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THE IMPACT OF PERFORMANCE FUNDING ON COMMUNITY COLLEGE DEGREE
COMPLETION, CERTIFICATE COMPLETION, AND TRANSFER RATE: A DIFFERENCE-
IN-DIFFERENCES APPROACH

by

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ABSTRACT

THE IMPACT OF PERFORMANCE FUNDING ON COMMUNITY COLLEGE DEGREE COMPLETION, CERTIFICATE COMPLETION, AND TRANSFER RATE: A DIFFERENCE- IN-DIFFERENCES APPROACH

Matthew J. Okerblom
Old Dominion University, 2019
Director: Mitchell R. Williams

Historically, state funding of higher education institutions has been allocated through enrollment, but there has been a recent trend towards a different model, performance funding. Performance funding is a model based on the attainment of designated metrics with the intent on improving student outcomes. The metrics used for these programs have often not aligned with the mission and characteristics of different institutions, especially that of community colleges. Although, several past performance funding models failed to improve student outcomes, much has been learned regarding program improvement. Texas implemented a performance funding model in 2013 which included a focus on community colleges and metrics specifically related to their institutional mission.

Using a difference-in-differences approach, the impact Texas' performance funding model had on associate degree completion, certificate completion, and transfer-out rates was evaluated. The study utilized IPEDS data from 2010 to 2017 and compared the pre- to post-differences in Texas to California. The results of the study found performance funding had no statistically significant impact on associate degree completion, certificate completion, or transfer-out rates, even after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid.

The study recommends further research on programs with 50% or more of appropriations based on performance. If this research confirms that performance funding does not improve

student outcomes, state legislatures need to consider the evidence from the results of this study and previous research and no longer pursue performance funding models.

Keywords: performance-based funding, outcomes funding, performance funding, higher education, community colleges, two-year college, metrics, outcomes, factors, indicators

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This thesis is dedicated to my parents, who have modeled a strong work ethic and have always supported me in all my endeavors.

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CHAPTER I

INTRODUCTION

Higher education has been in a state of constant change. The Truman Commission Report, issued in 1947, increased federal support for higher education (President's Commission on Higher Education, 1947). This eventually led to significant increases in student enrollment and advanced "open door" policies for community colleges (Bastedo, Altbach, & Gumport, 2016). "Open door" policies are institutional admission policies that generally accept any student who applies (NCES, 2018a). In addition to greater accessibility, the mission of the community college has expanded to meet various roles, including developmental (remedial) education, workforce development, transfer education, continuing education, and community service (Cohen, Brawer, & Kisker, 2013).

Despite increasing accessibility, especially for female, minority, low income, and first generation students, one of the most important goals of higher education institutions is student completion, wherein the student is conferred a degree or certificate (NCES, 2018a). Unfortunately, completion rates, especially in community colleges, have remained low. In 2008, only 26% of first time community college students graduated with a degree or certificate within five years (Altstadt, 2012).

Federal, state, and local governments, employers, and the public all have questioned the success of higher education, resulting in an increased expectation of transparency and accountability of higher education institutions (Bastedo, Altbach, & Gumport; Hart Research Associates, 2013). The United States Department of Education (2006) stated the following regarding the expectation of higher education institutions:

To meet the challenges of the 21st century, higher education must change from a system primarily based on reputation to one based on performance...Every one of our goals, from improving access and affordability to enhancing quality and innovation, will be

more easily achieved if higher education institutions embrace and implement serious accountability measures. (p. 21)

In his 2013 State of the Union Address, President Barack Obama challenged colleges to keep their costs down while also introducing a “College Scorecard,” which included information for students and their parents on the cost and effectiveness of individual colleges (The White House, 2013a). Even community college organizations have expected improvements. In 2011, the American Association of Community Colleges (AACC) launched the 21st-Century Initiative, recommending community colleges increase the number of students completing a degree or certificate by 50% by 2020 (American Association of Community Colleges, 2012a).

To meet this goal, state legislators have explored different initiatives to improve completion and student success. One such initiative is performance-based funding, also known as performance funding. Before 1979, states provided appropriations to higher education institutions based on enrollment, through the collective number of credits students enrolled for in a semester (McLendon & Hearn, 2013). Through performance funding, instead of using enrollment as a gauge for funding, institutions receive appropriations based on their attainment of designated metrics (McLendon & Hearn, 2013). Several different types of metrics have been included in these models, but they usually include measures related to retention and graduation.

In 2018, 35 states were using a performance funding model for at least a portion of their higher education appropriations (Hillman, Fryar, & Crespín-Trujillo, 2018). This model enables state legislatures to oversee institutional performance while incentivizing institutions to focus more on increasing student outcomes rather than enrollment alone.

