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Exploring the Variability in Institutional Characteristics Related to Meeting Various National STEM Baccalaureate Agendas

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**EXPLORING THE VARIABILITY IN INSTITUTIONAL CHARACTERISTICS
RELATED TO MEETING VARIOUS
NATIONAL STEM BACCALAUREATE AGENDAS**

By

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DISSERTATION

Submitted in Partial Fulfillment of the
Requirements for the Degree of

**Doctor of Education
Educational Leadership**

The University of New Mexico
Albuquerque, New Mexico

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Dedication

I dedicate my research to employees of state and national executive and legislative branches, whose job it is to interpret and implement higher education policy decisions made by elected officials. Despite quickly changing priorities and policies, you remain focused on the welfare of college students in America. While not often publicly recognized or praised, you are the engine that drives public policy in higher education. Thank you for your efforts, and I hope this research will prove helpful to you.

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ABSTRACT

Science, technology, engineering, and mathematics (STEM) professions are said to drive the American economy, provide access to the middle class for underrepresented minorities, and bolster national security. Since the launch of Sputnik in 1957, American STEM educators have been under pressure to improve STEM educational outcomes. In order to respond to these pressures, education policy makers must understand the relationship between institutional characteristics and STEM outcomes. In this study, I articulate three specific national STEM agendas, and then I explore the relationship between these agendas and the institutional characteristics of America's four-year colleges and universities.

Utilizing data from the U.S. Department of Education Integrated Postsecondary Education Data System (IPEDS), I operationalized three dependent variables and 108 independent variables, and studied the relationship between each combination of independent and dependent variables. The purpose of my exploratory research was to determine which types of four-year colleges and universities are most likely to produce

higher proportions of: (1) STEM graduates, (2) traditionally underrepresented STEM graduates, and (3) high-demand STEM graduates.

Through my research, I concluded that there are indeed distinct differences in institutional characteristics relative to the three national agendas, and that these differences appear to be related to institutional size, socioeconomic status of students, institutional wealth, ACT/SAT math scores, student academic achievement, institutional STEM mission, institutional research mission, sector, and diversity of students and faculty.

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Chapter One

Introduction

The health and longevity of our Nation's citizenry, economy, and environmental resources depend in large part on the acceleration of scientific and technological innovations, such as those that improve health care, inspire new industries, protect the environment, and safeguard us from harm. Maintaining America's historical preeminence in the STEM fields will require a concerted and inclusive effort to ensure that the STEM workforce is equipped with the skills and training needed to excel in these fields. (Committee on Science, Technology, Engineering and Mathematics, 2013, p. i)

Science, technology, engineering, and mathematics (STEM) professions are said to drive the American economy, provide access to the middle class for underrepresented minorities, and bolster national security (Committee on Science, Engineering and Public Policy, 2007). Since the launch of Sputnik in 1957, American STEM educators have been under siege to improve STEM educational outcomes. In order to respond to these pressures, education policy makers must understand the relationship between institutional characteristics and STEM outcomes. In this study, I articulate three specific national STEM agendas, and then I explore the relationship between these agendas and the institutional characteristics of America's four-year colleges and universities.

History of STEM Education

The 1944 Servicemen's Readjustment Act (commonly referred to as the G.I. Bill) changed the face of higher education. By opening campus doors to veterans from the working and middle classes, the G.I. Bill dramatically altered social perceptions of higher

education. No longer were colleges available only to the elite and privileged few. Suddenly, higher education became attainable at all levels and, consequently, accountable to a much broader constituency (Batten, 2011). This shift in public funding and perception opened higher education to the influence of legislators, industrialists, and activists.

This heightened national focus returned after the launch of Sputnik in 1957. Sputnik demonstrated that Russia had beaten the U.S. into space and inspired fears that the Russians could launch nuclear weapons (Powell, 2007). In response, legislators passed the National Defense Education Act in 1958, investing more than one billion dollars in STEM education. Nationwide, science instruction was overhauled, and federal agencies were created and tasked with catching up with the Russians (Abramson, 2007).

In 1983, education was once again thrust into the national spotlight. Under the Reagan administration, the National Commission on Excellence in Education blasted the U.S. education system with reports of declining test scores, low teacher salaries, poor teacher training programs and ineffective curriculum (Graham, 2013). While little additional funding was allocated to solve these challenges, education had become even more politicized, more polarized, and more driven by the agendas of individual politicians.

In 2007, the report *Rising Above the Gathering Storm* (Committee on Science, Engineering and Public Policy, 2007) garnered similar national attention, this time focused primarily on STEM education. Published by the National Academy of Science, the report cited America's failings compared to other industrialized nations and called for a number of reforms to STEM education throughout the educational pipeline. *Rising*

Above the Gathering Storm launched a new wave of national reports and reforms aimed at improving STEM student achievement (Committee on Science, Engineering and Public Policy, 2007).

Problem Statement

Since 2007, the calls for reform have coalesced into three agendas: (1) the call for more American STEM degree earners (Committee on Science, Engineering and Public Policy, 2007), (2) the call for a greater number of STEM degrees earned among traditionally underrepresented student populations (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011), and (3) the call for more STEM graduates in specific or high-demand disciplines (Anft, 2013; US News & World Report, 2016). While these agendas are somewhat distinct, they are not mutually exclusive. For instance, President Obama's national STEM strategic plan called for improvements in all three agendas (Committee on Science, Technology, Engineering and Mathematics Education, 2013).

At stake in this national dialogue are significant financial resources. Education in the United States is a \$1.37 trillion industry, with higher education accounting for \$541 billion (Silber & Chien, 2016). It is funded through national, state, regional, and private sources. In higher education, more than \$66 billion is allocated by the federal government in the form of financial aid to students (McCann, 2015). Nearly \$3 billion federal dollars are dedicated each year to STEM improvement alone (Committee on Science, Technology, Engineering and Mathematics Education, 2013). At the state level, approximately \$82 billion are allocated nationwide to higher education institutions

(Mitchell, Leachman, & Masterson, 2017). Through these resources, legislators and policy makers shape national education outcomes.

Likewise, the delivery mechanisms for STEM higher education are diverse. Sectors include public colleges, private non-profit colleges and private for-profit colleges, each with different constituents, funders, and priorities. Missions vary considerably, including those focused on liberal arts, professional preparation, and research. Some institutions have large numbers of full-time tenured faculty, while others employ only part-time lecturers or instructors. Some have extensive student and academic support systems, while others have none.

Research Question

The intersection of America's STEM agendas, resources, and delivery mechanisms was the focus of this study. My research sought to answer the following question: Which types of four-year colleges and universities are most likely to produce higher proportions of: (1) STEM graduates, (2) traditionally underrepresented STEM graduates, and (3) high-demand STEM graduates?

Significance

The purpose of this study is to help national and state policy makers to:

- Clarify how STEM reform initiatives are connected to separate but related STEM agendas;
- Maximize national financial investments in STEM improvement by funding colleges and universities that are most likely to deliver on the three agendas; and,
- Focus research as to why these colleges and universities are most successful at achieving positive outcomes in their respective agendas.

Logic Model

The logic model for my research is presented in Figure 1. This model illustrates a simplified goal of higher education, some of the student and institutional characteristics that impact STEM higher education, a set of three hypothetical colleges, the three STEM agendas, and the policy implications of this research.

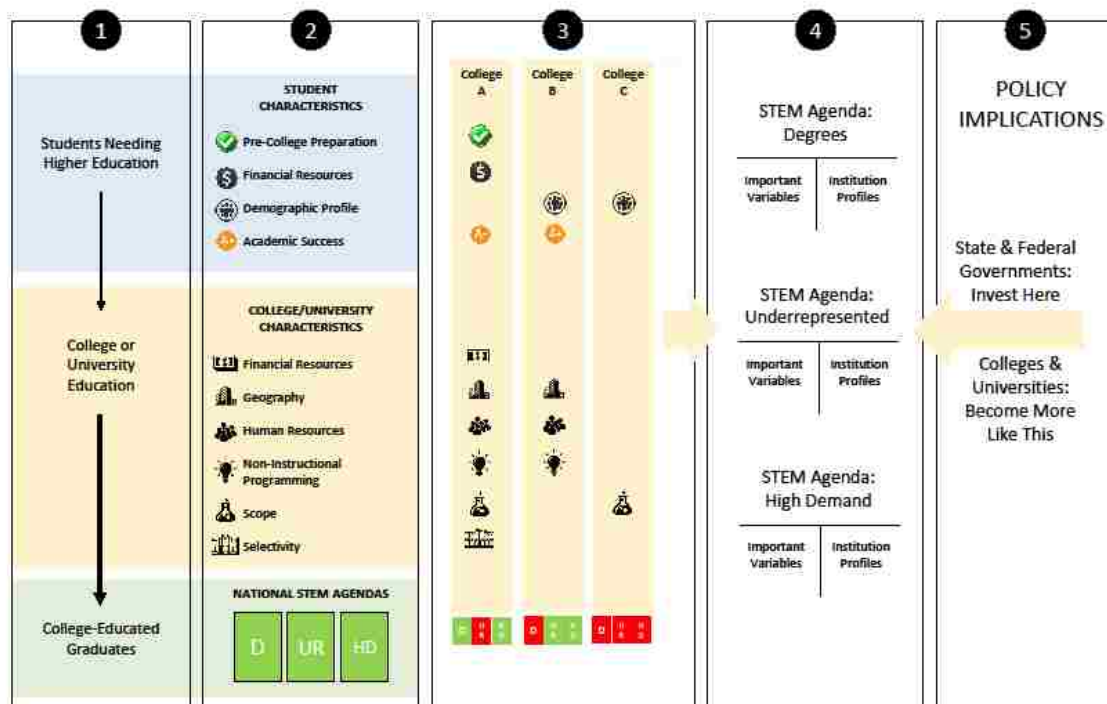


Figure 1. Logic model.

Column 1 illustrates a simplified view of a higher education goal. Students seek out colleges in order to receive a college education. They attend colleges where they are engaged in curricular and co-curricular learning interactions, and then they graduate with college degrees. Clearly, not every student graduates after entering college. Rather, this is an implied desired outcome for policy makers at the institutional, state, and federal levels.

Column 2 illustrates the variable categories I have chosen for defining institutions of higher education. These categories have been selected to capture the broad diversity of higher education institutions in the United States. For instance, some colleges enroll students with high levels of pre-college academic preparedness (evidenced through high school grade point averages and standardized tests), while other colleges enroll students with lower levels of pre-college preparedness. Likewise, some institutions provide a wide array of non-instructional programming, such as athletics and tutoring, while others provide none. Column 2 also illustrates the three STEM agendas: STEM degrees (D), STEM degrees for underrepresented students (UR), and high-demand STEM degrees (HD).

Column 3 shows three hypothetical institutions. Students at *College A* have high levels of pre-college academic preparedness and significant financial resources, and demonstrate high levels of academic performance in college. However, the student body of *College A* is not diverse. From an institutional perspective, *College A* is rich in endowments and/or government appropriations. It is located near an urban center (and the accompanying research, employment, and industry resources) and has a strong tenured faculty, expansive non-instructional programming, a research scope, and highly selective admissions. We might anticipate that *College A* would produce a high proportion of STEM graduates and a high proportion of high-demand STEM graduates. However, given *College A*'s lack of diversity, we might not anticipate that they would produce a high proportion of underrepresented STEM graduates.

Meanwhile, students at *College B* have low levels of pre-college academic preparation and limited financial resources. However, *College B* students are highly

diverse and demonstrate outstanding academic success in college. *College B* lacks financial resources and does not have a STEM-related mission, but it is located near an urban center, employs a tenured faculty, and offers extensive non-instructional programming. We might anticipate that *College B* would produce a relatively low proportion of STEM graduates but a high proportion of underrepresented and high-demand STEM graduates.

Students at *College C* have low levels of pre-college preparation, limited financial resources, and marginal academic success. They are, however, a diverse student body. *College C* also lacks institutional financial resources, is located in a rural setting, and does not have a tenured faculty or non-instructional programming. However, the mission of *College C* includes a strong STEM component. We might anticipate that, given their lack of resources, *College C* does not produce a high proportion of STEM graduates, underrepresented STEM graduates, or high-demand STEM graduates.

Column 4 illustrates the product of my research. Based on the analysis of student and institutional characteristics from Column 2, as demonstrated in the scenarios of Column 3, I identified important variables and developed institutional profiles for effectively meeting each of the three STEM agendas.

Column 5 illustrates the implications of my research. Based on the important variables identified and profiles built in Column 4, governments may opt to invest additional funding in colleges and universities most likely to meet their STEM agendas. For instance, if governments wish to diversify the STEM workforce, they may opt to fund colleges that match the profile for producing more STEM degrees among underrepresented students. Likewise, colleges and universities may opt to change those

variables within their control to become more like the effective profiles. For instance, if a college wishes to produce more high-demand STEM graduates, and non-instructional programming is strongly correlated to this outcome, then the college may opt to expand their non-instructional programming.

Chapter Two

Literature Review

Each year, state and national legislators appropriate billions of dollars to STEM higher education (Schroeder, Stauffer, Oliff, Robyn, Theal, Goodwin & Hillary, 2015). For instance, in 2016 the U.S. Department of Education spent more than \$600 million in grants awarded to colleges and universities designed to strengthen low-income and minority serving institutions (U.S. Department of Education, 2017b). Other federal departments also invest in institutional development, with the Department of Defense spending \$2.3 billion, Homeland Security spending \$1.4 billion, and the Department of State spending \$590 million, among others (as cited on Statistica, 2018). It is this public funding that is the reason for my research. These investments are often made directly to colleges and universities. But are their investments well placed? Are they funding institutions that have the best chance of improving STEM outcomes on a national level? In most cases, this STEM funding is spread throughout higher education, given to public colleges and private universities alike, to research schools and community colleges, to rural schools and metropolitan mega-campuses. Even in the best of situations, funding is appropriated based on only a few institutional characteristics that are assumed to correlate with the stated STEM agenda.

For instance, in 2011 the U.S. Department of Education's Title V STEM program awarded 100 institutional and cooperative grants (U.S. Department of Education, 2016). This funding was designed to improve STEM performance for underrepresented students. The funding was made available only to those institutions that serve high percentages of Hispanic and low-income students (U.S. Department of Education, 2016). In this respect,

the Department of Education appears to assume that these institutions are the ones most likely to increase the number of Hispanic and low-income students graduating in STEM fields. But is this assumption borne out through research? And beyond this limited institutional typing, would other factors correlate more strongly with this outcome? For instance, do research institutions produce higher percentages of Hispanic and low-income STEM graduates than non-research colleges? Do urban institutions produce higher proportions of STEM graduates than rural colleges?

My dissertation is designed to inform national and state policy makers as to which types of four-year institutions are most likely to deliver a return on their investments, relative to the three national STEM agendas. Likewise, it is designed to set new research directions for policy analysts who are asking why some colleges and universities produce better STEM outcomes than others.

Higher Education Public Policy

My research is placed within the literature of higher education public policy. Since my findings primarily inform how national and local governments disperse money to colleges and universities, it is appropriate to consider how problems escalate to become national agendas, how policy decisions are made regarding these agendas, how national and state funding governs the resulting actions of colleges and universities, and how policy analysis affects each of these areas.

STEM as public policy. This study is concerned with STEM's presence on the national stage. But why does STEM occupy such a prominent place in American policy and politics? Kingdon (1984) provides a public policy model that is useful in understanding the rise and sustaining power of STEM agendas. Kingdon's model looks at

several key stages, including how problems rise to national prominence and the ways in which individual solutions are chosen from the myriad of alternative proposals that are presented.

Kingdon (1984) noted several factors that can cause a problem to receive national attention. First, problems may be emphasized by a strong focusing event. When Russia launched Sputnik in 1957, the nation's attention turned to science education (Powell, 2007). Other smaller focusing events have followed, including President Kennedy's plan to land Americans on the moon (Pontin, 2012) and the publicity surrounding the reports *Nation at Risk* and *Rising Above the Gathering Storm* (Hechinger Report, 2011). Second, systematic indicators point to a problem, emphasizing its national scope. Today, these indicators are reported regularly by government agencies (Landivar, 2013; National Science Foundation, 2013), political bodies (Committee on Science, Technology, Engineering and Mathematics Education, 2013; Olson & Riordan, 2012), testing companies (ACT Inc., 2015), advocacy and research institutes (Committee on Science, Engineering and Public Policy, 2007; Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011) and private companies (Smith, 2012).

Kingdon (1984) noted that when problems rise to the level of national attention, they often become actionable when they violate important values or draw negative comparisons to other countries. The calls for an increase in the number of American STEM graduates are often framed as an issue of national security, with the implication that our inability to solve the challenge will result in forsaking the values of national prominence, influence, and security (Committee on Science, Engineering and Public

Policy, 2007). The movement to diversify the STEM workforce is often stated in terms of closing educational achievement and STEM employment gaps (Committee on Science, Technology, Engineering and Mathematics Education, 2013; Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011). The case for improving high-demand STEM occupations plays on values related to health care for all (Rosen, von Zastro, DeBreaux-Watts, & Gordon, 2015) and national security (Levy & Plucker, 2015). Likewise, advocates for change in STEM education relentlessly cite comparisons to other countries that illustrate America's decline or inadequacy (Committee on Science, Engineering and Public Policy, 2010).

When problems rise to the national agenda, various players are involved in developing and adopting solutions. First, visible participants publicly emphasize the scope and dangers related to a problem. These participants are often politicians, reporters, and industry leaders who operate in the national spotlight (Kingdon, 1984). STEM education has attracted the attention of such players, including statements from the president (Jones, 2015), senators (Heinrich, 2016), and tech industry leaders (Schmidt, 2013). Second, hidden participants generate alternatives, proposals, and solutions. These players are often specialists, academics, researchers, congressional staffers, and mid-level government officials (Kingdon, 1984). Indeed, the STEM reports cited in my research are often written by committees of hidden participants such as the Committee on Science, Engineering, and Public Policy (2007); the Committee on Science, Technology, Engineering, and Mathematics Education (2013); and the Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline (2011).

Central to the work of hidden participants is planning, analysis, and evaluation (Kingdon, 1984). It is here that my research is situated. By studying the relationships between the three national STEM agendas and the colleges most aligned with them, I hope to inform the work of hidden participants, thereby influencing the efforts of visible participants in addressing STEM challenges.

STEM as an accountability lever. Underscoring the value of my research is the assertion that state and national governments heavily influence the priorities and actions of America's colleges and universities. That is to say, the national and state focus on the three STEM agendas is important because colleges and universities adjust their actions accordingly.

Since higher education is a largely self-regulated industry (Lederman, 2008), governments often rely on financial levers to achieve accountability from colleges and universities (McKeown-Moak & Mullin, 2014). During the 2013-14 academic year, American public colleges and universities alone earned \$353 billion in revenues. Fifteen percent of that revenue came from the federal government, 21% came from state governments, and 6% came from local government (U.S. Department of Education Institute of Education Sciences, 2014). In total, public governments spend more than \$147 billion on public higher education, accounting for 37% of their revenues (Schroeder et al., 2015). Given the price tag, it is not surprising that calls for greater accountability in higher education have increased dramatically (McKeown-Moak & Mullin, 2014). Indeed, following the national budget crisis in the 1990s, the accountability paradigm for higher education has shifted away from equity and adequacy, and towards accountability and efficiency (McKeown-Moak & Mullin, 2014).

Burke (2004, p. 24) identified six accountability demands on college officials.

Among these are two that are most relevant to my research:

- “[College officials] must show that they are working to achieve the mission or priorities set for their office or organization.”
- “They must show that they serve the public needs.”

Burke (2004) further lists three primary accountability areas: state priorities (including local, state, and national needs), academic concerns, and market forces.

In building accountability systems, college administrators are required to report their effectiveness relative to outcome categories including: student enrollment (growth and decline), retention and persistence rates, student academic performance, and graduation rates (McKeown-Moak & Mullin, 2014). Colleges and universities report these and other accountability indicators through the National Center for Educational Statistics, Integrated Postsecondary Education Data System (IPEDS) program (U.S. Department of Education National Center for Education Statistics, 2016).

The national government began collecting higher educational institutional data in 1869. Obviously, this system has evolved significantly since then. One of the biggest change drivers to this system is federal legislation. With each new accountability law passed by Congress, IPEDS is changed to ensure greater accountability. For instance, the Student Right-to-Know and Campus Security Act of 1990 mandated that colleges report graduation rates and included measuring time to graduation. The 1998 amendments to the Higher Education Act (HEA) standardized reporting on student price (including tuition, housing, and other costs). HEA amendments in 1992 mandated that colleges provide this data in a timely fashion (Fuller, 2011).

The public policy literature provides a model for perceiving the connection between national agendas, higher education finance, and accountability mandates. But how have other researchers tapped into this paradigm and accountability data to answer related questions?

Similar Studies

Though my study is somewhat unique in its scope and structure, other studies have utilized similar methods and data sources. These studies examined the relationship between one or more institutional characteristics and one or more student outcomes. Most used IPEDS data and a method similar to the one I used in my research.

Owens, Shelton, Bloom, and Cavil (2012) explored the role played by Historically Black Colleges and Universities (HBCUs) in producing STEM bachelor's degrees among African American students. During the nine years between 2001 and 2009, they found that HBCUs awarded 21% of all bachelor's degrees earned by African American students and 39% of all STEM bachelor's degrees earned by African Americans. Interestingly, in both of these instances, these percentages have dropped between 2001 and 2009 (two percentage points for all bachelor's degrees, and nine percentage points for STEM bachelor's degrees).

In this same vein, Tietjen-Smith, Davis, Williams, and Anderson (2009) examined the relationship between institutional characteristics (specifically sector), student characteristics (specifically African American and Hispanic ethnicity), and STEM bachelor's degree attainment and completion rates. They found that at public and private institutions less than 10% of science degrees are awarded to African Americans and Hispanics. Proprietary schools had slightly higher percentage rates (still less than 20%).

Other researchers have explored the relationship between institutional finance and student achievement. Ryan (2004) explored the connection between institutional expenditures and graduation, finding that expenditures for instructional support produced a positive and significant effect on graduation rates, while increased administrative spending resulted in lower levels of student engagement. Similarly, Titus (2006) found that increased funding for administration resulted in decreased student retention. Conversely, Smart, Ethington, Riggs, and Thompson (2002) found that increasing instructional expenses produces a negative effect on student leadership abilities, while increasing student services expenses produces the opposite result. In general, though, Porter (1999) found a positive effect of increased higher education expenditures and student achievement. Together, I utilized these studies to inform my methodology.

Literature Supporting Three STEM Agendas

Central to my research is recognition of the three national agendas. But how are these agendas articulated? Who are their supporters? How do they make their cases on the national stage?

Agenda one: Increase the number of STEM degree earners. Since the turn of the century, three national reports have garnered the most attention in relation to this agenda.

Rising above the gathering storm. In 2007, the National Academy of Sciences published the report *Rising Above the Gathering Storm* (RAGS) (Committee on Science, Engineering and Public Policy, 2007). The authoring committee was composed of scientists, college presidents, and STEM industry leaders. The report was requested by

U.S. Senators Lamar Alexander and Jeff Bingaman of the Committee on Energy and Natural Resources and was charged with answering the following questions:

What are the top 10 actions, in priority order, that federal policymakers could take to enhance the science and technology enterprise so that the United States can successfully compete, prosper, and be secure in the global community of the 21st century? What strategy, with several concrete steps, could be used to implement each of those actions? (Committee on Science, Engineering and Public Policy, 2007, p. 252)

The committee's recommendations focused on actions in K-12 education, research, higher education, and economic policy. Several recommendations for K-12 education actually start or culminate in the realm of higher education:

- “Annually recruit 10,000 science and mathematics teachers by awarding 4-year scholarships and thereby educating 10 million minds” (Committee on Science, Engineering and Public Policy, 2007, p. 5). By calling for an increase in the number of K-12 science teachers, the committee stated the need for increasing STEM bachelor's degree or alternative licensure certifications.
- “Enlarge the pipeline of students who are prepared to enter college and graduate with a degree in science, engineering, or mathematics by increasing the number of students who pass AP and IB science and mathematics courses”(Committee on Science, Engineering and Public Policy, 2007, p. 6). The term “AP” refers to Advanced Placement, and the term “IB” refers to International Baccalaureate. The primary purpose of increasing AP and IB enrollments is to increase the

number of students who enter and supposedly graduate from colleges and universities with STEM degrees.

Within the focus area of higher education, the committee's recommendations addressed the need for more STEM-educated professionals:

- “Increase the number and proportion of US citizens who earn bachelor’s degrees in the physical sciences, the life sciences, engineering, and mathematics by providing 25,000 new 4-year competitive undergraduate scholarships each year to US citizens attending US institutions” (Committee on Science, Engineering and Public Policy, 2007, p. 165). This recommendation was the first listed in the higher education focus area, and it directly emphasizes the need for more STEM bachelor’s degree recipients.
- “Increase the number of US citizens pursuing graduate study in ‘areas of national need’ by funding 5,000 new graduate fellowships each year” (Committee on Science, Engineering and Public Policy, 2007, p. 9). This recommendation is focused primarily on graduate education, but it clearly aligns with the agenda for producing more STEM professionals in high-demand fields. Rather than list specific high-demand fields, the report recommends that “national need” be determined by federal agencies, with input from the corporate and business community.

Rising above the gathering storm, revisited. In 2010, the National Academy of Sciences published a follow-up report, *Rising Above the Gathering Storm, Revisited* (Committee on Science, Engineering and Public Policy, 2010). Prepared by the same committee that published the original report, *Revisited* provided an update of the global

contexts and events that occurred during the intervening three years. While acknowledging that significant progress was accomplished during that time, the report also lamented that many of the recommendations were not implemented, and that federal funding created after the original report was set to expire. In general, the committee reached consensus that America's STEM outlook worsened after the first report, and the need was greater than ever to implement the report's recommendations (Committee on Science, Engineering and Public Policy, 2010).

In contrast to the first report, *Revisited* begins its narrative with more than 60 factoids. These bulleted points stress the significance of America's STEM challenge. Included within these factoids are the following that address the agenda of producing more STEM degrees:

- In 2000, the number of foreign students studying the physical sciences and engineering in United States graduate schools for the first time surpassed the number of United States students.
- Sixty-nine percent of United States public school students in fifth through eighth grades are taught mathematics by a teacher without a degree or certificate in mathematics.
- Ninety-three percent of United States public school students in fifth through eighth grades are taught the physical sciences by a teacher without a degree or certificate in the physical sciences.
- The United States ranks 27th among developed nations in the proportion of college students receiving undergraduate degrees in science or engineering.

- The United States graduates more visual arts and performing arts majors than engineers. (Committee on Science, Engineering and Public Policy, 2010, pp. 6-11)

While *Revisited* did not produce new recommendations, it did bring *Rising Above the Gathering Storm* back into the media spotlight. By painting a dire outlook for America's STEM competitiveness, it helped fuel calls for increasing the number of STEM degrees awarded to U.S. citizens.

Engage to excel. In 2012, President Obama's Council of Advisors on Science and Technology (PCAST) published the report *Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering and Mathematics* (Olson & Riordan, 2012). As the title states, PCAST estimated that over the next decade, the American economy will need one million more college graduates in STEM fields than currently anticipated.

Agenda two: Increase the number of STEM degrees among underrepresented student populations. Influential calls for increasing the number of STEM degrees among underrepresented students often come in the form of reports issued by scientists, activists, and industry leaders. One of the most often cited of these is *Talent at the Crossroads* (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011). In 2011, the National Academy of Science's Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline published the report *Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads*. Like the committee for *Gathering Storm*, this authoring team was composed of scientists, university presidents, and industry leaders.

While praising *Gathering Storm*, the authors also pointed out the report's insufficiencies in meeting demographic realities:

A national effort to sustain and strengthen S&E [science and engineering] must also include a strategy for ensuring that we draw on the minds and talents of all Americans, including minorities who are underrepresented in S&E and currently embody a vastly underused resource and a lost opportunity for meeting our nation's technology needs. (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011, p. 2)

Talent at the Crossroads, like *Revisited*, begins with a list of factoids that illustrate the challenge:

- Underrepresented minority groups comprised 28.5 percent of our national population in 2006, yet just 9.1 percent of college-educated Americans in science and engineering occupations.
- The S&E workforce is large and fast-growing: more than 5 million strong and projected by the U.S. Bureau of Labor Statistics to grow faster than any other sector in coming years.
- In 2006, only 26 percent of African Americans, 18 percent of American Indians, and 16 percent of Hispanics in the 25- to 29-year-old cohort had attained at least an associate's degree.
- Underrepresented minorities aspire to major in STEM in college at the same rates as their white and Asian American peers, and have done so since the late 1980s. Yet, these underrepresented minorities have lower four- and five-year completion rates relative to those of whites and Asian Americans. (Committee on

Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011, pp. 3-4)

In their report, the authors recognized that different approaches are needed for different types of institutions. For predominantly white institutions, a key recommendation is to replicate successful STEM support programs at large institutions nationwide, particularly at large state flagships. For minority-serving institutions, a key recommendation is to increase financial support for expanding their effectiveness in recruiting, retaining and graduating an increased number of minorities (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, 2011).

Hispanic/Latino/Latina students in STEM. Hispanic Americans constitute 16% of the U.S. general population and 15% of the U.S. workforce, but only 6-7% of scientists and engineers in the STEM workforce (Landivar, 2013; National Science Foundation, 2013). Despite increasing their share in the U.S. workforce by four percentage points in just nine years, their share in the STEM workforce increased by only one percentage point during that same period (Beede, Julian, Langdon, McKittrick, Khan & Doms, 2011). These trends are closely tied to the efficacy of higher education (Chen, 2013). The STEM workforce is composed primarily of bachelor's degree earners (Beede et al., 2011); yet only 13% of Hispanics age 25 to 29 have completed bachelor's degrees, compared to 39% of white Americans (Committee on Equal Opportunities in Science and Engineering, 2013). Only 2.2% of Hispanic students have earned a first bachelor's degree in STEM by the age of 24 (Baron, Nettles, Segal, Henderson, & McGill Lawson, 2015). While Hispanic students encounter obstacles to earning STEM degrees, they are

not underrepresented in their interest in those degrees. Thirty-six percent of Hispanic students enrolling in four-year institutions indicate the intent to major in a STEM discipline (Dowd, Malcom, & Bensimon, 2009).

The roots for these challenges run deep. Hispanic students are twice as likely as white students to attend K-12 schools where one fifth of their teachers have not met their state certification requirements (Baron et al., 2015). Hispanic students account for only 14% of Biology Advanced Placement (AP) exams, 8.2% of Calculus BC AP exams, 10% of Chemistry AP exams, and 11% of physics AP exams and are less likely to pass than white and Asian students (Baron et al., 2015).

African American students in STEM. African Americans constitute 12% of the U.S. general population and 11% of the U.S. workforce but only 5 to 6% of the scientists and engineers in the STEM workforce (Landivar, 2013; National Science Foundation, 2013). Only 28% of African Americans with STEM degrees work in STEM jobs, compared to 34% for white and 49% for Asian Americans (Beede et al., 2011). As with the Hispanic population, STEM achievement gaps are closely tied to higher education. In 2011, only 30% of African Americans aged 25 to 29 had completed a bachelor's or higher degree, compared to 39% for white Americans and 56% for Asian Americans (Committee on Equal Opportunities in Science and Engineering, 2013). In 2009, African Americans accounted for only 9% of STEM bachelor's degrees earned (Upton & Tanenbaum, 2014). At the graduate level, African American students earn proportionally fewer masters and doctorate degrees than white and Asian students (Sasso, 2008). Similar to Hispanic students, African American students are not underrepresented in their

STEM interest. In 2006, 34% of African American students intended to major in STEM disciplines (Sasso, 2008).

Again, these challenges also precede college enrollment for African American students. Nearly one fifth of all African American students attend high schools that do not offer Advanced Placement courses (Baron et al., 2015). In 1954, the Supreme Court declared school segregation to be unconstitutional, and black students began attending majority white schools. This trend reached its zenith in 1988, with 44% of black students in these schools. Since then the trend has reversed, with only 33% of black students attending these schools today (Baron et al., 2015).

Native American students in STEM. While literature concerning Hispanic and African American populations in STEM is plentiful, Native Americans are understudied (Smith, Cech, Metz, Huntoon, & Moyer, 2014). Consequently, data points are few and far between, and are not always strongly connected to STEM.

Native Americans constitute 2% of the U.S. general population and 0.7% of the scientists and engineers in the STEM workforce (Smith et al., 2014). More Native American students live in poverty than any other ethnic population (Smith et al., 2014). In 2011, only 17% of American Indians aged 25 to 29 had completed a bachelor's or higher degree, compared to 39% for white and 56% for Asian Americans (Committee on Equal Opportunities in Science and Engineering, 2013). Native Americans also experienced the lowest employment rates for STEM graduates, with 6.6% unemployed and 17.9% out of the workforce, compared to 3.4% unemployed and 12.7% out of the workforce for white Americans (Landivar, 2013).

Women in STEM. The case for including women in the category of underrepresented in STEM is more complicated than the previously described populations. Whereas Hispanic, African American, and Native American students are consistently underrepresented across STEM disciplines, women are not. Indeed, the degree to which women are underrepresented in STEM depends heavily on the definition of STEM, specifically the list of academic disciplines included therein. Women are underrepresented in all computer and engineering occupation categories, half of math occupation categories, and most life and physical science categories. However, women are overrepresented in most social science STEM categories (Landivar, 2013). For this study, women are treated as an underrepresented population only when they earn degrees where they are underrepresented among degree earners.

Regardless of this caveat, however, a strong case can be made for including women as a generally underrepresented population in STEM. Women make up 50.8% of the U.S. population (U.S. Census Bureau, 2015) and hold nearly half of all jobs in the U.S. workforce (Beede et al., 2011), but only 26% of the STEM workforce (Landivar, 2013). Within each ethnicity, men outnumber women in STEM jobs. White men outnumber white women in STEM nearly 3:1, and Asian men outnumber Asian women more than 2:1 (National Science Foundation, 2013). Women with STEM degrees are also less likely to work in STEM occupations (Beede et al., 2011). Within STEM professions, women also earn considerably smaller wages than men. On average, men in STEM earn \$36.34 per hour, while women earn \$31.11 per hour, representing a 14% difference (Beede et al., 2011).

This pattern is also reflected in higher education. Women constitute 53% of college graduates, but only 41% of STEM graduates (Landivar, 2013). First-year female students are less likely to select STEM majors than first-year male students (Hill, Corbett, & St. Rose, 2010). Even in disciplines where women constitute more than half of all STEM degrees awarded, they still make up less than half of full and associate professorships (Committee on Equal Opportunities in Science and Engineering, 2013).

Unlike other STEM student populations, the achievement gaps for women do not extend consistently back into the K-12 arena. For instance, more girls participate in gifted/talented education programs than boys. Girls are less likely to be held back. Girls progress through math classes more quickly, with 30% taking Algebra I in the 7th and 8th grades, compared to 27% for boys. Girls are also more likely to pass Algebra I than boys. Girls are more likely to enroll in Advanced Placement science courses, and are more likely to enroll in chemistry courses. However, boys are more likely to take and pass Advanced Placement tests than girls, and are more likely to enroll in physics courses (Office for Civil Rights, 2012). Finally, and despite tremendous gains over the past 30 years, three times as many boys score above 700 on the SAT math exam at age 13 as girls (Hill et al., 2010).

Agenda three: Increase the number of STEM degrees in high-demand disciplines. In this study, I utilized the *Occupational Outlook Quarterly* to operationalize high-demand STEM disciplines. Occupational Outlook is published by the U.S. Department of Labor, U.S. Bureau of Labor Statistics (BLS). This report is generated by economists who create estimates based on population growth and labor force participation rates. Though these estimates are based on trends, the BLS acknowledges

that these trends can change unexpectedly due to shifts in technology and trade patterns (U.S. Department of Labor, Bureau of Labor Statistics, 2015a).

In this report, the BLS provides projections for numerous occupations, including many that are STEM-specific (U.S. Department of Labor, Bureau of Labor Statistics, 2015a). For each of these occupations, the BLS projects the number and percentage change in jobs between 2016 and 2026. These positions require a broad range of education, from high school completion, through associate's degree, bachelor's degree, and advanced degree. For the purpose of this dissertation, high-demand professions are defined as those with at least twice the average ten-year growth.

Where STEM? An example of a study that builds upon secondary labor data is the 2012 report *Where are the STEM students? What are their career interests? Where are the STEM jobs?* This report was published cooperatively by MyCollegeOptions and STEMconnector (Munce & Fraser, 2013). Through 2018, they anticipate STEM job growth as shown in Table 1.

Table 1

Job Growth Projections from MyCollegeOptions and STEMconnector Report

Sector	Percent Growth
Life Sciences	4%
Mathematics	2%
Traditional Engineering	16%
Physical Sciences	7%
Software Engineering	27%
Computer Support	7%
Database Administration	2%
Systems Analysis	10%
Computer Networking	21%
Computer Science Research	1%
Other Computing	3%

Note the predominance of the computer-based skills in the two largest categories: software engineering and computer networking (Munce & Fraser, 2012).

Agendas in Context: Pushback to the “STEM Crisis”

Not everyone agrees with the assertion that America is facing a crisis in STEM degree production. In recent years, the pushback to these national STEM agendas has intensified. Much of this opposition is aimed directly at the assertion that there is a STEM labor shortage in the United States. Several high-profile studies and articles have fueled this position.

In 2014, the RAND Corporation examined the size and adequacy of the federal government's workforce to carry out STEM activities (Butz, Kelly, Adamson, Bloom, Fossum & Gross., 2004). The RAND researchers did not find any evidence that labor shortages have occurred at any time since 1990, and they did not foresee shortages in the future. They found no evidence of low STEM unemployment rates or rising wages for STEM workers. They also found that aside from engineering, employment rates were even lower for STEM workers than for non-STEM workers (engineering employment rates were on par with non-STEM rates) (Butz et al., 2004). In 2012, the Economic Policy Institute (EPI) studied the computing labor force. As in the RAND study, EPI's researchers found no evidence of a STEM workforce shortage (Costa, 2012).

A comparison of the engineering system in the United States with those of China and India found no indication of a shortage of engineers in the United States (Wadhwa, Gereffi, Rissing, & Ong, 2007).

Critics also point out that the "STEM crisis" issue is far more complex than its proponents purport:

- STEM degree earners most often work outside of STEM disciplines. As many as 75% of STEM degree earners are not working in STEM jobs (Charette, 2013; Zeigler & Camarota, 2014).
- STEM jobs and STEM degrees are not necessarily intertwined (Anft, 2013; Costa, 2012; Salzman, Keuhn, & Lowell, 2013; Zeigler & Camarota, 2014). According to the Department of Commerce, of the 7.6 million STEM workers in the United States, only 3.3 million possess STEM degrees (Charette, 2013).

