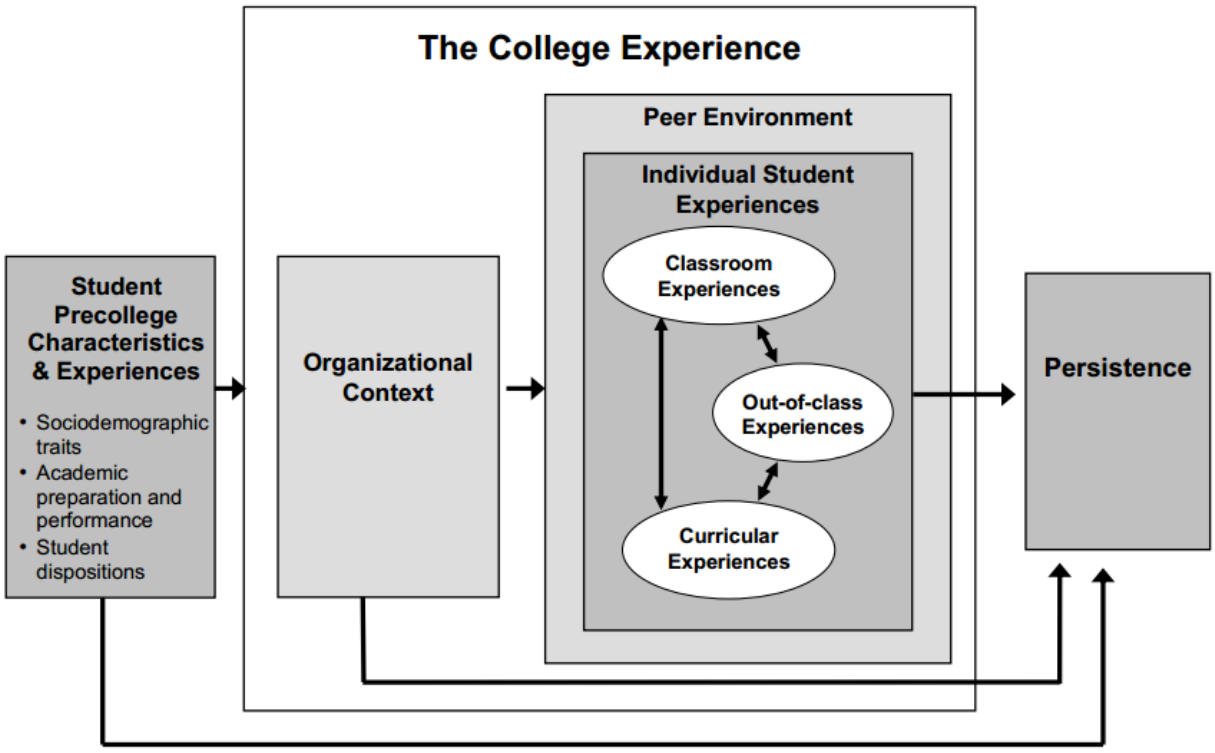

Figure A2. Robert Reason's comprehensive model of influences on student learning and persistence (Reason, 2009a).

APPENDIX B. ADDITIONAL TABLES

Table B1

Degree Paths for Associate Level Cohort

Degree Paths	Count of Students	Percentage of Cohort
No Degree--	1412	33.33%
ASSOCIATE--	1323	31.22%
ASSOCIATE-BACHELOR-	468	11.05%
CERTIFICATE--	263	6.21%
BACHELOR--	249	5.88%
ASSOCIATE-ASSOCIATE-	115	2.71%
CERTIFICATE-ASSOCIATE-	103	2.43%
DIPLOMA--	68	1.60%
ASSOCIATE-UNKNOWN-	32	0.76%
UNKNOWN--	25	0.59%
ASSOCIATE-ASSOCIATE-BACHELOR	23	0.54%
ASSOCIATE-BACHELOR-MASTER	20	0.47%
ASSOCIATE-CERTIFICATE-	19	0.45%
BACHELOR-MASTER-	16	0.38%
CERTIFICATE-ASSOCIATE-BACHELOR	13	0.31%
CERTIFICATE-BACHELOR-	12	0.28%
CERTIFICATE-CERTIFICATE-	9	0.21%
ASSOCIATE-CERTIFICATE-ASSOCIATE	5	0.12%
CERTIFICATE-ASSOCIATE-ASSOCIATE	4	0.09%
CERTIFICATE-DIPLOMA-	4	0.09%
DIPLOMA-ASSOCIATE-	4	0.09%
ASSOCIATE-BACHELOR-BACHELOR	3	0.07%
ASSOCIATE-BACHELOR-DOCTOR	3	0.07%
CERTIFICATE-CERTIFICATE-ASSOCIATE	3	0.07%
MASTER--	3	0.07%
ASSOCIATE-ASSOCIATE-ASSOCIATE	2	0.05%
ASSOCIATE-ASSOCIATE-CERTIFICATE	2	0.05%
ASSOCIATE-BACHELOR-UNKNOWN	2	0.05%
ASSOCIATE-DIPLOMA-	2	0.05%
ASSOCIATE-DOCTOR-	2	0.05%
BACHELOR-ASSOCIATE-	2	0.05%

Table B1. Degree Paths for Associate Level Cohort (continued)