Theoretical Framework

Two theoretical frameworks describe the purpose of performance funding models and provided guidance for this study: principal-agent theory and resource dependence theory.

Principal-agent theory. Principal-agent theory consists of the principal who employs agents to accomplish the principal's goals (Eisenhardt, 1989). Often the principal and the agent work collaboratively, but they may have different interests, which may lead the agents to act outside of the interests of the principal. In an attempt to increase the agent's compliance, an agreement is developed, but it must include incentives in order to be effective (Kivisto, 2008). In higher education, institutions are agents with several different principals. These include legislators, boards, and accrediting and professional associations (Lahr et al., 2014). The performance funding model is the agreement between the state legislators and institutions (Hillman, Tandberg, & Gross, 2014). State legislators use performance funding as an incentive for institutions to accomplish their expected goals, such as graduation rates. Theoretically, since states previously used funding formulas based on enrollment, institutions would focus more on enrollment than graduation rates when linked to funding. Performance funding has been an attempt to remedy this.

Resource dependence theory. Similarly, performance funding relates to resource dependence theory. Resource dependence theory posits that an institution depends on other organizations to varying degrees (Pfeffer & Salancik, 1978). The institution's behavior in complying with the expectations of an organization depends on the reliance on those resources (Nisar, 2015). In performance funding, institutions may be motivated to make changes to improve performance on designated metrics if they are more reliant on state appropriations or if the funding provides a significant financial incentive or percentage of the appropriation (Burke, 2002). For example, according to this theory, community colleges, which are typically heavily reliant on local or state appropriations, would be more likely to respond to a performance funding model as compared to institutions that can more easily receive funding from other sources (Li & Kennedy, 2018). Research universities are believed to be less likely to respond because they have alternative revenues and may not be as dependent on the state appropriation.

Performance Funding Results

Despite the support for performance funding and the myriad of models attempted, researchers have found limited positive results in improving desired outcomes (Dougherty et al., 2011; Hillman, 2016). The limited success of these programs led many states to eventually discontinue their programs (Burke, 2002; Dougherty, Natow, & Vega, 2012; Miao, 2012). One reason for the failure of performance funding is not using metrics aligned with the mission and goals of institutions, especially community colleges (Dougherty et al., 2011; McKinney & Hagedorn, 2017). Recent models, called Performance Funding 2.0 models, have designed performance funding models specifically for community colleges and the metrics important to their mission. Through this study, I examined the effectiveness of a performance funding model with metrics related to the community college.

Background

One strategy in an attempt to keep higher education institutions accountable is performance-related initiatives. This accountability movement has led to three different kinds of performance initiatives in regulating higher education institutions: performance reporting, performance budgeting, and performance funding. Performance reporting requires institutions to report on the performance of designated indicators without consideration of funding (Burke & Minassians, 2002). Performance budgeting considers the achievement of metrics as one factor of allocations, but does not tie funding to specific indicators (Burke, Modarresi, & Serban, 1999). Performance funding directly ties state funding to an institution's performance on designated metrics (McLendon & Hearn, 2013).

History of performance funding. Tennessee state legislators introduced the first performance funding model in 1979. Although significantly revised, it is still in use today (McLendon & Hearn, 2013). Over the next 20 years, initially Connecticut, Missouri, and Florida, and soon after several states in the South and Midwest implemented similar models, but

eventually most models were discontinued (Dougherty, Natow, Hare, Jones, & Vega, 2011). By 2001, over 20 states implemented a performance funding model (McLendon & Hearn, 2013; Miao, 2012). By 2007, 14 of these states discontinued their programs, with only two implementing new ones during that time (Dougherty & Natow, 2015).

Through quantitative studies, researchers have found limited positive results in the improvement of student outcomes by performance funding models. Studies conducted over the short term and long term resulted in no impact on research funding, retention rates, or graduation rates (Hillman, 2016). These models are referred to as Performance Funding 1.0 (PF 1.0) (Dougherty & Reddy, 2013). The failure of PF 1.0 models has informed future models through the development of best practices.

Through qualitative studies, researchers found several reasons for the failure of PF 1.0 models. Use of too many measures and unclear outcomes limited the effectiveness of these models, as institutions could not respond appropriately (Dougherty, Natow, & Vega, 2012). Other causes for discontinuing programs included the turnover of state officials with different agendas, high program costs, and a decrease in state funding (Dougherty et al., 2011). Lastly, there often was a lack of support for these programs from higher education leaders. This was due to several reasons including objections to accountability measures and the perception that higher education leaders were not consulted when developing the models (Burke, 2002). Administrators were concerned these models did not take into consideration the mission and local needs of institutions. This was especially the case for community colleges, which have a broader definition of success (Burke, 2002).