- A job is not always long term. While most research studies consider STEM jobs to be long-lasting and somewhat secure, today's STEM economy does not always work that way. Many high-tech jobs are now tied to short-term projects or temporary funding streams (Charette, 2013).
- STEM labor predictions are notoriously unreliable, plagued by rapid paradigm shifts in technology, and are driven by boom or bust cycles (Charette, 2013).
- Wages rates remain flat. If shortages in the STEM labor force were significant, it would be expected that STEM wages would increase as companies compete for workers. However, STEM wages have not increased (Anft, 2013; Charette, 2013; Costa, 2012; Salzman et al., 2013; Zeigler & Camarota, 2014).
- Definitions matter. In the sound-bite world of politics and mass media, definitions are often ignored in order to make space for dramatic statistics. But those definitions are crucial to understanding the scope of reported STEM labor shortages. For instance, the U.S. Department of Commerce reported that 7.6 million people worked in STEM in 2010, while the National Science Foundation (NSF) reported that 12.4 million people work in STEM. The difference? The Department of Commerce does not include healthcare workers, psychologists, or social scientists, while NSF does (Charette, 2013). Likewise, the alignment between education and the STEM workforce is not well defined. Are auto mechanics STEM workers? Are laboratory technicians? Does the designation "STEM worker" carry with it a specific educational requirement? Poorly articulated definitions result in studies that produce seemingly contradictory findings.

Critics also assert that the driving forces behind the reported STEM crisis are actually organizations that stand to benefit from the perception of a labor shortage. High tech companies such as Microsoft are accused of exaggerating or fabricating shortages in order to keep the labor pool for STEM positions high. This in turn keeps wages and benefits low, thereby increasing profits (Anft, 2013; Charette, 2013; Costa, 2012; Salzman et al., 2013; Zeigler & Camarota, 2014).

Other Factors Important to STEM Success

Though my research is focused on colleges and universities as the unit of analysis, it is important to briefly explore the literature related to individual student success. Specifically, other than ethnicity and gender, which pre-college predictors are most important to STEM degree attainment for individual students? For the purpose of this study, I have included only those predictors that are germane to my research. In other words, I have included only those variables that can be controlled or accounted for by colleges and that are encompassed within the Integrated Postsecondary Education Data System (IPEDS) data repository.

Pre-college academic attainment: Standardized math tests. One of the most publicly visible factors associated with STEM higher education student success is the use of ACT and SAT standardized assessments. Specifically, to what degree do ACT and SAT standardized scores and math sub-scores predict STEM bachelor's degree attainment? Though generally understood to hold minimal predictive power, the literature is not entirely conclusive.

A report posted on the website of College Board (maker of the SAT assessment) notes eight studies comparing SAT scores and sub-scores to college graduation. None of

these studies found correlations stronger than moderate, with the highest correlation being 0.33 (Burton & Ramist, 2001). Another well-publicized study examined SAT and ACT scores at 33 colleges and universities where these scores are optional for admission. The authors found that ACT and SAT scores had virtually no predictive power in college graduation (Hiss & Franks, 2014). Smaller studies have also found limited correlations. A study focused on Hispanic students in Texas found that SAT scores did not predict college success for either Hispanic or non-Hispanic students (Borman, Margolin, Garland, Rapaport, Park & LiCalsi, 2017). A dissertation conducted at Liberty University found that ACT math sub-scores were not predictive for first-time students in Arkansas earning STEM degrees (Jenkins, 2015). Similarly, a study of STEM students at a Texas Hispanic-Serving Institution found that SAT math scores had nearly no correlation to declaring a STEM major, changing to a STEM major, or graduating with a STEM degree (Crisp, Nora, & Taggart, 2009).

One isolated but notable counter to this trend comes from a study conducted at a single, upper Midwest university. The study sample included 3,459 students. The authors found that ACT math sub-scores were among the most powerful predictors of eventual graduation with STEM degrees, and with math and engineering degrees (LeBeau, Harwell, Monson, Dupuis, Medhanie & Post., 2012).

With ACT and SAT scores holding limited predictive power for college success, how are these scores utilized as policy levers by colleges and universities? In higher education, ACT and SAT scores are most often used in college admissions and course placement. In this study, I was most concerned with how these tests are used in determining which first-time students are admitted.

In preparing their *2017 State of College Admission* report, the National Association for College Admission Counseling (NACAC) conducted a survey of member colleges and universities in the United States (Clinedinst & Koranteng, 2017). For this report, they collected survey responses from 603 institutions. Based on this survey, NACAC reports that 54% of respondent institutions consider ACT and SAT scores to be of considerable importance, while 30% consider them to be moderate importance, and 14% consider them to be of limited importance. SAT and ACT scores rank as the fourth most important factor in college admission decisions (Clinedinst & Koranteng, 2017). Despite the limited predictive power of ACT or SAT scores, more than half of colleges surveyed still consider these scores to be important in their admission decisions.

Pre-college academic attainment: High school performance. If ACT and SAT scores have limited ability to predict college success, are there other factors that are better options? According to the NACAC survey, three factors are more important to college admission than ACT and SAT scores: 1) grades in college preparatory classes, 2) grades in all courses, and 3) strength of curriculum. The first of these, grades in prep classes, was reported as being of considerable importance by 77% of respondents. Grades in all classes were of considerable importance to 77%, and strength of curriculum was of considerable importance to 52% (Clinedinst & Koranteng, 2017).

Researchers most often approach these issues by studying high school GPAs (grade point averages), high school college-prep course enrollment and GPA, and class rank. For instance, a study conducted of 80,000 freshmen at the University of California found that high school GPA was consistently the best predictor of college grades and graduation, while also having a less adverse impact on underrepresented minority

students than standardized tests (Geiser & Santelices, 2007). Likewise, high school GPA is highly predictive to the completion of college STEM degrees (Jenkins, 2015).

Research published by the National Association of College Admissions Counseling found that high school GPAs are closely aligned with college GPAs, despite variations in standardized test scores (Hiss & Franks, 2014).

For STEM students, college-prep courses include math and science. Researchers in Texas found that student experiences in these courses, combined with strong high school attendance patterns, predicted persistence within STEM majors and eventual graduation with STEM degrees (Borman et al., 2017). In their study of a single Midwestern university, researchers found that high school enrollments and GPAs in mathematics were significant predictors to students graduating college with math, engineering, or other STEM degrees (LeBeau et al., 2012). Researchers in Florida found that students who complete higher levels of math while in high school have higher educational attainment than their peers (Tyson, Lee, Borman, & Hanson, 2007).

While high school performance is important to college admissions and appears to strongly predict college attainment, it was of limited utility to my research. This is due to the manner in which IPEDS collects and reports this data. With ACT and SAT scores, I was able to see for each institution the top-quartile average scores. However, this same granularity does not exist for class rank, high school GPA, or performance in college-prep courses. Rather, IPEDS only reports whether these factors are taken into consideration for admission to each college or university. It does not report how their students actually performed. The closest proxy to high school performance, and it is not a strong one, is the selectivity of the institution. This is reported as admissions yield, or

the percentage of applicants actually admitted by each school. I included selectivity among the variables studied. However, the poor value of selectivity to approximate high school curricular performance in this study remains a key limitation of secondary data.

Income and degree attainment. Socioeconomic status (SES) plays a large role in American education. Low-income students are underrepresented in college attendance and completion. A fascinating report from the National Center for Education Statistics (Kena, Musu-Gillette, Robinson, Wang, Rathbun, Zhang, Dunlop, & Velez., 2015) paints a clear picture. In 2004, 22% of the low-SES students they studied expected that their higher education careers would end with community college, compared to 17% for middle-SES and 5% for high-SES students. Only 25% of low-SES students anticipated earning bachelor's degrees, compared to 33% of middle-SES and high-SES students.

As students explored college options, their approaches differed by income level. Low-SES students were less likely to ask their parents for information about college (43%) than middle-SES students (59%) and high-SES students (73%) (Kena et al., 2015). Low-SES students were also less likely to get information from college representatives, college publications, college websites, or college search guides. They were, however, more likely to get college information from siblings or a non-parent relative (Kena et al., 2015).

As low-SES students prepared academically for college, they faced similar barriers. On standardized exams, only 10% of low-SES students placed in the top quartile of math achievement, compared to 23% for middle-SES and 48% for high-SES students. Even when low-SES students did place in the top quartile, they were still less

likely to complete a bachelor's degree within 10 years than their middle-SES and high-SES peers (Kena et al., 2015).

These leaks along the college pipeline resulted in fewer poor students earning bachelor's degrees. Only 14% of low-SES students earned a bachelor's or higher degree within 10 years, compared to 29% for middle-SES students and 60% for high-SES students (Kena et al., 2015).

For my research, it is important to understand how IPEDS classifies and reports SES. While IPEDS does not report annual income for students or their families, they do report the number and percentage of first-time, full-time students at each institution who receive Federal Pell Grants. In other words, even though other students (i.e., part-time students and seniors) make up the majority of students at most institutions, the Pell data is reported only for those students who are attending college for the first time, and doing so full-time.

Pell Grants are awarded to low-income students attending eligible U.S. colleges and universities. The determination of "low-income" is calculated based on figures from student and parent/guardian income tax statements and requires completion of the Free Application for Federal Student Aid. In general, eligibility is calculated based on net income, assets, and cost of attendance at the chosen college (U.S. Department of Education, 2017a). While not a perfect proxy for SES, this is the only option available through IPEDS.

Institutional sector. Four-year colleges and universities are categorized by their sector. Some are public institutions, funded at least in part by local, state, or federal tax dollars. Some are private not-for-profit (or non-profit), receiving no local, state, or

federal funding and reinvesting all surplus income back into the institution. Some are private for-profit, receiving no local, state, or federal funding and channeling at least some surplus income into profits for the owner(s).

The literature surrounding higher education sectors is as fascinating as it is stark. Most of the recent research and national conversation has been focused on the differences between for-profit schools on one hand and public and non-profit schools on the other.

Selected findings include the following:

- For-profit schools enroll a disproportionately large proportion of low-income and underrepresented students. Indeed, dependent students who attend for-profit colleges have family incomes only half as high as students enrolled in community colleges or non-selective four-year schools (Deming, Golden, & Katz, 2013).
- For-profit schools are most effective when they offer short, career-specific, two-year or certificate programs. They are much less effective at educating and graduating students from bachelor's degree programs. For example, at the two-year level, for-profit colleges account for 51% of all associated degrees in computer science and 23% in the health professions (Deming, Golden, & Katz, 2013).
- Students who attend for-profit schools pay higher tuition rates, utilize more Pell funding, take out more student loans, and have higher loan default rates (Deming, Golden, & Katz, 2013; Liu & Belfield, 2014). Default rates for students who attended for-profit schools are more than three times larger than those for students who attended non-selective, four-year schools (Deming, Golden, & Katz, 2013).

- Students who attend for-profit schools are less likely to finish their degrees. Only 26% of students in for-profit, bachelor's programs complete within six years, compared to 53% for students at nonselective four-year institutions (Deming, Golden, & Katz, 2013). According to one recent study, 13% of students at for-profit schools finished their bachelor's degrees, compared to 50.7% of students at four-year public and non-profit colleges (Liu & Belfield, 2014). The National Student Clearinghouse Research Center reports 2010 cohort completion rates as 62.4% for public four-year institutions, 73.9% for private non-profit schools and 37.1% for for-profit four-year colleges (Shapiro, Dundar, Wakhungu, Yuan, Nathan & Hwang, 2016).
- Students who attend for-profit schools are less likely to find employment and, when employed, are likely to be paid less than graduates from public or non-profit, four-year institutions (Deming, Golden, & Katz, 2013; Liu & Belfield, 2014).
- For-profit schools spend significantly more money on sales, marketing, and advertising and are simultaneously more reliant on federal financial aid to keep their doors open (Deming, Golden, & Katz, 2013).
- Not surprisingly, students at for-profit schools are dissatisfied with their educational experiences. The Century Foundation reviewed "borrower defense claims" data from the U.S. Department of Education (Cao & Habash, 2017). These claims are filed by student loan borrowers who request loan relief on the grounds that they were defrauded by their college or university. Of 98,868 claims, 98.6% were from students who secured their loans through for-profit

institutions. Indeed, students who attend for-profit schools are 1,100 times more likely to file a fraud claim than those who attend public schools (Cao & Habash, 2017). This crisis has reached the point to where the U.S. Department of Education established a new office specifically to investigate and respond to claims submitted by students who attend(ed) for-profit schools (Lam, 2016).

Political Implications: Why This Study Matters

At heart, the acronym “STEM” has become a political construct. “STEM” was coined in the 1990s by the National Science Foundation (NSF) simply to refer to the four separate and distinct fields of science, technology, engineering and mathematics (Bybee, 2010; Sanders, 2008). In the education realm, STEM has been used by legislators, educators, and industry leaders to:

- promote the integration of STEM disciplines as a single interdisciplinary, interconnected teaching emphasis (Bybee, 2010; Roberts & Styron, 2010);
- support the development of a national STEM curriculum, including the development of national content standards (Bybee, 2010);
- galvanize national identity around America’s perceived technological superiority (Sanders, 2008).

Federal STEM funding for higher education. Federal spending for STEM education is substantial. According to the Government Accounting Office (Scott, 2012), in 2010 the federal government spent more than \$3 billion specifically on STEM education programs. This funding was applied to 209 different programs and was primarily provided through the Health and Human Services Department, the Department of Energy, and the National Science Foundation (Scott, 2012).

State STEM funding. Nationwide, education is the largest sector of state spending, and higher education is the third. Together they account for nearly half of all state appropriations. In 2013, these state appropriations topped \$72 billion (Schroeder et al., 2015).

State higher education appropriations are often divided into two categories: base funding, driven by operating expenses, and performance-based funding, driven by state priorities. Performance funding is designed to advance state educational agendas, such as increasing degree production, closing achievement gaps, and meeting state workforce demands. Performance-based funding generally accounts for 5-20% of state appropriations (Davis Bell, 2008).

While performance-based funding formulas vary considerably from state to state, commonalities do exist. Improvements in STEM degree attainment and the closing of academic achievement gaps are two prime examples. To date, 25 states have implemented performance-based funding for higher education, with five more in the process of transitioning to this funding method. Of these 30 states, 14 utilize funding performance metrics that take into account STEM and/or health science degree production. Sixteen states include metrics for closing educational achievement gaps based on income level, race/ethnicity, and/or rural status (Dougherty, Jones, Lahr, Natow, Pheatt & Reddy, 2016).

Chapter Three

Research Design

I used secondary data analysis (SDA) to conduct this exploratory study.

Secondary analysis involves the use of data collected by other persons for other purposes (Law, 2005). Secondary data analysis provides the opportunity to study large datasets without the need to collect the data from thousands of institutions individually (Greenhoot & Dowsett, 2012). The secondary data I used for this research project were reported through standardized and validated surveys and were checked for internal consistency and then reported publicly online. Consequently, this SDA data enables replication by other researchers. In addition, the complexity of this secondary data allows for re-organization, analysis, and interpretation of data to fit multiple research questions (Smith, 2008). Although conducted as a cross-sectional analysis, SDA allows researchers to address longitudinal questions (Greenhoot & Dowsett, 2012).

At the same time, SDA involves limitations and cautions. First and foremost, the data I utilized was collected for purposes other than for this study. Therefore, I paid careful attention to ensure that the data actually answered the questions I posed for this secondary data analysis study (Smith, 2008). For this research, I examined each variable to determine its suitability in terms of answering the research question. In many cases, I combined variables to create new variables that better met the needs of the study. Second, since the data were collected by other personnel, I carefully examined the methods through which the original data were collected to ensure reliability (Smith, 2008).

Data Source

I conducted this study utilizing the most recently available complete data collected by the National Center for Education Statistics (NCES) as of the time I started my research. Specifically, I pulled the data from the Integrated Postsecondary Education Data System (IPEDS). These data were reported to NCES each year by all colleges and universities that participate in the Title IV program (federal student aid). Institutional research staff at colleges and universities reported the data through 12 surveys (Association for Institutional Research, 2014):

- Institutional Characteristic Header (frequently requested information about the institution);
- Institutional Characteristics (information about mission, sector, and funding sources);
- Admissions (information about admission standards and entering student populations);
- 12-Month Enrollment (information about students enrolled during an academic year);
- Fall Enrollment (information about students enrolled in the fall semester);
- Human Resources (information about faculty and staff demographics, rank, and compensation);
- Student Financial Aid (information about financial aid received by enrolled students);
- Finance (information about the institution's revenues, expenses, and endowments);

- Academic Libraries (information about the institution's library resources);
- Completions (information about degrees awarded at the institution);
- Graduation Rates (information about graduation rates for subpopulation of enrolled students);
- 200% Graduation Rates (information about graduation rates for subpopulations of enrolled students, specific to graduating within 200% of expected credit hour accumulation).

Each of these surveys contained a wide range of variables, though some were repeated in multiple surveys. Together, they represent over 500 possible variables for inclusion in this study (Association for Institutional Research, 2014). The original data were collected in order for policy makers and researchers to describe and analyze trends in postsecondary education (U.S. Department of Education Institute of Education Sciences, 2015).

I pulled all of the data, with the exception of degree completion data, from the IPEDS year 2014, which was the most recent complete data available at the time I began my research. I pulled degree completion data from IPEDS year 2015. This was the most recent complete data available at the time I began that phase of my research. I made the decision to pull degree completion data from the later year in order to include the most recent data available in both data pulls. However, the differing time frames should be considered a limitation of my research.

Reliability

Policy makers, legislators, and U.S. Department of Education employees utilize IPEDS data to prioritize and allocate financial resources (Jackson, Peecksen, Jang, &

Sukasih, 2005). Consequently, the IPEDS data collection methods are sophisticated and highly scrutinized.

For instance, data entered by institutions must be internally consistent (Jackson et al., 2005). Many data elements are reported more than once through the surveys previously mentioned. If the same numbers are not reported in each of these instances, the survey is not accepted and error reports are generated to assist the respondent in correcting the errors. Likewise, data entered by institutions must be longitudinally consistent. If last year's numbers differ markedly from this year's numbers, the survey is not accepted until respondents double-check and/or explain the difference. These methods help to catch and correct errors.

Due to the public availability of data and the strong control mechanisms to ensure that data are accurately reported, IPEDS data lend themselves well to research replication. Using the same definitions and variables from this research, another researcher could replicate this study and produce identical results.

Validity

The IPEDS data variables are clearly defined. These definitions are available through multiple online documents, including glossaries, handbooks, and pop-up screens. Policy makers and researchers appear to have confidence in the ability of IPEDS data to measure what they purport to measure.

Generalizability

Since I utilized a population rather than a sample, generalizability is not implied (Vogt, 2007). The findings relate only to those institutions in the population and are not intended to generalize to other institutions.

Missing Data

Since reporting these data is compulsory for Title IV institutions, there is little missing data. Where missing data existed, I took one of the two following actions:

- I verified with a representative of the U.S. Department of Education Helpdesk that that a missing value should be treated as zero (for instance, if an institution left blank the field “number of degrees awarded in electrical engineering,” I verified that it was correct to assume that entry to be zero). I then converted those blank cells to zeros.
- I left blank the value for a particular institution on a particular variable and removed it from any applicable analysis where missing values would result in the entire case being dropped from the analysis.

Data Collection

IPEDS data are available on the NCES website. The data are publicly available, and access to the data does not require a username, password, or other authentication methods. My process for collecting data from NCES included: (1) utilizing filters to identify the institution(s) studied, (2) identifying the variables for study, and (3) selecting a method for data output.

Unit of Analysis

For this study, the unit of analysis was individual institutions of higher education that award four-year STEM degrees. I utilized a full population rather than a sample. The characteristics I used to define this population included: (1) Institution participates in Title IV funding (federal financial aid); AND (2) Institution is located within one of the 50 U.S. states; AND (3) Institution is a degree-granting school; AND (4) Institution’s

highest degree offered is Bachelor's degree or higher; AND (5) Institution is degree-granting, primarily baccalaureate or above. These filters were applied on the NCES IPEDS Data Center website, using the "by groups > easy groups" selection option.

The resulting population consists of 2,068 colleges and universities. Forty of these institutions produced no bachelor's degrees and were eliminated from the study. Of the remaining 2,028 schools, 567 were public institutions, 1,212 were private non-profit, and 249 were private for-profit. I determined that 1,644 institutions awarded at least one STEM degree, 1,592 awarded at least one STEM degree to underrepresented student(s), and 1,273 awarded at least one STEM degree in a high-demand profession.

Research Variables

I created three dependent variables, one corresponding to each of the three STEM agendas discussed in the first three chapters. *DepSTEM* represents the agenda of producing more STEM degrees, *DepURSTEM* represents the agenda of producing more STEM degrees for underrepresented students, and *DepHDSTEM* represents the agenda of producing more STEM degrees in high-demand fields.

In quantifying the three STEM agendas via STEM degrees awarded, I had two choices. First, I could create dependent variables that include straight counts of the STEM degrees awarded by each institution. For example, College A, with an enrollment of 30,000, awarded 3,000 STEM degrees. College A would then be quantified as 3,000. College B, with an enrollment of 2,000, awarded 500 STEM degrees. College B would then be quantified as 500. Using this method would skew all correlations towards large universities.

Second, I could create dependent variables that are defined by STEM degree counts proportional to an institution's size. In the example above, College A awarded one STEM degree to every 0.1 student enrolled, and college B awarded one STEM degree to every 0.25 student enrolled. College B awarded more STEM degrees relative to the size of its student body than College A. Using this method would eliminate the skew towards large institutions, but would skew towards STEM-intensive schools (such as tech or engineering universities).

Consequently, I opted to use the proportional method for defining dependent variables, but then also included institutional size and STEM-focused mission among the independent variables in order to account for them fully.

The three dependent variables were thus defined as follows:

- *DepSTEM* quantified each institution's total number of STEM bachelor's degrees produced proportional to that institution's 12-month full-time equivalent enrollment (*fte12mn*).
- *DepURSTEM* quantified each institution's number of STEM bachelor's degrees produced for underrepresented students proportional to that institution's 12-month full-time equivalent enrollment.
- *DepHDSTEM* quantified each institution's number of STEM bachelor's degrees produced in high-demand professions proportional to that institution's 12-month full-time equivalent enrollment.

For these proportions, I chose the numerators to represent the three agendas.

These are straight counts of STEM degrees awarded in the three categories: total STEM degrees, underrepresented STEM degrees, and high-demand STEM degrees.

I selected *fte12mn* as the denominator after reviewing five variables that represent an institution's size. Specifically, *fte12mn* is a computation designed to approximate full-time equivalency (FTE), including undergraduate and graduate students. For instance, suppose a school on a semester system has 20 undergraduate students each enrolled in three hours during a specific semester. For this population, IPEDS assumes that 15 hours is full-time enrollment. This means FTE is calculated as number of students multiplied by the number of credit hours enrolled for all students combined, and then divided by 15. In this example, the FTE would be 4 $((20 \times 3) / 15)$. If the neighboring semester-based school has 20 undergraduate students at 12 hours each, then their FTE would be 16 $((20 \times 12) / 15)$. In practice, the calculations for FTE are somewhat more complex than the example above.

My rationale for selecting *fte12mn* to represent institutional size in the dependent variables (as opposed to using headcount, undergraduate headcount, or undergraduate FTE) is as follows:

- Institutions with graduate and undergraduate programs operate differently than schools that only offer undergraduate programs. Utilizing undergraduate headcount or undergraduate FTE variables would ignore the existence and impact of graduate programs on the variables I studied.
- Budget variables (expenditures and revenues) are not reported in IPEDS as differentiated between graduate and undergraduate levels for institutions that offer both. For instance, instructional expenses include those for graduate students as well as those for undergraduate students. The use of an undergraduate denominator would create the appearance that large universities with graduate and

undergraduate programs spend more on undergraduate education than they actually do.

- Some institutions, especially private for-profit schools, enroll primarily part-time students. Utilizing headcount instead of FTE would make these institutions appear larger than they are. Thus, the use of FTE allows me to compare institution size on a similar scale.

I selected the independent variables based on their presence in the literature review and based on my own 27 years of experience in higher education administration. They were selected based on my perception that they may reasonably be expected to have some relationship to an institution's production of STEM degrees, underrepresented STEM degrees, or high-demand STEM degrees. I selected 111 distinct independent variables for this study (see the codebook in Appendix A).

Defining STEM Degrees

The Department of Homeland Security (DHS) publishes a list of STEM-designated degree programs (U.S. Immigration and Customs Enforcement Student and Exchange Visitors Program, 2016). These programs are listed along with their corresponding CIP (Classification of Instructional Programs) codes. The National Center for Education Statistics developed the CIP Codes to standardize degree reporting by universities and colleges. Each degree is assigned a specific CIP code. IPEDS data for bachelor's degrees are also aligned with CIP codes. For this study, I counted as STEM degrees all bachelor's degrees in disciplines that appear on the DHS list. This list is provided in Appendix B.

Defining Underrepresented Student Populations

The National Science Foundation's 2014 *Science and Engineering Indicators Report* (National Science Foundation, 2016) lists the following races and ethnicities as being underrepresented in STEM bachelor's degree attainment: African American, Hispanic, American Indian, and Alaska Native. Gender is a bit more complicated. Women are underrepresented among some STEM bachelor's degrees, but by no means all. Specifically, women are underrepresented in the following STEM disciplines: engineering, earth and planetary sciences, math and computer sciences, and physical sciences (Landivar, 2013).

Since I could not adequately convert Landivar's (2013) analysis to standardized CIP codes, I developed another method for identifying fields in which women are underrepresented. For all colleges and universities combined, I calculated which individual degrees graduated fewer than 50.8% women (based on the 2010 U.S. census for percentage of women in the population). I classified those degrees where the percentage of women fell below this number as underrepresented among women. Consequently, for this study, I define underrepresented students as shown in Table 2.

Table 2

Underrepresented Student Populations

Student Group	STEM Degree Discipline
Alaska Native students, men, and women...	In all STEM degrees
African American students, men, and women...	In all STEM degrees
Hispanic students, men, and women...	In all STEM degrees
Native American students, men, and women...	In all STEM degrees
Women of all ethnicities and races...	In STEM degrees where fewer than 50.8% of the graduates were women

Defining High-demand Disciplines

The U.S. Bureau of Labor Statistics' *Occupational Outlook Quarterly* provides ten-year projections for most major occupations (U.S. Department of Labor, Bureau of Labor Statistics, 2015b). These projections include the numeric and percentage changes in projected occupational openings between 2014 and 2024. These occupations are reported by the Bureau with a distinct occupational code (SOC) attached to each profession.

In calculating high-demand professions, I utilized the following steps:

- I identified fields where a bachelor's degree is required as the typical entry-level education. This excludes fields where associate's degrees or vocational certificates meet entry-level requirements, as well as fields that require a post-baccalaureate degree for entry.
- From there, I narrowed down to fields where at least 1000 new jobs will be created nationwide by 2024.

- From there, I narrowed down to fields where growth percentage will be at least twice the national average of 6.5%.
- Finally, I converted the occupational codes (SOC) to CIP codes (degree codes) by utilizing a crosswalk for the two, developed by the National Center for Education Statistics (National Center for Education Statistics, 2010). This allowed me to pull the high-demand degree codes from IPEDS.

Appendix C contains the list of the resulting STEM occupations. Note that most health science occupations are not listed in this table, as health science is not determined to be a STEM field per the Department of Homeland Security (see Appendix B).

The Value of Descriptive Statistics

Of the five steps described above (contingency table analysis, correlation analysis, key forces analysis, descriptive profiles, and ideal institutions), four focus almost exclusively on descriptive statistics analysis. Descriptive statistics, especially the use of means, medians, counts, and proportions appear to form the basis for analyzing public policy in STEM higher education. For example, President Obama's five-year STEM strategic plan, addressed to members of Congress, made use of more than 10 descriptive statistic factoids in the executive summary and introduction, with only passing reference to one study that utilized inferential statistics (Committee on Science, Technology, Engineering and Mathematics Education, 2013). *Rising Above the Gathering Storm* opens with a barrage of 64 factoids. Every one of them is based on descriptive statistics (Committee on Science, Engineering and Public Policy, 2007). The National Science Foundation's (NSF) *Science and Engineering Indicators* report is composed entirely of descriptive statistics (National Science Foundation, 2016).

Similarly, the NSF's report *Why So Few: Women in Science, Technology, Engineering and Mathematics* makes use of numerous descriptive statistics factoids, tables and figures, while only referencing inferential studies in passing (Hill, 2010). The report *Expanding Underrepresented Minority Participation: American's Science and Technology Talent and the Crossroads* utilizes 40 tables and figures to illustrate their points, and all of these are based exclusively on descriptive statistics (Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline, and the Committee on Science, Engineering and Public Policy and Global Affairs, 2011). These are but a few examples. Whether national STEM policy reports are aimed at the public, the legislature, or at other policy majors, they almost exclusively rely on descriptive statistics.

The Value of Exploratory Research

Unlike typical dissertations, my research is not confirmatory (hypothesis-testing). Rather it is primarily exploratory. In *Exploratory Research in the Social Sciences*, Stebbins (2001) provides the context for better understanding this type of research. Exploratory research is designed to “maximize the discovery of generalizations leading to description ... of an area of social or psychological life” (Stebbins, 2001, Chapter 1, Section 2, para 5). Where confirmatory research is focused on testing a hypothesis, exploratory research is focused on generating new ideas and weaving them together to form new understandings. This type of research is most useful when there is little or no scientific knowledge about a phenomenon. It requires flexibility and open-mindedness in finding and exploring data. The value of exploratory research is perhaps best articulated by Stebbins (2001):

Yet even though a program of exploration can bring a field to the point of diminishing returns in new ideas, it is still better to abide the rule, when in doubt explore, rather than by its opposite, when in doubt confirm. Following the first rule avoids premature theoretical closure and the failure to discover something of importance, a far more deleterious situation than failing to start confirming key ideas, a process researchers can always initiate at a later date. (Chapter 1, Section 4, para 2)

There are several key differences between confirmatory and exploratory research as they pertain to my study. First, concerns regarding validity for exploratory research are focused on finding measures and indices that accurately describe the phenomenon. One approach to this challenge is to triangulate. By using different analysis methods to examine the same data or phenomenon, validity is strengthened (Stebbins, 2001). In my research, I followed this principle by utilizing five distinct analysis approaches (contingency table analysis, correlation analysis, key forces analysis, descriptive profiles, and ideal institutions).

Second, in order to draw preliminary or tentative conclusions in exploratory research, it is vital that the sample size be as large as possible (Stebbins, 2001). In my research, I eliminated this challenge by using a census rather than a sample. Since my study concerns the awarding of STEM bachelor's degrees, I included all accredited bachelor's degree awarding colleges and universities in the United States.

Third, exploratory research often struggles to produce results that are generalizable and conclusive (Stebbins, 2001). By utilizing a census rather than a sample, I have eliminated the generalizability issue and have strengthened the value of

my conclusions. However, it is important to note that in my research, I do not purport to offer high degrees of certainty in my conclusions.

Fourth, literature reviews in exploratory research are by definition less extensive. Because exploratory research projects involve questions that have not been extensively explored in the literature, their literature reviews are necessarily short. As Stebbins (2001) notes, “to stuff the research report with an extensive tour of marginally related studies makes for heavy and distracting reading” (Chapter 4, Section 2, para 3).

Finally, one key value of exploratory research is its ability to generate new ideas and questions. Stebbins quoted John Steinbeck in pointing out, “new ideas are like rabbits. You get a couple and learn how to handle them and pretty soon you have a dozen” (Stebbins, 2001, Chapter 4, Section 7, para 1). Exploratory research frequently allows ideas and data to bump up against each other to form new discoveries or frameworks.

Analysis Methods, Triangulation Using Five Approaches

I utilized five approaches to conduct the analyses (see Figure 2).

- Approach one: I calculated and explored appropriate descriptive statistics for 108 independent variables and three dependent variables to better understand the population and variables, prepare for additional analyses, and “relate substantive findings of great practical significance” (Vogt, 2007, p. 72).
- Approach two: I estimated correlation matrices between each of the independent variables and each of the dependent variables to better understand the significance and magnitude of each dependent and

independent variable combination. This process resulted in 44 independent variables with moderate or stronger relationships with one or more of the dependent variables.

- Approach three: I grouped the independent variables into closely connected clusters and then explored the relationships of those clusters to the dependent variables.
- Approach four: I created 12 descriptive profiles of various groupings of institutions relative to the three national STEM agendas and compared descriptive statistics between these profiles.
- Approach five: I operationalized “ideal” institutions that adequately met all three agendas, created profiles for these institutions, and then compared descriptive statistics between these profiles. From these five analysis processes, I identified and explored key findings.

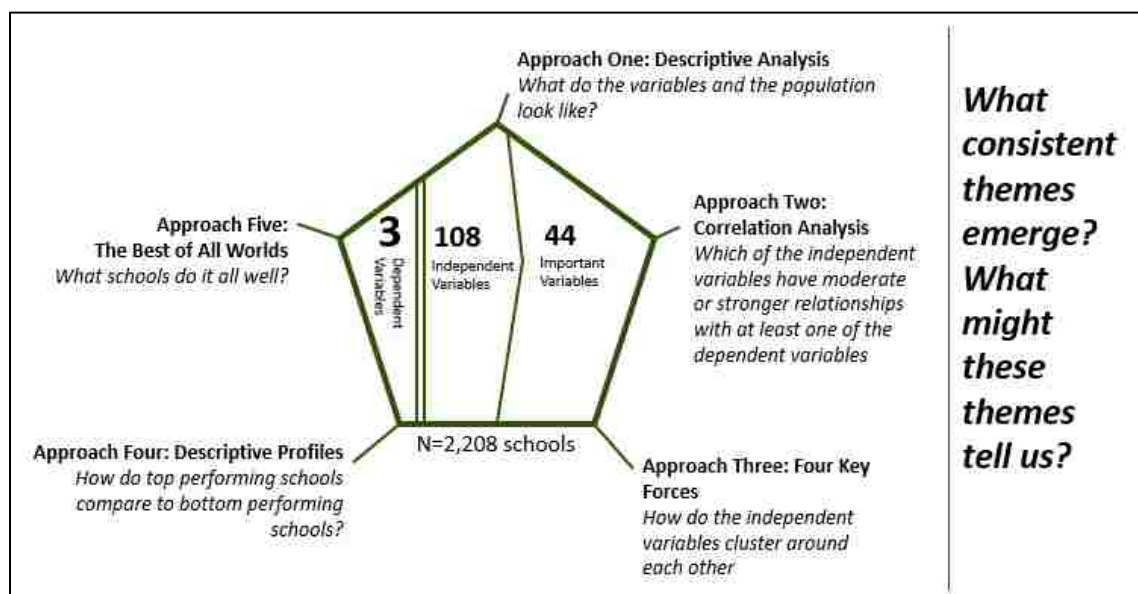


Figure 2. Triangulation approach used in my research.

Chapter Four

Analysis

As noted in Chapter 3, my research makes use of triangulation to explore the data using five approaches. First, I began with a broad descriptive analysis of the population, allowing me to get a better general understanding of the data. Second, I employed correlation analysis to identify significant relationships between the independent and dependent variables. Third, I explored the key forces, or themes, that emerged from the correlation analysis. Fourth, I utilized descriptive profiles to better understand the differences between high performing and low performing institutions. And fifth, I explored and compared descriptive statistics for institutions that are effective at meeting all three national STEM agendas.

I preface this section with a few important notes to the reader. First, the exploratory nature of my research makes for dense reading. It is easy to get lost in the tables and descriptive statistics embedded throughout the narrative. I recommend reading the analysis from the perspectives of triangulation and themes. Specifically, this chapter is designed to look at the same data using different groupings and analyses (triangulation) and then to identify common themes that emerge from those approaches.

Second, when I first mention a variable name, I include its definition. However, when I mention that variable again in the same section, I often do so without repeating its definition. I do this in order to shorten the already-lengthy narratives and to highlight the statistics. To overcome this challenge, I recommend that the reader keep Appendix A and Table 3 handy. Appendix A provides a listing and brief definition for each variable used in my study, and Table 3 (below) provides definitions for the dependent variables.

Third, I pulled 65 variables directly from IPEDS, using the variable names assigned by the National Center for Education Statistics (2010). I calculated my remaining variables from multiple IPEDS variables, and assigned them new names. In all of these cases, I utilize abbreviations from IPEDS documentation, and I explain them in their first usages (i.e., when you see “FT FT” in a variable description, it stands for “first-time full-time”). Appendix A contains a brief description of each variable. The full definition for each IPEDS variable is available online in the documentation download files at <https://nces.ed.gov/ipeds/Section/accessdatabase/>. The size and complexity of this documentation makes its inclusion in the appendices impractical. For deep dives into individual variables (definitions, uses, and values), I recommend accessing the documentation files directly.

Table 3

Definitions for Dependent Variables

Variable Name	Definition
DepSTEM	The number of STEM degrees awarded by an institution, proportional to its 12-month full-time equivalency enrollment.
DepURSTEM	The number of STEM degrees awarded to underrepresented students by an institution, proportional to its 12-month full-time equivalency enrollment.
DepHD STEM	The number of STEM degrees awarded in high-demand professions by an institution, proportional to its 12-month full-time equivalency enrollment.

Approach One: Broad Descriptive Analysis of the Population and Variables

As described in Chapter 3, my research led to the creation of three dependent variables and 108 independent variables. To begin my research, I analyzed the descriptive statistics for each of the independent variables. My intent with this approach was to better understand the full population, as well as the dependent and independent variables.

The population included 2,028 colleges and universities that awarded at least one bachelor's degree in the 2014-15 academic year. Of these, 28% were public, 60% were private non-profit, and 12% were private for-profit. Public schools accounted for 64% of the bachelor's degrees awarded, followed by 30% for private non-profit schools, and 6% for private for-profit schools. The majority of colleges and universities were located in cities (51%), followed by suburbs (26%), towns (17%), and rural locations (6%). The average 12-month unduplicated enrollment was 5,296. The average number of bachelor's degrees awarded was 957 per institution, and the average number of STEM bachelor's degrees awarded was 189. The average number of STEM degrees awarded to underrepresented students (including women in specific disciplines) was 58, which is 30% of the total STEM degrees awarded. The average number of high-demand STEM degrees was 36. On average, institutions awarded .0262 STEM degrees per enrolled student, .0085 STEM degrees to underrepresented students per enrolled student, and .0050 high-demand STEM degrees per enrolled student.

The mean for the percentage of first-time, full-time students receiving Pell Grants per institution was 44%, and the mean for enrolled students underrepresented by ethnicity was 25%. The mean for each institution's top quartile ACT math score was 19.5 and for

SAT was 478. The mean graduation rate for all students was 51%, and for students underrepresented by ethnicity 43%. Across all institutions, the mean for revenues coming from tuition and fees was 56%, and the mean percentage of expenditures spent on instruction was 40%. The mean for expenditures spent on research was 3%.

In conducting my broad descriptive analysis, the factors I examined most closely were: (1) means, minimums, and maximums for each variable, (2) variance for each variable (i.e., did each of the variables vary enough between schools to be useful for my research?), and (3) missing values (i.e., did each variable contain few enough missing values to be useful for my research?).