Degree Paths	Count of Students	Percentage of Cohort
BACHELOR-DOCTOR-	2	0.05%
CERTIFICATE-ASSOCIATE-CERTIFICATE	2	0.05%
APPRENTICESHIP--	1	0.02%
ASSOCIATE-BACHELOR-ASSOCIATE	1	0.02%
ASSOCIATE-BACHELOR-CERTIFICATE	1	0.02%
ASSOCIATE-BACHELOR-POST CERT	1	0.02%
ASSOCIATE-CERTIFICATE-BACHELOR	1	0.02%
ASSOCIATE-MASTER-	1	0.02%
ASSOCIATE-UNKNOWN-BACHELOR	1	0.02%
BACHELOR-ASSOCIATE-BACHELOR	1	0.02%
BACHELOR-BACHELOR-	1	0.02%
BACHELOR-CERTIFICATE-ASSOCIATE	1	0.02%
BACHELOR-UNKNOWN-	1	0.02%
CERTIFICATE-ASSOCIATE-DIPLOMA	1	0.02%
CERTIFICATE-CERTIFICATE-CERTIFICATE	1	0.02%
CERTIFICATE-DIPLOMA-ASSOCIATE	1	0.02%
CERTIFICATE-UNKNOWN-	1	0.02%
CERTIFICATE-UNKNOWN-ASSOCIATE	1	0.02%
DIPLOMA-ASSOCIATE-BACHELOR	1	0.02%
DIPLOMA-BACHELOR-	1	0.02%
DIPLOMA-DIPLOMA-	1	0.02%
UNKNOWN-ASSOCIATE-	1	0.02%
UNKNOWN-ASSOCIATE-BACHELOR	1	0.02%
UNKNOWN-BACHELOR-DOCTOR	1	0.02%
Grand Total	4,237	100.00%

Table B2

Degree Paths for Bachelor Level Cohort

Degree Paths	Count of Students	Percentage of Cohort
BACHELOR--	5849	53.16%
No Degree--	3279	29.80%
ASSOCIATE--	512	4.65%
BACHELOR-MASTER-	481	4.37%
BACHELOR-DOCTOR-	149	1.35%
ASSOCIATE-BACHELOR-	142	1.29%
UNKNOWN--	71	0.65%
CERTIFICATE--	70	0.64%
DIPLOMA--	68	0.62%
ASSOCIATE-ASSOCIATE-	49	0.45%
BACHELOR-CERTIFICATE-	49	0.45%
BACHELOR-BACHELOR-	46	0.42%
DOCTOR--	45	0.41%
CERTIFICATE-BACHELOR-	25	0.23%
CERTIFICATE-ASSOCIATE-	24	0.22%
BACHELOR-ASSOCIATE-	18	0.16%
ASSOCIATE-ASSOCIATE-BACHELOR	11	0.10%
BACHELOR-UNKNOWN-	10	0.09%
ASSOCIATE-CERTIFICATE-	8	0.07%
ASSOCIATE-DIPLOMA-	7	0.06%
ASSOCIATE-UNKNOWN-	5	0.05%
BACHELOR-DIPLOMA-	5	0.05%
CERTIFICATE-ASSOCIATE-ASSOCIATE	5	0.05%
CERTIFICATE-ASSOCIATE-BACHELOR	5	0.05%
DIPLOMA-ASSOCIATE-	6	0.05%
DIPLOMA-ASSOCIATE-ASSOCIATE	5	0.05%
MASTER--	6	0.05%
ASSOCIATE-BACHELOR-MASTER	4	0.04%
ASSOCIATE-ASSOCIATE-ASSOCIATE	3	0.03%
BACHELOR-MASTERS-	3	0.03%
BACHELOR-POST CERT-	3	0.03%
BACHELOR-ASSOCIATE-ASSOCIATE	2	0.02%
BACHELOR-CERTIFICATE-ASSOCIATE	2	0.02%
CERTIFICATE-CERTIFICATE-	2	0.02%
CERTIFICATE-CERTIFICATE-ASSOCIATE	2	0.02%
UNKNOWN-MASTER-	2	0.02%
ASSOCIATE-BACHELOR-CERTIFICATE	1	0.01%

Table B2. Degree Paths for Bachelor Level Cohort (continued)

Degree Paths	Count of Students	Percentage of Cohort
ASSOCIATE-BACHELOR-DOCTOR	1	0.01%
ASSOCIATE-CERTIFICATE-ASSOCIATE	1	0.01%
ASSOCIATE-DIPLOMA-UNKNOWN	1	0.01%
ASSOCIATE-UNKNOWN-MASTER	1	0.01%
BACHELOR-BACHELOR-DOCTOR	1	0.01%
BACHELOR-BACHELOR-MASTER	1	0.01%
BACHELOR-BACHELOR-UNKNOWN	1	0.01%
BACHELOR-CERTIFICATE-MASTER	1	0.01%
BACHELOR-DIPLOMA-ASSOCIATE	1	0.01%
BACHELOR-MASTER-CERTIFICATE	1	0.01%
BACHELOR-MASTER-DOCTOR	1	0.01%
BACHELOR-MASTER-MASTER	1	0.01%
BACHELOR-MASTER-POST CERT	1	0.01%
BACHELOR-MASTER-UNKNOWN	1	0.01%
CERTIFICATE-ASSOCIATE-DIPLOMA	1	0.01%
CERTIFICATE-BACHELOR-ASSOCIATE	1	0.01%
CERTIFICATE-BACHELOR-MASTER	1	0.01%
CERTIFICATE-DIPLOMA-	1	0.01%
CERTIFICATE-DIPLOMA-ASSOCIATE	1	0.01%
CERTIFICATE-DIPLOMA-BACHELOR	1	0.01%
DIPLOMA-ASSOCIATE-BACHELOR	1	0.01%
DIPLOMA-DIPLOMA-	1	0.01%
DIPLOMA-DIPLOMA-ASSOCIATE	1	0.01%
DIPLOMA-UNKNOWN-	1	0.01%
UNKNOWN-BACHELOR-	1	0.01%
UNKNOWN-BACHELOR-ASSOCIATE	1	0.01%
UNKNOWN-DIPLOMA-	1	0.01%
UNKNOWN-UNKNOWN-	1	0.01%
Grand Total	11,002	100.00%