Current trends in performance funding. Since the mid-2000s, a new wave of performance funding models called Performance Funding 2.0 (PF 2.0) has emerged (Dougherty & Reddy, 2013). State legislatures developed these models to address the failures of previous models by following recommended practices such as creating a separate system for community

colleges, allowing for a closer linkage to institutional mission, including stakeholder involvement, and phasing-in models (McKeown-Moak, 2013; NCSL, 2015). Despite these changes, researchers still found limited positive effects on student outcomes (Hillman, Fryar, & Crespín-Trujillo, 2018; Hillman, Tandberg, & Fryar, 2015; Li & Kennedy, 2018; Umbricht, Fernandez, & Ortagus, 2015).

In addition, studies have revealed several unintended consequences from performance funding. Through interviews of administration and faculty, researchers found practices contrary to the community college mission of open access, including schools recruiting more students with demographics associated with higher rates of success, such as those from higher income families (Kelchen & Stedrak, 2016). Colleges also developed higher admissions standards to bring in academically stronger students and, as a result, improve outcomes (Lahr et al., 2014).

McKinney and Hagedorn (2017) found students not considered “at-risk” were more likely to provide colleges with increased funding based on the performance funding metrics. “At-risk” includes populations such as racial/ethnic minority, part-time, and low socioeconomic students, which are at a greater risk of not succeeding in an educational context (Kaufman & Owings, 1992). Therefore, the model could result in less support for “at-risk” populations (McKinney & Hagedorn, 2017). Moreover, Hagoood (2019) found that high resource institutions benefit from these policies and those with low resources incur further burdens. This may imply that performance funding is not changing institutions as much as it is benefitting those who already are more effective in addressing outcomes.

Additionally, administrators expressed the possibility of weakened academic standards. This could happen from faculty feeling pressured to increase student grades, a decrease in the credits required for a curriculum, or curriculum revisions designed to increase the likelihood of student completion, but at the cost of important content (Dougherty et al., 2014).

Performance funding models and metrics. When evaluating performance funding models, most researchers have focused on metrics such as research, retention rates, graduation rates, and degree or certificate completion (Hillman, 2016). These metrics have been chosen for their importance and because they are commonly used and recorded within higher education (Rabovsky, 2012). Some recent models, such as Texas' Student Success Points Model, were developed specifically for community colleges and use metrics more appropriately aligned to the mission of a community college (McKinney & Hagedorn, 2017). These metrics include progression through and completion of developmental (remedial) education, graduation rates at 200% (equivalent to four years), completion rates for "at-risk" populations, and transfer rates (American Association of Community Colleges [AACCC], 2012b; Dougherty, Hare, & Natow, 2009). With changing models, further research on institutional improvement as indicated by these metrics is important to determine if the new focus on community college mission in performance funding formulas has effectively improved student outcomes.

For example, in 2013, Texas adopted two performance funding models: one for the technical institution, Texas State Technical College, and another for Texas' community colleges. The model for Texas State Technical College is the Returned Value Funding Model (Texas State Technical College [TSTC], 2018). Hutchison (2018) conducted research on this model to evaluate the impact of the model on graduation rates, and found no statistically significant impact (Hutchison, 2018). In contrast, this study evaluated associate degree and certificate completion for Texas' other performance funding model, Student Success Points Model, which is for community colleges. This evaluation was compared to the same outcomes in California, a state without performance funding.

Problem Statement

Past performance funding models have generally been unsuccessful in improving student outcomes in higher education (Hillman, 2016). One possible reason for the failure of past

performance funding models is the use of metrics not aligned with the unique goals of community colleges (Hillman, Tandberg, & Fryar, 2015). More recently, states have developed performance funding models with separate systems for community colleges, which incorporate more appropriate metrics. While research exists on various types of performance funding models, research on the success of performance funding when aligned with these particular student outcomes is limited.

In 2013, Texas adopted the Student Success Points Model, a performance funding formula specifically designed for the community college system. Beginning with the 2014-2015 academic year, the state appropriated funding using this model to its 50 community college districts. The success points, which determine a portion of institutional funding, include student progress, success in developmental (remedial) education and related gateway courses, transfer rates, and completion (Texas Association of Community Colleges [TACC], 2018a). Because it has incorporated community college metrics, it opens an opportunity for the researcher to collect and analyze data on the Texas Student Success Points model, to determine if it is effective in improving outcomes related to community college populations.