Approach Two: Correlation Analysis

Based on my broad descriptive analysis, I estimated the correlation coefficients for each of the dependent variables with each of the remaining independent variables. *My intent with this approach was to identify variables that have a moderate or strong relationship with at least one dependent variable ($r = \geq .3$, and $p < .05$). The resulting variables are shown in Table 4.* For this and future tables, “FT FT” means full-time first-time students, and FTE means full-time equivalent enrollment. First-time students are those who are enrolling to any college for the first time.

Table 4

Estimated Correlation Coefficients, Dependent and Significant Independent Variables

Variable	DepSTEM	r ²	Dep-URSTEM	r ²	Dep-HDSTEM	r ²
actmt25, Average ACT math score for top quartile of FT FT enrollees	.497**	0.2470	.328**	0.1076	.362**	0.1310
ccbasic, Carnegie classification	-.310**	0.0961	-.309**	0.0955	-.394**	0.1552
cotsfam, Total cost of attendance, out of state living with family	.342**	0.1170	.294**	0.0864	.136**	0.0185
cotsoff, Total cost of attendance, out of state living off campus	.338**	0.1142	.304**	0.0924	.143**	0.0204
cotson, Total cost of attendance, out of state living on campus	.376**	0.1414	.333**	0.1109	.205**	0.0420
credits3, Institution offers advanced placement credit	.320**	0.1024	.299**	0.0894	.256**	0.0655

Variable	DepSTEM	r ²	Dep-URSTEM	r ²	Dep-HDSTEM	r ²
efytotlt, 12 month undergrad undup headcount	.485**	0.2352	.474**	0.2247	.520**	0.2704
enrlt, Number of enrolled total	.480**	0.2304	.449**	0.2016	.500**	0.2500
fgrnt_p, Pct of full-time first-time students awarded federal grant aid	-.360**	0.1296	-.174**	0.0303	-.175**	0.0306
fte12mn, 12 month full-time equivalency enrollment	.480**	0.2304	.460**	0.2116	.506**	0.2560
grrttot, Graduation rate, all first-time, full-time students	.388**	0.1505	.254**	0.0645	.173**	0.0299
MIXz020b, Avg salary of FT nonmedical faculty	.387**	0.1498	.370**	0.1369	.361**	0.1303
MIXz042, Tuition and fees as pct of core revenues	-.300**	0.0900	-.275**	0.0756	-.148**	0.0219

Variable	DepSTEM	r ²	Dep-URSTEM	r ²	Dep-HDSTEM	r ²
MIXz052, Core revenues per FTE from govt grants and contracts	.324**	0.1050	.353**	0.1246	.245**	0.0600
MIXz054, Core revenues per FTE from investment returns	.333**	0.1109	.254**	0.0645	.108**	0.0117
MIXz055, Core revenues per FTE from other core revenues	.359**	0.1289	.294**	0.0864	.247**	0.0610
MIXz058, Research expenses as pct of core expenses	.438**	0.1918	.399**	0.1592	.363**	0.1318
MIXz059, Public service as pct of core expenses	.303**	0.0918	.264**	0.0697	.242**	0.0586
MIXz062, Institutional support expenses as pct of core expenses	-.340**	0.1156	-.249**	0.0620	-.294**	0.0864
MIXz064, Instruction expenses per FTE	.328**	0.1076	.273**	0.0745	.156**	0.0243

Variable	DepSTEM	r ²	Dep-URSTEM	r ²	Dep-HDSTEM	r ²
MIXz065, Research expenses per FTE	.477**	0.2275	.428**	0.1832	.387**	0.1498
MIXz066, Public service expenses per FTE	.351**	0.1232	.315**	0.0992	.302**	0.0912
MIXz098, Pct of degree undergrads under age 25	.472**	0.2228	.375**	0.1406	.191**	0.0365
MIXz122, Endowment assets	.314**	0.0986	.243**	0.0590	.081**	0.0066
openadmp, Use of open admissions Y/N	.325**	0.1056	.260**	0.0676	.180**	0.0324
pctft1st, First-time, full-time undergrads as pct of all undergrads	.346**	0.1197	.281**	0.0790	.096**	0.0092
PctFTfac, Pct of faculty who are full time	.322**	0.1037	.261**	0.0681	.198**	0.0392

Variable	DepSTEM	r ²	Dep-URSTEM	r ²	Dep-HDSTEM	r ²
PctSTEM, Percent of completers who are STEM	.902**	0.8136	.724**	0.5242	.481**	0.2314
pgrnt_p, Pct of first-time, full-time undergrads awarded Pell	-.358**	0.1282	-.171**	0.0292	-.174**	0.0303
PT_fac, Number of faculty who are part time	.184**	0.0339	.205**	0.0420	.324**	0.1050
ret_pcf, Full-time student retention rate	.356**	0.1267	.254**	0.0645	.192**	0.0369
satmt25, Average SAT math score for top quartile of admits	.508**	0.2581	.347**	0.1204	.360**	0.1296
SDXz007z001, Number of undergraduate STEM degrees awarded	.802**	0.6432	.724**	0.5242	.668**	0.4462
SDXz008z001, Number of undergraduate STEM degrees awarded to underrep students	.756**	0.5715	.808**	0.6529	.655**	0.4290

Variable	DepSTEM	r ²	Dep-URSTEM	r ²	Dep-HDSTEM	r ²
SDXz009z001, Number of undergraduate STEM degrees awarded in high-demand fields	.638**	0.4070	.594**	0.3528	.898**	0.8064
SIPz021z001, Pct of faculty tenured or tenure track	-.367**	0.1347	-.335**	0.1122	-.299**	0.0894
SIPz089z001, avg of underrep student grad rates	.307**	0.0942	.244**	0.0595	.145**	0.0210
slo6, Institution offers study abroad	.442**	0.1954	.385**	0.1482	.288**	0.0829
stusrv3, Institution offers student employment	.302**	0.0912	.280**	0.0784	.207**	0.0428
stusrv4, Institution offers career placement	.303**	0.0918	.294**	0.0864	.240**	0.0576
Tcompl, total number of bachelor's degrees awarded	.540**	0.2916	.499**	0.2490	.535**	0.2862

Variable	DepSTEM	r ²	Dep- URSTEM	r ²	Dep- HDSTEM	r ²
TotInstStaff, Total number of instructional staff (faculty)	.503**	0.2530	.453**	0.2052	.507**	0.2570
undup, 12 month unduplicated headcount	.437**	0.1910	.428**	0.1832	.500**	0.2500
undupug, 12 month unduplicated headcount, undergraduate	.485**	0.2352	.474**	0.2247	.520**	0.2704

** . Correlation is significant at the 0.01 level (2-tailed).

When looking at these correlations, I initially studied two sets of relationships. First, which independent-dependent variable pairs have the strongest relationships? Second, within each independent variable row, what are the differences in strength between the three STEM agendas (*DepSTEM*, *DepURSTEM* and *DepHDSTEM*)?

The significance of institutional STEM mission. From the data, we see that some institutions award higher proportions of STEM degrees than their peers. In part, this can be attributed to an institution's mission as it relates to STEM. For example, engineering colleges and technical schools have STEM-specific missions, enroll more STEM students, and consequently produce higher proportions of STEM degrees. It appears that an institution's STEM focus (*pctstem*) is important for all three agendas, but far more so for the general STEM agenda. The strongest relationships exist between *pctstem* (percent of bachelor's degrees awarded that are STEM) and the three dependent variables. But there are differences in how much variance in the three dependent variables is accounted for by changes in *pctstem*. For *DepSTEM*, changes in *pctstem* account for 81% of the variance. For *DepURSTEM*, this drops to 52%, and for *DepHDSTEM* it drops to 23%.

The significance of ACT and SAT math scores. Institutions vary in their use of ACT and SAT standardized tests. Some colleges require high test scores as a prerequisite to admissions, while others do not even require that applicants take the exams. As I discussed in Chapter 2, ACT and SAT math scores are not effective at predicting degree attainment for individual students. However, it appears that ACT and SAT math scores are important to an institution's production of STEM degrees.

My analysis indicates that there is a relationship between the three dependent variables and the two standardized math exam variables (*actmt25* and *satmt25*). As with STEM mission, this variable is most important to *DepSTEM*. These ACT and SAT scores account for nearly twice the variance in *DepSTEM* (*actmt25* $r^2=.2470$, *satmt25* $r^2=.2581$) than they do for *DepURSTEM* (*actmt25* $r^2=.1076$, *satmt25* $r^2=.1204$) and *DepHDSTEM* (*actmt25* $r^2=.1310$, *satmt25* $r^2=.1296$).

It is also important to note that the relationship between an institution's standardized math scores and their proportion of receiving students (*pgrnt_p*) is negative and remarkably strong. For the ACT scores this correlation is $-.781^{**}$, while for SAT scores this correlation is $-.752^{**}$.

The significance of retention and graduation rates. Institutional retention and graduation rates are also important to all three agendas. Again, there is an interesting correlation here. The relationship between an institution's retention rates and its percentage of students receiving Pell Grants is $-.639^{**}$, and between its graduation rate and Pell rate is $-.685^{**}$.

Policy levers: ACT/SAT, retention rates, and graduation rates. Colleges and universities do not use Pell Grant status, retention rates, or graduation rates as policy levers. Rather, these are byproducts of other policy decisions. For instance, admissions offices do not set minimum qualifications for Pell eligibility, but some do set minimum admission requirements for ACT and SAT scores. Likewise, universities do not adjust graduation rates in order to attract or push away low-income students. Rather, they adjust their tuition rates and institutional scholarships, and this has the effect of attracting or pushing away low-income students. Consequently, I perceive *satmt25*, *actmt25*, *ret_pcf*,

and *grrttot* to be the result of policy decisions made by universities that have strong impacts on the socioeconomic makeup of its student bodies.

The significance of research mission. Institutions vary considerably in their approach to faculty-led research. Some schools do not require or expect their faculty to conduct research, while for others, research is the most important requirement to achieve tenure. My analysis indicates that an institution's research mission is important to its production of STEM students. Based on these estimated correlations, variations in research expenses per full-time equivalent enrollment accounts for 23% of the variance in *DepSTEM*, 18% of the variance in *DepURSTEM*, and 15% of the variance in *DepHDSTEM*. Variations in research expenses as a percentage of core expenses account for 19% of the variance in *DepSTEM*, 16% of the variance in *DepURSTEM*, and 13% of the variance in *DepHDSTEM*. Again, we see that research variables are important to all three agendas but are more important to *DepSTEM* than the other two dependent variables.

The significance of institutional size. Of the 44 significant independent variables, 10 measure institutional size in one way or another. For instance, *TCompl* measures the number of bachelor's degrees awarded, *fte12mn* measures the 12-month full-time equivalency, and *TotInsStaff* measures the number of instructional staff (faculty). All 10 of these variables correlate moderately or stronger with all three of the dependent variables. The larger the institution, the more likely it appears to produce higher proportions of STEM degree earners. Other than STEM mission, institutional size appears to have the strongest correlation to all three dependent variables.

Approach Three: Four Key Forces

My next step was to explore the four forces I identified in my correlation analysis: STEM mission, socioeconomic status, research mission, and institution sector. In other words, the correlation analysis between each independent variable and all the other variables led me to identify four key forces (or clusters) for further exploration. My intent with this approach was to better understand the emerging important themes as they clustered together. The first three key forces can be represented through continuous variables. STEM mission refers to the focus of an institution on producing STEM degrees. Tech and engineering colleges are prime examples. This force can be represented by *pctstem* (percentage of bachelor's degree that are STEM). Socioeconomic standing refers to the relative wealth of an institution's student population. Though not a perfect proxy, this can be represented by *pgrnt_p* (percentage of first-time, full-time students who receive Pell Grant funding). Research mission refers to the focus of an institution on research, which can be represented by *mixz065* (research expenses per FTE). The fourth force, *sector*, can be represented only as a categorical variable. Sector is categorized as public, private non-profit, or private for-profit.

Table 5 illustrates the relationships between the first three of these forces to the three dependent variables. It also shows interesting relationships between these three forces and some of the significant independent variables identified earlier. These latter relationships speak to the clustering of independent variables around the key forces, even though they may not be collinear. Similarly, Table 6 illustrates the relationship between the dependent and independent variables for the fourth force, sector. The purpose of

Tables 5 and 6 is to further explore how the various relationships appear to cluster around STEM mission, research mission, socioeconomic status, and institutional sector.

Table 5

Estimated Correlation Coefficients Between Three Key Forces and Dependent Variables and Selected Independent Variables

	STEM Mission (Force 1): pctstem, pct of undergraduate completers who are STEM	Socioeconomic Status (Force 2): pgrnt_p, pct of ft ft awarded Pell Grants	Research Mission (Force 3): mixz065, research expenses per fte
Dependent Variables			
DepSTEM	.902**	-.358**	.477**
DepURSTEM	.724**	-.171**	.428**
DepHDSTEM	.481**	-.174**	.387**
Independent Variables			
pctstem, pct of undergraduate completers who are stem	1.000	-.333**	.435**
pgrnt_p, pct of ft ft awarded Pell Grants	-.333**	1.000	-.349**
mixz065, research expenses per fte	.435**	-.349**	1.000
actmt25, avg ACT math score for top quartile of ft ft enrollees	.464**	-.781**	.384**
coston, total price for out-of-state students living on campus	.249**	-.551**	.177**
grrttot, graduation rate, all ft ft students	.333**	-.685**	.347**
lexptotf, total library expenditures per fte	.339**	-.477**	.431**

	STEM Mission (Force 1): pctstem, pct of undergraduate completers who are STEM	Socioeconomic Status (Force 2): pgrnt_p, pct of ft ft awarded Pell Grants	Research Mission (Force 3): mixz065, research expenses per fte
mixz042, tuition and fees as pct of core revenues	-.307**	.187**	-.563**
mixz053, revenues per fte from private gifts, grants, and contracts	.220**	-.419**	.156**
mixz055, revenues per fte other core revenues	.334**	-.329**	.594**
mixz058, research expenses as pct of core expenses	.418**	-.308**	.929**
mixz064, instruction expenses per fte	.348**	-.561**	.458**
mixz067, academic support expenses per fte	.350**	-.361**	.398**
mixz098, pct of undergrads who are under age 25	.377**	-.554**	.341**
mixz122, endowment assets	.327**	-.499**	.131**
mixz020b, avg salary of full time nonmedical faculty	.353**	-.486**	.541**
Tcompl, total number of undergraduate Completers	.104**	-.059**	.486**
pctft1st, ft ft undergraduates as pct of all undergraduates	.266**	-.354**	.166**

	STEM Mission (Force 1): <i>pctstem</i> , pct of undergraduate completers who are STEM	Socioeconomic Status (Force 2): <i>pgrnt_p</i> , pct of ft ft awarded Pell Grants	Research Mission (Force 3): <i>mixz065</i> , research expenses per fte
<i>pctftfac</i> , pct of instructional staff (faculty) who are full time	.370**	-.241**	.427**
<i>ret_pcf</i> , full time student retention rate	.386**	-.639**	.404**
<i>satmt25</i> , avg SAT math score for top quartile of ft ft students	.495**	-.752**	.453**
<i>sipz08</i> entention rates for underrepresented students	.270**	-.545**	.305**

* $p < .05$. ** $p < .01$.

The importance of STEM mission. As would be expected, institutions that focus primarily on producing STEM degrees rank highly in each of the three agendas (dependent variables). However, other relationships are also apparent for these schools. Moderate relationships exist between *pctstem* and 16 of the other variables, with the strongest connections to SAT and ACT math scores and research expenditures. One likely interpretation is that schools that specialize in STEM degrees are more likely to require or encourage high ACT/SAT math scores upon admission and that these schools are also more likely to invest in research.

The importance of socioeconomic standing. Interestingly, 20 of the independent variables in Table 5 have a negative relationship with *pgrnt_pt*. That is to say, variables that are positively associated with producing STEM graduates are

negatively associated with low-income students. For instance, ACT math scores are moderately associated with producing STEM degrees ($r=.497$, $p<.01$) and are negatively and strongly associated with institutions that enroll larger low-income freshman populations ($r=-.781$, $p<.01$). This means that schools that produce more STEM degrees tend to have freshman populations with higher ACT scores, but these schools are also largely composed of students who are not low-income (see Figure 3).

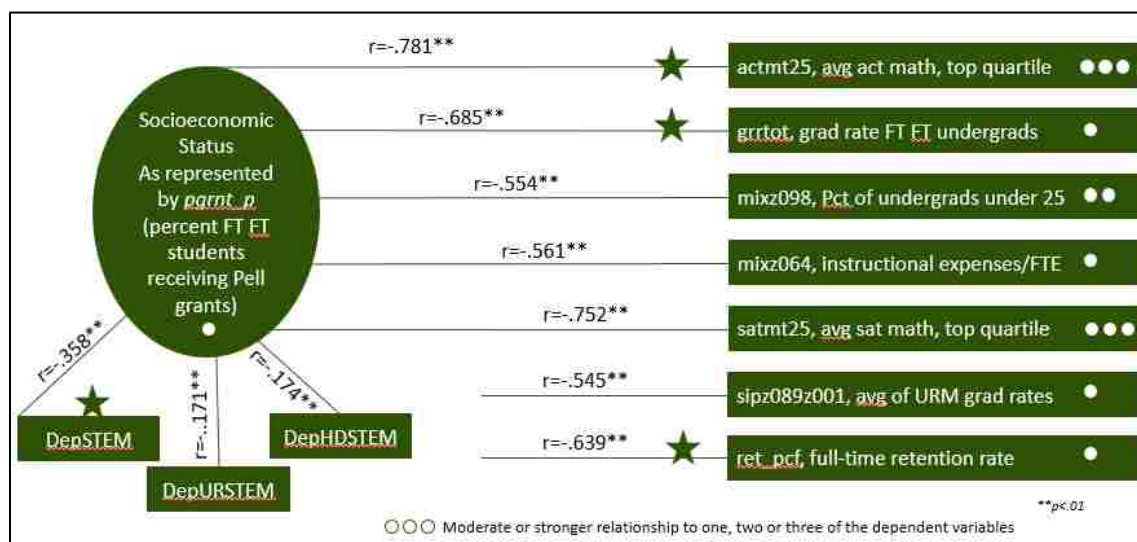


Figure 3. Socioeconomic status cluster.

This same strong negative relationship also exists with SAT math scores, total price for out of state students, instructional expenses per FTE, percentage of undergraduates who are under 25 years of age, full-time retention rates, and graduation rates. Simply stated, producing STEM degrees is associated with lower acceptance, retention, and graduation rates for low-income students.

The importance of research mission. An institution's research mission may also drive other variables. In addition to the relationships between research institutions and ACT/SAT math scores and STEM missions, research institutions are also associated with higher instructional costs (including a higher percentage of faculty who are full-

time, higher average salaries for faculty members, and higher instructional expenses per FTE) and higher library expenditures. There is also a moderate negative relationship between research institutions and low-income student populations (see Figure 4).

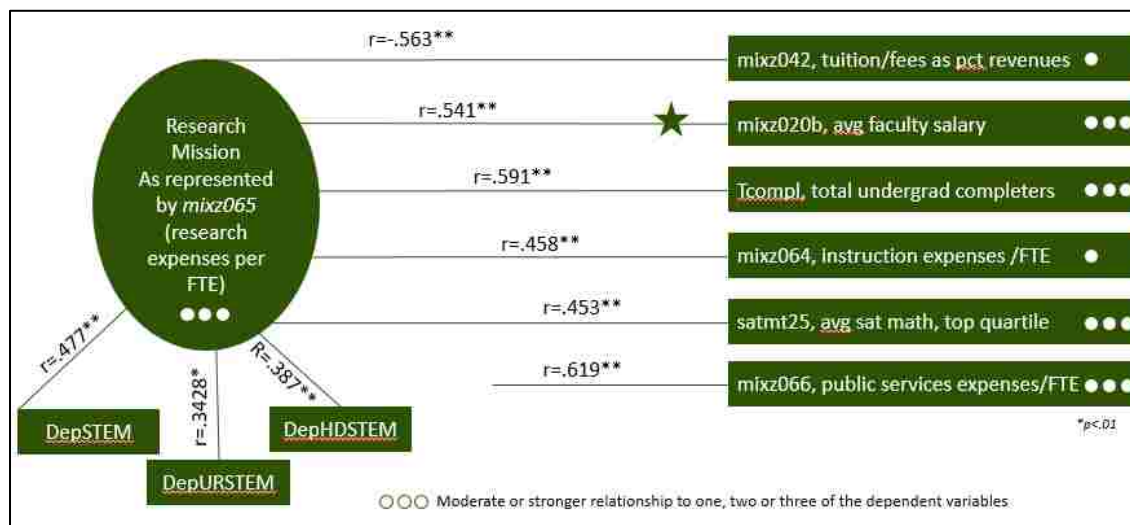


Figure 4. Research mission cluster.

The importance of sector. While *sector* did not emerge as having a moderate or stronger relationship with any of the dependent variables, its repeated presence in the literature prompted me to explore its influence on STEM degree production, especially in relation to high-demand STEM degrees. Many of these high-demand degrees are related to computer programming (see Appendix C). As I noted in Chapter 2, for-profit institutions often specialize in technical programs, such as programming. Table 6 illustrates the differences in the dependent variables and 22 independent variables, based on sector. Means are shown for each, rather than estimated correlation coefficients. *DepSTEM* represents the number of STEM degrees awarded per enrolled student, *DepURSTEM* represents the number of STEM degrees awarded to underrepresented students per enrolled student, and *DepHDSTEM* represents the number of STEM degrees awarded to students in high-demand fields per enrolled student.

Table 6

Means for Dependent and Independent Variables, by Sector

Variables	Public	Private Non-Profit	Private For-Profit
DepSTEM	0.0340	0.0244	0.0178
DepURSTEM	0.0103	0.0079	0.0073
DepHDSTEM	0.0061	0.0038	0.0084
pctstem, pct of undergraduate completers who are stem	0.1908	0.1718	0.1528
pgrnt_p, pct of ft ft awarded Pell Grants	41.67	40.54	64.82
mixz065, research expenses per fte	3424	1265	5.9
actmt25, avg ACT math score for top quartile of ft ft enrollees	19.06	19.78	18.75
coston, total price for out-of-state students living on campus	32300	40317	35079
grrttot, graduation rate, all ft ft students	49.15	55.15	29.65
lexptotf, total library expenditures per fte	529	707	154
mixz042, tuition and fees as pct of core revenues	33.59	60.53	90.36
mixz053, revenues per fte from private gifts, grants and contracts	2025	5660	13
mixz055, revenues per fte other core revenues	4107	1972	294

Variables	Public	Private Non-Profit	Private For-Profit
mixz058, research expenses as pct of core expenses	8.50	1.63	0.05
mixz064, instruction expenses per fte	10968	11073	5273
mixz067, academic support expenses per fte	2893	2852	2191
mixz098, pct of undergrads who are under age 25	78.45	76.35	36.60
mixz122, endowment assets	11426	64533	2084
mixz020b, avg salary of full time nonmedical faculty	75591	65918	61779
Tcompl, total number of undergraduate completers	2181	485	470
pctft1st, ft ft undergraduates as pct of all undergraduates	16.23	18.71	6.78
pctftfac, pct of instructional staff (faculty) who are full time	65	54	36
ret_pcf, full time student retention rate	74.29	74.59	51.79
satmt25, avg SAT math score for top quartile of ft ft students	473.48	481.65	437.17
sipz089z001, avg of undergraduate retention rates for underrepresented students	40.85	47.95	26.03

The most interesting trend illustrated with this sector analysis points to the differences between public and non-profit institutions on one side and for-profit institutions on the other.

Looking at the means for each of the dependent variables, we see that *DepSTEM* public institutions represent the largest sector. The average proportion of STEM degrees awarded for every 12-month FTE enrollment for *DepSTEM* is .340. For private non-profit institutions, this average is .244, and for private for-profit it is .0178. This trend is similar for *DepURSTEM*, led by public (.0103), and followed by private non-profit (.0079), and again by private for-profit (.0073). But this trend changes with *DepHDSTEM*. Here, private for-profit schools represent the largest sector (.0084), followed by public (.0061), and then by private non-profit (.0038).

We see from my analysis that for-profit institutions represent some interesting trends. They are more likely to serve low-income and non-traditional student populations than the other two categories of schools, but they are less likely to retain and graduate their students. They also spend less money on instruction, academic support, and library resources.

Approach Four: Comparison of Descriptive Profiles

For this phase of my exploratory research, I created descriptive profiles to better understand the differences and similarities related to each of the three dependent variables. Specifically, I wanted to explore profiles that answer these questions:

- Do institutions that produce STEM degrees, underrepresented STEM degrees, or high-demand STEM degrees look different from those that do not?

- For institutions that produce STEM degrees, underrepresented STEM degrees, or high-demand STEM degrees, do the schools that produce higher proportions of these degrees look different from those that produce lower proportions?

For approaches four and five, I chose to step back into the literature by including some independent variables that were not individually correlated moderately or stronger to any of the three dependent variables, but were still cited as important to student-level STEM achievement. These variables measure institutional diversity and institutional wealth. I chose to do so because, while these variables may be less important in their individual relationships with the dependent variables, they may yet be important to future researchers building multivariate predictive models.

For each of the three agendas (dependent variables), I first created one profile for institutions that award STEM degrees and one for institutions that do not (see Figure 5). This allowed me to compare variables across these two types of institutions.

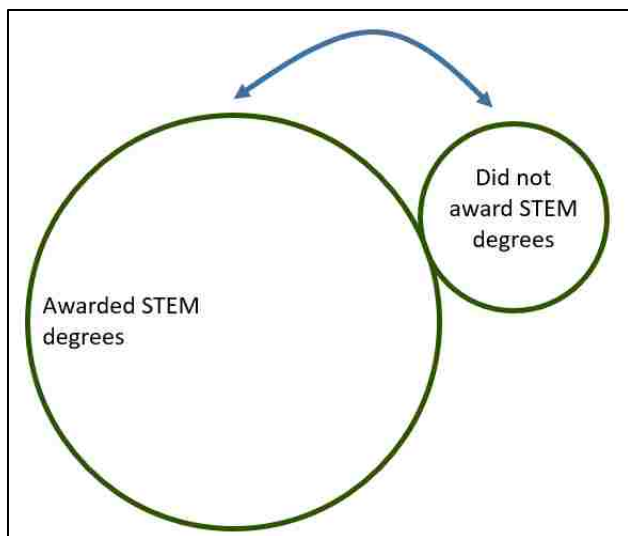


Figure 5. STEM and NOSTEM profiles.

I then created two new profiles, one for the STEM-awarding schools that produced the largest proportion of STEM degrees to enrolled students and one for STEM-awarding schools that produced the smallest proportion of STEM degrees to enrolled students. This allowed me to compare top quartile (top performing) schools to bottom quartile schools (see Figure 6).

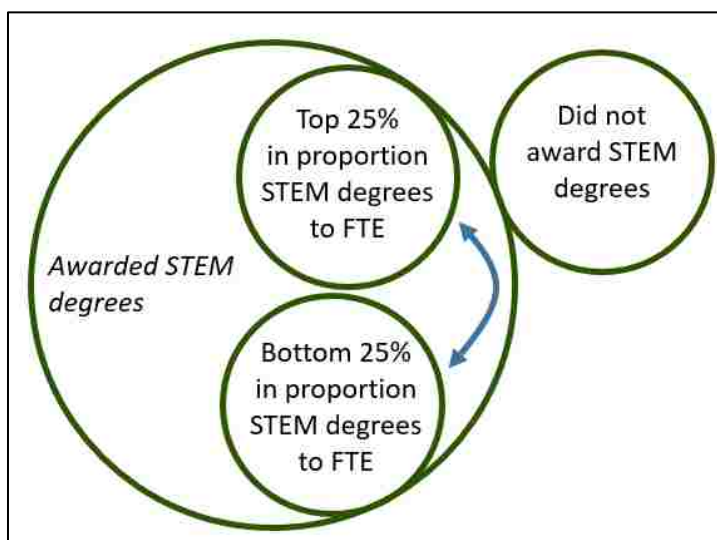


Figure 6. Top and bottom quartile STEM awarding schools' profiles.

I then repeated this process for the URSTEM and HDSTEM agendas. This allowed me to compare profiles across agendas, especially the top quartiles of each agenda (see Figure 7).

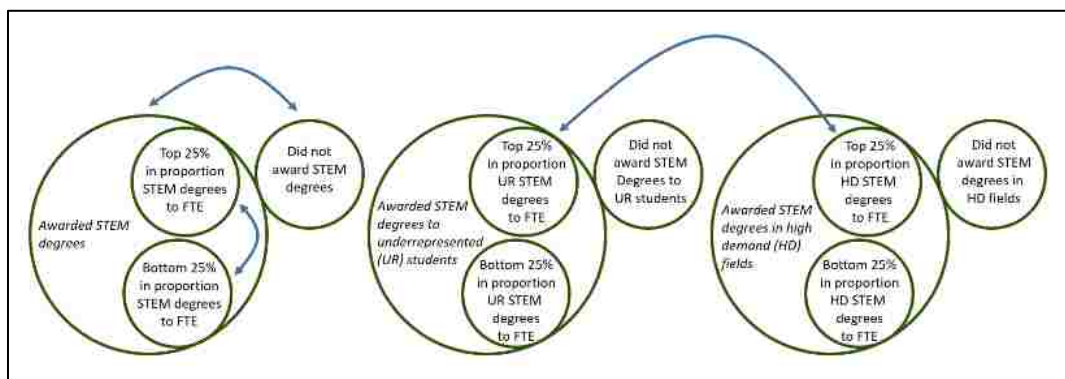


Figure 7. Comparison profiles for all agendas.

Detailed summary: STEM vs. NO STEM. For this analysis, schools that awarded at least one STEM bachelor's degree are abbreviated as STEM, and schools that awarded no STEM bachelor's degrees are abbreviated as NO STEM.

Sector, size, and location. STEM schools ($n = 1644$) are most often private non-profit (55%), followed by public (34%), and then private for-profit (11%). NO STEM ($n = 384$) schools are also most often private non-profit, but at a much higher percent (79%). These schools are only 3% public and are 18% private for-profit. STEM schools also tend to serve much larger undergraduate populations (mean of 6,570) than NO STEM (mean of 607). Finally, STEM schools are less concentrated in city or suburban locations (74% combined) than NO STEM (89%).

Socioeconomic status. STEM schools serve slightly higher proportions of ethnically underrepresented students (25%) than NO STEM (23%). While STEM school average net price (\$19,790) is similar to NO STEM (\$19,208), there are interesting differences in financial aid. STEM schools are more likely than NO STEM to serve

students receiving financial aid (91% compared to 85%), institutional grant aid (69% to 57%), and student loans (65% to 51%). Conversely, NO STEM schools are more likely than STEM schools to serve students receiving Pell Grants (50% compared to 42%).

Standardized math scores. STEM schools have higher top quartile ACT math scores (20) than NO STEM (18) and higher top quartile SAT math scores (480) than NO STEM (450).

Student success. STEM schools compare favorably to NO STEM schools when it comes to student achievement. STEM schools have higher full-time retention rates (73% compared to 68%), graduation rates (52% to 44%), and proportions of bachelor's degree earners who are ethnically underrepresented (23% to 20%).

Faculty. STEM schools and NO STEM schools have similar proportions of faculty from ethnically underrepresented populations (11% compared to 10%, respectively), but STEM schools hire more full-time instructors (56% compared to 50%), and pay their faculty members much more (mean of \$70,720 compared to \$56,810). Surprisingly, NO STEM schools hire more faculty members who are tenured or tenure track (97%) than STEM (80%). Finally, NO STEM schools have lower student to faculty ratios (12:1) than STEM (15:1).

Budget. There are several differences in how STEM and NO STEM schools collect and spend money. STEM schools are less reliant on tuition dollars (55% of core revenues) than NO STEM (63%), and they are less reliant on private gifts, grants, and contracts (9%) than NO STEM (20%). STEM schools spend more money on instruction (41% of core expenses) than NO STEM (37%), slightly more on research (4% compared to 1%), slightly more on academic support (11% to 10%), and slightly more on student

services (16% to 14%). NO STEM schools spend more on institutional support (30%) than STEM (21%).

Detailed summary: STEM TOP vs. STEM BOTTOM. The following analysis was completed only for schools that graduated at least one STEM bachelor's degree. As mentioned earlier, DepSTEM provides a ratio of STEM degrees produced to full-time 12 month FTE. For this analysis, the schools among the top quartile of this ratio (i.e., awarding the most STEM degrees per 12 month FTE) are abbreviated as STEM TOP. Schools among the last quartile of this ratio are abbreviated STEM BOTTOM. STEM TOP and STEM BOTTOM institutions included 411 schools each.

Sector, size, and location. STEM TOP schools compare closely to STEM schools in terms of sector. STEM TOP schools are most often private non-profit (57%), followed by public (35%) and then private for-profit (8%). STEM TOP schools tend to be larger, serving a mean of 7,461 students compared to 4,136 for STEM BOTTOM. There is no difference in the percentage of STEM TOP or STEM BOTTOM schools located in cities or suburbs (74% for each).

Socioeconomic status. Interestingly, STEM BOTTOM schools serve a much higher percentage of ethnically underrepresented students than STEM TOP schools (30% compared to 17%, respectively). STEM TOP schools' average net price (\$21,647) is similar to STEM BOTTOM (\$20,453), and STEM BOTTOM schools are more likely than STEM TOP schools to serve students who need financial aid in every category: students receiving financial aid (93% to 86%, respectively), students awarded institutional grant aid (71% to 70%), students receiving loans (72% to 57%), and students receiving Pell Grants (51% to 32%).

Standardized math scores. On average, STEM TOP schools have higher top quartile ACT math scores (mean = 23) than STEM BOTTOM (mean = 18), and they have higher top quartile SAT math scores (mean = 541) than STEM BOTTOM (mean = 443).

Student success. STEM TOP schools perform better academically than STEM BOTTOM schools. STEM TOP schools have higher retention rates than STEM BOTTOM (82% compared to 64%), higher graduation rates (65% to 41%), and higher graduation rates for ethnically underrepresented students (56% to 34%). However, STEM BOTTOM schools are more likely than STEM TOP schools to award a greater proportion of their degrees to underrepresented students (28% compared to 16%).

Faculty. STEM TOP schools hire fewer ethnically underrepresented faculty members than STEM BOTTOM (8% compared to 12 %, respectively). STEM TOP schools hire a much greater percentage of full-time faculty members than STEM BOTTOM (67% compared to 43%) and pay their faculty members more (\$80,789 compared to \$63,467). STEM BOTTOM schools hire more faculty members who are tenured or tenure track (83%) than STEM TOP (80%). Finally, and in contrast to the trend seen with STEM/NO STEM schools, STEM TOP schools have slightly lower student to faculty ratios (14:1) than STEM BOTTOM (15:1).

Budget. STEM TOP schools are less reliant on tuition income than STEM BOTTOM (46% compared to 68%, respectively). STEM TOP schools also have higher revenues from private gifts, contracts, and grants than STEM BOTTOM (10% compared to 8%), and they have higher revenues from investment returns (18% to 6%). STEM TOP schools spend greater proportions of their budgets than STEM BOTTOM schools on

instruction (41% compared to 39%, respectively) and research (8% to 2%), while STEM BOTTOM schools spend more on student services (19% to 14%) and institutional support (25% to 18%). STEM TOP schools spend more than twice as much money per FTE on library resources than STEM BOTTOM schools (\$898 compared to \$386).

Other profiles. I conducted similar analyses for each of the following:

- Schools that awarded bachelor's STEM degrees to underrepresented students, compared to schools that did not;
- The top quartile of schools that awarded bachelor's STEM degrees to underrepresented students, compared to schools in the bottom quartile;
- Schools that awarded bachelor's STEM degrees in high-demand fields, compared to schools that did not;
- The top quartile of schools that awarded bachelor's STEM degrees in high-demand fields, compared to schools in the bottom quartile.

Rather than describe the details for each analysis here, I will summarize the notable differences. Table 7 summarizes some of the similarities and differences between top and bottom quartiles for each of the three dependent variables.

Table 7 illustrates two sets of relationships. First, it shows the differences in key independent variable means between the top and bottom quartiles of each dependent variable (i.e., STEM TOP Mean, UR STEM TOP Mean). Second, it shows the degree of difference between the top and bottom quartiles for each independent variable under each dependent variable. For instance, in Row 1, looking at STEM TOP and STEM BOTTOM, we see that the means drop 83% between the top quartile and the bottom

quartile. The higher this percentage, the greater the difference is for that variable between top and bottom institutions.

This statistic is important in understanding how different the top schools are from the bottom schools for each variable, and to see how those differences vary among the three agendas. For instance, the percentage of students awarded any aid (row 7) varies little (2%) between the top STEM producing schools (STEM TOP mean) and the bottom schools (STEM BOTTOM mean). However, the percentage of undergraduates from underrepresented student populations (row 6) varies considerably (72%) between the top and bottom STEM producing schools. In other words, where there is a small difference between top and bottom quartile schools, the data may suggest that there is homogeneity or consistency among schools. Where there is a large difference, it may suggest that institutional characteristics vary considerably between top and bottom quartile schools.