Table B3

Degree and Institution Paths for Associate Level Cohort

Degree and Institution Path	Count of Students	Percentage of Cohort
(NO DEGREE)-()-()	1412	33.33%
ASSOCIATE(SAME)-()-()	1227	28.96%
ASSOCIATE(SAME)-BACHELOR(NDUS)-()	301	7.10%
CERTIFICATE(SAME)-()-()	244	5.76%
BACHELOR(NDUS)-()-()	136	3.21%
CERTIFICATE(SAME)-ASSOCIATE(SAME)-()	89	2.10%
ASSOCIATE(SAME)-ASSOCIATE(SAME)-()	81	1.91%
ASSOCIATE(SAME)-BACHELOR(MN)-()	61	1.44%
DIPLOMA(SAME)-()-()	53	1.25%
ASSOCIATE(SAME)-BACHELOR(OOS)-()	44	1.04%
BACHELOR(OOS)-()-()	44	1.04%
BACHELOR(MN)-()-()	41	0.97%
ASSOCIATE(MN)-()-()	39	0.92%
ASSOCIATE(SAME)-BACHELOR(ND)-()	33	0.78%
ASSOCIATE(NDUS)-()-()	32	0.76%
BACHELOR(ND)-()-()	26	0.61%
ASSOCIATE(SAME)-UNKNOWN(NDUS)-()	25	0.59%
ASSOCIATE(OOS)-()-()	22	0.52%
ASSOCIATE(SAME)-BACHELOR(SAME)-()	19	0.45%
ASSOCIATE(SAME)-ASSOCIATE(SAME)-BACHELOR(NDUS)	13	0.31%
ASSOCIATE(SAME)-CERTIFICATE(SAME)-()	13	0.31%
DIPLOMA(MN)-()-()	12	0.28%
ASSOCIATE(SAME)-ASSOCIATE(MN)-()	11	0.26%
ASSOCIATE(SAME)-ASSOCIATE(NDUS)-()	9	0.21%
CERTIFICATE(MN)-()-()	8	0.19%
CERTIFICATE(NDUS)-()-()	8	0.19%
UNKNOWN(ND)-()-()	8	0.19%
BACHELOR(NDUS)-MASTER(NDUS)-()	7	0.17%
CERTIFICATE(SAME)-BACHELOR(NDUS)-()	7	0.17%
UNKNOWN(OOS)-()-()	7	0.17%
UNKNOWN(SAME)-()-()	7	0.17%
CERTIFICATE(SAME)-CERTIFICATE(SAME)-()	6	0.14%
ASSOCIATE(SAME)-BACHELOR(NDUS)-MASTER(NDUS)	5	0.12%
ASSOCIATE(SAME)-UNKNOWN(OOS)-()	5	0.12%
CERTIFICATE(SAME)-ASSOCIATE(MN)-()	5	0.12%

Table B3. Degree and Institution Paths for Associate Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
CERTIFICATE(SAME)-ASSOCIATE(SAME)-BACHELOR(NDUS)	5	0.12%
ASSOCIATE(SAME)-ASSOCIATE(SAME)-BACHELOR(MN)	4	0.09%
ASSOCIATE(SAME)-BACHELOR(MN)-MASTER(MN)	4	0.09%
ASSOCIATE(SAME)-BACHELOR(ND)-MASTER(ND)	4	0.09%
ASSOCIATE(SAME)-CERTIFICATE(MN)-()	4	0.09%
CERTIFICATE(SAME)-ASSOCIATE(SAME)-ASSOCIATE(SAME)	4	0.09%
CERTIFICATE(SAME)-ASSOCIATE(SAME)-BACHELOR(MN)	4	0.09%
ASSOCIATE(MN)-ASSOCIATE(MN)-()	3	0.07%
ASSOCIATE(MN)-BACHELOR(NDUS)-()	3	0.07%
ASSOCIATE(SAME)-ASSOCIATE(ND)-()	3	0.07%
ASSOCIATE(SAME)-ASSOCIATE(OOS)-()	3	0.07%
ASSOCIATE(SAME)-BACHELOR(NDUS)-DOCTOR(NDUS)	3	0.07%
CERTIFICATE(OOS)-()-()	3	0.07%
CERTIFICATE(SAME)-ASSOCIATE(NDUS)-()	3	0.07%
CERTIFICATE(SAME)-BACHELOR(MN)-()	3	0.07%
CERTIFICATE(SAME)-CERTIFICATE(SAME)-ASSOCIATE(SAME)	3	0.07%
DIPLOMA(SAME)-ASSOCIATE(SAME)-()	3	0.07%
UNKNOWN(MN)-()-()	3	0.07%
ASSOCIATE(MN)-BACHELOR(MN)-()	2	0.05%
ASSOCIATE(ND)-()-()	2	0.05%
ASSOCIATE(NDUS)-ASSOCIATE(NDUS)-()	2	0.05%
ASSOCIATE(NDUS)-BACHELOR(NDUS)-()	2	0.05%
ASSOCIATE(OOS)-ASSOCIATE(OOS)-()	2	0.05%
ASSOCIATE(SAME)-ASSOCIATE(SAME)-ASSOCIATE(SAME)	2	0.05%
ASSOCIATE(SAME)-BACHELOR(NDUS)-BACHELOR(NDUS)	2	0.05%
ASSOCIATE(SAME)-BACHELOR(NDUS)-MASTER(MN)	2	0.05%
ASSOCIATE(SAME)-BACHELOR(NDUS)-MASTER(ND)	2	0.05%
ASSOCIATE(SAME)-CERTIFICATE(MN)-ASSOCIATE(MN)	2	0.05%
ASSOCIATE(SAME)-DOCTOR(NDUS)-()	2	0.05%