Purpose Statement

The purpose of the study is to compare community college outcomes in Texas, a state that has implemented performance funding, to outcomes in California, a state that has not implemented performance funding. I compared institutions in each group based on institutional characteristics such as race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid. The outcome variables were associate degree completion, certificate completion, and transfer-out rate. Transfer-out rate is defined as the rate of first-time full-time students seeking a degree or certificate, who transfer from the reporting institution within 150% of normal time without a degree or certificate to enroll in another postsecondary institution of the same level (e.g., undergraduate) (NCES, 2018a). In my in-depth review of the literature, I found

no study on how performance funding influences transfer-out rate. Normal time to completion is the amount of time to complete a certain type of degree, which for an associate degree, is two years (NCES, 2018a). Certificate completion excluded short-term certificates, which require less than one year of full-time coursework.

Research Questions

The following research questions guided this study:

1. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding, and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?
2. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?
3. To what extent is there a statistically significant difference in transfer-out rate for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?

- a. To what extent is there a statistically significant difference in transfer-out rates for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?

I used these questions to examine the effectiveness of a performance funding model. The questions focus on characteristics aligned to community colleges including associate degree completion, certificate completion, and transfer-out rates.

Professional Significance

There is a growing expectation for accountability of higher education institutions from legislatures, public, and politically conservative educational associations. Performance funding models are reemerging despite many states having previously abandoned their programs by the mid-2000s (Maio, 2012).

Researchers conducting quantitative research on performance funding have focused on four-year or higher institutions, finding little to no statistically significant impact on designated metrics such as retention, graduation, and degrees produced (Dougherty & Reddy, 2013; Hillman, 2016; Hillman, Fryar, & Crespín-Trujillo, 2018; Hillman, Tandberg, & Gross, 2014; Rutherford & Rabovsky, 2014; Sanford & Hunter, 2011; Shin, 2010; Shin & Milton, 2004; Tandberg & Hillman, 2014; Umbricht, Fernandez, & Ortagus, 2015). Performance funding research on community colleges has been sparse despite the high numbers of students attending these colleges. Of all students who obtained a degree at a four-year institution in 2015-2016, 49 percent enrolled in a community college within the past ten years; 75% in Texas (National Student Clearinghouse Research Center, 2017).

The limited research conducted on community colleges has also resulted in little to no statistically significant impact on metrics such as retention, graduation, associate degree

completion, and certificate completion (Hillman, Tandberg, & Fryar, 2015; Tandberg & Hillman, 2013, Tandberg, Hillman, & Barakat, 2015). Both Hillman, Tandberg, and Fryar (2015) and Li and Kennedy (2018) found an increase in the completion of short-term certificates, certificates generally taking less than a year to complete. Research, however, has found zero or even negative labor market value from short-term certificates in most disciplines and they have limited benefits as compared to a high school diploma (Dadgar & Trimble, 2015; Hillman et al., 2015).

Several qualitative studies on PF 1.0 models have included guidance and best practices for improving performance funding models in the future (Burke, 2002; McKeown-Moak, 2013; NCSL, 2013). One important best practice is considering the mission of an institution (McKeown-Moak, 2013; NCSL, 2013). Community colleges generally commit to open access mission and are less costly than four-year institutions, leading to higher rates of “at-risk” populations (Tandberg, Hillman, & Barakat, 2015). This can influence the results of the metrics of community colleges as compared to four-year institutions, especially as performance funding models tend to benefit those populations not “at-risk” (McKinney & Hagedorn, 2017). Hence, performance funding models not taking community college mission and student characteristics into account may put colleges and their students at a disadvantage. Unfortunately, most previous research focused on four-year institutions or examined PF 1.0 models. This study evaluated a PF 2.0 model focused on community colleges.

Research on Texas’ Student Success Points Model adds to the body of knowledge on performance funding because the design specifically focuses on community colleges and rewards institutions for metrics aligned with their mission. The model includes the commonly used metrics of degree or certificate completion, but also developmental (remedial) completion, and transferring to a university after 15 credits. Texas adopted this PF 2.0 model in 2013 (TACC, 2018a).

Given the recent reemergence of performance funding models, understanding the appropriateness of metrics is essential for legislators and higher education administrators in developing models or exploring other means in improving desired metrics such as graduation rates. While most studies focus on the retention rates, graduation rates, or degree/certificate completion, this study considered degree and certificate completion, but also looked at transfer-out rates, an outcome I have not found in other studies. I disaggregated associate degree completion, certificate completion, and transfer-out rate by race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid. Examining the outcomes of these demographics was important because researchers have found performance funding models may reward institutions for excluding “at-risk” populations (McKinney & Hagedorn, 2017).

With the failure of most previous performance funding models, I examined if performance funding models, which implement metrics aligned with the community college mission, will be effective in improving those metrics. Lack of improvement of metrics would provide more evidence for the ineffectiveness of performance funding initiatives.