Table 7

Differences in Means among STEM Institution Profiles, Selected Independent Variables

Row	Variable	DepSTEM			DepURSTEM			DepHDSTEM		
		STEM TOP Mean	STEM BOTTOM Mean	Diff as Pct of TOP	UR STEM TOP Mean	UR STEM BOTTOM Mean	Diff as Pct of TOP	HD STEM TOP Mean	HD STEM BOTTOM Mean	Diff as Pct of TOP
1	Ratio of Underrepresented STEM Completers to FTE	0.020	0.003	83%	0.024	0.003	89%	0.018	0.007	58%
2	Ratio of High-demand Completers to FTE	0.012	0.002	83%	0.012	0.003	78%	0.019	0.002	91%
3	Average ACT math score for top quartile of FT FT enrollees	22.65	17.81	21%	21.73	18.10	17%	22.61	18.79	17%
4	Average SAT math score for top quartile of FT FT enrollees	541.3	443.3	18%	523.3	449.7	14%	544.7	460.3	15%
5	12 Month Unduplicated Headcount, Undergraduate	7,461	4,136	45%	7,014	4,865	31%	9,141	5,692	38%
6	Percent of undergrad students who are from underrepresented Populations	17.48	29.98	-72%	35.69	20.99	41%	23.99	26.63	-11%

Row	Variable	DepSTEM			DepURSTEM			DepHDSTEM		
		STEM TOP Mean	STEM BOTTOM Mean	Diff as Pct of TOP	UR STEM TOP Mean	UR STEM BOTTOM Mean	Diff as Pct of TOP	HD STEM TOP Mean	HD STEM BOTTOM Mean	Diff as Pct of TOP
7	Pct of full-time first-time undergrads awarded any institutional grant aid	69.96	71.33	-2%	62.66	73.57	-17%	59.98	74.71	-25%
8	Pct of full-time first-time undergrads awarded student loans	57.44	72.10	-26%	59.41	70.12	-18%	61.17	67.25	-10%
9	Pct of first-time, full-time undergrads awarded Pell Grants	31.65	50.92	-61%	42.84	45.33	-6%	42.99	41.33	4%
10	Full-time retention rate	1.92	63.97	22%	77.62	67.09	14%	74.46	72.34	3%
11	Total Number of Completers	1,600	552	65%	1,422	680	52%	1,667	920	45%
12	Percent of completers who are STEM	35%	7%	80%	31.30%	9.76%	69%	30.32%	12.74%	58%
13	Graduation rate, all first-time, full-time students	65.19	41.01	37%	57.54	44.84	22%	53.86	51.00	5%
14	Graduation rate, all first-time full-time underrepresented students (by ethnicity only)	56.43	34.19	39%	51.72	35.69	31%	46.63	42.58	9%

Row	Variable	DepSTEM			DepURSTEM			DepHDSTEM		
		STEM TOP Mean	STEM BOTTOM Mean	Diff as Pct of TOP	UR STEM TOP Mean	UR STEM BOTTOM Mean	Diff as Pct of TOP	HD STEM TOP Mean	HD STEM BOTTOM Mean	Diff as Pct of TOP
15	Proportion of all completers who are underrepresented (by ethnicity only)	16.15%	27.52%	-70%	34.55%	18.49%	46%	22.76%	24.77%	-9%
16	Percent of faculty members who are from underrepresented populations	7.91%	11.92%	-51%	18.22%	7.66%	58%	10.32%	12.17%	-18%
17	Percent of instructional staff who are full time	67.31%	42.54%	37%	64.63%	45.57%	29%	57.64%	55.11%	4%
18	Avg salary of FT nonmedical faculty	\$80,790	\$63,467	21%	\$78,773	\$63,922	19%	\$80,138	\$67,125	16%
19	Tuition & fees as pct of core revenues	46.38	68.18	-47%	46.02	64.24	-40%	56.69	57.18	-1%
20	Private gifts, grants and contracts as pct of core revenues	10.16	7.54	26%	8.96	8.37	7%	7.20	8.66	-20%
21	Investment return as pct of core revenues	18.46	6.11	67%	16.10	6.68	58%	11.29	10.02	11%
22	Research expenses as pct of core expenses	8.06	1.65	80%	6.94	1.93	72%	7.14	2.47	65%

Row	Variable	DepSTEM			DepURSTEM			DepHDSTEM		
		STEM TOP Mean	STEM BOTTOM Mean	Diff as Pct of TOP	UR STEM TOP Mean	UR STEM BOTTOM Mean	Diff as Pct of TOP	HD STEM TOP Mean	HD STEM BOTTOM Mean	Diff as Pct of TOP
23	Institutional support expenses as pct of core expenses	18.45	25.34	-37%	20.91	22.85	-9%	21.83	21.12	3%
24	Total library expenditures per FTE	\$898	\$386	57%	\$853	\$387	55%	\$779	\$499	36%
25	Sector, Public	35	18	49%	33	26	21%	33	31	6%
26	Sector, Private Non Profit	57	62	-9%	55	62	-13%	44	65	-48%
27	Sector, Private For Profit	8	20	-150%	12	13	-8%	24	5	79%

The importance of STEM mission, rows 1 and 2. In all three areas, we see that institutions with STEM-specific missions (i.e., a greater proportion of STEM graduates to 12-month FTE enrollment) are more likely to produce higher proportions of STEM graduates. As discussed earlier, this is primarily an artifact of the way that dependent variables are defined. However, this factor seems to matter less for the high-demand dependent variable (*DepHDSTEM*) than for the other two. In other words, the percentage difference between the top and bottom quartiles for *DepHDSTEM* is less than that for both *DepSTEM* and *DepURSTEM*. It also appears that the top quartile *DepHDSTEM* schools are less STEM-mission specific than the top quartile *DepSTEM* and *DepURSTEM* schools. However, in row 2 we see that top quartile *DepHDSTEM* schools are more high-demand-STEM-focused than the other two. This could be caused by the predominance of computer programming fields in the high-demand list of professions. A predominance of schools that focus their STEM degree programs primarily on programming fields, but that still offer non-STEM degrees, may cause this result.

The importance of ACT/SAT math scores, rows 3 and 4. In all three areas, we see that schools whose top students score higher on ACT and SAT math exams are more likely to graduate higher proportions of STEM degrees. This is true for all three dependent variables. Interestingly, the differences between the top and bottom quartiles are larger for *DepSTEM* than they are for *DepURSTEM* and *DepHDSTEM*.

The importance of institutional size, rows 5 and 11. On average, schools that produce high-demand STEM degrees appear to be larger institutions than *DepSTEM* and *DepURSTEM* schools. This is true in terms of headcount and in terms of degrees awarded. But the difference

between top and bottom quartile *DepHDSTEM* schools is less than it is for *DepSTEM* and *DepURSTEM* schools. This could indicate that there is greater homogeneity among *DepHDSTEM* school sizes than the other two categories. In all three categories, though, larger schools produce higher proportions of STEM graduates. This is true if we view institutional size relative to headcount or relative to the number of degrees awarded.

The importance of underrepresented students and faculty, rows 6, 15 and 16. One of the most striking differences comes in relation to underrepresented students and faculty members. In row 6, we see that for *DepSTEM*, the top quartile schools serve considerably smaller proportions of ethnically underrepresented students (17.48%) than bottom quartile schools (29.98%). In row 15 for *DepSTEM*, the top quartile schools award fewer degrees to ethnically underrepresented students (16%) than bottom quartile schools (28%). Likewise, in row 16, we see that for *DepSTEM* the top quartile schools employ smaller proportions of ethnically underrepresented faculty members (7.91%) than bottom quartile schools (11.92%). In other words, if the goal is simply to produce more STEM degrees (*DepSTEM*), then the top schools are less diverse in their student and faculty populations than the bottom schools.

But if the goal is only to produce more underrepresented STEM graduates (*DepURSTEM*), then we see exactly the opposite trend. For *DepURSTEM*, the top quartile schools educate student bodies that are 35.69% underrepresented students, compared to 20.99% for bottom quartile schools. They graduate 35% underrepresented students, compared to 18% for bottom quartile schools. For *DepURSTEM*, top quartile schools employ faculty populations that are 18% underrepresented faculty, compared to 8% for bottom quartile schools.

If the goal is only to produce high-demand STEM schools (*DepHRSTEM*), then the top quartile again skews towards the negative trend. In other words, for *DepURSTEM*, the greater the diversity of students and faculty the more likely the school is to produce underrepresented graduates. For *DepSTEM* and *DepHDSTEM*, the greater the diversity of students and faculty, the less likely the school is to produce STEM or high-demand STEM graduates.

It should be noted again that the three national STEM agendas (represented by the three dependent variables), do not exist separate from each other. For instance, rarely would a national leader say that we should increase the number of STEM degrees produced, but we should not also try improve STEM achievement for traditionally underrepresented populations. However, as we have seen in the literature, studies and recommendations do sometimes target these agendas in isolation from each other.

The importance of low-income students, rows 8 and 9. As with ethnically underrepresented students, the top STEM producing schools appear to have an inverse relationship with low-income students (as represented by their need for financial aid). Pell-receiving students make up only 32% of the top quartile *STEM* schools but 51% of the bottom quartile. Loan recipients represent 57% of students in the top quartile but 72% of students in the bottom quartile. We see a smaller effect when looking at the *DepURSTEM* outcome. For the top quartile of schools that produce STEM degrees for traditionally underrepresented students we see that 43% of the students received Pell, compared to 45% for the bottom quartile. Loan recipients make up 59% in the top quartile and 70% in the bottom quartile. It appears that the colleges that serve smaller populations of low-income students produce more STEM degrees, and they also

produce more underrepresented STEM degrees. However, this effect seems far more pronounced when looking only at the STEM agenda than it does when looking at the underrepresented STEM agenda.

The importance of faculty status and salary, rows 17 and 18. In all three agendas, we see that the top quartile schools are more likely to have larger proportions of faculty members who are full-time, but the effect sizes are different. For *DepSTEM*, the top quartile of schools employ faculty groups that are on average 67% full-time, and the bottom quartile of schools employ faculty groups that are on average 43% full-time. This represents a difference of 24 percentage points. But for *DepHDSTEM*, the top quartile of schools employ faculty groups that are on average 58% full-time, while the bottom quartile of schools employ faculty groups that are on average 55% full-time. This represents a difference of only three percentage points. This may suggest that schools producing high-demand STEM degrees (*DepSTEM*) may be more consistent in their use of full-time faculty than schools that award any STEM degrees (*DepHDSTEM*). Salary ranges are similar between all three agendas, with top quartile schools paying 16-21% more than bottom quartile schools.

The importance of instruction and research budgets, rows 22 and 23. For *DepSTEM* and *DepURSTEM*, the bottom quartile schools spend a greater proportion of their budgets on instruction than the top quartile schools. For *DepHDSTEM*, the bottom quartile schools spend slightly less than the top quartile schools. This may be explained by the prominence of for-profit schools within the top quartile of *DepHDSTEM* schools (24%). These schools expend more

money on institutional support (including marketing) than either of the other two schools, leaving less money for instruction.

For all three agendas, top quartile schools spend a greater proportion of their budget on research, and at significantly higher rates. For *DepSTEM*, top quartile schools spend 80% more than bottom quartile schools. For *DepURSTEM* the difference is 72%, and for *DepHDSTEM* the difference is 65%.

The importance of sector, rows 25, 26, and 27. Public schools are consistently represented in top and bottom quartile schools across all three agendas. For instance, public schools make up 35% of top quartile *DepSTEM* schools, 33% of top quartile *DepURSTEM* schools, and 33% of top quartile *DepHDSTEM* schools. The interesting variance comes in private non-profit and private for-profit schools. Private non-profit schools make up 57% of top quartile *DepSTEM* schools and 55% of top quartile *DepURSTEM* schools, but only 44% of top quartile *DepHDSTEM* schools. Private for-profit schools show an opposite trend. These schools make up only 8% of the top quartile *DepSTEM* schools and 12% of the top quartile *DepURSTEM* schools, but they make up 24% of the top quartile *DepHDSTEM* schools. This could mean that private non-profit schools are less likely to attract and/or graduate students in high-demand fields than private for-profit schools.

It is also interesting to look at how each sector operates within each agenda. Public schools are more likely to be in the top quartile colleges in all three agendas. Private non-profit schools are more likely to be in the bottom quartile colleges in all three agendas. Private for-

profit schools are more likely to be in the bottom quartiles for *DepSTEM* and *DepURSTEM*, but they are more likely to be in the top quartile for *DepHDSTEM*.

Approach Five: The Best of All Worlds

Though not part of my original research question, my analysis led me to two new questions. First, are there colleges and universities that complete all three agendas reasonably well, and if so, what do these institutions look like? Second, are there colleges and universities that complete all three agendas reasonably well, and do so while serving larger populations of low-income students and ethnically underrepresented students, and with reasonably high retention and graduation rates? If so, what do these schools look like?

To answer these questions, I first established a metric for “reasonably well.” For the first question, I looked at institutions that ranked in the top half of all three agendas. These institutions I called *superSTEM*.

For the second question, I wanted a bit more granularity. I looked at institutions that ranked in the top half of all three agendas and ranked in the top half of the following independent variables:

- *MIXz101*, percent of undergraduate students who are from underrepresented populations;
- *pgrnt_p*, percent of undergraduate students who were awarded Pell Grants;
- *ret_pcf*, full-time undergraduate retention rate;
- *grrttot*, graduation rate for all first-time, full-time students;
- *SIPz089z001*, graduation rate for ethnically underrepresented students.

These institutions I called *superSTEMplus*. But knowing that would be a small group, I also looked at institutions that ranked in the top half of all three agendas and that ranked in the top 75% of the above independent variables. These schools I called *superSTEMminus*.

In summary, the three categories of schools are defined as:

- *superSTEM*: Schools that rank in the top half of all three agendas (*depSTEM*, *depURSTEM*, and *depHDSTEM*).
- *superSTEMminus*: *superSTEM* schools that rank in the top 75% of the five diversity and academic attainment variables listed above.
- *superSTEMplus*: *superSTEM* schools that rank in the top 50% of the five diversity and academic attainment variables listed above.

SuperSTEM contains 318 schools, *superSTEMminus* contains 148, and *superSTEMplus* contains nine. The nine *superSTEMplus* institutions are shown in Table 8.

Table 8

List of superSTEMplus Institutions

Institution Name	Location	Pct Hispanic
Dominican University	River Forest, IL	40%
University of California, Riverside	Riverside, CA	36%
California State Polytechnic University, Pomona	Pomona, CA	37%
Notre Dame de Namur University	Belmont, CA	34%
St. Mary's University	San Antonio, TX	72%
California State University, Channel Islands	Camarillo, CA	41%
University of Illinois at Chicago	Chicago, IL	25%
Saint Peter's University	Jersey City, NJ	28%
Saint Xavier University	Chicago, IL	23%

Table 9 allows us to easily compare the superSTEM, superSTEMminus and superSTEMplus schools to the top schools in each of the three agendas (depSTEM, depURSTEM, and depHDSTEM). In other words, we can compare the best schools through two different lenses: (1) the best schools, as defined by producing the highest proportions of graduates in one of the three agendas; and (2) the best schools, as defined by producing high

proportions of graduates in all three agendas and doing so with emphasis placed on diversity and academic attainment.

Specifically, this comparison allows us to answer these questions:

- Are there important similarities or differences between any of the *superSTEM* categories and any of the top dependent variable categories? For instance, do *superSTEM* schools resemble top STEM producing (*depSTEM*) schools, and do *superSTEMminus* schools resemble top underrepresented STEM producing (*depURSTEM*) schools?
- Are there important similarities or differences between the three *superSTEM* categories? For instance, are *superSTEMplus* schools more likely to be public institutions than *superSTEM* schools?

Table 9

Comparison of Means, Top Quartiles Compared to superSTEM Categories

Row	Variable	STEM TOP (Mean)	UR STEM TOP (Mean)	HD STEM TOP (Mean)	superSTEM (Mean)	superSTEM minus (Mean)	superSTEM plus (Mean)
	Number of cases	411	398	318	369	148	9
1	Ratio of Underrepresented STEM Completers to FTE	0.0201	0.0239	0.0176	0.0197	0.0182	0.0215
2	Ratio of High Demand Completers to FTE	0.0120	0.0118	0.0194	0.0156	0.0134	0.0074
3	average ACT math score for top quartile of FT FT enrollees	22.65	21.73	22.61	22.56	20.68	19.86
4	average SAT math score for top quartile of FT FT enrollees	541.32	523.35	544.67	540.86	499.75	466.5

Row	Variable	STEM TOP (Mean)	UR STEM TOP (Mean)	HD STEM TOP (Mean)	superSTEM (Mean)	superSTEM minus (Mean)	superSTEM plus (Mean)
5	12 Month Unduplicated Headcount, Undergraduate	7,461	7,014	9,141	10,296	12,203	8,671
6	Percent of undergrad students who are from underrepresented populations	17.48	35.69	23.99	22.84	29.15	46.94
7	Pct of full-time first-time undergrads awarded any institutional grant aid	69.96	62.66	59.98	63.54	65.53	78.22
8	Pct of full-time first-time undergrads awarded student loans	57.44	59.41	61.17	57.57	58.55	62.22

Row	Variable	STEM TOP (Mean)	UR STEM TOP (Mean)	HD STEM TOP (Mean)	superSTEM (Mean)	superSTEM minus (Mean)	superSTEM plus (Mean)
9	Pct of first-time, full-time undergrads awarded Pell Grants	31.65	42.84	42.99	36.66	42.55	56.67
10	Full-time retention rate	81.92	77.62	74.46	79.87	77.97	79.78
11	Total number of completers	1,600	1,422	1,667	2,075	2,488	1,872
12	Percent of completers who are STEM	35%	31.30%	30.32%	31.73%	26.62%	21.95%
13	Graduation rate, all first-time, full-time students	65.19	57.54	53.86	61.17	57.9	59.22
14	Graduation rate, all first-time full- time underrepresented students (by ethnicity only)	56.43	51.72	46.63	53.74	52.45	56.54

Row	Variable	STEM TOP (Mean)	UR STEM TOP (Mean)	HD STEM TOP (Mean)	superSTEM (Mean)	superSTEM minus (Mean)	superSTEM plus (Mean)
15	Proportion of all completers who are underrepresented (by ethnicity only)	16.15%	34.55%	22.76%	21.99%	27.30%	41.93%
16	Percent of faculty members who are from underrepresented populations	7.91%	18.22%	10.32%	9.99%	11.14%	11.87%
17	Percent of instructional staff who are full time	67.31%	64.63%	57.64%	64.07%	60.57%	49.54%
18	Avg salary of FT nonmedical faculty	\$80,790	\$78,773	\$80,138	\$83,884	\$80,002	\$81,444
19	Tuition & fees as pct of core revenues	46.38	46.02	56.69	47.71	45.09	49.33

Row	Variable	STEM TOP (Mean)	UR STEM TOP (Mean)	HD STEM TOP (Mean)	superSTEM (Mean)	superSTEM minus (Mean)	superSTEM plus (Mean)
20	Private gifts, grants and contracts as pct of core revenues	10.16	8.96	7.20	8.29	6.58	4.77
21	Investment return as pct of core revenues	18.46	16.10	11.29	14.27	8.94	6.33
22	Research expenses as pct of core expenses	8.06	6.94	7.14	8.96	8.2	4.55
23	Institutional support expenses as pct of core expenses	18.45	20.91	21.83	18.26	17.32	18.44
24	Total library expenditures per FTE	\$898	\$853	\$779	\$872	\$583	\$501
25	Sector, Public	35	33	33	41	56	44
26	Sector, Private Non Profit	57	55	44	47	36	56

Row	Variable	STEM TOP (Mean)	UR STEM TOP (Mean)	HD STEM TOP (Mean)	superSTEM (Mean)	superSTEM minus (Mean)	superSTEM plus (Mean)
27	Sector, Private For Profit	8	12	24	12	8	0

As seen in Table 9, *superSTEM* and *superSTEMminus* generally align with either *depSTEM* or *depURSTEM*, depending on the independent variable under consideration.

superSTEMplus schools have lower ACT/SAT scores. For the nine *superSTEMplus* schools, we see that ACT and SAT math scores are nearly 10% lower than for *depSTEM* and *depURSTEM* (rows 3 and 4). Thus, *superSTEMplus* schools appear to be less selective than the top STEM producing and underrepresented STEM producing schools in terms of standardized exams.

superSTEMplus schools have greater diversity. *superSTEMplus* schools are also more diverse than their peers. *superSTEMplus* schools serve undergraduate populations that are nearly three times as ethnically diverse as *DepSTEM* top quartile schools, and 11% more so than *DepURSTEM* top quartile schools (row 6). *superSTEMplus* schools also graduate higher proportions of underrepresented students than either of the other categories (row 15). *superSTEMplus* schools serve lower-income populations than either *DepSTEM* or *DepURSTEM* top quartile schools, as measured by Pell Grant recipients (row 9) and loan recipients (row 8). Interestingly, all nine of the *superSTEMplus* schools have sizeable Hispanic student populations, well above the average of 9% for all schools in my study.

superSTEMplus schools are larger, but less STEM focused. *superSTEMplus* schools appear to be slightly larger than *DepSTEM* and *DepURSTEM* top quartile schools, both in terms of enrollments (row 5) and degrees awarded (row 11). However, *superSTEMplus* schools are less STEM-focused (row 12).

superSTEMplus schools have higher graduation rates. In terms of academic success, *superSTEM* schools have overall graduation rates below *DepSTEM* top quartile

schools, but above DepURSTEM schools (row 13). Retention rates also fall between the two (row 10). However, superSTEMplus graduation rates for underrepresented students exceed those of both other categories (row 14).

superSTEMplus schools pay higher faculty salaries. Interestingly, *superSTEMplus* schools are far less likely to rely on full-time faculty members than either *DepSTEM* or *DepURSTEM* top quartile schools (row 17), but are more likely to pay these faculty higher salaries (row 18).

superSTEMplus schools spend less on research. *superSTEMplus* schools appear to earn a smaller proportion of their budget from investment returns than their peers (row 21) and spend a smaller proportion on research (row 22). They also spend less on library expenditures (row 22).

There are no for-profit superSTEMplus schools. Finally, while *superSTEMplus* schools follow the trend of most often coming from the private non-profit sector, followed by the public sector, there are no *superSTEMplus* schools at all in the private for-profit sector.

superSTEMplus private schools are largely Catholic. Five of the six private schools (Dominican University, Notre Dame de Namur University, St. Mary's University, Saint Peter's University, and Saint Xavier University) are Catholic institutions.

Analysis Conclusion

The process of triangulation allowed me to explore the same data set from five different approaches. Similar patterns emerged from these approaches, allowing me to identify important factors to consider in answering my research question. Most

importantly, an institution's STEM mission, research mission, sector, and socioeconomic mission appear to be important to understanding their role in STEM production relative to the three agendas.

Chapter Five

Implications

Research Question Summary

I set out to answer the following research question: Which types of four-year colleges and universities are most likely to produce higher proportions of: (1) STEM graduates, (2) traditionally underrepresented STEM graduates and (3) high-demand STEM graduates? Through the use of exploratory research, I discovered that there are indeed differences between the institutions that excel at each of the three agendas. These differences are illuminated by the following observations:

- (1) Variables that measure institution size, ACT/SAT math scores, and STEM mission are those most closely related to the three dependent variables.
- (2) Academic achievement, institutional wealth, sector, research mission, and diversity variables also appear important to understanding the differences between institutions relative to the three national agendas.
- (3) Multiple important independent variables appear to cluster around socioeconomic status, which was closely associated with ACT math scores, SAT math scores, graduation rates, instructional expenses, and retention rates, among others.
- (4) In general, colleges and universities that produce the highest proportions of STEM graduates (depSTEM) tend to enroll students with higher ACT and SAT math scores than their peers and produce higher retention and graduation rates. They tend to expend more of their budget on research and are more likely to include for-profit institutions. However, these schools tend to enroll fewer

underrepresented and low-income students than their peers. They also employ fewer underrepresented faculty members.

- (5) Colleges and universities that produce the highest proportions of STEM degrees among underrepresented populations (depURSTEM) tend to enroll higher proportions of underrepresented and low-income students than their peers and hire greater proportions of underrepresented faculty members. These schools also tend to be smaller than the top schools in either of the other two STEM-producing categories.
- (6) Institutions that produce the highest proportions of STEM degrees in high-demand majors (depHDSTEM) tend to enroll students with higher ACT and SAT math scores than their peers and enroll larger student populations. These schools also include a greater proportion of for-profit schools. However, these institutions produce lower retention and graduation rates than their peers.

Limitations

The nature of exploratory research. One important note to consider when reviewing the implications of my research is that my findings are not causal. In other words, if an institution wants to increase the number of STEM degrees awarded to underrepresented students, my research does not indicate that lowering ACT and/or SAT math requirements will produce that result, even though schools that produce more of these degrees enroll students with lower ACT and/or SAT math scores. This distinction is crucial, and is in keeping with the nature of exploratory research.

Rather, the implications that follow suggest starting points for further analysis and research. For instance, I do not recommend that federal policy makers hold one sector more or less accountable than the other sectors, but rather that federal policy makers further consider the relationships between sector and STEM production.

My research has established that institutions do vary in accordance with the three STEM agendas, and it has shown some of the ways this variance takes shape. In effect, it is a valuable survey of the landscape, but not a map to a specific destination.

The importance of definitions. There are several important definitions that define my study. First, I selected the Homeland Security definition for STEM professions specifically because it is supported with CIP codes (degree major codes) that allow me to calculate the dependent variables. Other definitions (for instance, by the National Science Foundation) are also commonly utilized in higher education and differ significantly from the Homeland Security definition. Consequently, use of a different STEM definition might result in radically different findings. Second, as discussed in Chapter 3, my definition of the dependent variables skew findings towards colleges with STEM-specific missions. While this was the best option available to me, it should still be considered a limitation of my research.

The nature of secondary data. Another important limitation is my use of secondary data. The data I utilized was not designed or collected specifically to answer my research questions. One result is that I had to adapt data proxies to answer my questions, and sometimes these are proxies for proxies. For example, the socioeconomic status of students is obviously important to my research question. The most direct

method for determining SES might be for each college or university to look at individual income tax statements, then to report multiple average income numbers (parents, student, spouse, etc.) to the National Center for Education Statistics, then to be included in IPEDS. But this is not how the system works, and some might argue such a system would not be feasible or wise. Therefore, the best option available to me was to utilize Pell Grant recipients as a proxy for SES (as mentioned in Chapter 2). However, IPEDS makes this data available only for first-time, full-time (FT FT) freshmen. In a sense, then, Pell-receiving status is a proxy for SES, and FT FT Pell receiving status is a proxy for Pell-receiving among the entire student population.

Another result of using secondary data is that there is simply missing information that could prove useful. For instance, the literature suggests that high school grade point averages are better predictors of college success than standardized scores but that information is not available in IPEDS.

Finally, because I chose to utilize the most recent, degree completion data available when I began each phase of my research, data come from two different time frames (IPEDS years 2014 and 2015).

The nature of college graduation. The dependent variables in my research were centered on bachelor's degree graduations. College graduation in and of itself has little societal value. To society, college degrees pay off when graduates enter the workforce. My study stops at the former and does not reach into the latter. Completion of a STEM bachelor's degree cannot be assumed to represent eventual entry into the STEM workforce.

Recommendations

Participants in policy change. Kingdon's multiple streams theory (1984) describes the way that issues rise to national prominence, become actionable, and are acted upon by various visible and hidden participants. As I described in Chapter 2, STEM higher education has achieved this national stature. My research is designed to inform those participants currently studying and modifying policy in the arena of STEM higher education, including visible participants (i.e., federal and state legislators, university presidents) and hidden participants (i.e., legislative staffers, bureaucrats, and university faculty, staff, and administrators).

For each of the recommendations in this section, I propose specific action items and identify the participants I feel are most likely to act upon them. There are likely other participants (especially hidden participants) who may also find these recommendations of value.

Target funding to specific STEM agendas (state and federal legislators).

Since federal and state governments provide limited direct oversight of higher education institutions, the most important policy lever they wield is funding. As described in Chapter 2, this funding is provided through direct appropriations and grants, among other methods. Processes vary considerably for determining which institutions get funded and how much funding is distributed. However, one method utilized by the U.S. Department of Education, the National Science Foundation, Health and Human Services, and other departments is to award grants to specific types of institutions (i.e., historically black colleges and universities, low-income serving schools, and Hispanic-serving institutions),

based on federal priorities. Similarly, through incentive funding mechanisms, states award funding to institutions based on state priorities.

The variables I identified as important can inform those priorities. For instance, if states or government agencies place a high value on diverse STEM graduates, then they may want to consider providing additional funding to the schools that are most likely to produce that result. Specifically, they may want to fund schools that enroll high percentages of low-income or ethnically diverse students in order to connect the money most directly to the students they intend to serve. They may also wish to target specific outcomes for improvement. For instance, these schools tend to have lower retention and graduation rates than their peers. Funding could be targeted specifically to high impact practices that improve student success.

Diversify top-producing STEM schools (state and federal legislators). State and federal policy makers may wish to incentivize some schools to become more diverse. For instance, the top quartile of STEM producers award 211,506 STEM degrees and 61,300 STEM degrees to underrepresented students. The top quartile of underrepresented STEM producers award 174,682 STEM degrees and 62,548 STEM degrees to underrepresented students. So even though the underrepresented STEM producers award a higher proportion of their STEM degrees to underrepresented students, they produce only marginally more of these degrees than the top quartile STEM producers. At the same time, top quartile underrepresented STEM producers have lower graduation rates (57.54%) than top quartile STEM producers (65.19%). Perhaps federal or state funders could develop financial incentives for colleges or universities that

strategically and effectively increase the diversity of their enrolled and graduated student populations over time.

Explore the relationship between sector and STEM production (state and federal legislators, state and federal bureaucrats). In addition, federal and state policy makers may want to examine more closely the relationship between sector and STEM production. Specifically, they may want to explore the nature of for-profit schools in attracting, retaining, and graduating STEM students in multiple disciplines. Policy makers should also examine this issue in relation to declining state higher education budgets. The increase in enrollments at for-profit colleges coincided with nationwide decreases in state funding for higher education (Deming, Golden & Katz, 2013). In other words, decreases in state funding gave rise to for-profit schools that wasted tax dollars, defrauded students and taxpayers, and preyed on low-income and other underrepresented students. Though state legislators did not explicitly set out to choose one of the three STEM agendas over the others, the unintended consequences of their actions certainly disadvantaged the production of STEM degrees among underrepresented students. I suggest that state legislators further explore this and other unintended consequences of tightening state higher education budgets.

Explore the relationship between SES and STEM degree production (state and federal legislators, state and federal bureaucrats). Federal and state policy makers should pay special attention to how important SES is to producing STEM degrees. An institution's proportion of low-income students is strongly related to many other independent variables. Since STEM professionals are most often paid higher than

other employment clusters, higher education institutions could be creating a “rich get richer” system by not adequately addressing the needs of schools that serve high proportions of low-income students.

Consider changing policies regarding the use of ACT and SAT scores in college admissions (state legislators, boards of regents, university presidents, university chief enrollment officers). If ACT and SAT scores are not highly predictive of college success (as evidenced in Chapter 2), but tend to be important to graduating a more diverse STEM student population, then are institutional policies regarding ACT/SAT scores in admission appropriate to institutional goals? Colleges should research their own STEM degree outcomes at the individual student level to further understand the relationship between ACT/SAT scores, STEM production, and diversity. They should explore whether these scores are utilized more to screen students out than to identify students most likely to succeed.

Consider changes in institutional costs for low-income students (state legislators, boards of regents, university presidents, university chief financial and enrollment officers). Policy makers should research how the relationship between SES and STEM production takes shape at their institution. For instance, would their own institutional research indicate that they may want consider changes in tuition charges, tuition discounts, or scholarships in order to serve a larger, low-income population, especially relative to their STEM goals?

Investigate the institutions that are effective at all three agendas (state legislators, boards of regents, bureaucrats, university presidents, university faculty,

administrators and staff). As seen in Chapter 4, there are institutions that meet all three national agendas, and that also produce high levels of academic achievement among diverse student populations. Policy makers should investigate these schools to determine whether these outcomes are the result of circumstance or the result of strategically implemented policy changes. If the latter, policy makers should explore to what extent these policies are transferrable or scalable.

Study the nimbleness of for-profit schools (boards of regents, university presidents, university faculty, administrators and staff). From my research, we know that private for-profit schools have focused on educating students in high-demand STEM disciplines. From the literature, we know that these schools leverage their nimbleness in order to quickly meet emerging industry demands, but that they do so with much lower student academic achievement rates. Universities should research and implement structures that allow them to move more quickly to meet the needs of industry, but without sacrificing high student achievement.

Expand the functionality of IPEDS (U.S. Department of Education administrators). Currently, IPEDS includes ACT and SAT scores and sub-scores for the top quartile of first-time, full-time freshmen. However, the literature indicates these variables are not highly predictive to college graduation. I suggest that IPEDS be expanded to collect and report high school performance variables that are more predictive, specifically: (1) high school GPA for top quartile of first-time, full-time freshmen; and (2) high school GPA in college preparatory classes for top quartile of first-time, full-time freshmen.

In addition, pulling degree completion data for STEM students was a laborious task. I recommend that IPEDS creates degree completion clusters to better support researchers. Specifically, I suggest at least the following: (1) STEM degrees, NSF definition, (2) STEM degrees, Homeland Security definition, (3) social science degrees, (4) humanities and arts degrees, and (4) business degrees. Clusters should be created in collaboration with higher education researchers across all sectors and institution types.

Future Research

When considering future research relevant to my dissertation, it is crucial to note one important distinction. My research focused on institutions as the unit of analysis, not individual students. For example, my research explored the relationship between institutions that enroll high percentages of low-income students and the institutional production of STEM degrees. It did not explore the relationship between a student's income level and that student's likelihood of earning a STEM degree. This distinction is central to my research.

The body of literature surrounding students as the unit of analysis, especially focusing on predictors of academic attainment, is already extensive. There are studies that look at high school GPA, ACT/SAT scores, college-prep curriculum, honors/AP curriculum, math proficiency, and so forth. These studies attempt to predict which factors matter in students earning degrees. My research is guided by these studies, but it does not inform them or provide new directions for them.

Instead, my research concerns institutions and their roles in producing STEM degrees. This is an area where far less literature exists. The studies that have been

conducted have generally focused on pre-established institutional types (for instance, the role historically black colleges and universities play in producing STEM awards among African American students). My research pushes us back further, to reconsider institutional categories with the hope of better understanding the impact of colleges on STEM degree production, relative to the three national agendas.

Consequently, the additional research I suggest is focused on the trends that have emerged relative to the variables I found to be important to institutional production of STEM degrees. Below are some of the questions I suggest need further exploration:

- **Predictive model:** My research identified several variables that might be most important for understanding an institution's STEM degree production, namely: socioeconomic status of students, diversity of students and faculty, research mission, STEM-specific mission, sector, and standardized test scores. I would suggest that future researchers attempt to develop a predictive model based on these variables.
- **STEM mission:** What is the role that tech and engineering institutions (schools with clear STEM-specific missions) play in the national production of STEM degrees? Do they produce the lion's share, and if so, what role do they play in diversifying STEM professions?
- **Research mission:** What is the role that research institutions play in the national production of STEM degrees? How do they leverage their research assets to improve undergraduate education, and are those efforts effective at increasing graduation rates and diversifying the STEM workforce?

- **ACT/SAT and SES:** An institution's proportion of freshmen that are low-income appears strongly connected to an institution's freshman ACT/SAT scores and to its retention and graduation rate, among other variables. I suggest that we need to better understand these relationships. To what extent are these connections the product of conscious policy decisions, and to what extent are they the product of institutional evolution? If they are driven by policy decisions, are these policies achieving their goal? Are they creating unintended consequences? To what extent do these policy decisions reinforce existing socioeconomic power structures, and is that reinforcement congruent with the mission of higher education in general, or the mission of individual institutions in specific?
- **ACT/SAT utilization:** We know from Chapter 2 that more than half of surveyed institutions feel that ACT and SAT scores are of considerable importance to their college admission processes. But how are these scores utilized at the departmental level? For instance, do engineering departments utilize SAT math scores in determining departmental admission? Are ACT and SAT math scores used for placement into college math courses? The importance of ACT and SAT scores to STEM degree production may not rest entirely with the admissions office, but rather with the different ways the scores are utilized around the institution.
- **SES and academic attainment:** Why do institutions with higher percentages of low-income students have lower retention and graduation rates? Is this entirely a product of student level preparation, or do institutional factors play a role? Are

there colleges that prove the exception to the rule? And if so, what are these colleges doing to improve academic performance among low-income student populations?

- **Budget:** To what extent do expenditures for instruction, instructional support, and/or student services result in higher STEM graduation rates? Do the costs differ for producing STEM degrees relative to the three national agendas (STEM, URSTEM, and HDSTEM)?
- **Location:** My research made only a cursory pass at the importance of institutional location. I suggest more research is needed to better understand the role that institutions play in STEM production based on their proximity to metropolitan or rural settings.
- **Workforce:** As noted earlier, we cannot assume that a student who graduates with a STEM bachelor's degree will enter the STEM workforce. Additional research is needed to understand the STEM college to workforce pipeline, particularly the roles that colleges play in reinforcing or ignoring this transition point.
- **Faculty salaries:** My research indicates that STEM-degree-awarding schools pay their faculty members higher salaries than schools that do not. But what does this phenomenon look like within individual colleges? Do STEM faculty within individual institutions earn higher salaries than non-STEM faculty within the same institutions? If so, what problems or opportunities arise from this discrepancy? Does this discrepancy have any bearing on STEM degree

production? In other words, do colleges with greater salary discrepancies tend to produce more STEM degrees than those with lesser discrepancies?

- **Diversity:** Institutions that are highly effective at simply producing more STEM degrees are less diverse than institutions that are highly effective at producing more STEM degrees among underrepresented populations, yet they have higher retention and graduation rates. What is the nature of this phenomenon? Is it driven by possibly lower levels of academic preparedness among underrepresented student populations (especially low-income students)? Or is it driven by institutional culture and policy decisions that intentionally maintain low levels of diversity in specific institutions?
- **superSTEMplus schools:** Most importantly, what are the superSTEMplus schools doing that make them so effective at meeting all three agendas, while still upholding high student success standards? Is their success a result of circumstance or the result of deliberate and strategic planning?
- **Other research:** Finally, the nature of my research resulted in a large dataset that can be used to tackle other important questions, even those unrelated to STEM. For instance, what is the relationship between library expenditures and student success, or between student SES and institutional use of tenure?

Conclusion

My journey towards this research topic began 15 years ago at the University of Alaska, where I co-authored and supervised my first U.S. Department of Education grant. That grant, which increased higher education access and support for rural Alaskans, was

funded by the Alaska Native and Native Hawaiian-Serving Division. Since that time, I have written and/or supervised eight other grants designed to strengthen colleges or universities that serve high proportions of low-income, Alaska Native, Native American, and Hispanic students. Five of these grants were focused specifically on STEM student success.

Through these experiences, I attended and presented at numerous professional conferences, and I read countless national and regional reports focused on STEM higher education. The more time I spent engaged in STEM education conversations, the more I saw two primary agendas emerge: the need to generate more STEM degrees in America, and the need to graduate more underrepresented students in STEM fields. The third agenda, the need to graduate more students from high-demand fields, emerged quietly and much more slowly. It appeared to emerge more in the context of the STEM pushback and the counter arguments to that resistance.

As I completed my Educational Leadership coursework, these three agendas crystalized into a specific research pondering. Specifically, I began asking, “Are we funding the right schools? Are we spending tax money on the institutions that are most likely to achieve our societal aims in regards to STEM degree production?”

Today, while I have not fully answered those musings, I feel I am closer to understanding the assumptions behind them. Indeed, my research has taught me that there are differences among the institutions that excel in the three separate STEM agendas, and those differences are profound, and in some cases quite dramatic. I now know that the diversity of a school’s student population and its service to low-income

students are important to understanding its role in producing STEM degrees. I understand that, even if utilized with the best of intentions, the inclusion of ACT and SAT scores in admissions decisions may have unintended consequences in regards to producing STEM degrees among diverse student populations. And I have a much stronger awareness of the role played by sector, especially those differences between public and non-profit schools on one hand and for-profit schools on the other.

From this research experience, I have come to an even greater appreciation for the funding devoted to strengthening minority-serving schools. But based on my own personal values centered on inclusion and diversity, I have also come to recognize the need to incentivize non-diverse STEM institutions to become more welcoming and supportive of students of color and students from low-income families.

In short, while my journey to understanding the three STEM agendas is not yet complete, my dissertation research has given me a stronger foundation for further inquiry and effective practice in STEM education. I know much more today than when I began this project, and I am hopeful that my contributions will add to the collective efforts of so many other STEM educators in expanding STEM access and achievement for students who have traditionally been minimalized in these important fields.