Table B3. Degree and Institution Paths for Associate Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
BACHELOR(MN)-MASTER(MN)-()	2	0.05%
BACHELOR(ND)-MASTER(ND)-()	2	0.05%
BACHELOR(OOS)-MASTER(OOS)-()	2	0.05%
BACHELOR(SAME)-()-()	2	0.05%
CERTIFICATE(NDUS)-ASSOCIATE(NDUS)-()	2	0.05%
CERTIFICATE(SAME)-CERTIFICATE(MN)-()	2	0.05%
CERTIFICATE(SAME)-DIPLOMA(SAME)-()	2	0.05%
DIPLOMA(OOS)-()-()	2	0.05%
MASTER(OOS)-()-()	2	0.05%
APPRENTICESHIP(OOS)-()-()	1	0.02%
ASSOCIATE(MN)-BACHELOR(MN)-CERTIFICATE(OOS)	1	0.02%
ASSOCIATE(MN)-BACHELOR(OOS)-()	1	0.02%
ASSOCIATE(MN)-DIPLOMA(MN)-()	1	0.02%
ASSOCIATE(NDUS)-ASSOCIATE(SAME)-()	1	0.02%
ASSOCIATE(NDUS)-BACHELOR(ND)-()	1	0.02%
ASSOCIATE(NDUS)-BACHELOR(NDUS)-MASTER(NDUS)	1	0.02%
ASSOCIATE(NDUS)-UNKNOWN(NDUS)-()	1	0.02%
ASSOCIATE(OOS)-BACHELOR(OOS)-()	1	0.02%
ASSOCIATE(SAME)-(NDUS)-()	1	0.02%
ASSOCIATE(SAME)-ASSOCIATE(MN)-BACHELOR(MN)	1	0.02%
ASSOCIATE(SAME)-ASSOCIATE(ND)-BACHELOR(ND)	1	0.02%
ASSOCIATE(SAME)-ASSOCIATE(ND)-BACHELOR(OOS)	1	0.02%
ASSOCIATE(SAME)-ASSOCIATE(OOS)-BACHELOR(OOS)	1	0.02%
ASSOCIATE(SAME)-ASSOCIATE(SAME)-BACHELOR(ND)	1	0.02%
ASSOCIATE(SAME)-ASSOCIATE(SAME)-BACHELOR(SAME)	1	0.02%
ASSOCIATE(SAME)-ASSOCIATE(SAME)-CERTIFICATE(AME)	1	0.02%
ASSOCIATE(SAME)-ASSOCIATE(SAME)-CERTIFICATE(MN)	1	0.02%
ASSOCIATE(SAME)-BACHELOR(MN)-MASTER(NDUS)	1	0.02%
ASSOCIATE(SAME)-BACHELOR(ND)-UNKNOWN(ND)	1	0.02%

Table B3. Degree and Institution Paths for Associate Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
ASSOCIATE(SAME)-BACHELOR(NDUS)-POST CERT(NDUS)	1	0.02%
ASSOCIATE(SAME)-BACHELOR(OOS)-ASSOCIATE(MN)	1	0.02%
ASSOCIATE(SAME)-BACHELOR(OOS)-BACHELOR(OOS)	1	0.02%
ASSOCIATE(SAME)-BACHELOR(SAME)-MASTER(OOS)	1	0.02%
ASSOCIATE(SAME)-BACHELOR(SAME)-UNKNOWN(OOS)	1	0.02%
ASSOCIATE(SAME)-CERTIFICATE(ND)-()	1	0.02%
ASSOCIATE(SAME)-CERTIFICATE(NDUS)-()	1	0.02%
ASSOCIATE(SAME)-CERTIFICATE(NDUS)-ASSOCIATE(NDUS)	1	0.02%
ASSOCIATE(SAME)-CERTIFICATE(NDUS)-BACHELOR(NDUS)	1	0.02%
ASSOCIATE(SAME)-CERTIFICATE(OOS)-ASSOCIATE(OOS)	1	0.02%
ASSOCIATE(SAME)-CERTIFICATE(SAME)-ASSOCIATE(SAME)	1	0.02%
ASSOCIATE(SAME)-DIPLOMA(SAME)-()	1	0.02%
ASSOCIATE(SAME)-MASTER(OOS)-()	1	0.02%
ASSOCIATE(SAME)-UNKNOWN(ND)-BACHELOR(ND)	1	0.02%
ASSOCIATE(SAME)-UNKNOWN(SAME)-()	1	0.02%
BACHELOR(MN)-ASSOCIATE(SAME)-BACHELOR(NDUS)	1	0.02%
BACHELOR(ND)-DOCTOR(ND)-()	1	0.02%
BACHELOR(ND)-UNKNOWN(NDUS)-()	1	0.02%
BACHELOR(NDUS)-ASSOCIATE(NDUS)-()	1	0.02%
BACHELOR(NDUS)-ASSOCIATE(SAME)-()	1	0.02%
BACHELOR(NDUS)-BACHELOR(OOS)-()	1	0.02%
BACHELOR(NDUS)-DOCTOR(NDUS)-()	1	0.02%
BACHELOR(NDUS)-MASTER(OOS)-()	1	0.02%
BACHELOR(OOS)-CERTIFICATE(SAME)-ASSOCIATE(SAME)	1	0.02%
BACHELOR(OOS)-MASTER(NDUS)-()	1	0.02%
BACHELOR(SAME)-MASTER(OOS)-()	1	0.02%
CERTIFICATE(MN)-ASSOCIATE(MN)-()	1	0.02%
CERTIFICATE(MN)-ASSOCIATE(MN)-BACHELOR(MN)	1	0.02%