Overview of the Methodology

Using a quasi-experimental, quantitative study, I used data from the U.S. Department of Education’s Integrated Postsecondary Education Data System (IPEDS) to compare Texas community college performance after implementation of a performance funding model to the performance of California community colleges using a difference-in-differences approach. The independent variable was the implementation of a performance funding model. The student outcome variables included associate degree completion, certificate completion, and transfer-out rates. The completions included the percentage of degrees or certificates conferred by an institution in an academic year, from July 1 of a calendar year to June 30 of the following year, the dates used in IPEDS (NCES, 2018b). Statistically significant improvement to completion or

transfer-out rates as compared to the comparison groups was necessary to show the model's effectiveness.

The analysis included 52 public community college campuses in Texas, all under a performance funding model, the Student Success Points Model since 2013. It is possible the results of the metrics would have occurred without the implementation of the performance funding model. Therefore, the comparison group of 85 California community college campuses controlled for these effects. The community colleges in Texas and California were chosen through purposeful sampling. All public community colleges in Texas and California were included in the study except institutions not in operation during the entire length of the study or those that did not report all the relevant outcomes to IPEDS. Texas was chosen, as it is a PF 2.0 model, which includes incentives for increasing metrics related to community colleges. California was chosen as it includes a population with similar ethnic diversity as Texas and did not have a performance funding model during the time of the study, nor ever had one for its community colleges.

Associate degree completion, certificate completion, and transfer-out rates were controlled using the institutional variables of race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid. Racial/ethnic minority students and those of low socioeconomic status tend to be more common to community colleges (Shapiro et al., 2013).

Delimitations

This study had several delimitations. The study focused on Texas' Student Success Points Model, a performance funding formula for the community colleges in Texas. This model was chosen as it encompasses a large number of community colleges and incorporated best practices and metrics aligned to their mission and goals. The structure of each performance funding model is different, however, so the results of this study may not be generalizable to all other states or models.

Additionally, since the model only included public community colleges, both four-year institutions and technical colleges were excluded from the study. The technical college of Texas is under a performance funding model, called the Returned Value Funding Model, which is different from the one used for community colleges (Texas State Technical College [TSTC], 2018).

I also reviewed a specific period, which limits the scope of the model's success, but is also a strength of the study, since the study evaluated a PF 2.0 model, which incorporated best practices and metrics aligned with community colleges. Texas' model met this criterion and was adopted in 2013 (TACC, 2018a).

College dual enrollment data were also excluded from the study. Dual enrollment students take college courses in high school and get credit for both the high school and college. This study used data from the Integrated Postsecondary Education Data System (IPEDS), which does not consider dual enrollment students as degree/certificate-seeking (NCES, 2018a). Including these non-matriculated students would perhaps slant the data in a negative way.

Definition of Key Terms

Associate degree: an award granted by postsecondary institutions, generally requiring at least two but fewer than four years of full-time coursework (National Center for Education Statistics [NCES], 2018a).

"At-risk" populations: populations, such as racial/ethnic minority, part-time, and low socioeconomic students, which are at a greater risk of not succeeding in an educational context (Kaufman & Owings, 1992).

Certificate: an award granted by postsecondary institutions, generally requiring fewer than two years of full-time coursework (NCES, 2018a). Short-term certificates, requiring less than one year of full-time coursework were not be included in this study.

Community college: a public college conferring associate degrees and certificates. In addition to open access, the mission of the community college includes developmental education, workforce development, transfer education, continuing education, and community service (Cohen, Brawer, & Kisker, 2013). In Texas, technical colleges are separate from community colleges (Rios, 2014).

Completion: degrees or certificates conferred by an institution during an academic year.

Considers all completions from July 1 of one calendar year through June 30 of the following year (NCES, 2018a).

Full-time student: a student enrolled in at least 12 credits in a semester (NCES, 2018a).

Graduation rate: percentage of first-time full-time degree/certificate-seeking students completing their program within 150 percent of normal time to completion (NCES, 2018a).

Normal time to completion: the amount of time required to complete a certain type of degree.

Normal time to complete an associate degree is two years (NCES, 2018a).

Open door policies: institutional admission policies, which accept any student who applies (NCES, 2018a).

Part-time student: a student enrolled for fewer than 12 credits in a semester (NCES, 2018a).

Pell-Grant: federal grant provided to students with demonstrated financial need to assist in meeting postsecondary educational expenses (NCES, 2018a).

Performance budgeting: considers the achievement of metrics as one factor in allocations, but does not tie funding to specific indicators (Burke, Modarresi, & Serban, 1999).

Performance funding: type of state appropriation directly tying state funding to an institution's performance on designated metrics (McLendon & Hearn, 2013).

Performance reporting: requirement of institutions to report on the performance of designated indicators without consideration of funding (Burke & Minassians, 2002).