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Appendices

Appendix A: Codebook and Correlations for Dependent and Independent Variables

Dependent Variables						
Variable	Type	Notes	Spierman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
DepSTEM, proportion of STEM degrees to 12 month FTE	Interval	Calculated as the ratio of SDXz007z001 to fte12mn	Coefficient	1.000	.864**	.659**
			Sig. (2-tailed)		0.000	0.000
			N	2028	2028	2028
DepURSTEM, proportion of underrepresented STEM degrees to 12 month FTE	Interval	Calculated as the ratio of SDXz008z001 to fte12mn	Coefficient	.864**	1.000	.623**
			Sig. (2-tailed)	0.000		0.000
			N	2028	2028	2028
DepHDSTEM, proportion of high demand STEM degrees to 12 month FTE	Interval	Calculated as the ratio of SDXz008z001 to fte12mn	Coefficient	.659**	.623**	1.000
			Sig. (2-tailed)	0.000	0.000	
			N	2028	2028	2028

Independent Variables

Variable	Type	Notes	Spierman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
actmt25, average ACT math score for top quartile of FT FT enrollees	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.497**	.328**	.362**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1058	1058	1058
admcon7, admission tests required Y/N	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.234**	-.218**	-.196**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1606	1606	1606
alloncam, oncampus housing required for freshmen	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.084**	.093**	.067**
			Sig. (2- tailed)	0.000	0.000	0.003
			N	2028	2028	2028
anyaidp, Pct of full-time first- time students awarded any fin aid	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.117**	-.118**	-.178**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1913	1913	1913
board, institution provides on campus meals	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.187**	-.159**	-.051*
			Sig. (2- tailed)	0.000	0.000	0.022
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
ccbasic, Carnegie classification	Categorical	Pulled directly from ipeds using their variable name (see Appendix G for definitions)	Correlation Coefficient	-.310**	-.309**	-.394**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
cindfam, total price for in- district living with family	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.100**	.087**	-.048*
			Sig. (2- tailed)	0.000	0.000	0.040
			N	1833	1833	1833
cindoff, total price for in- district living off campus	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.091**	.090**	-.052*
			Sig. (2- tailed)	0.000	0.000	0.026
			N	1825	1825	1825
cindon, total price for in- district living on campus	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.200**	.184**	0.045
			Sig. (2- tailed)	0.000	0.000	0.072
			N	1616	1616	1616
cinsfam, total price for in-state living with family	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.100**	.087**	-.048*
			Sig. (2- tailed)	0.000	0.000	0.040
			N	1833	1833	1833

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
cinsoff, total price for in-state living off campus	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.091**	.090**	-.052*
			Sig. (2- tailed)	0.000	0.000	0.026
			N	1825	1825	1825
cinson, total price for in-state living on campus	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.200**	.184**	0.045
			Sig. (2- tailed)	0.000	0.000	0.072
			N	1616	1616	1616
cngdstcd, congressional district code	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.074**	0.022	.068**
			Sig. (2- tailed)	0.001	0.314	0.002
			N	2028	2028	2028
cotsfam, Total cost of attendance, out of state living with family	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.342**	.294**	.136**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1833	1833	1833
cotsoff, Total cost of attendance, out of state living off campus	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.338**	.304**	.143**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1825	1825	1825

Variable	Type	Notes	Spearman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
cotson, Total cost of attendance, out of state living on campus	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.376**	.333**	.205**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1616	1616	1616
credits1, institution offers dual credit	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.178**	.138**	.095**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
credits2, institution offers credit for life experience	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.145**	-.114**	0.012
			Sig. (2- tailed)	0.000	0.000	0.598
			N	2028	2028	2028
credits3, Institution offers advanced placement credit	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.320**	.299**	.256**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
credits4, institution does NOT accept dual credit, CFLE or AP	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.272**	-.266**	-.230**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028

Variable	Type	Notes	Spierman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
disab, categorial representation of number of students with disabilities	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.268**	.207**	.111**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
dvadme01, percent of applicants admitted	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.119**	-.209**	-.086**
			Sig. (2- tailed)	0.000	0.000	0.001
			N	1601	1601	1601
efytotlt, 12 month undergrad undup headcount	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.485**	.474**	.520**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
enrlt, number of enrolled total	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.480**	.449**	.500**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1599	1599	1599
fl1capft,Core revenues per FTE from local appropriations	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.047*	0.040	.048*
			Sig. (2- tailed)	0.036	0.074	0.032
			N	2028	2028	2028

Variable	Type	Notes	Spierman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
f1lcappc, local appropriations as pct of core revenues	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	0.018	0.019	0.038
			Sig. (2-tailed)	0.425	0.396	0.085
			N	2028	2028	2028
f1stapft, Core revenues per FTE from state appropriations	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.259**	.247**	.290**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028
f1stappc, state appropriations as pct of core revenues	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.239**	.229**	.275**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028
fgrnt_p, Pct of full-time first-time students awarded federal grant aid	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.360**	-.174**	-.175**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	1913	1913	1913
fte12mn, 12 month full-time equivalency enrollment	Interval	Pulled directly from ipeds using their variable name. Used as the DEMONINATOR in dependent variables.	Correlation Coefficient	.480**	.460**	.506**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028

Variable	Type	Notes	Spierman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
grttot, Graduation rate, all first-time full-time students	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.388**	.254**	.173**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1871	1871	1871
hbcu, institutuion is historically black college or university	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-0.032	-.230**	-0.039
			Sig. (2- tailed)	0.154	0.000	0.080
			N	2028	2028	2028
hospital, institutuion has a hospital	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.117**	.068**	-0.003
			Sig. (2- tailed)	0.000	0.002	0.883
			N	2028	2028	2028
igrnt_p, pct of FT FT undergrads awarded institutuional aid	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	0.043	-0.034	-.123**
			Sig. (2- tailed)	0.059	0.132	0.000
			N	1913	1913	1913
landgrnt, institutuion is land grant	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.188**	-.189**	-.146**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028

Variable	Type	Notes	Spierman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
latitude, latitude of institution	Ordinal	Pulled directly from ipeds using their variable name	Correlation Coefficient	.092**	-.067**	.076**
			Sig. (2- tailed)	0.000	0.003	0.001
			N	2028	2028	2028
lexptotf, total library expenditures per FTE	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.263**	.199**	.058*
			Sig. (2- tailed)	0.000	0.000	0.016
			N	1732	1732	1732
libfac, institution offers library facilities at institution	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.066**	-.049*	-.052*
			Sig. (2- tailed)	0.003	0.029	0.020
			N	2028	2028	2028
loan_p, pct of FT FT undergrads awarded student loans	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.121**	-.071**	-.088**
			Sig. (2- tailed)	0.000	0.002	0.000
			N	1913	1913	1913
locale, degree of urbanization with 12 categories	Categorical	Pulled directly from ipeds using their variable name (see Appendix G for definitions)	Correlation Coefficient	.131**	0.028	0.040
			Sig. (2- tailed)	0.000	0.215	0.074
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
longitud, longitude of institution	Ordinal	Pulled directly from ipeds using their variable name	Correlation Coefficient	-0.006	-0.006	-0.018
			Sig. (2- tailed)	0.771	0.804	0.427
			N	2028	2028	2028
medical, Institution grants medical degrees	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.173**	-.128**	-.207**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIPz128b, Avg of Full-time and Part-time student retention rates	Interval	Calculated as means of ipeds variables ret_pcf and ret_pcp	Correlation Coefficient	.269**	.182**	.138**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1151	1151	1151
MIXz017, average of average costs of attendance	Interval	Calculated as the mean of the following ipeds variables: cindon,cinson, cotson, cindoff, cinsoff, cotsoff, cindfam, cinsfam, cotsfam	Correlation Coefficient	.255**	.226**	.058*
			Sig. (2- tailed)	0.000	0.000	0.011
			N	1921	1921	1921
MIXz020b, Avg salary of FT nonmedical faculty	Interval	Calculated by dividing ipeds variable saoutlt by satotlt (rank=7)	Correlation Coefficient	.387**	.370**	.361**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1971	1971	1971

Variable	Type	Notes	Spierman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
MIXz022, pct of faculty from ethnically underrepresented populations	Interval	Calculated as the totals for the ipeds variables hraiant, hrbkaat, hrhispt, hrnhpit, divided by ipeds variable hrtotlt. Underrepresented defined as American Indian or Alaska Native, Black or African American, Hispanic, Native Hawaiian or Pacific Islander	Correlation Coefficient	.046*	.267**	.119**
			Sig. (2- tailed)	0.044	0.000	0.000
			N	1893	1893	1893
MIXz030b, degree of urbanization, grouped	Categorical	Calculated from ipeds variable (locale), grouped into four categories: Urban, Suburban, Town, Rural	Correlation Coefficient	.074**	-0.008	0.007
			Sig. (2- tailed)	0.001	0.709	0.763
			N	2028	2028	2028
MIXz042, Tuition and fees as pct of core revenues	Interval	Calculated from summing ipeds variables tufepc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	-.300**	-.275**	-.148**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz045, Government grants and contracts as pct of core revenues	Interval	Calculated from summing ipeds variables gvgcpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.229**	.265**	.195**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz046, private gifts, grants and contracts as pct of core revenues	Interval	Calculated from summing ipeds variables pggcpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	0.001	-.074**	-.168**
			Sig. (2- tailed)	0.970	0.001	0.000
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
MIXz047, investment return as pct of core revenues	Interval	Calculated from summing ipeds variables invrpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.290**	.209**	.071**
			Sig. (2- tailed)	0.000	0.000	0.001
			N	2028	2028	2028
MIXz048, Other revenues as pct of core revenues	Interval	Calculated from summing ipeds variables otrvpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.266**	.204**	.207**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz049, core revenues per FTE from tuition and fees	Interval	Calculated from summing ipeds variables tufeft, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.093**	.075**	0.011
			Sig. (2- tailed)	0.000	0.001	0.628
			N	2028	2028	2028
MIXz052, Core revenues per FTE from govt grants and contracts	Interval	Calculated from summing ipeds variables gvgcft from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.324**	.353**	.245**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz053, core revenues per FTE from private gifts, grants and contracts	Interval	Calculated from summing ipeds variables pggcft from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.133**	.059**	-.070**
			Sig. (2- tailed)	0.000	0.008	0.002
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
MIXz054, Core revenues per FTE from investment returns	Interval	Calculated from summing ipeds variables invrft from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.333**	.254**	.108**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz055, Core revenues per FTE from other core revenues	Interval	Calculated from summing ipeds variables otrvft from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.359**	.294**	.247**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz057, instruction expenses as pct of core expenses	Interval	Calculated from summing ipeds variables instpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.141**	.059**	.109**
			Sig. (2-tailed)	0.000	0.008	0.000
			N	2028	2028	2028
MIXz058, Research expenses as pct of core expenses	Interval	Calculated from summing ipeds variables rsrcpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.438**	.399**	.363**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz059, Public service as pct of core expenses	Interval	Calculated from summing ipeds variables pbsvpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.303**	.264**	.242**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
MIXz060, academic support as pct of core expenses	Interval	Calculated from summing ipeds variables acsppc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.153**	.131**	.179**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz061, student services expenses as pct of core expenses	Interval	Calculated from summing ipeds variables stsvpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	-.057*	-.052*	-.131**
			Sig. (2- tailed)	0.010	0.020	0.000
			N	2028	2028	2028
MIXz062, Institutional support expenses as pct of core expenses	Interval	Calculated from summing ipeds variables insupc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	-.340**	-.249**	-.294**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
MIXz063, other expenses as pct of core expenses	Interval	Calculated from summing ipeds variables otexpc, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.075**	.081**	.117**
			Sig. (2- tailed)	0.001	0.000	0.000
			N	2028	2028	2028
MIXz064, Instruction expenses per FTE	Interval	Calculated from summing ipeds variables instft, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.328**	.273**	.156**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2018	2018	2018

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
MIXz065, Research expenses per FTE	Interval	Calculated from summing ipeds variables rsrcft, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.477**	.428**	.387**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2018	2018	2018
MIXz066, Public service expenses per FTE	Interval	Calculated from summing ipeds variables pbsvft, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.351**	.315**	.302**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2018	2018	2018
MIXz067, academic support expenses per FTE	Interval	Calculated from summing ipeds variables acspft, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.297**	.275**	.221**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2018	2018	2018
MIXz068, student service expenses per FTE	Interval	Calculated from summing ipeds variables stsvft, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.139**	.120**	-.073**
			Sig. (2- tailed)	0.000	0.000	0.001
			N	2018	2018	2018
MIXz069, institutional support expenses per FTE	Interval	Calculated from summing ipeds variables insuft, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	-.049*	0.005	-.166**
			Sig. (2- tailed)	0.027	0.823	0.000
			N	2018	2018	2018

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
MIXz070, all other expenses per FTE	Interval	Calculated from summing ipeds variables otexft, from f1, f2 and f3 (3 different accounting systems)	Correlation Coefficient	.097**	.100**	.141**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2018	2018	2018
MIXz078, graduate enrollment as pct of total enrollment	Interval	Calculated from ipeds variables as total graduate enrollment (efgrad) divided by total enrollment (enrtot)	Correlation Coefficient	-.089**	-.060**	.075**
			Sig. (2- tailed)	0.000	0.007	0.001
			N	2010	2010	2010
MIXz097d, pct of completers who are from ethnically underrep populations	Interval	Calculated from ipeds academic year completion variables, as (csaiant+csbkaat+cshispt+csnhpit)/cstotlt	Correlation Coefficient	-.076**	.222**	.045*
			Sig. (2- tailed)	0.001	0.000	0.045
			N	2028	2028	2028
MIXz098, Pct of degree undergrads under age 25	Interval	Calculated from ipeds variables, efbage09 (with efbage=2) as pct of efbage09 (with efbage=2&7)	Correlation Coefficient	.472**	.375**	.191**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1970	1970	1970
MIXz101, pct of undergrads from ethnically underrep populations	Interval	Calculated from ipeds fall enrollment variables, as (efaiaant+efbkaat+efhispt+efnhpit)/eftotlt	Correlation Coefficient	-.108**	.175**	0.014
			Sig. (2- tailed)	0.000	0.000	0.540
			N	2010	2010	2010

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
MIXz122, endowment assets	Interval	Calculated by summing ipeds variables f1endmft and f2endmft	Correlation Coefficient	.314**	.243**	.081**
			Sig. (2- tailed)	0.000	0.000	0.001
			N	1618	1618	1618
obereg, geographic region	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-0.032	0.036	-0.025
			Sig. (2- tailed)	0.145	0.104	0.263
			N	2028	2028	2028
openadmp, Use of open admissions Y/N	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.325**	.260**	.180**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
pctAfAm, pct of enrolled students who are African American	Interval	Calculated from ipeds variable, efybkaat as pct of efytotlt	Correlation Coefficient	-.063**	0.001	0.015
			Sig. (2- tailed)	0.005	0.953	0.509
			N	2028	2028	2028
pctft1st, First- time full-time undergrads as pct of all undergrads	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.346**	.281**	.096**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2010	2010	2010

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
PctFTfac, Pct of faculty who are full time	Interval	Calculated from ipeds variable hrtotlt, as staffcat=2210 (full-time) pct of [staffcat=2210 + staffcat=3210 (part- time)]	Correlation Coefficient	.322**	.261**	.198**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2009	2009	2009
pctHisp, pct of enrolled students who are Hispanic	Interval	Calculated from ipeds variable, efyhispt as pct of efytotlt	Correlation Coefficient	-0.035	0.029	-0.005
			Sig. (2- tailed)	0.120	0.186	0.829
			N	2028	2028	2028
PctSTEM, Percent of completers who are STEM	Interval	Calculated from ipeds completion variables based on CIP codes (see Appendix B) as a pct of Tcompl	Correlation Coefficient	.902**	.724**	.481**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1682	1682	1682
pcudeexc, pct of undergraduates enrolled exclusively in distance education	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.152**	-.138**	.063**
			Sig. (2- tailed)	0.000	0.000	0.005
			N	2010	2010	2010
pgrnt_p, Pct of first-time full- time undergrads awarded Pell	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.358**	-.171**	-.174**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1913	1913	1913

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
PT_fac, Number of faculty who are part time	Interval	Calculated from ipeds variable hrtotlt, as staffcat=2210 (full-time)	Correlation Coefficient	.184**	.205**	.324**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1875	1875	1875
ret_pcf, full-time student retention rate	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.356**	.254**	.192**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1883	1883	1883
ret_pcp, part- time student retention rate	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.173**	.114**	.078**
			Sig. (2- tailed)	0.000	0.000	0.008
			N	1167	1167	1167
room, Institution provides on campus housing	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.260**	-.219**	-.094**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
satmt25, average SAT math score for top quartile of admits	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.508**	.347**	.360**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1150	1150	1150

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
SDXz007z001, Number of undergraduate STEM degrees awarded	Interval	Totaled from completion variables within ipeds, disaggregated by CIP code (majors), see Appendix B	Correlation Coefficient	.802**	.724**	.668**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
SDXz008z001, Number of undergraduate STEM degrees awarded to underrep students	Interval	Totaled from completion variables within ipeds, disaggregated by CIP code (majors) and ethnicity/gender, see Appendices E & F	Correlation Coefficient	.756**	.808**	.655**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
SDXz009z001, Number of undergraduate STEM degrees awarded in high demand fields	Interval	Totaled from completion variables within ipeds, disaggregated by CIP code (majors), see Appendix C	Correlation Coefficient	.638**	.594**	.898**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
sector, Sector of the institution	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-.284**	-.224**	-.228**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
sgrnt_p, Pct of full-time first-time undergrads awarded state/local grants	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.086**	.107**	0.030
			Sig. (2-tailed)	0.000	0.000	0.185
			N	1913	1913	1913
SIPz021z001, Pct of faculty tenured or tenure track	Interval	Pulled from ipeds variable facstat, with facstat=20, facstat=30, facstat=40	Correlation Coefficient	-.367**	-.335**	-.299**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	1860	1860	1860
SIPz089z001, avg of underrep. student grad rates	Interval	Calculated as a pct of ipeds variable grrtot the following: grrtan, grtrnh, grrtbk, grtrhs	Correlation Coefficient	.307**	.244**	.145**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	1761	1761	1761
SIXz079z006, budget spent per FTE on non-instructional staff salaries	Interval	Calculated as iped variable sanit01 divided by sanin01, for non-instructional staff	Correlation Coefficient	.149**	.179**	.180**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	1993	1993	1993
slo6, Institution offers study abroad	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.442**	.385**	.288**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation Coefficient	DepSTEM	Dep- URSTEM	Dep- HDSTEM
slo7, Institution offers weekend or evening college	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-0.126**	-0.065**	0.027
			Sig. (2-tailed)	0.000	0.003	0.220
			N	2028	2028	2028
stufacr, Student to faculty ratio	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.132**	.152**	.227**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2010	2010	2010
stusrv1, Institution offers remedial services	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	-0.119**	-0.093**	-0.043
			Sig. (2-tailed)	0.000	0.000	0.053
			N	2028	2028	2028
stusrv2, Institution offers academic or career advising	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.133**	.143**	.123**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028
stusrv3, Institution offers student employment	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.302**	.280**	.207**
			Sig. (2-tailed)	0.000	0.000	0.000
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
stusrv4, Institution offers career placement	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.303**	.294**	.240**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
stusrv8, Institution offers oncampus day care for students	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	.231**	.212**	.240**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
Tcompl, total number of bachelor's degrees awarded	Interval	Pulled directly from ipeds using the variable name "ctsotlt"	Correlation Coefficient	.540**	.499**	.535**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
TotInstStaff, total number of instructional staff (faculty)	Interval	Calculated as hrtotlt, combining stafcat=2210 with stafcat=3210	Correlation Coefficient	.503**	.453**	.507**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	1860	1860	1860
tribal, Institution is a tribal college or university	Categorical	Pulled directly from ipeds using their variable name	Correlation Coefficient	0.031	0.030	0.025
			Sig. (2- tailed)	0.159	0.172	0.264
			N	2028	2028	2028

Variable	Type	Notes	Spearman Correlation	DepSTEM	Dep- URSTEM	Dep- HDSTEM
tufeyr3, total tuition and fees	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.163**	.130**	-0.007
			Sig. (2- tailed)	0.000	0.000	0.759
			N	1921	1921	1921
undup, 12 month unduplicated headcount	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.437**	.428**	.500**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028
undupug, 12 month unduplicated headcount, undergraduate	Interval	Pulled directly from ipeds using their variable name	Correlation Coefficient	.485**	.474**	.520**
			Sig. (2- tailed)	0.000	0.000	0.000
			N	2028	2028	2028

** . Correlation is significant at the 0.01 level (2-tailed).

Appendix B: DHS-Designated STEM Fields

The following degree programs are designated as STEM (*Broadcast Mesage 1204-07, Re: Additions to the STEM-Designated Degree Program List, 2016*).

STEM Designated Degree Program List

Effective May 10, 2016

The STEM Designated Degree Program list is a complete list of fields of study that DHS considers to be science, technology, engineering or mathematics (STEM) fields of study for purposes of the 24-month STEM optional practical training extension described at 8 CFR 214.2(f). Under 8 CFR 214.2(f)(10)(ii)(C)(2), a STEM field of study is a field of study “included in the Department of Education’s Classification of Instructional Programs taxonomy within the two-digit series containing engineering, biological sciences, mathematics, and physical sciences, or a related field. In general, related fields will include fields involving research, innovation, or development of new technologies using engineering, mathematics, computer science, or natural sciences (including physical, biological, and agricultural sciences).”

Accordingly, this list designates the following four CIP summary groups/series at the 2-digit CIP code level: Engineering (CIP code 14), Biological and Biomedical Sciences (CIP code 26), Mathematics and Statistics (CIP code 27), and Physical Sciences (CIP code 40). Any new additions to those areas will automatically be included on this STEM Designated Degree Program list. Consistent with the definition of “related field” above, related fields in this list include fields involving research, innovation, or development of new technologies using engineering, mathematics, computer science, or natural sciences. DHS designates these fields at the 6-digit level.

CIP Code Two-Digit Series	2010 CIP Code	CIP Code Title
01	01.0308	Agroecology and Sustainable Agriculture
01	01.0901	Animal Sciences, General

01	01.0902	Agricultural Animal Breeding
01	01.0903	Animal Health
01	01.0904	Animal Nutrition
01	01.0905	Dairy Science
01	01.0906	Livestock Management
01	01.0907	Poultry Science
01	01.0999	Animal Sciences, Other
01	01.1001	Food Science
01	01.1002	Food Technology and Processing
01	01.1099	Food Science and Technology, Other
01	01.1101	Plant Sciences, General
01	01.1102	Agronomy and Crop Science
01	01.1103	Horticultural Science
01	01.1104	Agricultural and Horticultural Plant Breeding
01	01.1105	Plant Protection and Integrated Pest Management
01	01.1106	Range Science and Management
01	01.1199	Plant Sciences, Other
01	01.1201	Soil Science and Agronomy, General
01	01.1202	Soil Chemistry and Physics
01	01.1203	Soil Microbiology
01	01.1299	Soil Sciences, Other
03	03.0101	Natural Resources/Conservation, General
03	03.0103	Environmental Studies
03	03.0104	Environmental Science
03	03.0199	Natural Resources Conservation and Research, Other
03	03.0205	Water, Wetlands, and Marine Resources Management

03	03.0502	Forest Sciences and Biology
03	03.0508	Urban Forestry
03	03.0509	Wood Science and Wood Products/Pulp and Paper Technology
03	03.0601	Wildlife, Fish and Wildlands Science and Management
04	04.0902	Architectural and Building Sciences/Technology
09	09.0702	Digital Communication and Media/Multimedia
10	10.0304	Animation, Interactive Technology, Video Graphics and Special Effects
11	11.0101	Computer and Information Sciences, General
11	11.0102	Artificial Intelligence
11	11.0103	Information Technology
11	11.0104	Informatics
11	11.0199	Computer and Information Sciences, Other
11	11.0201	Computer Programming/Programmer, General
11	11.0202	Computer Programming, Specific Applications
11	11.0203	Computer Programming, Vendor/Product Certification
11	11.0299	Computer Programming, Other
11	11.0301	Data Processing and Data Processing Technology/Technician
11	11.0401	Information Science/Studies
11	11.0501	Computer Systems Analysis/Analyst
11	11.0701	Computer Science
11	11.0801	Web Page, Digital/Multimedia and Information Resources Design
11	11.0802	Data Modeling/Warehousing and Database Administration
11	11.0803	Computer Graphics
11	11.0804	Modeling, Virtual Environments and Simulation
11	11.0899	Computer Software and Media Applications, Other
11	11.0901	Computer Systems Networking and Telecommunications
11	11.1001	Network and System Administration/Administrator

11	11.1002	System, Networking, and LAN/WAN Management/Manager
11	11.1003	Computer and Information Systems Security/Information Assurance
11	11.1004	Web/Multimedia Management and Webmaster
11	11.1005	Information Technology Project Management
11	11.1006	Computer Support Specialist
11	11.1099	Computer/Information Technology Services Administration and Management, Other
13	13.0501	Educational/Instructional Technology
13	13.0601	Educational Evaluation and Research
13	13.0603	Educational Statistics and Research Methods
14	14.XXXX	Engineering
15	15.0000	Engineering Technology, General
15	15.0101	Architectural Engineering Technology/Technician
15	15.0201	Civil Engineering Technology/Technician
15	15.0303	Electrical, Electronic and Communications Engineering Technology/Technician
15	15.0304	Laser and Optical Technology/Technician
15	15.0305	Telecommunications Technology/Technician
15	15.0306	Integrated Circuit Design
15	15.0399	Electrical and Electronic Engineering Technologies/Technicians, Other
15	15.0401	Biomedical Technology/Technician
15	15.0403	Electromechanical Technology/Electromechanical Engineering Technology
15	15.0404	Instrumentation Technology/Technician
15	15.0405	Robotics Technology/Technician
15	15.0406	Automation Engineer Technology/Technician
15	15.0499	Electromechanical and Instrumentation and Maintenance Technologies/Technicians, Other
15	15.0501	Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician
15	15.0503	Energy Management and Systems Technology/Technician
15	15.0505	Solar Energy Technology/Technician

15	15.0506	Water Quality and Wastewater Treatment Management and Recycling Technology/Technician
15	15.0507	Environmental Engineering Technology/Environmental Technology
15	15.0508	Hazardous Materials Management and Waste Technology/Technician
15	15.0599	Environmental Control Technologies/Technicians, Other
15	15.0607	Plastics and Polymer Engineering Technology/Technician
15	15.0611	Metallurgical Technology/Technician
15	15.0612	Industrial Technology/Technician
15	15.0613	Manufacturing Engineering Technology/Technician
15	15.0614	Welding Engineering Technology/Technician
15	15.0615	Chemical Engineering Technology/Technician
15	15.0616	Semiconductor Manufacturing Technology
15	15.0699	Industrial Production Technologies/Technicians, Other
15	15.0701	Occupational Safety and Health Technology/Technician
15	15.0702	Quality Control Technology/Technician
15	15.0703	Industrial Safety Technology/Technician
15	15.0704	Hazardous Materials Information Systems Technology/Technician
15	15.0799	Quality Control and Safety Technologies/Technicians, Other
15	15.0801	Aeronautical/Aerospace Engineering Technology/Technician
15	15.0803	Automotive Engineering Technology/Technician
15	15.0805	Mechanical Engineering/Mechanical Technology/Technician
15	15.0899	Mechanical Engineering Related Technologies/Technicians, Other
15	15.0901	Mining Technology/Technician
15	15.0903	Petroleum Technology/Technician
15	15.0999	Mining and Petroleum Technologies/Technicians, Other
15	15.1001	Construction Engineering Technology/Technician
15	15.1102	Surveying Technology/Surveying
15	15.1103	Hydraulics and Fluid Power Technology/Technician

15	15.1199	Engineering-Related Technologies, Other
15	15.1201	Computer Engineering Technology/Technician
15	15.1202	Computer Technology/Computer Systems Technology
15	15.1203	Computer Hardware Technology/Technician
15	15.1204	Computer Software Technology/Technician
15	15.1299	Computer Engineering Technologies/Technicians, Other
15	15.1301	Drafting and Design Technology/Technician, General
15	15.1302	CAD/CADD Drafting and/or Design Technology/Technician
15	15.1303	Architectural Drafting and Architectural CAD/CADD
15	15.1304	Civil Drafting and Civil Engineering CAD/CADD
15	15.1305	Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD
15	15.1306	Mechanical Drafting and Mechanical Drafting CAD/CADD
15	15.1399	Drafting/Design Engineering Technologies/Technicians, Other
15	15.1401	Nuclear Engineering Technology/Technician
15	15.1501	Engineering/Industrial Management
15	15.1502	Engineering Design
15	15.1503	Packaging Science
15	15.1599	Engineering-Related Fields, Other
15	15.1601	Nanotechnology
15	15.9999	Engineering Technologies and Engineering-Related Fields, Other
26	26.XXXX	Biological and Biomedical Sciences
27	27.XXXX	Mathematics and Statistics
28	28.0501	Air Science/Airpower Studies
28	28.0502	Air and Space Operational Art and Science
28	28.0505	Naval Science and Operational Studies
29	29.0201	Intelligence, General
29	29.0202	Strategic Intelligence

29	29.0203	Signal/Geospatial Intelligence
29	29.0204	Command & Control (C3, C4I) Systems and Operations
29	29.0205	Information Operations/Joint Information Operations
29	29.0206	Information/Psychological Warfare and Military Media Relations
29	29.0207	Cyber/Electronic Operations and Warfare
29	29.0299	Intelligence, Command Control and Information Operations, Other
29	29.0301	Combat Systems Engineering
29	29.0302	Directed Energy Systems
29	29.0303	Engineering Acoustics
29	29.0304	Low-Observables and Stealth Technology
29	29.0305	Space Systems Operations
29	29.0306	Operational Oceanography
29	29.0307	Undersea Warfare
29	29.0399	Military Applied Sciences, Other
29	29.0401	Aerospace Ground Equipment Technology
29	29.0402	Air and Space Operations Technology
29	29.0403	Aircraft Armament Systems Technology
29	29.0404	Explosive Ordnance/Bomb Disposal
29	29.0405	Joint Command/Task Force (C3, C4I) Systems
29	29.0406	Military Information Systems Technology
29	29.0407	Missile and Space Systems Technology
29	29.0408	Munitions Systems/Ordnance Technology
29	29.0409	Radar Communications and Systems Technology
29	29.0499	Military Systems and Maintenance Technology, Other
29	29.9999	Military Technologies and Applied Sciences, Other
30	30.0101	Biological and Physical Sciences
30	30.0601	Systems Science and Theory

30	30.0801	Mathematics and Computer Science
30	30.1001	Biopsychology
30	30.1701	Behavioral Sciences
30	30.1801	Natural Sciences
30	30.1901	Nutrition Sciences
30	30.2501	Cognitive Science
30	30.2701	Human Biology
30	30.3001	Computational Science
30	30.3101	Human Computer Interaction
30	30.3201	Marine Sciences
30	30.3301	Sustainability Studies
40	40.XXXX	Physical Sciences
41	41.0000	Science Technologies/Technicians, General
41	41.0101	Biology Technician/Biotechnology Laboratory Technician
41	41.0204	Industrial Radiologic Technology/Technician
41	41.0205	Nuclear/Nuclear Power Technology/Technician
41	41.0299	Nuclear and Industrial Radiologic Technologies/Technicians, Other
41	41.0301	Chemical Technology/Technician
41	41.0303	Chemical Process Technology
41	41.0399	Physical Science Technologies/Technicians, Other
41	41.9999	Science Technologies/Technicians, Other
42	42.2701	Cognitive Psychology and Psycholinguistics
42	42.2702	Comparative Psychology
42	42.2703	Developmental and Child Psychology
42	42.2704	Experimental Psychology
42	42.2705	Personality Psychology
42	42.2706	Physiological Psychology/Psychobiology

42	42.2707	Social Psychology
42	42.2708	Psychometrics and Quantitative Psychology
42	42.2709	Psychopharmacology
42	42.2799	Research and Experimental Psychology, Other
43	43.0106	Forensic Science and Technology
43	43.0116	Cyber/Computer Forensics and Counterterrorism
45	45.0301	Archeology
45	45.0603	Econometrics and Quantitative Economics
45	45.0702	Geographic Information Science and Cartography
49	49.0101	Aeronautics/Aviation/Aerospace Science and Technology, General
51	51.1002	Cytotechnology/Cytotechnologist
51	51.1005	Clinical Laboratory Science/Medical Technology/Technologist
51	51.1401	Medical Scientist
51	51.2003	Pharmaceutics and Drug Design
51	51.2004	Medicinal and Pharmaceutical Chemistry
51	51.2005	Natural Products Chemistry and Pharmacognosy
51	51.2006	Clinical and Industrial Drug Development
51	51.2007	Pharmacoeconomics/Pharmaceutical Economics
51	51.2009	Industrial and Physical Pharmacy and Cosmetic Sciences
51	51.2010	Pharmaceutical Sciences
51	51.2202	Environmental Health
51	51.2205	Health/Medical Physics
51	51.2502	Veterinary Anatomy
51	51.2503	Veterinary Physiology
51	51.2504	Veterinary Microbiology and Immunobiology
51	51.2505	Veterinary Pathology and Pathobiology
51	51.2506	Veterinary Toxicology and Pharmacology

51	51.2510	Veterinary Preventive Medicine, Epidemiology, and Public Health
51	51.2511	Veterinary Infectious Diseases
51	51.2706	Medical Informatics
52	52.1301	Management Science
52	52.1302	Business Statistics
52	52.1304	Actuarial Science
52	52.1399	Management Science and Quantitative Methods, Other

**Appendix C: List of High Demand Degree Programs, and Syntax for Bachelor's
Degree Data from IPEDS**

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_9222017-376.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
MAJORNUM f1
CIPCODE a7
AWLEVEL f2
CTOTALT f6
IDX_C f6.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
MAJORNUM 'First or Second Major'
CIPCODE 'CIP Code for major field of study'
AWLEVEL 'Award Level code'
CTOTALT 'Grand total'
IDX_C 'ID of institution where data are reported for the Completions component'.

```

VALUE LABELS

```

/MAJORNUM
1 'First major'
2 'Second major'
/CIPCODE
'11.0101' 'Computer and Information Sciences, General'
'11.0102' 'Artificial Intelligence'

```

'11.0103' 'Information Technology'
'11.0104' 'Informatics'
'11.0201' 'Computer Programming/Programmer, General'
'11.0202' 'Computer Programming, Specific Applications'
'11.0501' 'Computer Systems Analysis/Analyst'
'11.0701' 'Computer Science'
'11.0804' 'Modeling, Virtual Environments and Simulation'
'11.0901' 'Computer Systems Networking and Telecommunications'
'11.1001' 'Network and System Administration/Administrator'
'11.1002' 'System, Networking, and LAN/WAN Management/Manager'
'11.1003' 'Computer and Information Systems Security/Information Assurance'
'11.1005' 'Information Technology Project Management'
'14.0501' 'Bioengineering and Biomedical Engineering'
'14.0901' 'Computer Engineering, General'
'14.0903' 'Computer Software Engineering'
'14.3701' 'Operations Research'
'14.4501' 'Biological/Biosystems Engineering'
'15.1102' 'Surveying Technology/Surveying'
'15.1204' 'Computer Software Technology/Technician'
'26.1103' 'Bioinformatics'
'27.0301' 'Applied Mathematics, General'
'27.0304' 'Computational and Applied Mathematics'
'27.0501' 'Statistics, General'
'27.0502' 'Mathematical Statistics and Probability'
'27.0503' 'Mathematics and Statistics'
'27.0599' 'Statistics, Other'
'40.0510' 'Forensic Chemistry'
'43.0106' 'Forensic Science and Technology'
'43.0116' 'Cyber/Computer Forensics and Counterterrorism'
'45.0702' 'Geographic Information Science and Cartography'
'51.1002' 'Cytotechnology/Cytotechnologist'
'51.1005' 'Clinical Laboratory Science/Medical Technology/Technologist'
'51.2706' 'Medical Informatics'
'52.1301' 'Management Science'
'52.1304' 'Actuarial Science'
/AWLEVEL
5 'Bachelor's degree'.

```
FREQUENCIES VARIABLES=  
MAJORNUM CIPCODE AWLEVEL.
```

```
DESCRIPTIVES VARIABLES=  
CTOTALT IDX_C.  
/STATS=SUM MIN MAX MEAN.
```

Appendix D: Syntax for Pulling STEM Degrees from IPEDS

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_9252017-586.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
MAJORNUM f1
CIPCODE a7
AWLEVEL f2
CTOTALT f6
IDX_C f6.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
MAJORNUM 'First or Second Major'
CIPCODE 'CIP Code for major field of study'
AWLEVEL 'Award Level code'
CTOTALT 'Grand total'
IDX_C 'ID of institution where data are reported for the Completions component'.