Table B3. Degree and Institution Paths for Associate Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
CERTIFICATE(MN)-DIPLOMA(MN)-()	1	0.02%
CERTIFICATE(MN)-DIPLOMA(MN)-ASSOCIATE(MN)	1	0.02%
CERTIFICATE(MN)-UNKNOWN(MN)-ASSOCIATE(MN)	1	0.02%
CERTIFICATE(NDUS)-ASSOCIATE(NDUS)-BACHELOR(MN)	1	0.02%
CERTIFICATE(NDUS)-ASSOCIATE(SAME)-()	1	0.02%
CERTIFICATE(NDUS)-BACHELOR(NDUS)-()	1	0.02%
CERTIFICATE(OOS)-ASSOCIATE(SAME)-()	1	0.02%
CERTIFICATE(OOS)-CERTIFICATE(OOS)-()	1	0.02%
CERTIFICATE(SAME)-ASSOCIATE(MN)-BACHELOR(OOS)	1	0.02%
CERTIFICATE(SAME)-ASSOCIATE(OOS)-()	1	0.02%
CERTIFICATE(SAME)-ASSOCIATE(SAME)-BACHELOR(OOS)	1	0.02%
CERTIFICATE(SAME)-ASSOCIATE(SAME)-CERTIFICATE(OOS)	1	0.02%
CERTIFICATE(SAME)-ASSOCIATE(SAME)-CERTIFICATE(SAME)	1	0.02%
CERTIFICATE(SAME)-ASSOCIATE(SAME)-DIPLOMA(SAME)	1	0.02%
CERTIFICATE(SAME)-BACHELOR(OOS)-()	1	0.02%
CERTIFICATE(SAME)-CERTIFICATE(SAME)-CERTIFICATE(SAME)	1	0.02%
CERTIFICATE(SAME)-DIPLOMA(MN)-()	1	0.02%
CERTIFICATE(SAME)-UNKNOWN(OOS)-()	1	0.02%
DIPLOMA(MN)-ASSOCIATE(SAME)-BACHELOR(MN)	1	0.02%
DIPLOMA(MN)-BACHELOR(NDUS)-()	1	0.02%
DIPLOMA(NDUS)-()-()	1	0.02%
DIPLOMA(SAME)-ASSOCIATE(NDUS)-()	1	0.02%
DIPLOMA(SAME)-DIPLOMA(MN)-()	1	0.02%
MASTER(MN)-()-()	1	0.02%
UNKNOWN(SAME)-ASSOCIATE(SAME)-()	1	0.02%
UNKNOWN(SAME)-ASSOCIATE(SAME)-BACHELOR(NDUS)	1	0.02%
UNKNOWN(SAME)-BACHELOR(ND)-DOCTOR(ND)	1	0.02%
Grand Total	4,237	100.00%