Race/ethnicity: categories used to describe groups to which individuals identify. Ethnicity is designated as either “Hispanic or Latino” or “Not Hispanic or Latino.” Race includes any of the following categories that apply: “American Indian or Alaska Native,” “Asian,” “Black or African American,” “Native Hawaiian or Other Pacific Islander,” or “White” (NCES, 2018a).

Retention rates: rate at which students persist at an institution. Percentage of first-time full-time degree/certificate-seeking students from the previous fall who persisted by the following fall or graduated (NCES, 2018a).

Student Success Points Model: the Texas performance funding formula adopted in 2013 with funding appropriated starting for the 2014-2015 academic year to the state’s 50 community college districts (TACC, 2018a).

Transfer-out rate: rate of first-time full-time students seeking a degree or certificate, who transfer from the reporting institution within 150% of normal time without a degree or certificate to enroll in another postsecondary institution of the same level (e.g., undergraduate, graduate) (NCES, 2018a).

Summary

With more than 50 percent of states using performance funding for at least a portion of their state allocation to higher education institutions, the effectiveness of this model is of utmost importance (Hillman, Fryar, & Crespin-Trujillo, 2018; NSCRC, 2017). Despite researchers finding little to no impact on retention rates, graduation rates, and degrees/certificates completed, further research is necessary to determine if new models following best practices can positively influence metrics at institutions, particularly community colleges. Texas’ Student Success Points Model is aligned towards community colleges, which provides opportunity to determine the effectiveness of a new performance funding model. In the next chapter provides discussion on the literature review.

CHAPTER 2

LITERATURE REVIEW

This chapter includes a review of the literature on the public funding of higher education institutions, particularly through performance funding. The review includes reasons for increased accountability, the design of performance funding models, the theoretical framework for such models, and a review of both quantitative and qualitative studies on the impact of performance funding on higher education institutions. I discussed community colleges, relevant metrics to their missions and goals, and the importance of considering this in performance funding models. Finally, an explanation of Texas' Student Success Points Model provided context for the study.

Method of the Literature Review

Both the Old Dominion University library and the Arizona State University library served as initial sources to perform searches. These searches included use of EBSCOHost and ProQuest Dissertation & Theses Global. Use of both Education Resources Information Center (ERIC) and Google Scholar provided additional articles.

Key search terms. I identified key search terms based on an initial review of the literature and terms used in recent dissertations. Since there was extensive research on performance funding, the study excluded some types of articles. This included only reviewing dissertations in ProQuest within the last five years, peer-reviewed literature, and excluded international studies or studies not related to performance funding in higher education. Key terms used a combination of words for institutional type, policy name, and outcomes. Institutional type key words included "community college" and "two-year college." Additionally, using "higher education" ensured covering the expansiveness of the research as some studies included community college within their research of other colleges and universities. Key terms for policy names included "performance-based funding," "performance funding," and

“outcomes funding.” Terms for outcomes included “outcomes,” “metrics,” “factors,” and “indicators.” Different term combinations produced a variety of results, expanding the extensiveness of the search.

Sources. I used dissertations and peer-reviewed literature to obtain additional sources through the reference sections. Journal articles published within the last seven years were included. Articles came from several major journals related to higher education including the *Community College Review*, *Journal of Higher Education*, *New Directions for Community Colleges*, *Higher Education Management and Policy*, *Economics of Education Review*, *Journal of Education Finance*, *Community College Journal of Research and Practice*, *Educational Evaluation and Policy Analysis*, *Higher Education*, and *Education Policy Analysis Archives*. The research also used several books as resources such as Dougherty and Natow (2015), Mullin, Baime, and Honeyman (2015), and St. John, Daun-Barnett, and Moronski-Chapman (2013).

Organizations. In addition to these sources, literature on performance funding was acquired through relevant research and educational organizations. This included the American Association of Community Colleges (AACC), Center for American Progress, Community College Research Center (CCRC), The Lumina Foundation, National Center for Education Statistics (NCES), National Center for Higher Education Management Systems, National Conference of State Legislatures (NCSL), Texas Association of Community Colleges (TACC), and the United States Department of Education.

Higher Education and Accountability

Higher education has changed significantly over the last century. The Truman Commission Report issued in 1947, which increased federal support for higher education led to significant increases in student enrollment and advanced “open door” policies for community colleges (Bastedo, Altbach, & Gumport, 2016). In addition to greater accessibility, the mission of the community college has expanded to meet various needs including developmental

(remedial) education, workforce development, transfer education, continuing education, and community service (Cohen, Brawer, & Kisker, 2013). Though higher education has experienced a significant increase in access, some federal, state, and local governments, employers, and public are questioning the success of higher education and its cost effectiveness (Bastedo, Altbach, & Gumport, 2016; Hart Research Associates, 2013).