```

VALUE LABELS

```

/MAJORNUM
1 'First major'
2 'Second major'
/CIPCODE
'01.0308' 'Agroecology and Sustainable Agriculture'
'01.0902' 'Agricultural Animal Breeding'
'01.0903' 'Animal Health'

```


'01.0904' 'Animal Nutrition'
'01.0905' 'Dairy Science'
'01.0906' 'Livestock Management'
'01.0907' 'Poultry Science'
'01.0999' 'Animal Sciences, Other'
'01.10' 'Food Science and Technology'
'01.11' 'Plant Sciences'
'01.12' 'Soil Sciences'
'03.0199' 'Natural Resources Conservation and Research, Other'
'03.0205' 'Water, Wetlands, and Marine Resources Management'
'03.0502' 'Forest Sciences and Biology'
'03.0508' 'Urban Forestry'
'03.0509' 'Wood Science and Wood Products/Pulp and Paper Technology'
'03.0601' 'Wildlife, Fish and Wildlands Science and Management'
'04.0902' 'Architectural and Building Sciences/Technology'
'09.0702' 'Digital Communication and Media/Multimedia'
'10.0304' 'Animation, Interactive Technology, Video Graphics and Special Effects'
'11.01' 'Computer and Information Sciences, General'
'11.02' 'Computer Programming'
'11.0301' 'Data Processing and Data Processing Technology/Technician'
'11.0401' 'Information Science/Studies'
'11.0501' 'Computer Systems Analysis/Analyst'
'11.0701' 'Computer Science'
'11.08' 'Computer Software and Media Applications'
'11.0901' 'Computer Systems Networking and Telecommunications'
'11.10' 'Computer/Information Technology Administration and Management'
'13.0501' 'Educational/Instructional Technology'
'13.0601' 'Educational Evaluation and Research'
'13.0603' 'Educational Statistics and Research Methods'
'14' 'Engineering'
'15.00' 'Engineering Technology, General'
'15.01' 'Architectural Engineering Technologies/Technicians'
'15.02' 'Civil Engineering Technologies/Technicians'
'15.03' 'Electrical Engineering Technologies/Technicians'
'15.04' 'Electromechanical Instrumentation and Maintenance Technologies/Technicians'
'15.05' 'Environmental Control Technologies/Technicians'
'15.06' 'Industrial Production Technologies/Technicians'
'15.07' 'Quality Control and Safety Technologies/Technicians'

'15.08' 'Mechanical Engineering Related Technologies/Technicians'
'15.09' 'Mining and Petroleum Technologies/Technicians'
'15.1001' 'Construction Engineering Technology/Technician'
'15.11' 'Engineering-Related Technologies'
'15.12' 'Computer Engineering Technologies/Technicians'
'15.13' 'Drafting/Design Engineering Technologies/Technicians'
'15.1401' 'Nuclear Engineering Technology/Technician'
'15.15' 'Engineering-Related Fields'
'15.1601' 'Nanotechnology'
'15.9999' 'Engineering Technologies and Engineering-Related Fields, Other'
'26' 'Biological and Biomedical Sciences'
'27' 'Mathematics and Statistics'
'29.02' 'Intelligence, Command Control and Information Operations'
'29.03' 'Military Applied Sciences'
'29.04' 'Military Systems and Maintenance Technology'
'29.9999' 'Military Technologies and Applied Sciences, Other'
'30.0101' 'Biological and Physical Sciences'
'30.0601' 'Systems Science and Theory'
'30.0801' 'Mathematics and Computer Science'
'30.1001' 'Biopsychology'
'30.1701' 'Behavioral Sciences'
'30.1801' 'Natural Sciences'
'30.1901' 'Nutrition Sciences'
'30.2501' 'Cognitive Science'
'30.2701' 'Human Biology'
'30.3001' 'Computational Science'
'30.3101' 'Human Computer Interaction'
'30.3201' 'Marine Sciences'
'30.3301' 'Sustainability Studies'
'40' 'Physical Sciences'
'41.0000' 'Science Technologies/Technicians, General'
'41.0101' 'Biology Technician/Biotechnology Laboratory Technician'
'41.02' 'Nuclear and Industrial Radiologic Technologies/Technicians'
'41.03' 'Physical Science Technologies/Technicians'
'41.9999' 'Science Technologies/Technicians, Other'
'42.27' 'Research and Experimental Psychology'
'43.0106' 'Forensic Science and Technology'
'43.0116' 'Cyber/Computer Forensics and Counterterrorism'

'45.0301' 'Archeology'
 '45.0603' 'Econometrics and Quantitative Economics'
 '45.0702' 'Geographic Information Science and Cartography'
 '49.0101' 'Aeronautics/Aviation/Aerospace Science and Technology, General'
 '51.1002' 'Cytotechnology/Cytotechnologist'
 '51.1005' 'Clinical Laboratory Science/Medical Technology/Technologist'
 '51.1401' 'Medical Scientist'
 '51.2003' 'Pharmaceutics and Drug Design'
 '51.2004' 'Medicinal and Pharmaceutical Chemistry'
 '51.2005' 'Natural Products Chemistry and Pharmacognosy'
 '51.2006' 'Clinical and Industrial Drug Development'
 '51.2007' 'Pharmacoeconomics/Pharmaceutical Economics'
 '51.2009' 'Industrial and Physical Pharmacy and Cosmetic Sciences'
 '51.2010' 'Pharmaceutical Sciences'
 '51.2202' 'Environmental Health'
 '51.2205' 'Health/Medical Physics'
 '51.2502' 'Veterinary Anatomy'
 '51.2503' 'Veterinary Physiology'
 '51.2504' 'Veterinary Microbiology and Immunobiology'
 '51.2505' 'Veterinary Pathology and Pathobiology'
 '51.2506' 'Veterinary Toxicology and Pharmacology'
 '51.2510' 'Veterinary Preventive Medicine, Epidemiology, and Public Health'
 '51.2511' 'Veterinary Infectious Diseases'
 '51.2706' 'Medical Informatics'
 '52.1301' 'Management Science'
 '52.1302' 'Business Statistics'
 '52.1304' 'Actuarial Science'
 '52.1399' 'Management Sciences and Quantitative Methods, Other'
 /AWLEVEL
 5 'Bachelor's degree'.

FREQUENCIES VARIABLES=
 MAJORNUM CIPCODE AWLEVEL.

DESCRIPTIVES VARIABLES=
 CTOTALT IDX_C.
 /STATS=SUM MIN MAX MEAN.

Appendix E: Syntax for Pulling from IPEDS STEM Degrees for Students Underrepresented by Ethnicity

```

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INSTNM A50
year F4
MAJORNUM f1
CIPCODE a7
AWLEVEL f2
CAIANT f6
CBKAAT f6
CHISPT f6
CNHPIT f6
IDX_C f6.

VARIABLE LABELS
unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
MAJORNUM 'First or Second Major'
CIPCODE 'CIP Code for major field of study'
AWLEVEL 'Award Level code'
CAIANT 'American Indian or Alaska Native total'
CBKAAT 'Black or African American total'
CHISPT 'Hispanic or Latino total'
CNHPIT 'Native Hawaiian or Other Pacific Islander total'
IDX_C 'ID of institution where data are reported for the Completions component'.

VALUE LABELS

```

/MAJORNUM

1 'First major'

2 'Second major'

/CIPCODE

'01.0308' 'Agroecology and Sustainable Agriculture'

'01.09' 'Animal Sciences'

'01.10' 'Food Science and Technology'

'01.11' 'Plant Sciences'

'01.12' 'Soil Sciences'

'03.01' 'Natural Resources Conservation and Research'

'03.0205' 'Water, Wetlands, and Marine Resources Management'

'03.0502' 'Forest Sciences and Biology'

'03.0508' 'Urban Forestry'

'03.0509' 'Wood Science and Wood Products/Pulp and Paper Technology'

'03.06' 'Wildlife and Wildlands Science and Management'

'04.0902' 'Architectural and Building Sciences/Technology'

'09.0702' 'Digital Communication and Media/Multimedia'

'10.0304' 'Animation, Interactive Technology, Video Graphics and Special Effects'

'11.01' 'Computer and Information Sciences, General'

'11.02' 'Computer Programming'

'11.03' 'Data Processing'

'11.04' 'Information Science/Studies'

'11.05' 'Computer Systems Analysis'

'11.07' 'Computer Science'

'11.08' 'Computer Software and Media Applications'

'11.09' 'Computer Systems Networking and Telecommunications'

'11.10' 'Computer/Information Technology Administration and Management'

'13.05' 'Educational/Instructional Media Design'

'13.0601' 'Educational Evaluation and Research'

'13.0603' 'Educational Statistics and Research Methods'

'14' 'Engineering'

'15.00' 'Engineering Technology, General'

'15.01' 'Architectural Engineering Technologies/Technicians'

'15.02' 'Civil Engineering Technologies/Technicians'

'15.03' 'Electrical Engineering Technologies/Technicians'

'15.04' 'Electromechanical Instrumentation and Maintenance Technologies/Technicians'

'15.05' 'Environmental Control Technologies/Technicians'

'15.06' 'Industrial Production Technologies/Technicians'

'15.07' 'Quality Control and Safety Technologies/Technicians'
'15.08' 'Mechanical Engineering Related Technologies/Technicians'
'15.09' 'Mining and Petroleum Technologies/Technicians'
'15.10' 'Construction Engineering Technologies'
'15.11' 'Engineering-Related Technologies'
'15.12' 'Computer Engineering Technologies/Technicians'
'15.13' 'Drafting/Design Engineering Technologies/Technicians'
'15.14' 'Nuclear Engineering Technologies/Technicians'
'15.15' 'Engineering-Related Fields'
'15.16' 'Nanotechnology'
'15.99' 'Engineering Technologies/Technicians, Other'
'26' 'Biological and Biomedical Sciences'
'27' 'Mathematics and Statistics'
'29.02' 'Intelligence, Command Control and Information Operations'
'29.03' 'Military Applied Sciences'
'29.04' 'Military Systems and Maintenance Technology'
'29.99' 'Military Technologies and Applied Sciences, Other'
'30.01' 'Biological and Physical Sciences'
'30.06' 'Systems Science and Theory'
'30.08' 'Mathematics and Computer Science'
'30.10' 'Biopsychology'
'30.17' 'Behavioral Sciences'
'30.18' 'Natural Sciences'
'30.19' 'Nutrition Sciences'
'30.25' 'Cognitive Science'
'30.27' 'Human Biology'
'30.30' 'Computational Science'
'30.31' 'Human Computer Interaction'
'30.32' 'Marine Sciences'
'30.33' 'Sustainability Studies'
'40' 'Physical Sciences'
'41.00' 'Science Technologies/Technicians, General'
'41.01' 'Biology Technician/Biotechnology Laboratory Technician'
'41.02' 'Nuclear and Industrial Radiologic Technologies/Technicians'
'41.03' 'Physical Science Technologies/Technicians'
'41.99' 'Science Technologies/Technicians, Other'
'42.27' 'Research and Experimental Psychology'
'43.0106' 'Forensic Science and Technology'

'43.0116' 'Cyber/Computer Forensics and Counterterrorism'
 '45.03' 'Archeology'
 '45.0603' 'Econometrics and Quantitative Economics'
 '45.0702' 'Geographic Information Science and Cartography'
 '49.0101' 'Aeronautics/Aviation/Aerospace Science and Technology, General'
 '51.1002' 'Cytotechnology/Cytotechnologist'
 '51.1005' 'Clinical Laboratory Science/Medical Technology/Technologist'
 '51.1401' 'Medical Scientist'
 '51.2003' 'Pharmaceutics and Drug Design'
 '51.2004' 'Medicinal and Pharmaceutical Chemistry'
 '51.2005' 'Natural Products Chemistry and Pharmacognosy'
 '51.2006' 'Clinical and Industrial Drug Development'
 '51.2007' 'Pharmacoeconomics/Pharmaceutical Economics'
 '51.2009' 'Industrial and Physical Pharmacy and Cosmetic Sciences'
 '51.2010' 'Pharmaceutical Sciences'
 '51.2202' 'Environmental Health'
 '51.2205' 'Health/Medical Physics'
 '51.2502' 'Veterinary Anatomy'
 '51.2503' 'Veterinary Physiology'
 '51.2504' 'Veterinary Microbiology and Immunobiology'
 '51.2505' 'Veterinary Pathology and Pathobiology'
 '51.2506' 'Veterinary Toxicology and Pharmacology'
 '51.2510' 'Veterinary Preventive Medicine, Epidemiology, and Public Health'
 '51.2511' 'Veterinary Infectious Diseases'
 '51.2706' 'Medical Informatics'
 '52.1301' 'Management Science'
 '52.1302' 'Business Statistics'
 '52.1304' 'Actuarial Science'
 '52.1399' 'Management Sciences and Quantitative Methods, Other'
 /AWLEVEL
 5 'Bachelor"s degree'.

FREQUENCIES VARIABLES=
 MAJORNUM CIPCODE AWLEVEL.

DESCRIPTIVES VARIABLES=
 CAIANT CBKAAT CHISPT CNHPIT IDX_C.
 /STATS=SUM MIN MAX MEAN.

**Appendix F: Degree Programs Where Women are Underrepresented Among
Bachelor's Graduates, Including Syntax**

```

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/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
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INSTNM A50
year F4
MAJORNUM f1
CIPCODE a7
AWLEVEL f2
CASIAW f6
CWHITW f6
C2MORW f6
CUNKNW f6
CNRALW f6
IDX_C f6.

VARIABLE LABELS
unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
MAJORNUM 'First or Second Major'
CIPCODE 'CIP Code for major field of study'
AWLEVEL 'Award Level code'
CASIAW 'Asian women'
CWHITW 'White women'
C2MORW 'Two or more races women'
CUNKNW 'Race/ethnicity unknown women'
CNRALW 'Nonresident alien women'

```


IDX_C 'ID of institution where data are reported for the Completions component'.

VALUE LABELS

/MAJORNUM

1 'First major'

2 'Second major'

/CIPCODE

'01.0308' 'Agroecology and Sustainable Agriculture'

'01.0902' 'Agricultural Animal Breeding'

'01.0903' 'Animal Health'

'01.0904' 'Animal Nutrition'

'01.1099' 'Food Science and Technology, Other'

'01.11' 'Plant Sciences'

'01.12' 'Soil Sciences'

'03.0101' 'Natural Resources/Conservation, General'

'03.0199' 'Natural Resources Conservation and Research, Other'

'03.0205' 'Water, Wetlands, and Marine Resources Management'

'03.0502' 'Forest Sciences and Biology'

'03.0508' 'Urban Forestry'

'03.0509' 'Wood Science and Wood Products/Pulp and Paper Technology'

'03.0601' 'Wildlife, Fish and Wildlands Science and Management'

'04.0902' 'Architectural and Building Sciences/Technology'

'10.0304' 'Animation, Interactive Technology, Video Graphics and Special Effects'

'11.01' 'Computer and Information Sciences, General'

'11.02' 'Computer Programming'

'11.0301' 'Data Processing and Data Processing Technology/Technician'

'11.0401' 'Information Science/Studies'

'11.0501' 'Computer Systems Analysis/Analyst'

'11.0701' 'Computer Science'

'11.08' 'Computer Software and Media Applications'

'11.0901' 'Computer Systems Networking and Telecommunications'

'11.10' 'Computer/Information Technology Administration and Management'

'13.0501' 'Educational/Instructional Technology'

'13.0601' 'Educational Evaluation and Research'

'13.0603' 'Educational Statistics and Research Methods'

'14.01' 'Engineering, General'

'14.02' 'Aerospace, Aeronautical and Astronautical Engineering'

'14.03' 'Agricultural Engineering'

'14.04' 'Architectural Engineering'
'14.05' 'Biomedical/Medical Engineering'
'14.06' 'Ceramic Sciences and Engineering'
'14.07' 'Chemical Engineering'
'14.0801' 'Civil Engineering, General'
'14.0802' 'Geotechnical and Geoenvironmental Engineering'
'14.0803' 'Structural Engineering'
'14.0804' 'Transportation and Highway Engineering'
'14.09' 'Computer Engineering'
'14.10' 'Electrical, Electronics and Communications Engineering'
'14.11' 'Engineering Mechanics'
'14.12' 'Engineering Physics'
'14.13' 'Engineering Science'
'14.14' 'Environmental/Environmental Health Engineering'
'14.18' 'Materials Engineering'
'14.19' 'Mechanical Engineering'
'14.20' 'Metallurgical Engineering'
'14.21' 'Mining and Mineral Engineering'
'14.22' 'Naval Architecture and Marine Engineering'
'14.23' 'Nuclear Engineering'
'14.24' 'Ocean Engineering'
'14.25' 'Petroleum Engineering'
'14.27' 'Systems Engineering'
'14.32' 'Polymer/Plastics Engineering'
'14.33' 'Construction Engineering'
'14.34' 'Forest Engineering'
'14.35' 'Industrial Engineering'
'14.36' 'Manufacturing Engineering'
'14.37' 'Operations Research'
'14.38' 'Surveying Engineering'
'14.39' 'Geological/Geophysical Engineering'
'14.40' 'Paper Science and Engineering'
'14.41' 'Electromechanical Engineering'
'14.42' 'Mechatronics, Robotics, and Automation Engineering'
'14.43' 'Biochemical Engineering'
'14.44' 'Engineering Chemistry'
'14.45' 'Biological/Biosystems Engineering'
'14.99' 'Engineering, Other'

'15.0000' 'Engineering Technology, General'
'15.0101' 'Architectural Engineering Technology/Technician'
'15.0201' 'Civil Engineering Technology/Technician'
'15.03' 'Electrical Engineering Technologies/Technicians'
'15.04' 'Electromechanical Instrumentation and Maintenance Technologies/Technicians'
'15.05' 'Environmental Control Technologies/Technicians'
'15.06' 'Industrial Production Technologies/Technicians'
'15.07' 'Quality Control and Safety Technologies/Technicians'
'15.08' 'Mechanical Engineering Related Technologies/Technicians'
'15.09' 'Mining and Petroleum Technologies/Technicians'
'15.1001' 'Construction Engineering Technology/Technician'
'15.11' 'Engineering-Related Technologies'
'15.12' 'Computer Engineering Technologies/Technicians'
'15.13' 'Drafting/Design Engineering Technologies/Technicians'
'15.1401' 'Nuclear Engineering Technology/Technician'
'15.15' 'Engineering-Related Fields'
'15.1601' 'Nanotechnology'
'15.9999' 'Engineering Technologies and Engineering-Related Fields, Other'
'26.0202' 'Biochemistry'
'26.0203' 'Biophysics'
'26.0205' 'Molecular Biochemistry'
'26.0206' 'Molecular Biophysics'
'26.0207' 'Structural Biology'
'26.0208' 'Photobiology'
'26.0210' 'Biochemistry and Molecular Biology'
'26.0301' 'Botany/Plant Biology'
'26.0307' 'Plant Physiology'
'26.0404' 'Developmental Biology and Embryology'
'26.0504' 'Virology'
'26.0505' 'Parasitology'
'26.0506' 'Mycology'
'26.0507' 'Immunology'
'26.0599' 'Microbiological Sciences and Immunology, Other'
'26.0707' 'Animal Physiology'
'26.0803' 'Microbial and Eukaryotic Genetics'
'26.0805' 'Plant Genetics'
'26.0899' 'Genetics, Other'
'26.0902' 'Molecular Physiology'

'26.0903' 'Cell Physiology'
'26.0904' 'Endocrinology'
'26.0905' 'Reproductive Biology'
'26.0907' 'Cardiovascular Science'
'26.0911' 'Oncology and Cancer Biology'
'26.0912' 'Aerospace Physiology and Medicine'
'26.0999' 'Physiology, Pathology, and Related Sciences, Other'
'26.1001' 'Pharmacology'
'26.1002' 'Molecular Pharmacology'
'26.1003' 'Neuropharmacology'
'26.1005' 'Molecular Toxicology'
'26.1007' 'Pharmacology and Toxicology'
'26.1099' 'Pharmacology and Toxicology, Other'
'26.1101' 'Biometry/Biometrics'
'26.1103' 'Bioinformatics'
'26.1104' 'Computational Biology'
'26.1199' 'Biomathematics, Bioinformatics, and Computational Biology, Other'
'26.1201' 'Biotechnology'
'26.1306' 'Population Biology'
'26.1310' 'Ecology and Evolutionary Biology'
'26.1401' 'Molecular Medicine'
'26.1502' 'Neuroanatomy'
'27.01' 'Mathematics'
'27.0301' 'Applied Mathematics, General'
'27.0303' 'Computational Mathematics'
'27.0304' 'Computational and Applied Mathematics'
'27.0305' 'Financial Mathematics'
'27.0399' 'Applied Mathematics, Other'
'27.05' 'Statistics'
'29.02' 'Intelligence, Command Control and Information Operations'
'29.03' 'Military Applied Sciences'
'29.04' 'Military Systems and Maintenance Technology'
'29.9999' 'Military Technologies and Applied Sciences, Other'
'30.0601' 'Systems Science and Theory'
'30.0801' 'Mathematics and Computer Science'
'30.3001' 'Computational Science'
'30.3101' 'Human Computer Interaction'
'40.0101' 'Physical Sciences'

'40.0201' 'Astronomy'
'40.0202' 'Astrophysics'
'40.0299' 'Astronomy and Astrophysics, Other'
'40.0401' 'Atmospheric Sciences and Meteorology, General'
'40.0402' 'Atmospheric Chemistry and Climatology'
'40.0403' 'Atmospheric Physics and Dynamics'
'40.0404' 'Meteorology'
'40.0499' 'Atmospheric Sciences and Meteorology, Other'
'40.0501' 'Chemistry, General'
'40.0503' 'Inorganic Chemistry'
'40.0504' 'Organic Chemistry'
'40.0506' 'Physical Chemistry'
'40.0507' 'Polymer Chemistry'
'40.0508' 'Chemical Physics'
'40.0511' 'Theoretical Chemistry'
'40.0599' 'Chemistry, Other'
'40.0601' 'Geology/Earth Science, General'
'40.0602' 'Geochemistry'
'40.0603' 'Geophysics and Seismology'
'40.0605' 'Hydrology and Water Resources Science'
'40.0606' 'Geochemistry and Petrology'
'40.0607' 'Oceanography, Chemical and Physical'
'40.0699' 'Geological and Earth Sciences/Geosciences, Other'
'40.0801' 'Physics, General'
'40.0802' 'Atomic/Molecular Physics'
'40.0804' 'Elementary Particle Physics'
'40.0805' 'Plasma and High-Temperature Physics'
'40.0806' 'Nuclear Physics'
'40.0807' 'Optics/Optical Sciences'
'40.0808' 'Condensed Matter and Materials Physics'
'40.0809' 'Acoustics'
'40.0810' 'Theoretical and Mathematical Physics'
'40.0899' 'Physics, Other'
'40.1001' 'Materials Science'
'40.1002' 'Materials Chemistry'
'40.9999' 'Physical Sciences, Other'
'40.1099' 'Materials Sciences, Other'
'41.0000' 'Science Technologies/Technicians, General'

'41.0101' 'Biology Technician/Biotechnology Laboratory Technician'
 '41.02' 'Nuclear and Industrial Radiologic Technologies/Technicians'
 '41.03' 'Physical Science Technologies/Technicians'
 '41.9999' 'Science Technologies/Technicians, Other'
 '42.2702' 'Comparative Psychology'
 '42.2708' 'Psychometrics and Quantitative Psychology'
 '42.2709' 'Psychopharmacology'
 '43.0116' 'Cyber/Computer Forensics and Counterterrorism'
 '45.0603' 'Econometrics and Quantitative Economics'
 '45.0702' 'Geographic Information Science and Cartography'
 '49.0101' 'Aeronautics/Aviation/Aerospace Science and Technology, General'
 '51.1401' 'Medical Scientist'
 '51.2005' 'Natural Products Chemistry and Pharmacognosy'
 '51.2007' 'Pharmacoeconomics/Pharmaceutical Economics'
 '51.2009' 'Industrial and Physical Pharmacy and Cosmetic Sciences'
 '51.2205' 'Health/Medical Physics'
 '51.2502' 'Veterinary Anatomy'
 '51.2503' 'Veterinary Physiology'
 '51.2504' 'Veterinary Microbiology and Immunobiology'
 '51.2505' 'Veterinary Pathology and Pathobiology'
 '51.2506' 'Veterinary Toxicology and Pharmacology'
 '51.2510' 'Veterinary Preventive Medicine, Epidemiology, and Public Health'
 '51.2511' 'Veterinary Infectious Diseases'
 '52.13' 'Management Sciences and Quantitative Methods'
 /AWLEVEL
 5 'Bachelor"s degree'.

FREQUENCIES VARIABLES=
 MAJORNUM CIPCODE AWLEVEL.

DESCRIPTIVES VARIABLES=
 CASIAW CWHITW C2MORW CUNKNW CNRALW IDX_C.
 /STATS=SUM MIN MAX MEAN.

Appendix G: IPEDS Definition for Selected Variables

Values for variable ccbasic (Carnegie classification)

- 3 Not Applicable, not in Carnegie universe
- 0 Not Classified
- 1 Associate's - Public Rural - serving Small
- 2 Associate's - Public Rural - serving Medium
- 3 Associate's - Public Rural - serving Large
- 4 Associate's - Public Suburban - serving Single campus
- 5 Associate's - Public Suburban - serving Multi- campus
- 6 Associate's - Public Urban - serving Single campus
- 7 Associate's - Public Urban- serving Multi- campus
- 8 Associate's - Public Special Use
- 9 Associate's - Private Not-for-profit
- 10 Associate's - Private For-profit
- 11 Associate's - Public 2-year Colleges Under 4- year Universities
- 12 Associate's - Public 4-year Primarily Associate's
- 13 Associate's - Private Not-for-profit 4-year primarily Associate's
- 14 Associate's - Private For-profit 4-year primarily Associate's
- 15 Research Universities (very high research activity)
- 16 Research Universities (high research activity)
- 17 Doctoral/Research Universities, Master's Colleges and Universities
- 18 Master's Colleges and Universities (larger programs)
- 19 Master's Colleges and Universities (medium programs)
- 20 Master's Colleges and Universities (smaller programs)
- 21 Baccalaureate Colleges-Arts and Sciences
- 22 Baccalaureate Colleges-Diverse Fields
- 23 Baccalaureate/Associate's Colleges
- 24 Theological Seminaries, Bible Colleges and Other Faith-Related Institutions
- 25 Medical Schools and Medical centers
- 26 Other Separate Health Profession Schools
- 27 Schools of Engineering
- 28 Other Technology-Related Schools
- 29 Schools of Business and management
- 30 Schools of Art, Music, and Design
- 31 Schools of Law
- 32 Other – special focus institutions
- 33 Tribal Colleges

Values for variable locale

- 3 Not available
- 11 City: Large

- 12 City: Midsize
- 13 City: Small
- 21 Suburb: Large
- 22 Suburb: Midsize
- 23 Suburb: Small
- 31 Town: Fringe
- 32 Town: Distant
- 33 Town: Remote
- 41 Rural: Fringe
- 42 Rural: Distant
- 43 Rural: Remote

Note: For the variable MIXz030b, I recoded these variables into four categories: city (including large, midsize and small), suburb, town and rural.

Appendix H: Selected Profiles

STEM Vs NO STEM	STEM DEGREES AWARDED: NO				STEM DEGREES AWARDED: YES		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Number of STEM Completers	SDXz007z001	384	0	NA	1644	0	232.82
Ratio of STEM Completers to FTE	DepSTEM SDXz007z002	384	0	NA	1644	0	0.0324
Number of Underrep. STEM Completers	SDXz008z001	384	0	NA	1644	0	71.69
Ratio of Underrep. STEM Completers to FTE	DepURSTEM SDXz008z002	384	0	NA	1644	0	0.0105
Number of Completers in High Demand Disciplines	SDXz009z001	384	0	NA	1644	0	44.91
Ratio of High Demand Completers to FTE	DepHDSTEM SDXz009z002	384	0	NA	1644	0	0.0062
average ACT math score for top quartile of FT FT enrollees	actmt25	71	313	18.10	987	657	19.5968

STEM Vs NO STEM	STEM DEGREES AWARDED: NO				STEM DEGREES AWARDED: YES		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
average SAT math score for top quartile of FT FT enrollees	satmt25	59	325	449.85	1091	553	479.83
12 Month Unduplicated Headcount, Undergraduate	undupug	384	0	607	1644	0	6,571
Percent of undergrad students who are from underrepresented populations	MIXz101	383	1	22.81	1627	17	25.23
First-time, Full-time Undergraduates as a percentage of all undergraduates	pctft1st	383	1	12.45	1627	17	17.6091
Avg Net Price for Students awarded grant or scholarship aid	MIPz112	287	97	\$19,207	1580	64	\$19,791
Pct of full-time first-time	anyaidp	314	70	84.79	1599	45	90.64

STEM Vs NO STEM	STEM DEGREES AWARDED: NO				STEM DEGREES AWARDED: YES		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
students awarded any fin aid							
Pct of full-time first-time undergrads awarded any institutional grant aid	igrnt_p	314	70	57.25	1599	45	68.91
Pct of full-time first-time undergrads awarded student loans	loan_p	314	70	50.88	1599	45	64.97
Pct of first-time full-time undergrads awarded pell grants	pgrnt_p	314	70	50.16	1599	45	42.48
Full-time retention rate	ret_pcf	312	72	68.37	1571	73	72.72
Average of full time and part time retention rates	MIPz128b	136	248	53.31	1015	629	59.35
Total Number of Completers	TCompl	384	0	103.90	1644	0	1,156.61

STEM Vs NO STEM	STEM DEGREES AWARDED: NO				STEM DEGREES AWARDED: YES		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Percent of completers who are STEM	PctSTEM	38	346	NA	1644	0	17.99%
Graduation rate, all first-time full-time students	grrttot	286	98	44.24	1585	59	51.7401
Graduation rate, all first-time full-time underrepresented students (by ethnicity only)	SIPz089z001	192	192	39.57	1569	75	43.86
Proportion of all completers who are underrepresented (by ethnicity only)	MIXz097d	384	0	20.28%	1644	0	23.20%
Student to faculty ratio	stufacr	383	1	11.78	1627	17	14.6386
Percent of faculty members who are from underrepresented populations	MIXz022	287	97	10.18%	1606	38	10.86%
Percent of instructional staff who are full time	PctFTfac	377	7	49.87%	1632	12	55.66%

STEM Vs NO STEM	STEM DEGREES AWARDED: NO				STEM DEGREES AWARDED: YES		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Percentage of all instructional staff who are tenured or on tenure track	SIPz021z001	281	103	96.74%	1579	65	79.94%
Avg salary of FT nonmedical faculty	MIXz020b	354	30	\$56,810	1617	27	\$70,720
Tuition & fees as pct of core revenues	MIXz042	384	0	63.23	1644	0	55.13
State appropriations as pct of core revenues	f1stappc	384	0	0.91	1644	0	9.22
Government grants and contracts as pct of core revenues	MIXz045	384	0	5.34	1644	0	9.96
Private gifts, grants and contracts as pct of core revenues	MIXz046	384	0	20.47	1644	0	8.71
Investment return as pct of core revenues	MIXz047	384	0	5.43	1644	0	10.45

STEM Vs NO STEM	STEM DEGREES AWARDED: NO				STEM DEGREES AWARDED: YES		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Other revenues as pct of core revenues	MIXz048	384	0	4.48	1644	0	6.31
Instruction expenses as pct of core expenses	MIXz057	384	0	37.37	1644	0	40.99
Research expenses as pct of core expenses	MIXz058	384	0	0.69	1644	0	3.98
Public service expenses s as pct of core expenses	MIXz059	384	0	0.68	1644	0	1.99
Academic support as pct of core expenses	MIXz060	384	0	9.88	1644	0	10.95
Student service expenses as pct of core expenses	MIXz061	384	0	14.38	1644	0	16.15
Institutional support expenses as pct of core expenses	MIXz062	384	0	29.94	1644	0	21.28
Other expenses as pct of core expenses	MIXz063	384	0	7.08	1644	0	4.66

STEM Vs NO STEM	STEM DEGREES AWARDED: NO				STEM DEGREES AWARDED: YES		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Total library expenditures per FTE	lexptof	188	196	\$842.56	1544	100	\$573.60

STEM top Vs STEM bottom	STEM DEGREES AWARDED, YES: Ratio - top25%				STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Number of STEM Completers	SDXz007z001	411	0	514.61	411	0	35.01
Ratio of STEM Completers to FTE	DepSTEM SDXz007z002	411	0	0.0673	411	0	0.0091
Number of Underrepresented STEM Completers	SDXz008z001	411	0	149.15	411	0	13.05
Ratio of Underrepresented STEM Completers to FTE	DepURSTEM SDXz008z002	411	0	0.0201	411	0	0.0035
Number of Completers in High Demand Disciplines	SDXz009z001	411	0	90.52	411	0	10.54
Ratio of High Demand Completers to FTE	DepHDSTEM SDXz009z002	411	0	0.0120	411	0	0.0020
average ACT math score for top quartile of FT FT enrollees	actmt25	253	158	22.65	199	212	17.81

STEM top Vs STEM bottom	STEM DEGREES AWARDED, YES: Ratio - top25%				STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
average SAT math score for top quartile of FT FT enrollees	satmt25	290	121	541.32	218	193	443.33
12 Month Unduplicated Headcount, Undergraduate	undupug	411	0	7,461	411	0	4,136
Percent of undergrad students who are from underrepresented populations	MIXz101	409	2	17.48	408	3	29.98
First-time, Full-time Undergraduates as a percentage of all undergraduates	pctft1st	409	2	20.39	408	3	14.41
Avg Net Price for Students awarded grant or scholarship aid	MIPz112	399	12	\$21,648	380	31	\$20,454

STEM top Vs STEM bottom	STEM DEGREES AWARDED, YES: Ratio - top25%				STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Pct of full-time first-time students awarded any fin aid	anyaidp	405	6	86.39	390	21	93.13
Pct of full-time first-time undergrads awarded any institutional grant aid	igrnt_p	405	6	69.96	390	21	71.33
Pct of full-time first-time undergrads awarded student loans	loan_p	405	6	57.44	390	21	72.10
Pct of first-time full-time undergrads awarded pell grants	pgrnt_p	405	6	31.65	390	21	50.92
Full-time retention rate	ret_pcf	400	11	81.92	383	28	63.97
Average of full time and part time retention rates	MIPz128b	203	208	67.24	270	141	53.53

STEM top Vs STEM bottom	STEM DEGREES AWARDED, YES: Ratio - top25%				STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Total Number of Completers	TCompl	411	0	1,600	411	0	552
Percent of completers who are STEM	PctSTEM	411	0	35%	411	0	7%
Graduation rate, all first-time full-time students	grrttot	405	6	65.19	383	28	41.01
Graduation rate, all first-time full-time underrepresented students (by ethnicity only)	SIPz089z001	400	11	56.43	377	34	34.19
Proportion of all completers who are underrepresented (by ethnicity only)	MIXz097d	411	0	16.15%	411	0	27.52%
Student to faculty ratio	stufacr	409	2	13.71	408	3	14.56
Percent of faculty members who are from underrepresented populations	MIXz022	406	5	7.91%	402	9	11.92%

STEM top Vs STEM bottom	STEM DEGREES AWARDED, YES: Ratio - top25%				STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Percent of instructional staff who are full time	PctFTfac	411	0	67.31%	406	5	42.54%
Percentage of all instructional staff who are tenured or on tenure track	SIPz021z001	400	11	79.89%	390	21	82.88%
Avg salary of FT nonmedical faculty	MIXz020b	408	3	\$80,790	406	5	\$63,467
Tuition & fees as pct of core revenues	MIXz042	411	0	46.38	411	0	68.18
State appropriations as pct of core revenues	f1stappc	411	0	7.95	411	0	5.36
Local appropriations as pct of core revenues	f1lcappc	411	0	0.00	411	0	0.07
Government grants and contracts as pct of core revenues	MIXz045	411	0	9.21	411	0	8.19

STEM top Vs STEM bottom	STEM DEGREES AWARDED, YES: Ratio - top25%				STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Private gifts, grants and contracts as pct of core revenues	MIXz046	411	0	10.16	411	0	7.54
Investment return as pct of core revenues	MIXz047	411	0	18.46	411	0	6.11
Other revenues as pct of core revenues	MIXz048	411	0	7.69	411	0	4.29
Instruction expenses as pct of core expenses	MIXz057	411	0	40.94	411	0	38.64
Research expenses as pct of core expenses	MIXz058	411	0	8.06	411	0	1.65
Public service expenses s as pct of core expenses	MIXz059	411	0	2.40	411	0	1.09
Academic support as pct of core expenses	MIXz060	411	0	11.60	411	0	10.00
Student service expenses as pct of core expenses	MIXz061	411	0	14.29	411	0	19.21

STEM top Vs STEM bottom	STEM DEGREES AWARDED, YES: Ratio - top25%				STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Institutional support expenses as pct of core expenses	MIXz062	411	0	18.45	411	0	25.34
Other expenses as pct of core expenses	MIXz063	411	0	4.22	411	0	4.04
Total library expenditures per FTE	lexptof	389	22	\$898.44	365	46	\$386.34

URSTEM top Vs URSTEM bottom	UR STEM DEGREES AWARDED, YES: Ratio - top25%				UR STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Number of STEM Completers	SDXz007z001	398	0	438.90	398	0	57.82
Ratio of STEM Completers to FTE	DepSTEM SDXz007z002	398	0	0.060	398	0	0.014
Number of Underrepresented STEM Completers	SDXz008z001	398	0	157.16	398	0	12.13
Ratio of Underrepresented STEM Completers to FTE	DepURSTEM SDXz008z002	398	0	0.0239	398	0	0.0027
Number of Completers in High Demand Disciplines	SDXz009z001	398	0	82.24	398	0	12.18
Ratio of High Demand Completers to FTE	DepHDSTEM SDXz009z002	398	0	0.0118	398	0	0.0025
average ACT math score for top quartile of FT FT enrollees	actmt25	223	175	21.73	234	164	18.10

URSTEM top Vs URSTEM bottom	UR STEM DEGREES AWARDED, YES: Ratio - top25%				UR STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
average SAT math score for top quartile of FT FT enrollees	satmt25	260	138	523.35	242	156	449.69
12 Month Unduplicated Headcount, Undergraduate	undupug	398	0	7,014.40	398	0	4,865.01
Percent of undergrad students who are from underrepresented populations	MIXz101	392	6	35.69	396	2	20.99
First-time, Full-time Undergraduates as a percentage of all undergraduates	pctft1st	392	6	19.16	396	2	15.45

URSTEM top Vs URSTEM bottom	UR STEM DEGREES AWARDED, YES: Ratio - top25%				UR STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Avg Net Price for Students awarded grant or scholarship aid	MIPz112	389	9	\$20,373	371	27	\$19,578
Pct of full-time first-time students awarded any fin aid	anyaidp	393	5	86.99	379	19	93.36
Pct of full-time first-time undergrads awarded any institutional grant aid	igrnt_p	393	5	62.66	379	19	73.57
Pct of full-time first-time undergrads awarded student loans	loan_p	393	5	59.41	379	19	70.12

URSTEM top Vs URSTEM bottom	UR STEM DEGREES AWARDED, YES: Ratio - top25%				UR STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Pct of first-time full-time undergrads awarded pell grants	pgrnt_p	393	5	42.84	379	19	45.33
Full-time retention rate	ret_pcf	383	15	77.62	370	28	67.09
Average of full time and part time retention rates	MIPz128b	223	175	61.73	254	144	55.01
Total Number of Completers	TCompl	398	0	1,422.09	398	0	680.35
Percent of completers who are STEM	PctSTEM	398	0	31.30%	396	2	9.76%
Graduation rate, all first-time full-time students	grttot	392	6	57.54	374	24	44.84

URSTEM top Vs URSTEM bottom	UR STEM DEGREES AWARDED, YES: Ratio - top25%				UR STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Graduation rate, all first-time full-time underrepresented students (by ethnicity only)	SIPz089z001	388	10	51.72	369	29	35.69
Proportion of all completers who are underrepresented (by ethnicity only)	MIXz097d	398	0	34.55%	398	0	18.49%
Student to faculty ratio	stufacr	392	6	14.27	396	2	14.48
Percent of faculty members who are from underrepresented populations	MIXz022	386	12	18.22%	393	5	7.66%
Percent of instructional staff who are full time	PctFTfac	395	3	64.63%	397	1	45.57%

URSTEM top Vs URSTEM bottom	UR STEM DEGREES AWARDED, YES: Ratio - top25%				UR STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Percentage of all instructional staff who are tenured or on tenure track	SIPz021z001	380	18	79.34%	387	11	80.80%
Avg salary of FT nonmedical faculty	MIXz020b	388	10	\$78,773	395	3	\$63,922
Tuition & fees as pct of core revenues	MIXz042	398	0	46.02	398	0	64.24
State appropriations as pct of core revenues	f1stappc	398	0	9.18	398	0	7.26
Local appropriations as pct of core revenues	f1lcappc	398	0	0.03	398	0	0.07
Government grants and contracts as pct of core revenues	MIXz045	398	0	12.1131	398	0	8.0854