Table B4

Degree and Institution Paths for Bachelor Level Cohort

Degree and Institution Path	Count of Students	Percentage of Cohort
BACHELOR(SAME)-()-()	4913	44.66%
(NO DEGREE)-()-()	3279	29.80%
BACHELOR(MN)-()-()	418	3.80%
ASSOCIATE(MN)-()-()	307	2.79%
BACHELOR(SAME)-MASTER(SAME)-()	261	2.37%
BACHELOR(OOS)-()-()	259	2.35%
BACHELOR(NDUS)-()-()	229	2.08%
ASSOCIATE(NDUS)-()-()	119	1.08%
BACHELOR(SAME)-DOCTOR(SAME)-()	104	0.95%
BACHELOR(SAME)-MASTER(OOS)-()	93	0.85%
ASSOCIATE(OOS)-()-()	61	0.55%
DIPLOMA(MN)-()-()	55	0.50%
ASSOCIATE(MN)-BACHELOR(MN)-()	44	0.40%
ASSOCIATE(MN)-ASSOCIATE(MN)-()	35	0.32%
BACHELOR(SAME)-MASTER(MN)-()	35	0.32%
CERTIFICATE(MN)-()-()	34	0.31%
DOCTOR(SAME)-()-()	34	0.31%
UNKNOWN(MN)-()-()	32	0.29%
BACHELOR(ND)-()-()	30	0.27%
BACHELOR(SAME)-MASTER(NDUS)-()	26	0.24%
ASSOCIATE(SAME)-()-()	25	0.23%
UNKNOWN(OOS)-()-()	25	0.23%
BACHELOR(SAME)-BACHELOR(SAME)-()	21	0.19%
BACHELOR(SAME)-CERTIFICATE(MN)-()	20	0.18%
ASSOCIATE(NDUS)-BACHELOR(NDUS)-()	19	0.17%
CERTIFICATE(OOS)-()-()	19	0.17%
ASSOCIATE(OOS)-BACHELOR(OOS)-()	17	0.15%
ASSOCIATE(SAME)-BACHELOR(SAME)-()	17	0.15%
BACHELOR(MN)-MASTER(MN)-()	16	0.15%
CERTIFICATE(NDUS)-()-()	16	0.15%
BACHELOR(SAME)-CERTIFICATE(NDUS)-()	15	0.14%
CERTIFICATE(MN)-ASSOCIATE(MN)-()	14	0.13%
ASSOCIATE(MN)-BACHELOR(SAME)-()	13	0.12%
BACHELOR(SAME)-DOCTOR(OOS)-()	13	0.12%
BACHELOR(SAME)-ASSOCIATE(MN)-()	12	0.11%
BACHELOR(NDUS)-MASTER(NDUS)-()	11	0.10%
BACHELOR(SAME)-BACHELOR(NDUS)-()	11	0.10%

Table B4. Degree and Institution Paths for Bachelor Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
BACHELOR(OOS)-MASTER(OOS)-()	10	0.09%
ASSOCIATE(NDUS)-ASSOCIATE(NDUS)-()	9	0.08%
CERTIFICATE(MN)-BACHELOR(MN)-()	9	0.08%
CERTIFICATE(MN)-BACHELOR(SAME)-()	9	0.08%
DIPLOMA(OOS)-()-()	9	0.08%
ASSOCIATE(MN)-ASSOCIATE(MN)-BACHELOR(MN)	8	0.07%
ASSOCIATE(NDUS)-BACHELOR(SAME)-()	8	0.07%
BACHELOR(SAME)-DOCTOR(MN)-()	8	0.07%
CERTIFICATE(NDUS)-ASSOCIATE(NDUS)-()	8	0.07%
UNKNOWN(ND)-()-()	8	0.07%
BACHELOR(SAME)-BACHELOR(OOS)-()	7	0.06%
BACHELOR(SAME)-DOCTOR(NDUS)-()	7	0.06%
ASSOCIATE(MN)-BACHELOR(NDUS)-()	5	0.05%
ASSOCIATE(MN)-CERTIFICATE(MN)-()	5	0.05%
ASSOCIATE(MN)-DIPLOMA(MN)-()	6	0.05%
ASSOCIATE(NDUS)-BACHELOR(ND)-()	5	0.05%
BACHELOR(MN)-CERTIFICATE(MN)-()	6	0.05%
BACHELOR(MN)-MASTER(OOS)-()	5	0.05%
BACHELOR(ND)-MASTER(ND)-()	5	0.05%
BACHELOR(SAME)-DOCTOR(ND)-()	6	0.05%
BACHELOR(SAME)-MASTER(ND)-()	5	0.05%
DIPLOMA(MN)-ASSOCIATE(MN)-()	6	0.05%
DIPLOMA(MN)-ASSOCIATE(MN)-ASSOCIATE(MN)	5	0.05%
UNKNOWN(SAME)-()-()	6	0.05%
ASSOCIATE(MN)-BACHELOR(OOS)-()	4	0.04%
BACHELOR(OOS)-DOCTOR(OOS)-()	4	0.04%
BACHELOR(SAME)-UNKNOWN(OOS)-()	4	0.04%
CERTIFICATE(MN)-ASSOCIATE(MN)-ASSOCIATE(MN)	4	0.04%
DIPLOMA(NDUS)-()-()	4	0.04%
DOCTOR(NDUS)-()-()	4	0.04%
DOCTOR(OOS)-()-()	4	0.04%
ASSOCIATE(MN)-BACHELOR(ND)-()	3	0.03%
BACHELOR(NDUS)-MASTER(OOS)-()	3	0.03%
BACHELOR(SAME)-CERTIFICATE(SAME)-()	3	0.03%
BACHELOR(SAME)-DIPLOMA(MN)-()	3	0.03%
DOCTOR(MN)-()-()	3	0.03%