Cost. The costs of higher education are continually rising. After adjusting for inflation, published tuition and fees for community colleges is 2.4 times as high as it was in the 1986-1987 academic year, and it has tripled for public four-year institutions (The College Board, 2017).

Degree completion. Despite the increased costs, higher education personnel, legislatures, and the public perceive the percentage of degree completion to be too low. Of first-time full-time students enrolled in fall 2010, only 60% graduated with a bachelor's degree by 2016 (U.S. Department of Education, 2018). Additionally, students first enrolled in fall 2013, only 30% of degree- or certificate-seeking first-time full-time community college students graduated with a degree or certificate at 150% of normal time. For public community colleges, the graduation rate was only 24% (U.S. Department of Education, 2018). Altstadt (2012), an economist, projected in 2012 that higher education would be unable to fill the necessary credentials for future positions with the current completion rates.

Workforce preparedness. Additionally, several reports have shared with the public the lack of preparation students have for key aspects of entering the workforce. Arum and Roksa (2011) found 45% of students showed no significant improvement in areas of critical thinking, reasoning, and writing after two years of college. After four years, 36% still showed no significant improvement. McKinsey and Company (2013) surveyed graduates finding 30% did not feel prepared for their jobs, especially in the areas of technical skills and quantitative reasoning. Almost half of graduates from four-year institutions were in a job not requiring a bachelor's degree.

Hart Research Associates (2013) reached out to the executives of organizations and, though most found higher education was doing a good job, 40% stated it was only fair, and four percent, poor. Additionally, more than 80% of the executives surveyed stated the top three areas higher education needs to focus more on are critical thinking and reasoning, complex problem solving, and written and oral communication. Though these studies are not peer-reviewed work, they influence public opinion, increasing the expectation of accountability.

Performance. The rising costs of higher education, low graduation rates, an expected gap in meeting workforce needs, and lack of workplace preparedness have resulted in a demand for increased transparency and accountability. Higher education institutions, which have historically been self-governing systems, are now experiencing increased involvement and expectations from the government (Hillman, Tandberg, & Fryar, 2015). Additionally, states have funded public higher education institutions based on student enrollment through full-time equivalency (FTE). Theoretically, this incentivizes increasing enrollment rather than improving other measures such as retention, completion, and job placement (Miao, 2012). States are moving toward funding models based on performance to change these incentives.

Performance Funding

The United States Department of Education (2006) stated the following regarding the current expectation of higher education institutions:

To meet the challenges of the 21st century, higher education must change from a system primarily based on reputation to one based on performance...Every one of our goals, from improving access and affordability to enhancing quality and innovation, will be more easily achieved if higher education institutions embrace and implement serious accountability measures. (p. 21)

One such accountability measure is performance funding. Performance funding is a type of state allocation, which funds higher education institutions at least partially based on institutional

performance on designated metrics rather than on enrollment alone (McLendon & Hearn, 2013). State legislators intend to implement performance funding to monitor and measure performance on desired metrics to evaluate the return on investment for their funding allocations (Dougherty, Natow, Bork, Jones, Vega, 2013; St. John, Daun-Barnett, & Moronski-Chapman, 2013).

Despite the interest from state legislatures, performance funding has its critics (Dougherty & Natow, 2015). Because each institution is unique, it is difficult to choose metrics effectively to capture the mission and purpose of multiple institutions under the same state model of funding (Burke, 2002). This is especially the case for community colleges, which have a comprehensive mission and encounter greater challenges to achieving success in student outcomes.

History of Performance Funding

Tennessee initiated the first performance funding model in 1979 (McLendon & Hearn, 2013). Connecticut followed in implementing performance funding in 1985 (McLendon & Hearn, 2013). Missouri and Florida added programs in the early 1990s and several states in the South and Midwest soon followed (Dougherty, Natow, Hare, Jones, & Vega, 2011; McLendon & Hearn, 2013). According to McLendon and Hearn (2013), by 2001, 21 states had implemented performance funding models. Miao (2012) found 25 states to have implemented these models by 2001. The programs from earlier generations are called Performance Funding 1.0 (PF 1.0), which generally provided an additional amount of funding beyond the base state budget (Dougherty & Natow, 2015; Dougherty & Reddy, 2013).

By 2007, 14 of the states discontinued their programs with only two reinstating new ones (Miao, 2012). The effectiveness of performance funding models was limited because they included too many measures and/or unclear outcomes. Budgetary pressures resulted in the end of several programs (Dougherty, Natow, & Vega, 2012). Research by Burke (2002), found several causes leading to the demise of PF 1.0 models, including changes in state officials, designs developed too quickly and inadequately, and lack of support from higher education institutions.