URSTEM top Vs URSTEM bottom	UR STEM DEGREES AWARDED, YES: Ratio - top25%				UR STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Private gifts, grants and contracts as pct of core revenues	MIXz046	398	0	8.9573	398	0	8.3744
Investment return as pct of core revenues	MIXz047	398	0	16.1005	398	0	6.6834
Other revenues as pct of core revenues	MIXz048	398	0	7.3769	398	0	5.0854
Instruction expenses as pct of core expenses	MIXz057	398	0	38.7563	398	0	41.1910
Research expenses as pct of core expenses	MIXz058	398	0	6.9447	398	0	1.9322
Public service expenses s as pct of core expenses	MIXz059	398	0	2.0628	398	0	1.3869
Academic support as pct of core expenses	MIXz060	398	0	11.6533	398	0	10.1784

URSTEM top Vs URSTEM bottom	UR STEM DEGREES AWARDED, YES: Ratio - top25%				UR STEM DEGREES AWARDED, YES: Ratio - Bottom25%		
		N		Mean	N		Mean
		Valid	Missing		Valid	Missing	
Student service expenses as pct of core expenses	MIXz061	398	0	13.9925	398	0	18.0955
Institutional support expenses as pct of core expenses	MIXz062	398	0	20.9095	398	0	22.8518
Other expenses as pct of core expenses	MIXz063	398	0	5.6583	398	0	4.3367
Total library expenditures per FTE	lexptof	376	22	\$853	368	30	\$387

Appendix I: Process for Creating Dependent Variables

Process for creating DepSTEM (see chapter three for methodology and definitions)

- On the ipeds data interface, request completion counts for the Appendix B CIP codes (for the year 2015), for all students (see Appendix D for syntax):
- This process results in one case (row) for each CIP code at each school, with one column for all students.
- Restructure data from long format to wide format (<https://kb.iu.edu/d/bbqj>)
- This results in one case per institution, with one column for each CIP code completion total
- Calculate new variable, totaling all columns into one variable, defined as total number of STEM degrees awarded per institution
- Merge (add variables) this new variable into the master data set

Process for creating DepURSTEM (see chapter three for methodology and definitions)

- Part One: Underrepresented Students by Ethnicity
 - On the ipeds data interface, request completion counts for the Appendix B CIP codes (for the year 2015), for the following ethnicities (men and women) (see Appendix E for syntax):
 - CAIANT 'American Indian or Alaska Native total'
 - CBKAAT 'Black or African American total'
 - CHISPT 'Hispanic or Latino total'
 - CNHPIT 'Native Hawaiian or Other Pacific Islander total'
 - This process results in one case (row) for each CIP code at each school, with columns for completion counts for each ethnicity.
 - Restructure data from long format to wide format (<https://kb.iu.edu/d/bbqj>)
 - This results in one case per institution, with one column for each CIP code completion per ethnicity
 - Calculate new variable, totaling all columns into one variable, defined as total number of STEM degrees awarded to students underrepresented by ethnicity
 - Merge (add variables) this new variable into the master data set
- Part Two: Underrepresented Students by Gender
 - On the ipeds data interface, request completion counts for the Appendix F CIP codes (for the year 2015), for the following women categories (excludes women already counted in Part One) (see Appendix F for syntax):
 - CASIAW 'Asian women'
 - CWHITW 'White women'
 - C2MORW 'Two or more races women'
 - CUNKNW 'Race/ethnicity unknown women'
 - CNRALW 'Nonresident alien women'

- This process results in one case (row) for each CIP code at each school, with columns for completion counts for each ethnicity.
- Restructure data from long format to wide format (<https://kb.iu.edu/d/bbqj>)
- This results in one case per institution, with one column for each CIP code completion per ethnicity
- Calculate new variable, totaling all columns into one variable, defined as total number of STEM degrees awarded to women who are not underrepresented by ethnicity, but who are underrepresented in specific STEM degrees
- Merge (add variables) this new variable into the master data set
- Part Three: Creating DepURSTEM
 - Calculate new variable (DepURSTEM), using the formula ((part one new variable PLUS part two new variable) DIVIDED BY fte12mn)

Process for creating DepHDSTEM (see chapter three for methodology and definitions)

- On the ipeds data interface, request completion counts for the Appendix C CIP codes (for the year 2015), for all students (see Appendix C for syntax):
- This process results in one case (row) for each CIP code at each school, with one column for all students.
- Restructure data from long format to wide format (<https://kb.iu.edu/d/bbqj>)
- This results in one case per institution, with one column for each CIP code completion total
- Calculate new variable, totaling all columns into one variable, defined as total number of STEM degrees awarded in high demand degrees per institution
- Merge (add variables) this new variable into the master data set

For instructions on how to access IPEDS data, please refer to the IPEDS Data Center User Manual, PDF located here:

<https://nces.ed.gov/ipeds/datacenter/IPEDSManual.pdf>

Appendix J: Syntax for Independent Variable Data Pulls

ALL COMPLETERS

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1052017-345.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
AWLEVELC f2
CSTOTLT f6
CSTOTLM f6
CSTOTLW f6
CSAIANT f6
CSASIAT f6
CSBKAAT f6
CSHISPT f6
CSNHPIT f6
CSWHITT f6
IDX_C f6.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
AWLEVELC 'Award Level code'
CSTOTLT 'Grand total'
CSTOTLM 'Grand total men'
CSTOTLW 'Grand total women'
CSAIANT 'American Indian or Alaska Native total'
CSASIAT 'Asian total'
CSBKAAT 'Black or African American total'
CSHISPT 'Hispanic or Latino total'
CSNHPIT 'Native Hawaiian or Other Pacific Islander total'
CSWHITT 'White total'
IDX_C 'ID of institution where data are reported for the Completions component'.

```

VALUE LABELS
 /AWLEVELC
 5 'Bachelor"s degree'.

FREQUENCIES VARIABLES=
 AWLEVELC.

DESCRIPTIVES VARIABLES=
 CSTOTLT CSTOTLM CSTOTLW CSAIANT CSASIAT CSBKAAT CSHISPT
 CSNHPIT CSWHITT IDX_C.
 /STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1052017-345.sav' /Compressed.

NET PRICE

GET DATA /TYPE = TXT
 /FILE = 'C:\cds\SPSS_RV_1052017-768.csv'
 /DELCASE = LINE
 /DELIMITERS = ","
 /QUALIFIER = ""
 /ARRANGEMENT = DELIMITED
 /FIRSTCASE = 2
 /IMPORTCASE = ALL
 /VARIABLES =
 UNITID F6
 INSTNM A50
 year F4
 NPIST2 f6
 NPGRN2 f6.

VARIABLE LABELS
 unitid 'Unique identification number for an institution'
 instnm 'Institution (entity) name'
 year 'Survey year'
 NPIST2 'Average net price-students awarded grant or scholarship aid, 2014-15'
 NPGRN2 'Average net price-students awarded grant or scholarship aid, 2014-15'.

DESCRIPTIVES VARIABLES=
 NPIST2 NPGRN2.
 /STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1052017-768.sav' /Compressed.

RESIDENCE

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1052017-695.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
RMINSTTP f3
RMOUSTTP f3
RMFRGNCP f3
RMUNKNWP f3.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
RMINSTTP 'Percent of first-time undergraduates - in-state'
RMOUSTTP 'Percent of first-time undergraduates - out-of-state'
RMFRGNCP 'Percent of first-time undergraduates - foreign countries'
RMUNKNWP 'Percent of first-time undergraduates - residence unknown'.

```

DESCRIPTIVES VARIABLES=

```

RMINSTTP RMOUSTTP RMFRGNCP RMUNKNWP.
/STATS=SUM MIN MAX MEAN.

```

```

SAVE OUTFILE='cdsfile_allSPSS_RV_1052017-695.sav' /Compressed.

```

CORE EXPENSES 1

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_9282017-226.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =

```

UNITID F6
 INSTNM A50
 year F4
 F1INSTFT f10
 F1RSRCFT f10
 F1PBSVFT f10
 F1ACSPFT f10
 F1STSVFT f10
 F1INSUFT f10
 F1OTEXFT f10
 F2INSTFT f10
 F2RSRCFT f10
 F2PBSVFT f10
 F2ACSPFT f10
 F2STSVFT f10
 F2INSUFT f10
 F2OTEXFT f10
 F3INSTFT f10
 F3RSRCFT f10
 F3PBSVFT f10
 F3ACSPFT f10
 F3STSVFT f10
 F3INSUFT f10
 F3OTEXFT f10.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
 instnm 'Institution (entity) name'
 year 'Survey year'
 F1INSTFT 'Instruction expenses per FTE (GASB)'
 F1RSRCFT 'Research expenses per FTE (GASB)'
 F1PBSVFT 'Public service expenses per FTE (GASB)'
 F1ACSPFT 'Academic support expenses per FTE (GASB)'
 F1STSVFT 'Student service expenses per FTE (GASB)'
 F1INSUFT 'Institutional support expenses per FTE (GASB)'
 F1OTEXFT 'All other core expenses per FTE (GASB)'
 F2INSTFT 'Instruction expenses per FTE (FASB)'
 F2RSRCFT 'Research expenses per FTE (FASB)'
 F2PBSVFT 'Public service expenses per FTE (FASB)'
 F2ACSPFT 'Academic support expenses per FTE (FASB)'
 F2STSVFT 'Student service expenses per FTE (FASB)'
 F2INSUFT 'Institutional support expenses per FTE (FASB)'
 F2OTEXFT 'All other core expenses per FTE (FASB)'

```

F3INSTFT 'Instruction expenses per FTE (for-profit institutions)'
F3RSRCFT 'Research expenses per FTE (for-profit institutions)'
F3PBSVFT 'Public service expenses per FTE (for-profit institutions)'
F3ACSPFT 'Academic support expenses per FTE (for-profit institutions)'
F3STSVFT 'Student service expenses per FTE (for-profit institutions)'
F3INSUFT 'Institutional support expenses per FTE (for-profit institutions)'
F3OTEXFT 'All other core expenses per FTE (for-profit institutions)'.

```

DESCRIPTIVES VARIABLES=

```

F1INSTFT F1RSRCFT F1PBSVFT F1ACSPFT F1STSVFT F1INSUFT F1OTEXFT
F2INSTFT F2RSRCFT F2PBSVFT F2ACSPFT F2STSVFT F2INSUFT F2OTEXFT
F3INSTFT F3RSRCFT F3PBSVFT F3ACSPFT F3STSVFT F3INSUFT F3OTEXFT.
/STATS=SUM MIN MAX MEAN.

```

SAVE OUTFILE='cdsfile_allSPSS_RV_9282017-226.sav' /Compressed.

FACULTY 1

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_9282017-341.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
STAFFCAT f4
HRTOTLT f6
IDX_HR f6.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
STAFFCAT 'Occupation and full- and part-time status'
HRTOTLT 'Grand total'
IDX_HR 'ID of institution where data are reported for the Human Resource component'.

```

VALUE LABELS

```

/STAFFCAT

```

2210 'Full-time, Instructional staff'
 3210 'Part-time, Instructional staff'.

FREQUENCIES VARIABLES=
 STAFFCAT.

DESCRIPTIVES VARIABLES=
 HRTOTLT IDX_HR.
 /STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_9282017-341.sav' /Compressed.

FACULTY 2

GET DATA /TYPE = TXT
 /FILE = 'C:\cds\SPSS_RV_9282017-725.csv'
 /DELCASE = LINE
 /DELIMITERS = ","
 /QUALIFIER = ""
 /ARRANGEMENT = DELIMITED
 /FIRSTCASE = 2
 /IMPORTCASE = ALL
 /VARIABLES =
 UNITID F6
 INSTNM A50
 year F4
 FACSTAT f3
 SISTOTL f2
 IDX_HR f6.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
 instnm 'Institution (entity) name'
 year 'Survey year'
 FACSTAT 'Faculty and tenure status'
 SISTOTL 'All ranks'
 IDX_HR 'ID of institution where data are reported for the Human Resource component'.

VALUE LABELS

/FACSTAT
 20 'With faculty status, tenured'
 30 'With faculty status, on tenure track'
 40 'With faculty status not on tenure track/No tenure system, total'
 50 'Without faculty status'.

FREQUENCIES VARIABLES=
FACSTAT.

DESCRIPTIVES VARIABLES=
SISTOTL IDX_HR.
/STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_9282017-725.sav' /Compressed.

12 MONTH HEADCOUNT

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-78.csv'
/DELCASE = LINE
/DELIMITERS = ", "
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
UNDUP f6
UNDUPUG f6
FTE12MN f6.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
UNDUP '12-month unduplicated headcount, total: 2013-14'
UNDUPUG '12-month unduplicated headcount, undergraduate: 2013-14'
FTE12MN '12-month full-time equivalent enrollment: 2013-14'.

DESCRIPTIVES VARIABLES=
UNDUP UNDUPUG FTE12MN.
/STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-78.sav' /Compressed.

12 MONTH ENROLLMENT

GET DATA /TYPE = TXT

```

/FILE = 'C:\cds\SPSS_RV_1062016-931.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
EFFYLEV f1
EFYTOTLT f6
XEYTOTLT a1
EFYTOTLM f6
XEYTOTLM a1
EFYTOTLW f6
XEYTOTLW a1
EFYAIANT f6
XEFYAIAT a1
EFYASIAT f6
XEFYASIT a1
EFYBKAAT f6
XEFYBKAT a1
EFYHISPT f6
XEFYHIST a1
EFYNHPIT f6
XEFYNHPT a1
EFYWHITT f6
XEFYWHIT a1
EFY2MORT f6
XEFY2MOT a1
EFYUNKNT f6
XEYUNKNT a1
EFYNRALT f6
XEYNRALT a1
IDX_E12 f6.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
EFFYLEV 'Level of student'

```


EFYTOTLT 'Grand total'
 XEYTOTLT 'Imputation flag for XEYTOTLT'
 EFYTOTLM 'Grand total men'
 XEYTOTLM 'Imputation flag for XEYTOTLM'
 EFYTOTLW 'Grand total women'
 XEYTOTLW 'Imputation flag for XEYTOTLW'
 EFYAIANT 'American Indian or Alaska Native total'
 XEFYAIAT 'Imputation flag for XEFYAIAT'
 EFYASIAT 'Asian total'
 XEFYASIT 'Imputation flag for XEFYASIT'
 EFYBKAAT 'Black or African American total'
 XEFYBKAT 'Imputation flag for XEFYBKAT'
 EFYHISPT 'Hispanic or Latino total'
 XEFYHIST 'Imputation flag for XEFYHIST'
 EFYNHPIT 'Native Hawaiian or Other Pacific Islander total'
 XEFYNHPT 'Imputation flag for XEFYNHPT'
 EFYWHITT 'White total'
 XEFYWHIT 'Imputation flag for XEFYWHIT'
 EFY2MORT 'Two or more races total'
 XEFY2MOT 'Imputation flag for XEFY2MOT'
 EFYUNKNT 'Race/ethnicity unknown total'
 XEYUNKNT 'Imputation flag for XEYUNKNT'
 EFYNRALT 'Nonresident alien total'
 XEYNRALT 'Imputation flag for XEYNRALT'
 IDX_E12 'ID of institution where data are reported for the 12-month enrollment component'.

VALUE LABELS

/EFFYLEV
 2 'Undergraduate'.

FREQUENCIES VARIABLES=
 EFFYLEV.

DESCRIPTIVES VARIABLES=
 EFYTOTLT EFYTOTLM EFYTOTLW EFYAIANT EFYASIAT EFYBKAAT
 EFYHISPT EFYNHPIT EFYWHITT EFY2MORT EFYUNKNT EFYNRALT IDX_E12.
 /STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-931.sav' /Compressed.

ADMISSIONS

GET DATA /TYPE = TXT

```

/FILE = 'C:\cds\SPSS_RV_1062016-978.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
SATVR25 f3
XSATVR25 a1
SATMT25 f3
XSATMT25 a1
ACTCM25 f3
XACTCM25 a1
ACTMT25 f3
XACTMT25 a1
OPENADMP f2
ADMCON7 f2
APPLCN f6
XAPPLCN a1
ADMSSN f6
XADMSSN a1
ENRLT f6
XENRLT a1
DVADM01 f6.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
SATVR25 'SAT Critical Reading 25th percentile score'
XSATVR25 'Imputation flag for XSATVR25'
SATMT25 'SAT Math 25th percentile score'
XSATMT25 'Imputation flag for XSATMT25'
ACTCM25 'ACT Composite 25th percentile score'
XACTCM25 'Imputation flag for XACTCM25'
ACTMT25 'ACT Math 25th percentile score'
XACTMT25 'Imputation flag for XACTMT25'
OPENADMP 'Open admission policy'
ADMCON7 'Admission test scores'

```

APPLCN 'Applicants total'
 XAPPLCN 'Imputation flag for XAPPLCN'
 ADMSSN 'Admissions total'
 XADMSSN 'Imputation flag for XADMSSN'
 ENRLT 'Enrolled total'
 XENRLT 'Imputation flag for XENRLT'
 DVADM01 'Percent admitted - total'.

VALUE LABELS

/OPENADMP

1 'Yes'

2 'No'

-1 'Not reported'

-2 'Not applicable'

/ADMCON7

1 'Required'

2 'Recommended'

3 'Neither required nor recommended'

4 'Do not know'

-1 'Not reported'

-2 'Not applicable'.

FREQUENCIES VARIABLES=

OPENADMP ADMCON7.

DESCRIPTIVES VARIABLES=

SATVR25 SATMT25 ACTCM25 ACTMT25 APPLCN ADMSSN ENRLT DVADM01.

/STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-978.sav' /Compressed.

CORE REVENUES

GET DATA /TYPE = TXT

/FILE = 'C:\cds\SPSS_RV_1062016-234.csv'

/DELCASE = LINE

/DELIMITERS = ","

/QUALIFIER = ""

/ARRANGEMENT = DELIMITED

/FIRSTCASE = 2

/IMPORTCASE = ALL

/VARIABLES =

UNITID F6

INSTNM A50

year F4

F1CORREV f12

F1TUFEPF f6

F1STAPPC f6

F1LCAPPC f6

F1GVGCPC f6

F1PGGCPC f6

F1INVRPC f6

F1OTRVPC f6

F2CORREV f12

F2TUFEPF f6

F2GVGCPC f6

F2PGGCPC f6

F2INVRPC f6

F2OTRVPC f6

F3CORREV f12

F3TUFEPF f6

F3GVGCPC f6

F3PGGCPC f6

F3INVRPC f6

F3SSEAPC f6

F3OTRVPC f6

F1TUFEFT f10

F1STAPFT f10

F1LCAPFT f10

F1GVGCFT f10

F1PGGCFT f10

F1INVRFT f10

F1OTRVFT f10

F2TUFEFT f10

F2GVGCFT f10

F2PGGCFT f10

F2INVRFT f10

F2OTRVFT f10

F3TUFEFT f10

F3GVGCFT f10

F3PGGCFT f10

F3INVRFT f10

F3SSEAFT f10

F3OTRVFT f10

F1COREXP f12

F1INSTPC f6

F1RSRCPC f6

F1PBSVPC f6
F1ACSPPC f6
F1STSVPC f6
F1INSUPC f6
F1OTEXPC f6
F2COREXP f12
F2INSTPC f6
F2R SRCPC f6
F2PBSVPC f6
F2ACSPPC f6
F2STSVPC f6
F2INSUPC f6
F2OTEXPC f6
F3COREXP f12
F3INSTPC f6
F3R SRCPC f6
F3PBSVPC f6
F3ACSPPC f6
F3STSVPC f6
F3INSUPC f6
F3OTEXPC f6
F1INSTFT f10
F1R SRCFT f10
F1PBSVFT f10
F1ACSPFT f10
F1STSVFT f10
F1INSUFT f10
F1OTEXFT f10
F2INSTFT f10
F2R SRCFT f10
F2PBSVFT f10
F2ACSPFT f10
F2STSVFT f10
F2INSUFT f10
F2OTEXFT f10
F3INSTFT f10
F3R SRCFT f10
F3PBSVFT f10
F3ACSPFT f10
F3STSVFT f10
F3INSUFT f10
F3OTEXFT f10.

VARIABLE LABELS

unitid 'Unique identification number for an institution'

instnm 'Institution (entity) name'

year 'Survey year'

F1CORREV 'Core revenues, total dollars (GASB)'

F1TUFEP 'Tuition and fees as a percent of core revenues (GASB)'

F1STAPPC 'State appropriations as percent of core revenues (GASB)'

F1LCAPPC 'Local appropriations as a percent of core revenues (GASB)'

F1GVGCPC 'Government grants and contracts as a percent of core revenues (GASB)'

F1PGGCPC 'Private gifts, grants, and contracts as a percent of core revenues (GASB)'

F1INVRPC 'Investment return as a percent of core revenues (GASB)'

F1OTRVPC 'Other revenues as a percent of core revenues (GASB)'

F2CORREV 'Core revenues, total dollars (FASB)'

F2TUFEP 'Tuition and fees as a percent of core revenues (FASB)'

F2GVGCPC 'Government grants and contracts as a percent of core revenues (FASB)'

F2PGGCPC 'Private gifts, grants, contracts/contributions from affiliated entities as a percent of core revenues (FASB)'

F2INVRPC 'Investment return as a percent of core revenues (FASB)'

F2OTRVPC 'Other revenues as a percent of core revenues (FASB)'

F3CORREV 'Core revenues, total dollars (for-profit institutions)'

F3TUFEP 'Tuition and fees as a percent of core revenues (for-profit institutions)'

F3GVGCPC 'Government grants and contracts as a percent of core revenues (for-profit institutions)'

F3PGGCPC 'Private gifts, grants, contracts as a percent of core revenues (for-profit institutions)'

F3INVRPC 'Investment return as a percent of core revenues (for-profit institutions)'

F3SSEAPC 'Sales and services of educational activities as a percent of core revenues (for-profit institutions)'

F3OTRVPC 'Other revenues as a percent of core revenues (for-profit institutions)'

F1TUFEF 'Revenues from tuition and fees per FTE (GASB)'

F1STAPFT 'Revenues from state appropriations per FTE (GASB)'

F1LCAPFT 'Revenues from local appropriations per FTE (GASB)'

F1GVGCFT 'Revenues from government grants and contracts per FTE (GASB)'

F1PGGCFT 'Revenues from private gifts, grants, and contracts per FTE (GASB)'

F1INVRFT 'Revenues from investment return per FTE (GASB)'

F1OTRVFT 'Other core revenues per FTE (GASB)'

F2TUFEF 'Revenues from tuition and fees per FTE (FASB)'

F2GVGCFT 'Revenues from government grants and contracts per FTE (FASB)'

F2PGGCFT 'Revenues from private gifts, grants, contracts/contributions from affiliated entities per FTE (FASB)'

F2INVRFT 'Revenues from investment return per FTE (FASB)'

F2OTRVFT 'Other core revenues per FTE (FASB)'

F3TUFEF 'Revenues from tuition and fees per FTE (for-profit institutions)'

F3GVGCFT 'Revenues from government grants and contracts per FTE (for-profit institutions)'
 F3PGGCFT 'Revenues from private gifts, grants, contracts per FTE (for-profit institutions)'
 F3INVRFT 'Revenues from investment return per FTE (for-profit institutions)'
 F3SSEAFT 'Revenues from sales and services of educational activities per FTE (for-profit institutions)'
 F3OTRVFT 'Other core revenues per FTE (for-profit institutions)'
 F1COREXP 'Core expenses, total dollars (GASB)'
 F1INSTPC 'Instruction expenses as a percent of total core expenses (GASB)'
 F1RSRCPC 'Research expenses as a percent of total core expenses (GASB)'
 F1PBSVPC 'Public service expenses as a percent of total core expenses (GASB)'
 F1ACSPPC 'Academic support expenses as a percent of total core expenses (GASB)'
 F1STSVPC 'Student service expenses as a percent of total core expenses (GASB)'
 F1INSUPC 'Institutional support expenses as a percent of total core expenses (GASB)'
 F1OTEXPC 'Other core expenses as a percent of total core expenses (GASB)'
 F2COREXP 'Core expenses, total dollars (FASB)'
 F2INSTPC 'Instruction expenses as a percent of total core expenses (FASB)'
 F2RSRCPC 'Research expenses as a percent of total core expenses (FASB)'
 F2PBSVPC 'Public service expenses as a percent of total core expenses (FASB)'
 F2ACSPPC 'Academic support expenses as a percent of total core expenses (FASB)'
 F2STSVPC 'Student service expenses as a percent of total core expenses (FASB)'
 F2INSUPC 'Institutional support expenses as a percent of total core expenses (FASB)'
 F2OTEXPC 'Other core expenses as a percent of total core expenses (FASB)'
 F3COREXP 'Core expenses, total dollars (for-profit institutions)'
 F3INSTPC 'Instruction expenses as a percent of total core expenses (for-profit institutions)'
 F3RSRCPC 'Research expenses as a percent of total core expenses (for-profit institutions)'
 F3PBSVPC 'Public service expenses as a percent of total core expenses (for-profit institutions)'
 F3ACSPPC 'Academic support expenses as a percent of total core expenses (for-profit institutions)'
 F3STSVPC 'Student service expenses as a percent of total core expenses (for-profit institutions)'
 F3INSUPC 'Institutional support expenses as a percent of total core expenses (for-profit institutions)'
 F3OTEXPC 'Other core expenses as a percent of total core expenses (for-profit institutions)'
 F1INSTFT 'Instruction expenses per FTE (GASB)'
 F1RSRCFT 'Research expenses per FTE (GASB)'
 F1PBSVFT 'Public service expenses per FTE (GASB)'
 F1ACSPFT 'Academic support expenses per FTE (GASB)'

F1STSVFT 'Student service expenses per FTE (GASB)'
 F1INSUFT 'Institutional support expenses per FTE (GASB)'
 F1OTEXFT 'All other core expenses per FTE (GASB)'
 F2INSTFT 'Instruction expenses per FTE (FASB)'
 F2RSRCFT 'Research expenses per FTE (FASB)'
 F2PBSVFT 'Public service expenses per FTE (FASB)'
 F2ACSPFT 'Academic support expenses per FTE (FASB)'
 F2STSVFT 'Student service expenses per FTE (FASB)'
 F2INSUFT 'Institutional support expenses per FTE (FASB)'
 F2OTEXFT 'All other core expenses per FTE (FASB)'
 F3INSTFT 'Instruction expenses per FTE (for-profit institutions)'
 F3RSRCFT 'Research expenses per FTE (for-profit institutions)'
 F3PBSVFT 'Public service expenses per FTE (for-profit institutions)'
 F3ACSPFT 'Academic support expenses per FTE (for-profit institutions)'
 F3STSVFT 'Student service expenses per FTE (for-profit institutions)'
 F3INSUFT 'Institutional support expenses per FTE (for-profit institutions)'
 F3OTEXFT 'All other core expenses per FTE (for-profit institutions)'.

DESCRIPTIVES VARIABLES=

F1CORREV F1TUFEP C F1STAPPC F1LCAPPC F1GVGCPC F1PGGCPC F1INVRPC
 F1OTRVPC F2CORREV F2TUFEP C F2GVGCPC F2PGGCPC F2INVRPC F2OTRVPC
 F3CORREV F3TUFEP C F3GVGCPC F3PGGCPC F3INVRPC F3SSEAPC F3OTRVPC
 F1TUFEFT F1STAPFT F1LCAPFT F1GVGCFT F1PGGCFT F1INVRFT F1OTRVFT
 F2TUFEFT F2GVGCFT F2PGGCFT F2INVRFT F2OTRVFT F3TUFEFT F3GVGCFT
 F3PGGCFT F3INVRFT F3SSEAFT F3OTRVFT F1COREXP F1INSTPC F1RSRCPC
 F1PBSVPC F1ACSPPC F1STSVPC F1INSUPC F1OTEXPC F2COREXP F2INSTPC
 F2RSRCPC F2PBSVPC F2ACSPPC F2STSVPC F2INSUPC F2OTEXPC F3COREXP
 F3INSTPC F3RSRCPC F3PBSVPC F3ACSPPC F3STSVPC F3INSUPC F3OTEXPC
 F1INSTFT F1RSRCFT F1PBSVFT F1ACSPFT F1STSVFT F1INSUFT F1OTEXFT
 F2INSTFT F2RSRCFT F2PBSVFT F2ACSPFT F2STSVFT F2INSUFT F2OTEXFT
 F3INSTFT F3RSRCFT F3PBSVFT F3ACSPFT F3STSVFT F3INSUFT F3OTEXFT.
 /STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-234.sav' /Compressed.

COST OF ATTENDANCE

GET DATA /TYPE = TXT
 /FILE = 'C:\cds\SPSS_RV_1062016-402.csv'
 /DELCASE = LINE
 /DELIMITERS = ","
 /QUALIFIER = ""
 /ARRANGEMENT = DELIMITED
 /FIRSTCASE = 2


```

/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
TUFEYR3 f6
CINDON f5
CINSON f5
COTSON f5
CINDOFF f5
CINSOFF f5
COTSOFF f5
CINDFAM f5
CINSFAM f5
COTSFAM f5.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
TUFEYR3 'Tuition and fees, 2013-14'
CINDON 'Total price for in-district students living on campus 2013-14'
CINSON 'Total price for in-state students living on campus 2013-14'
COTSON 'Total price for out-of-state students living on campus 2013-14'
CINDOFF 'Total price for in-district students living off campus (not with family) 2013-14'
CINSOFF 'Total price for in-state students living off campus (not with family) 2013-14'
COTSOFF 'Total price for out-of-state students living off campus (not with family) 2013-14'
CINDFAM 'Total price for in-district students living off campus (with family) 2013-14'
CINSFAM 'Total price for in-state students living off campus (with family) 2013-14'
COTSFAM 'Total price for out-of-state students living off campus (with family) 2013-14'.

```

DESCRIPTIVES VARIABLES=

```

TUFEYR3 CINDON CINSON COTSON CINDOFF CINSOFF COTSOFF CINDFAM
CINSFAM COTSFAM.
/STATS=SUM MIN MAX MEAN.

```

```

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-402.sav' /Compressed.

```

EMPLOYEES 1

```

GET DATA /TYPE = TXT

```

```
/FILE = 'C:\cds\SPSS_RV_1062016-521.csv'  
/DELCASE = LINE  
/DELIMITERS = ","  
/QUALIFIER = ""  
/ARRANGEMENT = DELIMITED  
/FIRSTCASE = 2  
/IMPORTCASE = ALL  
/VARIABLES =  
UNITID F6  
INSTNM A50  
year F4  
SISCAT f3  
HRTOTLT f6  
XHRTOTLT a1  
HRTOTLM f6  
XHRTOTLM a1  
HRTOTLW f6  
XHRTOTLW a1  
HRAIANT f6  
XHRAIANT a1  
HRAIANM f6  
XHRAIANM a1  
HRAIANW f6  
XHRAIANW a1  
HRASIAT f6  
XHRASIAT a1  
HRASIAM f6  
XHRASIAM a1  
HRASIAW f6  
XHRASIAW a1  
HRBKAAT f6  
XHRBKAAT a1  
HRBKAAM f6  
XHRBKAAM a1  
HRBKAAW f6  
XHRBKAAW a1  
HRHISPT f6  
XHRHISPT a1  
HRHISPM f6  
XHRHISPM a1  
HRHISPW f6  
XHRHISPW a1  
HRNHPIT f6
```

XHRNHPIT a1
HRNHPIM f6
XHRNHPIM a1
HRNHPIW f6
XHRNHPIW a1
HRWHITT f6
XHRWHITT a1
HRWHITM f6
XHRWHITM a1
HRWHITW f6
XHRWHITW a1
HR2MORT f6
XHR2MORT a1
HR2MORM f6
XHR2MORM a1
HR2MORW f6
XHR2MORW a1
HRUNKNT f6
XHRUNKNT a1
HRUNKNM f6
XHRUNKNM a1
HRUNKNW f6
XHRUNKNW a1
HRNRALT f6
XHRNRALT a1
HRNRALM f6
XHRNRALM a1
HRNRALW f6
XHRNRALW a1
IDX_HR f6.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
SISCAT 'Instructional staff category'
HRTOTLT 'Grand total'
XHRTOTLT 'Imputation flag for XHRTOTLT'
HRTOTLM 'Grand total men'
XHRTOTLM 'Imputation flag for XHRTOTLM'
HRTOTLW 'Grand total women'
XHRTOTLW 'Imputation flag for XHRTOTLW'
HRAIANT 'American Indian or Alaska Native total'

XHRAIANT 'Imputation flag for XHRAIANT'
HRAIANM 'American Indian or Alaska Native men'
XHRAIANM 'Imputation flag for XHRAIANM'
HRAIANW 'American Indian or Alaska Native women'
XHRAIANW 'Imputation flag for XHRAIANW'
HRASIAT 'Asian total'
XHRASIAT 'Imputation flag for XHRASIAT'
HRASIAM 'Asian men'
XHRASIAM 'Imputation flag for XHRASIAM'
HRASIAW 'Asian women'
XHRASIAW 'Imputation flag for XHRASIAW'
HRBKAAT 'Black or African American total'
XHRBKAAT 'Imputation flag for XHRBKAAT'
HRBKAAM 'Black or African American men'
XHRBKAAM 'Imputation flag for XHRBKAAM'
HRBKAAW 'Black or African American women'
XHRBKAAW 'Imputation flag for XHRBKAAW'
HRHISPT 'Hispanic or Latino total'
XHRHISPT 'Imputation flag for XHRHISPT'
HRHISPM 'Hispanic or Latino men'
XHRHISPM 'Imputation flag for XHRHISPM'
HRHISPW 'Hispanic or Latino women'
XHRHISPW 'Imputation flag for XHRHISPW'
HRNHPIT 'Native Hawaiian or Other Pacific Islander total'
XHRNHPIT 'Imputation flag for XHRNHPIT'
HRNHPIM 'Native Hawaiian or Other Pacific Islander men'
XHRNHPIM 'Imputation flag for XHRNHPIM'
HRNHPIW 'Native Hawaiian or Other Pacific Islander women'
XHRNHPIW 'Imputation flag for XHRNHPIW'
HRWHITT 'White total'
XHRWHITT 'Imputation flag for XHRWHITT'
HRWHITM 'White men'
XHRWHITM 'Imputation flag for XHRWHITM'
HRWHITW 'White women'
XHRWHITW 'Imputation flag for XHRWHITW'
HR2MORT 'Two or more races total'
XHR2MORT 'Imputation flag for XHR2MORT'
HR2MORM 'Two or more races men'
XHR2MORM 'Imputation flag for XHR2MORM'
HR2MORW 'Two or more races women'
XHR2MORW 'Imputation flag for XHR2MORW'
HRUNKNT 'Race/ethnicity unknown total'
XHRUNKNT 'Imputation flag for XHRUNKNT'

HRUNKNM 'Race/ethnicity unknown men'
 XHRUNKNM 'Imputation flag for XHRUNKNM'
 HRUNKNW 'Race/ethnicity unknown women'
 XHRUNKNW 'Imputation flag for XHRUNKNW'
 HRNRALT 'Nonresident alien total'
 XHRNRALT 'Imputation flag for XHRNRALT'
 HRNRALM 'Nonresident alien men'
 XHRNRALM 'Imputation flag for XHRNRALM'
 HRNRALW 'Nonresident alien women'
 XHRNRALW 'Imputation flag for XHRNRALW'
 IDX_HR 'ID of institution where data are reported for the Human Resource component'.

VALUE LABELS

/SISCAT

1 'All full-time instructional staff'.

FREQUENCIES VARIABLES=

SISCAT.

DESCRIPTIVES VARIABLES=

HRTOTLT HRTOTLM HRTOTLW HRAIANT HRAIANM HRAIANW HRASIAT
 HRASIAM HRASIAW HRBKAAT HRBKAAM HRBKAAW HRHISPT HRHISPM
 HRHISPW HRNHPIT HRNHPIM HRNHPIW HRWHITT HRWHITM HRWHITW
 HR2MORT HR2MORM HR2MORW HRUNKNT HRUNKNM HRUNKNW
 HRNRALT HRNRALM HRNRALW IDX_HR.
 /STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-521.sav' /Compressed.

EMPLOYEES 2

GET DATA /TYPE = TXT

/FILE = 'C:\cds\SPSS_RV_1062016-521.csv'

/DELCASE = LINE

/DELIMITERS = ","

/QUALIFIER = ""

/ARRANGEMENT = DELIMITED

/FIRSTCASE = 2

/IMPORTCASE = ALL

/VARIABLES =

UNITID F6

INSTNM A50

year F4

SISCAT f3

HRTOTLT f6
XHRTOTLT a1
HRTOTLM f6
XHRTOTLM a1
HRTOTLW f6
XHRTOTLW a1
HRAIANT f6
XHRAIANT a1
HRAIANM f6
XHRAIANM a1
HRAIANW f6
XHRAIANW a1
HRASIAT f6
XHRASIAT a1
HRASIAM f6
XHRASIAM a1
HRASIAW f6
XHRASIAW a1
HRBKAAT f6
XHRBKAAT a1
HRBKAAM f6
XHRBKAAM a1
HRBKAAW f6
XHRBKAAW a1
HRHISPT f6
XHRHISPT a1
HRHISPM f6
XHRHISPM a1
HRHISPW f6
XHRHISPW a1
HRNHPIT f6
XHRNHPIT a1
HRNHPIM f6
XHRNHPIM a1
HRNHPIW f6
XHRNHPIW a1
HRWHITT f6
XHRWHITT a1
HRWHITM f6
XHRWHITM a1
HRWHITW f6
XHRWHITW a1
HR2MORT f6

XHR2MORT a1
 HR2MORM f6
 XHR2MORM a1
 HR2MORW f6
 XHR2MORW a1
 HRUNKNT f6
 XHRUNKNT a1
 HRUNKNM f6
 XHRUNKNM a1
 HRUNKNW f6
 XHRUNKNW a1
 HRNRALT f6
 XHRNRALT a1
 HRNRALM f6
 XHRNRALM a1
 HRNRALW f6
 XHRNRALW a1
 IDX_HR f6.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
 instnm 'Institution (entity) name'
 year 'Survey year'
 SISCAT 'Instructional staff category'
 HRTOTLT 'Grand total'
 XHRTOTLT 'Imputation flag for XHRTOTLT'
 HRTOTLM 'Grand total men'
 XHRTOTLM 'Imputation flag for XHRTOTLM'
 HRTOTLW 'Grand total women'
 XHRTOTLW 'Imputation flag for XHRTOTLW'
 HRAIANT 'American Indian or Alaska Native total'
 XHRAIANT 'Imputation flag for XHRAIANT'
 HRAIANM 'American Indian or Alaska Native men'
 XHRAIANM 'Imputation flag for XHRAIANM'
 HRAIANW 'American Indian or Alaska Native women'
 XHRAIANW 'Imputation flag for XHRAIANW'
 HRASIAT 'Asian total'
 XHRASIAT 'Imputation flag for XHRASIAT'
 HRASIAM 'Asian men'
 XHRASIAM 'Imputation flag for XHRASIAM'
 HRASIAW 'Asian women'
 XHRASIAW 'Imputation flag for XHRASIAW'
 HRBKAAT 'Black or African American total'

XHRBKAAT 'Imputation flag for XHRBKAAT'
HRBKAAM 'Black or African American men'
XHRBKAAM 'Imputation flag for XHRBKAAM'
HRBKAAW 'Black or African American women'
XHRBKAAW 'Imputation flag for XHRBKAAW'
HRHISPT 'Hispanic or Latino total'
XHRHISPT 'Imputation flag for XHRHISPT'
HRHISPM 'Hispanic or Latino men'
XHRHISPM 'Imputation flag for XHRHISPM'
HRHISPW 'Hispanic or Latino women'
XHRHISPW 'Imputation flag for XHRHISPW'
HRNHPIT 'Native Hawaiian or Other Pacific Islander total'
XHRNHPIT 'Imputation flag for XHRNHPIT'
HRNHPIM 'Native Hawaiian or Other Pacific Islander men'
XHRNHPIM 'Imputation flag for XHRNHPIM'
HRNHPIW 'Native Hawaiian or Other Pacific Islander women'
XHRNHPIW 'Imputation flag for XHRNHPIW'
HRWHITT 'White total'
XHRWHITT 'Imputation flag for XHRWHITT'
HRWHITM 'White men'
XHRWHITM 'Imputation flag for XHRWHITM'
HRWHITW 'White women'
XHRWHITW 'Imputation flag for XHRWHITW'
HR2MORT 'Two or more races total'
XHR2MORT 'Imputation flag for XHR2MORT'
HR2MORM 'Two or more races men'
XHR2MORM 'Imputation flag for XHR2MORM'
HR2MORW 'Two or more races women'
XHR2MORW 'Imputation flag for XHR2MORW'
HRUNKNT 'Race/ethnicity unknown total'
XHRUNKNT 'Imputation flag for XHRUNKNT'
HRUNKNM 'Race/ethnicity unknown men'
XHRUNKNM 'Imputation flag for XHRUNKNM'
HRUNKNW 'Race/ethnicity unknown women'
XHRUNKNW 'Imputation flag for XHRUNKNW'
HRNRALT 'Nonresident alien total'
XHRNRALT 'Imputation flag for XHRNRALT'
HRNRALM 'Nonresident alien men'
XHRNRALM 'Imputation flag for XHRNRALM'
HRNRALW 'Nonresident alien women'
XHRNRALW 'Imputation flag for XHRNRALW'
IDX_HR 'ID of institution where data are reported for the Human Resource component'.