Table B4. Degree and Institution Paths for Bachelor Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
ASSOCIATE(MN)-ASSOCIATE(MN)-ASSOCIATE(MN)	2	0.02%
ASSOCIATE(MN)-ASSOCIATE(MN)-BACHELOR(SAME)	2	0.02%
ASSOCIATE(MN)-UNKNOWN(OOS)-()	2	0.02%
ASSOCIATE(NDUS)-BACHELOR(MN)-()	2	0.02%
ASSOCIATE(NDUS)-BACHELOR(OOS)-()	2	0.02%
ASSOCIATE(OOS)-CERTIFICATE(OOS)-()	2	0.02%
ASSOCIATE(SAME)-BACHELOR(NDUS)-()	2	0.02%
BACHELOR(MN)-MASTER(NDUS)-()	2	0.02%
BACHELOR(MN)-UNKNOWN(MN)-()	2	0.02%
BACHELOR(ND)-DOCTOR(ND)-()	2	0.02%
BACHELOR(ND)-MASTERS(ND)-()	2	0.02%
BACHELOR(OOS)-CERTIFICATE(OOS)-()	2	0.02%
BACHELOR(SAME)-ASSOCIATE(OOS)-()	2	0.02%
BACHELOR(SAME)-ASSOCIATE(SAME)-()	2	0.02%
BACHELOR(SAME)-BACHELOR(MN)-()	2	0.02%
BACHELOR(SAME)-UNKNOWN(MN)-()	2	0.02%
CERTIFICATE(NDUS)-ASSOCIATE(NDUS)-BACHELOR(NDUS)	2	0.02%
CERTIFICATE(NDUS)-BACHELOR(NDUS)-()	2	0.02%
CERTIFICATE(NDUS)-BACHELOR(SAME)-()	2	0.02%
MASTER(OOS)-()-()	2	0.02%
MASTER(SAME)-()-()	2	0.02%
ASSOCIATE(MN)-ASSOCIATE(NDUS)-()	1	0.01%
ASSOCIATE(MN)-BACHELOR(NDUS)-MASTER(MN)	1	0.01%
ASSOCIATE(MN)-BACHELOR(NDUS)-MASTER(NDUS)	1	0.01%
ASSOCIATE(MN)-BACHELOR(SAME)-DOCTOR(OOS)	1	0.01%
ASSOCIATE(MN)-BACHELOR(SAME)-MASTER(SAME)	1	0.01%
ASSOCIATE(MN)-CERTIFICATE(MN)-ASSOCIATE(MN)	1	0.01%
ASSOCIATE(MN)-CERTIFICATE(NDUS)-()	1	0.01%
ASSOCIATE(MN)-DIPLOMA(MN)-UNKNOWN(MN)	1	0.01%
ASSOCIATE(MN)-UNKNOWN(MN)-()	1	0.01%
ASSOCIATE(NDUS)-ASSOCIATE(MN)-()	1	0.01%

Table B4. Degree and Institution Paths for Bachelor Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
ASSOCIATE(NDUS)-ASSOCIATE(NDUS)-ASSOCIATE(NDUS)	1	0.01%
ASSOCIATE(NDUS)-ASSOCIATE(NDUS)-BACHELOR(ND)	1	0.01%
ASSOCIATE(NDUS)-ASSOCIATE(SAME)-()	1	0.01%
ASSOCIATE(NDUS)-BACHELOR(OOS)-CERTIFICATE(NDUS)	1	0.01%
ASSOCIATE(NDUS)-UNKNOWN(NDUS)-()	1	0.01%
ASSOCIATE(NDUS)-UNKNOWN(NDUS)-MASTER(OOS)	1	0.01%
ASSOCIATE(OOS)-BACHELOR(MN)-()	1	0.01%
ASSOCIATE(OOS)-DIPLOMA(OOS)-()	1	0.01%
ASSOCIATE(OOS)-UNKNOWN(OOS)-()	1	0.01%
ASSOCIATE(SAME)-ASSOCIATE(MN)-()	1	0.01%
ASSOCIATE(SAME)-ASSOCIATE(OOS)-()	1	0.01%
ASSOCIATE(SAME)-BACHELOR(SAME)-MASTER(NDUS)	1	0.01%
BACHELOR(MN)-ASSOCIATE(MN)-()	1	0.01%
BACHELOR(MN)-BACHELOR(MN)-()	1	0.01%
BACHELOR(MN)-BACHELOR(SAME)-()	1	0.01%
BACHELOR(MN)-CERTIFICATE(MN)-ASSOCIATE(MN)	1	0.01%
BACHELOR(MN)-CERTIFICATE(OOS)-()	1	0.01%
BACHELOR(MN)-CERTIFICATE(SAME)-()	1	0.01%
BACHELOR(MN)-DOCTOR(MN)-()	1	0.01%
BACHELOR(MN)-DOCTOR(OOS)-()	1	0.01%
BACHELOR(MN)-MASTER(MN)-()	1	0.01%
BACHELOR(MN)-MASTER(SAME)-()	1	0.01%
BACHELOR(MN)-UNKNOWN(OOS)-()	1	0.01%
BACHELOR(ND)-MASTER(OOS)-()	1	0.01%
BACHELOR(NDUS)-BACHELOR(NDUS)-()	1	0.01%
BACHELOR(NDUS)-BACHELOR(SAME)-()	1	0.01%
BACHELOR(NDUS)-CERTIFICATE(NDUS)-()	1	0.01%
BACHELOR(NDUS)-DOCTOR(NDUS)-()	1	0.01%
BACHELOR(NDUS)-DOCTOR(SAME)-()	1	0.01%
BACHELOR(NDUS)-MASTER(MN)-()	1	0.01%
BACHELOR(NDUS)-MASTER(ND)-()	1	0.01%
BACHELOR(OOS)-ASSOCIATE(MN)-()	1	0.01%
BACHELOR(OOS)-ASSOCIATE(OOS)-ASSOCIATE(OOS)	1	0.01%

Table B4. Degree and Institution Paths for Bachelor Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
BACHELOR(OOS)-BACHELOR(OOS)-()	1	0.01%
BACHELOR(OOS)-DIPLOMA(OOS)-()	1	0.01%
BACHELOR(OOS)-DOCTOR(MN)-()	1	0.01%
BACHELOR(OOS)-MASTER(NDUS)-()	1	0.01%
BACHELOR(OOS)-UNKNOWN(OOS)-()	1	0.01%
BACHELOR(SAME)-ASSOCIATE(MN)-ASSOCIATE(MN)	1	0.01%
BACHELOR(SAME)-BACHELOR(NDUS)-MASTER(MN)	1	0.01%
BACHELOR(SAME)-BACHELOR(SAME)-DOCTOR(SAME)	1	0.01%
BACHELOR(SAME)-BACHELOR(SAME)-UNKNOWN(MN)	1	0.01%
BACHELOR(SAME)-CERTIFICATE(MN)-ASSOCIATE(MN)	1	0.01%
BACHELOR(SAME)-CERTIFICATE(SAME)-MASTER(SAME)	1	0.01%
BACHELOR(SAME)-DIPLOMA(MN)-ASSOCIATE(MN)	1	0.01%
BACHELOR(SAME)-DIPLOMA(OOS)-()	1	0.01%
BACHELOR(SAME)-MASTER()-()	1	0.01%
BACHELOR(SAME)-MASTER(NDUS)-CERTIFICATE(SAME)	1	0.01%
BACHELOR(SAME)-MASTER(OOS)-POST CERT(OOS)	1	0.01%
BACHELOR(SAME)-MASTER(OOS)-UNKNOWN(OOS)	1	0.01%
BACHELOR(SAME)-MASTER(SAME')-()	1	0.01%
BACHELOR(SAME)-MASTER(SAME)-DOCTOR(SAME)	1	0.01%
BACHELOR(SAME)-MASTER(SAME)-MASTER(SAME)	1	0.01%
BACHELOR(SAME)-MASTER(SANE)-()	1	0.01%
BACHELOR(SAME)-MASTERS(ND)-()	1	0.01%
BACHELOR(SAME)-POST CERT(MN)-()	1	0.01%
BACHELOR(SAME)-POST CERT(OOS)-()	1	0.01%
BACHELOR(SAME)-POST CERT(SAME)-()	1	0.01%
CERTIFICATE(MN)-ASSOCIATE(MN)-BACHELOR(MN)	1	0.01%
CERTIFICATE(MN)-ASSOCIATE(MN)-DIPLOMA(MN)	1	0.01%

Table B4. Degree and Institution Paths for Bachelor Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
CERTIFICATE(MN)-ASSOCIATE(NDUS)-()	1	0.01%
CERTIFICATE(MN)-BACHELOR(ND)-MASTER(ND)	1	0.01%
CERTIFICATE(MN)-BACHELOR(SAME)-ASSOCIATE(MN)	1	0.01%
CERTIFICATE(MN)-CERTIFICATE(MN)-()	1	0.01%
CERTIFICATE(MN)-CERTIFICATE(MN)-ASSOCIATE(MN)	1	0.01%
CERTIFICATE(MN)-DIPLOMA(MN)-ASSOCIATE(MN)	1	0.01%
CERTIFICATE(MN)-DIPLOMA(MN)-BACHELOR(MN)	1	0.01%
CERTIFICATE(NDUS)-ASSOCIATE(NDUS)-BACHELOR(SAME)	1	0.01%
CERTIFICATE(NDUS)-ASSOCIATE(SAME)-()	1	0.01%
CERTIFICATE(NDUS)-ASSOCIATE(SAME)-ASSOCIATE(SAME)	1	0.01%
CERTIFICATE(NDUS)-CERTIFICATE(NDUS)-ASSOCIATE(NDUS)	1	0.01%
CERTIFICATE(OOS)-BACHELOR(OOS)-()	1	0.01%
CERTIFICATE(OOS)-BACHELOR(SAME)-()	1	0.01%
CERTIFICATE(OOS)-CERTIFICATE(OOS)-()	1	0.01%
CERTIFICATE(OOS)-DIPLOMA(OOS)-()	1	0.01%
CERTIFICATE(SAME)-()-()	1	0.01%
CERTIFICATE(SAME)-ASSOCIATE(NDUS)-BACHELOR(SAME)	1	0.01%
CERTIFICATE(SAME)-BACHELOR(SAME)-()	1	0.01%
DIPLOMA(MN)-ASSOCIATE(MN)-BACHELOR(MN)	1	0.01%
DIPLOMA(MN)-DIPLOMA(MN)-()	1	0.01%
DIPLOMA(OOS)-DIPLOMA(OOS)-ASSOCIATE(OOS)	1	0.01%
DIPLOMA(OOS)-UNKNOWN(OOS)-()	1	0.01%
MASTER(MN)-()-()	1	0.01%
MASTER(ND)-()-()	1	0.01%
UNKNOWN(MN)-BACHELOR(SAME)-ASSOCIATE(NDUS)	1	0.01%
UNKNOWN(MN)-DIPLOMA(MN)-()	1	0.01%
UNKNOWN(MN)-MASTER(OOS)-()	1	0.01%
UNKNOWN(MN)-UNKNOWN(MN)-()	1	0.01%
UNKNOWN(OOS)-BACHELOR(OOS)-()	1	0.01%
UNKNOWN(OOS)-MASTER(OOS)-()	1	0.01%

Table B4. Degree and Institution Paths for Bachelor Level Cohort (continued)

Degree and Institution Path	Count of Students	Percentage of Cohort
Grand Total	11,002	100.00%