VALUE LABELS

/SISCAT

1 'All full-time instructional staff.'

FREQUENCIES VARIABLES=

SISCAT.

DESCRIPTIVES VARIABLES=

HRTOTLT HRTOTLM HRTOTLW HRAIANT HRAIANM HRAIANW HRASIAT
 HRASIAM HRASIAW HRBKAAT HRBKAAM HRBKAAW HRHISPT HRHISPM
 HRHISPW HRNHPIV HRNHPIW HRWHITT HRWHITM HRWHITW
 HR2MORT HR2MORM HR2MORW HRUNKNT HRUNKNM HRUNKNW
 HRNRALT HRNRALM HRNRALW IDX_HR.

/STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-521.sav' /Compressed.

ENDOWMENT

GET DATA /TYPE = TXT

/FILE = 'C:\cds\SPSS_RV_1062016-930.csv'

/DELCASE = LINE

/DELIMITERS = ","

/QUALIFIER = ""

/ARRANGEMENT = DELIMITED

/FIRSTCASE = 2

/IMPORTCASE = ALL

/VARIABLES =

UNITID F6

INSTNM A50

year F4

F1ENDMFT f10

F2ENDMFT f10.

VARIABLE LABELS

unitid 'Unique identification number for an institution'

instnm 'Institution (entity) name'

year 'Survey year'

F1ENDMFT 'Endowment assets (year end) per FTE enrollment (GASB)'

F2ENDMFT 'Endowment assets (year end) per FTE enrollment (FASB)'.

```
DESCRIPTIVES VARIABLES=
F1ENDMFT F2ENDMFT.
/STATS=SUM MIN MAX MEAN.
```

```
SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-930.sav' /Compressed.
```

ENROLLMENT BY AGE

```
GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-797.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
EFBAGE f2
LSTUDY f2
EFAGE09 f6
XEFA09 a1
EFAGE05 f6
XEFA05 a1
EFAGE06 f6
XEFA06 a1
IDX_EF f6.
```

VARIABLE LABELS

```
unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
EFBAGE 'Age category'
LSTUDY 'Level of student'
EFAGE09 'Grand total'
XEFA09 'Imputation flag for XEFA09'
EFAGE05 'Full time total'
XEFA05 'Imputation flag for XEFA05'
EFAGE06 'Part time total'
XEFA06 'Imputation flag for XEFA06'
IDX_EF 'ID of institution where data are reported for the Fall enrollment component'.
```

VALUE LABELS

/EFBAGE

2 'Age under 25 total'

7 'Age 25 and over total'

/LSTUDY

2 'Undergraduate'.

FREQUENCIES VARIABLES=

EFBAGE LSTUDY.

DESCRIPTIVES VARIABLES=

EFAGE09 EFAGE05 EFAGE06 IDX_EF.

/STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-797.sav' /Compressed.

ENROLLMENT BY ETHNICITY

GET DATA /TYPE = TXT

/FILE = 'C:\cds\SPSS_RV_1062016-104.csv'

/DELCASE = LINE

/DELIMITERS = ","

/QUALIFIER = ""

/ARRANGEMENT = DELIMITED

/FIRSTCASE = 2

/IMPORTCASE = ALL

/VARIABLES =

UNITID F6

INSTNM A50

year F4

EFALEVEL f2

EFTOTLT f6

XEFTOTLT a1

EFTOTLM f6

XEFTOTLM a1

EFTOTLW f6

XEFTOTLW a1

EFAIANT f6

XEFAIANT a1

EFAIANM f6

XEFAIANM a1

EFAIANW f6

XEFAIANW a1

EFASIAT f6
XEFASIAT a1
EFASIAM f6
XEFASIAM a1
EFASIAW f6
XEFASIAW a1
EFBKAAT f6
XEFBKAAT a1
EFBKAAM f6
XEFBKAAM a1
EFBKAAW f6
XEFBKAAW a1
EFHISPT f6
XEFHISPT a1
EFHISPM f6
XEFHISPM a1
EFHISPW f6
XEFHISPW a1
EFNHPIT f6
XEFNHPIT a1
EFNHPIM f6
XEFNHPIM a1
EFNHPIW f6
XEFNHPIW a1
EFWHITT f6
XEFWHITT a1
EFWHITM f6
XEFWHITM a1
EFWHITW f6
XEFWHITW a1
EF2MORT f6
XEF2MORT a1
EF2MORM f6
XEF2MORM a1
EF2MORW f6
XEF2MORW a1
EFUNKNT f6
XEFUNKNT a1
EFUNKNM f6
XEFUNKNM a1
EFUNKNW f6
XEFUNKNW a1
EFNRALT f6

XEFNRALT a1
 EFNRALM f6
 XEFNRALM a1
 EFNRALW f6
 XEFNRALW a1
 IDX_EF f6.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
 instnm 'Institution (entity) name'
 year 'Survey year'
 EFALEVEL 'Level of student'
 EFTOTLT 'Grand total'
 XEFTOTLT 'Imputation flag for XEFTOTLT'
 EFTOTLM 'Grand total men'
 XEFTOTLM 'Imputation flag for XEFTOTLM'
 EFTOTLW 'Grand total women'
 XEFTOTLW 'Imputation flag for XEFTOTLW'
 EFAIANT 'American Indian or Alaska Native total'
 XEFAIANT 'Imputation flag for XEFAIANT'
 EFAIANM 'American Indian or Alaska Native men'
 XEFAIANM 'Imputation flag for XEFAIANM'
 EFAIANW 'American Indian or Alaska Native women'
 XEFAIANW 'Imputation flag for XEFAIANW'
 EFASIAT 'Asian total'
 XEFASIAT 'Imputation flag for XEFASIAT'
 EFASIAM 'Asian men'
 XEFASIAM 'Imputation flag for XEFASIAM'
 EFASIAW 'Asian women'
 XEFASIAW 'Imputation flag for XEFASIAW'
 EFBKAAT 'Black or African American total'
 XEFBKAAT 'Imputation flag for XEFBKAAT'
 EFBKAAM 'Black or African American men'
 XEFBKAAM 'Imputation flag for XEFBKAAM'
 EFBKAAW 'Black or African American women'
 XEFBKAAW 'Imputation flag for XEFBKAAW'
 EFHISPT 'Hispanic total'
 XEFHISPT 'Imputation flag for XEFHISPT'
 EFHISPM 'Hispanic men'
 XEFHISPM 'Imputation flag for XEFHISPM'
 EFHISPW 'Hispanic women'
 XEFHISPW 'Imputation flag for XEFHISPW'
 EFNHPIT 'Native Hawaiian or Other Pacific Islander total'

XEFNHPIT 'Imputation flag for XEFNHPIT'
 EFNHPIM 'Native Hawaiian or Other Pacific Islander men'
 XEFNHPIM 'Imputation flag for XEFNHPIM'
 EFNHPIW 'Native Hawaiian or Other Pacific Islander women'
 XEFNHPIW 'Imputation flag for XEFNHPIW'
 EFWHITT 'White total'
 XEFWHITT 'Imputation flag for XEFWHITT'
 EFWHITM 'White men'
 XEFWHITM 'Imputation flag for XEFWHITM'
 EFWHITW 'White women'
 XEFWHITW 'Imputation flag for XEFWHITW'
 EF2MORT 'Two or more races total'
 XEF2MORT 'Imputation flag for XEF2MORT'
 EF2MORM 'Two or more races men'
 XEF2MORM 'Imputation flag for XEF2MORM'
 EF2MORW 'Two or more races women'
 XEF2MORW 'Imputation flag for XEF2MORW'
 EFUNKNT 'Race/ethnicity unknown total'
 XEFUNKNT 'Imputation flag for XEFUNKNT'
 EFUNKNM 'Race/ethnicity unknown men'
 XEFUNKNM 'Imputation flag for XEFUNKNM'
 EFUNKNW 'Race/ethnicity unknown women'
 XEFUNKNW 'Imputation flag for XEFUNKNW'
 EFNRAIT 'Nonresident alien total'
 XEFNRALT 'Imputation flag for XEFNRALT'
 EFNRALM 'Nonresident alien men'
 XEFNRALM 'Imputation flag for XEFNRALM'
 EFNRALW 'Nonresident alien women'
 XEFNRALW 'Imputation flag for XEFNRALW'
 IDX_EF 'ID of institution where data are reported for the Fall enrollment component'.

VALUE LABELS

/EFALEVEL

2 'All students, Undergraduate total'.

FREQUENCIES VARIABLES=

EFALEVEL.

DESCRIPTIVES VARIABLES=

EFTOTLT EFTOTLM EFTOTLW EFAIANT EFAIANM EFAIANW EFASIAT
 EFASIAM EFASIAW EFBKAAT EFBKAAM EFBKAAW EFHISPT EFHISPM
 EFHISPW EFNHPIT EFNHPIM EFNHPIW EFWHITT EFWHITM EFWHITW

```
EF2MORT EF2MORM EF2MORW EFUNKNT EFUNKNM EFUNKNW EFNRLT
EFNRLM EFNRLW IDX_EF.
/STATS=SUM MIN MAX MEAN.
```

```
SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-104.sav' /Compressed.
```

FACULTY RANK

```
GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-154.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
ARANK f2
SATOTLT f6
XSATOTLT a1
SAOUTLT f10
XSAOUTLT a1
IDX_HR f6.
```

VARIABLE LABELS

```
unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
ARANK 'Academic rank'
SATOTLT 'Instructional staff on 9, 10, 11 or 12 month contract-total'
XSATOTLT 'Imputation flag for XSATOTLT'
SAOUTLT 'Salary outlays - total'
XSAOUTLT 'Imputation flag for XSAOUTLT'
IDX_HR 'ID of institution where data are reported for the Human Resource component'.
```

VALUE LABELS

```
/ARANK
7 'All instructional staff total'.
```

```
FREQUENCIES VARIABLES=
ARANK.
```

```
DESCRIPTIVES VARIABLES=
SATOTLT SAOUTLT IDX_HR.
/STATS=SUM MIN MAX MEAN.
```

```
SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-154.sav' /Compressed.
```

FINANCIAL AID 1

```
GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-601.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
ANYAIDP f3
XANYAIDP a1
FGRNT_P f3
XFGRNT_P a1
PGRNT_P f6
XPGRNT_P a1
SGRNT_P f3
XSGRNT_P a1
IGRNT_P f3
XIGRNT_P a1
LOAN_P f3
XLOAN_P a1.
```

VARIABLE LABELS

```
unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
ANYAIDP 'Percent of full-time first-time undergraduates awarded any financial aid'
XANYAIDP 'Imputation flag for XANYAIDP'
FGRNT_P 'Percent of full-time first-time undergraduates awarded federal grant aid'
XFGRNT_P 'Imputation flag for XFGRNT_P'
PGRNT_P 'Percent of full-time first-time undergraduates awarded Pell grants'
XPGRNT_P 'Imputation flag for XPGRNT_P'
```


SGRNT_P 'Percent of full-time first-time undergraduates awarded state/local grant aid'
 XSGRNT_P 'Imputation flag for XSGRNT_P'
 IGRNT_P 'Percent of full-time first-time undergraduates awarded institutional grant aid'
 XIGRNT_P 'Imputation flag for XIGRNT_P'
 LOAN_P 'Percent of full-time first-time undergraduates awarded student loans'
 XLOAN_P 'Imputation flag for XLOAN_P'.

DESCRIPTIVES VARIABLES=
 ANYAIDP FGRNT_P PGRNT_P SGRNT_P IGRNT_P LOAN_P.
 /STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-601.sav' /Compressed.

FINANCIAL AID 2

GET DATA /TYPE = TXT
 /FILE = 'C:\cds\SPSS_RV_1062016-545.csv'
 /DELCASE = LINE
 /DELIMITERS = ","
 /QUALIFIER = ""
 /ARRANGEMENT = DELIMITED
 /FIRSTCASE = 2
 /IMPORTCASE = ALL
 /VARIABLES =
 UNITID F6
 INSTNM A50
 year F4
 SCFY1N f6
 XSCFY1N a1
 SCFY1P f3
 XSCFY1P a1
 SCFY11P f3
 XSCFY11P a1
 SCFY12P f3
 XSCFY12P a1
 SCFY13P f3
 XSCFY13P a1
 SCFY14P f3
 XSCFY14P a1
 SCUGFFN f6
 XSCUGFFN a1
 ANYAIDP f3
 XANYAIDP a1
 AGRNT_P f6

XAGRNT_P a1
 AGRNT_A f6
 XAGRNT_A a1
 FGRNT_P f3
 XFGRNT_P a1
 FGRNT_A f6
 XFGRNT_A a1
 PGRNT_P f6
 XPGRNT_P a1
 PGRNT_A f6
 XPGRNT_A a1
 SGRNT_P f3
 XSGRNT_P a1
 SGRNT_A f6
 XSGRNT_A a1
 IGRNT_P f3
 XIGRNT_P a1
 IGRNT_A f6
 XIGRNT_A a1
 LOAN_P f3
 XLOAN_P a1
 LOAN_A f6
 XLOAN_A a1
 FLOAN_P f6
 XFLOAN_P a1
 FLOAN_A f6
 XFLOAN_A a1.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
 instnm 'Institution (entity) name'
 year 'Survey year'
 SCFY1N 'Number of students in full-year cohort'
 XSCFY1N 'Imputation flag for XSCFY1N'
 SCFY1P 'Students in full-year cohort as a percentage of all undergraduates'
 XSCFY1P 'Imputation flag for XSCFY1P'
 SCFY11P 'Percentage of students in full-year cohort who are paying in-district tuition rates'
 XSCFY11P 'Imputation flag for XSCFY11P'
 SCFY12P 'Percentage of students in full-year cohort who are paying in-state tuition rates'
 XSCFY12P 'Imputation flag for XSCFY12P'
 SCFY13P 'Percentage of students in full-year cohort who are paying out-of-state tuition rates'

XSCFY13P 'Imputation flag for XSCFY13P'
 SCFY14P 'Percentage of students in full-year cohort whose residence/tuition rate is unknown'
 XSCFY14P 'Imputation flag for XSCFY14P'
 SCUGFFN 'Total number of full-time first-time degree/certificate seeking undergraduates - financial aid cohort'
 XSCUGFFN 'Imputation flag for XSCUGFFN'
 ANYAIDP 'Percent of full-time first-time undergraduates awarded any financial aid'
 XANYAIDP 'Imputation flag for XANYAIDP'
 AGRNT_P 'Percent of full-time first-time undergraduates awarded federal, state, local or institutional grant aid'
 XAGRNT_P 'Imputation flag for XAGRNT_P'
 AGRNT_A 'Average amount of federal, state, local or institutional grant aid awarded'
 XAGRNT_A 'Imputation flag for XAGRNT_A'
 FGRNT_P 'Percent of full-time first-time undergraduates awarded federal grant aid'
 XFGRNT_P 'Imputation flag for XFGRNT_P'
 FGRNT_A 'Average amount of federal grant aid awarded to full-time first-time undergraduates'
 XFGRNT_A 'Imputation flag for XFGRNT_A'
 PGRNT_P 'Percent of full-time first-time undergraduates awarded Pell grants'
 XPGRNT_P 'Imputation flag for XPGRNT_P'
 PGRNT_A 'Average amount of Pell grant aid awarded to full-time first-time undergraduates'
 XPGRNT_A 'Imputation flag for XPGRNT_A'
 SGRNT_P 'Percent of full-time first-time undergraduates awarded state/local grant aid'
 XSGRNT_P 'Imputation flag for XSGRNT_P'
 SGRNT_A 'Average amount of state/local grant aid awarded to full-time first-time undergraduates'
 XSGRNT_A 'Imputation flag for XSGRNT_A'
 IGRNT_P 'Percent of full-time first-time undergraduates awarded institutional grant aid'
 XIGRNT_P 'Imputation flag for XIGRNT_P'
 IGRNT_A 'Average amount of institutional grant aid awarded to full-time first-time undergraduates'
 XIGRNT_A 'Imputation flag for XIGRNT_A'
 LOAN_P 'Percent of full-time first-time undergraduates awarded student loans'
 XLOAN_P 'Imputation flag for XLOAN_P'
 LOAN_A 'Average amount of student loans awarded to full-time first-time undergraduates'
 XLOAN_A 'Imputation flag for XLOAN_A'
 FLOAN_P 'Percent of full-time first-time undergraduates awarded federal student loans'
 XFLOAN_P 'Imputation flag for XFLOAN_P'
 FLOAN_A 'Average amount of federal student loans awarded to full-time first-time undergraduates'

XFLOAN_A 'Imputation flag for XFLOAN_A'.

DESCRIPTIVES VARIABLES=

SCFY1N SCFY1P SCFY11P SCFY12P SCFY13P SCFY14P SCUGFFN ANYAIDP
 AGRNT_P AGRNT_A FGRNT_P FGRNT_A PGRNT_P PGRNT_A SGRNT_P
 SGRNT_A IGRNT_P IGRNT_A LOAN_P LOAN_A FLOAN_P FLOAN_A.
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FREQUENTLY USED VARIABLES 1

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UNITID F6

INSTNM A50

year F4

STABBR a2

OBEREG f2

SECTOR f2

ICLEVEL f2

CONTROL f2

HBCU f2

TRIBAL f2

LOCALE f2

CCBASIC f2

LANDGRNT f2

INSTSIZE f2.

VARIABLE LABELS

unitid 'Unique identification number for an institution'

instnm 'Institution (entity) name'

year 'Survey year'

STABBR 'State abbreviation'

OBEREG 'Geographic region'

SECTOR 'Sector of institution'

ICLEVEL 'Level of institution'

CONTROL 'Control of institution'
HBCU 'Historically Black College or University'
TRIBAL 'Tribal college'
LOCALE 'Degree of urbanization (Urban-centric locale)'
CCBASIC 'Carnegie Classification 2010: Basic'
LANDGRNT 'Land Grant Institution'
INSTSIZE 'Institution size category'.

VALUE LABELS

/STABBR

'AL' 'Alabama'
'AK' 'Alaska'
'AZ' 'Arizona'
'AR' 'Arkansas'
'CA' 'California'
'CO' 'Colorado'
'CT' 'Connecticut'
'DE' 'Delaware'
'DC' 'District of Columbia'
'FL' 'Florida'
'GA' 'Georgia'
'HI' 'Hawaii'
'ID' 'Idaho'
'IL' 'Illinois'
'IN' 'Indiana'
'IA' 'Iowa'
'KS' 'Kansas'
'KY' 'Kentucky'
'LA' 'Louisiana'
'ME' 'Maine'
'MD' 'Maryland'
'MA' 'Massachusetts'
'MI' 'Michigan'
'MN' 'Minnesota'
'MS' 'Mississippi'
'MO' 'Missouri'
'MT' 'Montana'
'NE' 'Nebraska'
'NV' 'Nevada'
'NH' 'New Hampshire'
'NJ' 'New Jersey'
'NM' 'New Mexico'
'NY' 'New York'

'NC' 'North Carolina'
 'ND' 'North Dakota'
 'OH' 'Ohio'
 'OK' 'Oklahoma'
 'OR' 'Oregon'
 'PA' 'Pennsylvania'
 'RI' 'Rhode Island'
 'SC' 'South Carolina'
 'SD' 'South Dakota'
 'TN' 'Tennessee'
 'TX' 'Texas'
 'UT' 'Utah'
 'VT' 'Vermont'
 'VA' 'Virginia'
 'WA' 'Washington'
 'WV' 'West Virginia'
 'WI' 'Wisconsin'
 'WY' 'Wyoming'
 'AS' 'American Samoa'
 'FM' 'Federated States of Micronesia'
 'GU' 'Guam'
 'MH' 'Marshall Islands'
 'MP' 'Northern Marianas'
 'PW' 'Palau'
 'PR' 'Puerto Rico'
 'VI' 'Virgin Islands'
 /OBEREG
 0 'US Service schools'
 1 'New England CT ME MA NH RI VT'
 2 'Mid East DE DC MD NJ NY PA'
 3 'Great Lakes IL IN MI OH WI'
 4 'Plains IA KS MN MO NE ND SD'
 5 'Southeast AL AR FL GA KY LA MS NC SC TN VA WV'
 6 'Southwest AZ NM OK TX'
 7 'Rocky Mountains CO ID MT UT WY'
 8 'Far West AK CA HI NV OR WA'
 9 'Outlying areas AS FM GU MH MP PR PW VI'
 /SECTOR
 0 'Administrative Unit'
 1 'Public, 4-year or above'
 2 'Private not-for-profit, 4-year or above'
 3 'Private for-profit, 4-year or above'
 4 'Public, 2-year'

5 'Private not-for-profit, 2-year'
 6 'Private for-profit, 2-year'
 7 'Public, less-than 2-year'
 8 'Private not-for-profit, less-than 2-year'
 9 'Private for-profit, less-than 2-year'
 99 'Sector unknown (not active)'
 /ICLEVEL
 1 'Four or more years'
 2 'At least 2 but less than 4 years'
 3 'Less than 2 years (below associate)'
 -3 '{Not available}'
 /CONTROL
 1 'Public'
 2 'Private not-for-profit'
 3 'Private for-profit'
 -3 '{Not available}'
 /HBCU
 1 'Yes'
 2 'No'
 /TRIBAL
 1 'Yes'
 2 'No'
 /LOCALE
 11 'City: Large'
 12 'City: Midsize'
 13 'City: Small'
 21 'Suburb: Large'
 22 'Suburb: Midsize'
 23 'Suburb: Small'
 31 'Town: Fringe'
 32 'Town: Distant'
 33 'Town: Remote'
 41 'Rural: Fringe'
 42 'Rural: Distant'
 43 'Rural: Remote'
 -3 '{Not available}'
 /CCBASIC
 1 'Associate"s--Public Rural-serving Small'
 2 'Associate"s--Public Rural-serving Medium'
 3 'Associate"s--Public Rural-serving Large'
 4 'Associate"s--Public Suburban-serving Single Campus'
 5 'Associate"s--Public Suburban-serving Multicampus'
 6 'Associate"s--Public Urban-serving Single Campus'

7 'Associate"s--Public Urban-serving Multicampus'
 8 'Associate"s--Public Special Use'
 9 'Associate"s--Private Not-for-profit'
 10 'Associate"s--Private For-profit'
 11 'Associate"s--Public 2-year colleges under 4-year universities'
 12 'Associate"s--Public 4-year Primarily Associate"s'
 13 'Associate"s--Private Not-for-profit 4-year Primarily Associate"s'
 14 'Associate"s--Private For-profit 4-year Primarily Associate"s'
 15 'Research Universities (very high research activity)'
 16 'Research Universities (high research activity)'
 17 'Doctoral/Research Universities'
 18 'Master"s Colleges and Universities (larger programs)'
 19 'Master"s Colleges and Universities (medium programs)'
 20 'Master"s Colleges and Universities (smaller programs)'
 21 'Baccalaureate Colleges--Arts & Sciences'
 22 'Baccalaureate Colleges--Diverse Fields'
 23 'Baccalaureate/Associate"s Colleges'
 24 'Theological seminaries, Bible colleges, and other faith-related institutions'
 25 'Medical schools and medical centers'
 26 'Other health professions schools'
 27 'Schools of engineering'
 28 'Other technology-related schools'
 29 'Schools of business and management'
 30 'Schools of art, music, and design'
 31 'Schools of law'
 32 'Other special-focus institutions'
 33 'Tribal Colleges'
 0 'Not classified'
 -3 'Not applicable, not in Carnegie universe (not accredited or nondegree-granting)'
 /LANDGRNT
 1 'Land Grant Institution'
 2 'Not a Land Grant Institution'
 /INSTSIZE
 1 'Under 1,000'
 2 '1,000 - 4,999'
 3 '5,000 - 9,999'
 4 '10,000 - 19,999'
 5 '20,000 and above'
 -1 'Not reported'
 -2 'Not applicable'.

FREQUENCIES VARIABLES=

STABBR OBEREG SECTOR ICLEVEL CONTROL HBCU TRIBAL LOCALE
CCBASIC LANDGRNT INSTSIZE.

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FREQUENTLY USED VARIABLES 2

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INSTNM A50
year F4
ENRTOT f6
EFGRAD f6
STUFACR f6
XSTUFACR a1
RET_PCF f3
XRET_PCF a1
RET_PCP f3
XRET_PCP a1
PCTFT1ST f5
PCUDEEXC f4
PCUDESOM f4
PCUDENON f4.
```

VARIABLE LABELS

```
unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
ENRTOT 'Total enrollment'
EFGRAD 'Graduate enrollment'
STUFACR 'Student-to-faculty ratio'
XSTUFACR 'Imputation flag for XSTUFACR'
RET_PCF 'Full-time retention rate, 2013'
XRET_PCF 'Imputation flag for XRET_PCF'
RET_PCP 'Part-time retention rate, 2013'
```

XRET_PCP 'Imputation flag for XRET_PCP'
 PCTFT1ST 'Full-time, first-time, degree/certificate seeking undergraduates (GRS Cohort)
 as percent of all undergraduates'
 PCUDEEXC 'Percent of undergraduate students enrolled exclusively in distance
 education courses'
 PCUDESOM 'Percent of undergraduate students enrolled in some but not all distance
 education courses'
 PCUDENON 'Percent of undergraduate students not enrolled in any distance education
 courses'.

DESCRIPTIVES VARIABLES=
 ENRTOT EFGRAD STUFACR RET_PCF RET_PCP PCTFT1ST PCUDEEXC
 PCUDESOM PCUDENON.
 /STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-866.sav' /Compressed.

GRADUATION RATES

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 UNITID F6
 INSTNM A50
 year F4
 GRRTTOT f5
 GRRTM f5
 GRRTW f5
 GRRTAN f5
 GRRTAS f5
 GRRTNH f5
 GRRTBK f5
 GRRTHS f5
 GRRTWH f5
 GRRT2M f5
 GRRTUN f5
 GRRTNR f5
 GBA4RTT f5

GBA5RTT f5
 GBA6RTT f5
 GBATRRT f5.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
 instnm 'Institution (entity) name'
 year 'Survey year'
 GRRTTOT 'Graduation rate, total cohort'
 GRRTM 'Graduation rate, men'
 GRRTW 'Graduation rate, women'
 GRRTAN 'Graduation rate, American Indian or Alaska Native'
 GRRTAS 'Graduation rate, Asian'
 GRRTNH 'Graduation rate, Native Hawaiian or Other Pacific Islander'
 GRRTBK 'Graduation rate, Black, non-Hispanic'
 GRRTHS 'Graduation rate, Hispanic'
 GRRTWH 'Graduation rate, White, non-Hispanic'
 GRRT2M 'Graduation rate, two or more races'
 GRRTUN 'Graduation rate, Race/ethnicity unknown'
 GRRTNR 'Graduation rate, Nonresident alien'
 GBA4RTT 'Graduation rate - Bachelor degree within 4 years, total'
 GBA5RTT 'Graduation rate - Bachelor degree within 5 years, total'
 GBA6RTT 'Graduation rate - Bachelor degree within 6 years, total'
 GBATRRT 'Transfer-out rate - Bachelor cohort'.

DESCRIPTIVES VARIABLES=

GRRTTOT GRRTM GRRTW GRRTAN GRRTAS GRRTNH GRRTBK GRRTHS
 GRRTWH GRRT2M GRRTUN GRRTNR GBA4RTT GBA5RTT GBA6RTT
 GBATRRT.

/STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-491.sav' /Compressed.

INSTITUTIONAL CHARACTERISTICS

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UNITID F6
 INSTNM A50
 year F4
 SLO6 f2
 SLO7 f2
 STUSRV1 f2
 STUSRV2 f2
 STUSRV3 f2
 STUSRV4 f2
 STUSRV8 f2
 LIBFAC f2
 HOSPITAL f2
 MEDICAL f2
 CNGDSTCD f4
 LONGITUD f12
 LATITUDE f12
 ALLONCAM f2
 ROOM f2
 BOARD f2
 CREDITS1 f2
 CREDITS2 f2
 CREDITS3 f2
 CREDITS4 f2.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
 instnm 'Institution (entity) name'
 year 'Survey year'
 SLO6 'Study abroad'
 SLO7 'Weekend/evening college'
 STUSRV1 'Remedial services'
 STUSRV2 'Academic/career counseling service'
 STUSRV3 'Employment services for students'
 STUSRV4 'Placement services for completers'
 STUSRV8 'On-campus day care for students' children'
 LIBFAC 'Library facilities at institution'
 HOSPITAL 'Institution has hospital'
 MEDICAL 'Institution grants a medical degree'
 CNGDSTCD 'Congressional district code'
 LONGITUD 'Longitude location of institution'
 LATITUDE 'Latitude location of institution'
 ALLONCAM 'Full-time, first-time degree/certificate-seeking students required to live on campus'

ROOM 'Institution provide on-campus housing'
BOARD 'Institution provides board or meal plan'
CREDITS1 'Dual credit'
CREDITS2 'Credit for life experiences'
CREDITS3 'Advanced placement (AP) credits'
CREDITS4 'Institution does not accept dual, credit for life, or AP credits'.

VALUE LABELS

/SLO6

1 'Yes'

0 'Implied no'

-1 'Not reported'

-2 'Not applicable'

/SLO7

1 'Yes'

0 'Implied no'

-1 'Not reported'

-2 'Not applicable'

/STUSR1

1 'Yes'

0 'Implied no'

-1 'Not reported'

-2 'Not applicable'

/STUSR2

1 'Yes'

0 'Implied no'

-1 'Not reported'

-2 'Not applicable'

/STUSR3

1 'Yes'

0 'Implied no'

-1 'Not reported'

-2 'Not applicable'

/STUSR4

1 'Yes'

0 'Implied no'

-1 'Not reported'

-2 'Not applicable'

/STUSR8

1 'Yes'

0 'Implied no'

-1 'Not reported'

-2 'Not applicable'

/LIBFAC

- 1 'Has own library'
- 2 'Shared financial support for library'
- 3 'None of the above'

-1 'Not reported'

-2 'Not applicable'

/HOSPITAL

1 'Yes'

2 'No'

-1 'Not reported'

-2 'Not applicable'

/MEDICAL

1 'Yes'

2 'No'

-1 'Not reported'

-2 'Not applicable'

/CNGDSTCD

101 'AL, District 01'

102 'AL, District 02'

103 'AL, District 03'

104 'AL, District 04'

105 'AL, District 05'

106 'AL, District 06'

107 'AL, District 07'

200 'AK, District 00'

401 'AZ, District 01'

402 'AZ, District 02'

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406 'AZ, District 06'

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4809 'TX, District 09'
4810 'TX, District 10'
4811 'TX, District 11'
4812 'TX, District 12'
4813 'TX, District 13'
4814 'TX, District 14'
4815 'TX, District 15'
4816 'TX, District 16'
4817 'TX, District 17'
4818 'TX, District 18'
4819 'TX, District 19'
4820 'TX, District 20'
4821 'TX, District 21'
4822 'TX, District 22'
4823 'TX, District 23'
4824 'TX, District 24'
4825 'TX, District 25'
4826 'TX, District 26'
4827 'TX, District 27'
4828 'TX, District 28'
4829 'TX, District 29'
4830 'TX, District 30'
4831 'TX, District 31'
4832 'TX, District 32'
4833 'TX, District 33'
4834 'TX, District 34'
4835 'TX, District 35'
4836 'TX, District 36'
4901 'UT, District 01'
4902 'UT, District 02'
4903 'UT, District 03'
4904 'UT, District 04'
5000 'VT, District 00'
5101 'VA, District 01'
5102 'VA, District 02'
5103 'VA, District 03'
5104 'VA, District 04'
5105 'VA, District 05'
5106 'VA, District 06'
5107 'VA, District 07'
5108 'VA, District 08'
5109 'VA, District 09'
5110 'VA, District 10'

5111 'VA, District 11'
5301 'WA, District 01'
5302 'WA, District 02'
5303 'WA, District 03'
5304 'WA, District 04'
5305 'WA, District 05'
5306 'WA, District 06'
5307 'WA, District 07'
5308 'WA, District 08'
5309 'WA, District 09'
5310 'WA, District 10'
5401 'WV, District 01'
5402 'WV, District 02'
5403 'WV, District 03'
5501 'WI, District 01'
5502 'WI, District 02'
5503 'WI, District 03'
5504 'WI, District 04'
5505 'WI, District 05'
5506 'WI, District 06'
5507 'WI, District 07'
5508 'WI, District 08'
5600 'WY, District 00'
6098 'AS, District 98'
6698 'GU, District 98'
6998 'MP, District 98'
7298 'PR, District 98'
7898 'VI, District 98'
-2 'Not applicable'
/ALLONCAM
1 'Yes'
2 'No'
-1 'Not reported'
-2 'Not applicable'
/ROOM
1 'Yes'
2 'No'
-1 'Not reported'
-2 'Not applicable'
/BOARD
1 'Yes, number of meals in the maximum meal plan offered'
2 'Yes, number of meals per week can vary'
3 'No'


```

-1 'Not reported'
-2 'Not applicable'
/CREDITS1
1 'Yes'
0 'Implied no'
-1 'Not reported'
-2 'Not applicable'
/CREDITS2
1 'Yes'
0 'Implied no'
-1 'Not reported'
-2 'Not applicable'
/CREDITS3
1 'Yes'
0 'Implied no'
-1 'Not reported'
-2 'Not applicable'
/CREDITS4
1 'Yes'
0 'Implied no'
-1 'Not reported'
-2 'Not applicable'.

```

```

FREQUENCIES VARIABLES=
SLO6 SLO7 STUSRV1 STUSRV2 STUSRV3 STUSRV4 STUSRV8 LIBFAC
HOSPITAL MEDICAL CNGDSTCD ALLONCAM ROOM BOARD CREDITS1
CREDITS2 CREDITS3 CREDITS4.

```

```

DESCRIPTIVES VARIABLES=
LONGITUD LATITUDE.
/STATS=SUM MIN MAX MEAN.

```

```

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-470.sav' /Compressed.

```

LIBRARY

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-225.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL

```

```

/VARIABLES =
UNITID F6
INSTNM A50
year F4
LEXPTOTF f8.

```

```

VARIABLE LABELS
unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
LEXPTOTF 'Total library expenditures per FTE'.

```

```

DESCRIPTIVES VARIABLES=
LEXPTOTF.
/STATS=SUM MIN MAX MEAN.

```

```

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-225.sav' /Compressed.

```

RETENTION

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-967.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
RET_PCF f3
XRET_PCF a1
RET_PCP f3
XRET_PCP a1.

```

```

VARIABLE LABELS
unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
RET_PCF 'Full-time retention rate, 2014'
XRET_PCF 'Imputation flag for XRET_PCF'
RET_PCP 'Part-time retention rate, 2014'

```

XRET_PCP 'Imputation flag for XRET_PCP'.

DESCRIPTIVES VARIABLES=
RET_PCF RET_PCP.
/STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-967.sav' /Compressed.

DISABILITIES

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-724.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
DISAB f2.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
DISAB 'Percent indicator of undergraduates formally registered as students with disabilities'.

VALUE LABELS

/DISAB
1 '3 percent or less'
2 'More than 3 percent'
-1 'Not reported'
-2 'Not applicable'.

FREQUENCIES VARIABLES=
DISAB.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-724.sav' /Compressed.

SALARIES

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-656.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =
UNITID F6
INSTNM A50
year F4
SANIN01 f6
XSANIN01 a1
SANIT01 f10
XSANIT01 a1.

```

VARIABLE LABELS

```

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
SANIN01 'Full-time non-instructional staff - number'
XSANIN01 'Imputation flag for XSANIN01'
SANIT01 'Full-time non-instructional staff - outlays'
XSANIT01 'Imputation flag for XSANIT01'.

```

DESCRIPTIVES VARIABLES=

```

SANIN01 SANIT01.
/STATS=SUM MIN MAX MEAN.

```

```

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-656.sav' /Compressed.

```

UNDERGRADUATE FTE

```

GET DATA /TYPE = TXT
/FILE = 'C:\cds\SPSS_RV_1062016-636.csv'
/DELCASE = LINE
/DELIMITERS = ","
/QUALIFIER = ""
/ARRANGEMENT = DELIMITED
/FIRSTCASE = 2
/IMPORTCASE = ALL
/VARIABLES =

```

UNITID F6
INSTNM A50
year F4
EFTEUG f8
XEFTEUG a1.

VARIABLE LABELS

unitid 'Unique identification number for an institution'
instnm 'Institution (entity) name'
year 'Survey year'
EFTEUG 'Estimated full-time equivalent (FTE) undergraduate enrollment, 2013-14'
XEFTEUG 'Imputation flag for XEFTEUG'.

DESCRIPTIVES VARIABLES=

EFTEUG.
/STATS=SUM MIN MAX MEAN.

SAVE OUTFILE='cdsfile_allSPSS_RV_1062016-636.sav' /Compressed.