Other factors resulting in the elimination of PF 1.0 models include the lack of consultation of higher education administrators, indicators focused on state needs more than institutional goals, perception of the high costs of implementing and maintaining the programs, a significant decrease in state funding, and changes in political leadership (Dougherty et al., 2011).

Performance Funding 2.0

Despite the inconsistency of PF 1.0 models, “performance funding has risen from the near dead, returning forcefully to the policy and political agendas of many states” (McLendon & Hearn, 2013, p. 1). A new wave of performance funding models, called Performance Funding 2.0 (PF 2.0), has been emerging since the mid-2000s (Dougherty & Reddy, 2011). These models tend to emphasize both intermediate outcomes, such as developmental (remedial) education or completion of a designated number of credits, as well as traditional outcomes, such as job placement and graduation (Offenstein & Shulock, 2010). Additionally, they typically include funding within the base budget (Dougherty & Reddy, 2013). With PF 2.0, funding is now incorporated within the base funding and not just a bonus, as occurred in most PF 1.0 models (Dougherty & Reddy, 2011). Completion metrics also commonly include certificate completion or apprenticeships (McKeown-Moak, 2013). By 2018, 35 states tied at least a portion of their higher education appropriations to performance (Hillman, Fryar, & Crespín-Trujillo, 2018).

Program Stability and Best Practices

Researchers have reviewed PF 1.0 models and developed best practices for designing more stable programs. Burke (2002) found limiting the number of indicators and providing enough time to assess program results as important factors to providing stability to performance funding models. McKeown-Moak (2013, p. 11) developed a list of “Guiding Principles for Developing and Establishing Institutional Performance Indicators” based on what was learned from research on PF 1.0. This list includes:

- Credibility

- Linkage to mission, strategic plan, and policy goals
- Stakeholder involvement and consensus
- Simplicity
- Reliant on valid, consistent, and existing information
- Recognizes range of error in measurement
- Adaptable to special situations
- Minimizes number of indicators
- Reflects industry “standards” and “best practices”
- Incorporates input, process, output, and outcome measures
- Incorporates quantitative and qualitative measures

The NCSL (2015) also developed a list of nine best practices for designing a performance funding model. This aligned with McKeown-Moak’s (2013) research including: a linkage to institutional mission, collaboration with stakeholders, and a simple funding model. It also suggested the following:

- Providing enough funding to incentivize the improvement of indicators
- Phase in the model
- Protecting “at-risk” students with relevant supporting indicators
- Maintain focus on college completion
- Aligning funding with economic and workforce needs
- Protecting academic quality

Developers of PF 2.0 programs can learn from the mistakes of past models in an attempt to design sustainable and effective programs (Dougherty & Reddy, 2011). In addition to following best practices, PF 2.0 tends to include intermediate indicators, such as developmental

course completion, as well as embed funding into the base funds received by institutions (Tandberg & Hillman, 2013).

Concerns with Performance Funding

Despite the resurgence of performance funding models, it is not without problems. The complexity of higher education, with unique needs, capabilities, and student demographics, complicates the mission and purpose of higher education as a whole. By choosing specific metrics, consideration of an institution's uniqueness is limited, which can result in an institution focusing on the chosen metrics at the expense of other student outcomes (Burke, 2002). Past models have favored traditional students and four-year colleges and universities. This focus can negatively influence community colleges, with a larger part-time population and non-traditional enrollment (McKinney & Hagedorn, 2017). Additionally, institutions with a larger percentage of low socio-economic populations will likely also suffer as these students have a higher likelihood of decreased performance (Li, Gándara, & Assalone, 2018; McKinney & Hagedorn, 2017). Although, some studies have found that developing a model that considers at-risk populations, can help mitigate the disadvantage these models have previously had on populations such as low socioeconomic status, part-time, and those aged 25 and older (Natale & Jones, 2018). Moreover, Hagoood (2019) found that performance funding models could financially benefit higher resource institutions and further burden lower resource institutions.

Effectiveness of Performance Funding

Several studies have evaluated the effectiveness of performance funding models. Much of this research focused on PF 1.0 models and on four-year institutions. The limited research on how performance funding models influence community colleges largely focused on PF 1.0 models. However, some of the latest research on community college PF 2.0 models are finding little to no statistically significant difference on improving student outcomes.

Four-year. Dougherty and Hong (2006) stated that the ultimate impact of performance funding should be on student outcomes. This includes retention, remediation, credit accrual, transfer, graduation, and job placement (Dougherty & Hong, 2006). Dougherty and Reddy (2011, p. 43) conducted a literature review on the impact of performance funding models on higher education and found “the research literature does not provide firm evidence that performance funding significantly increases rates of developmental completion, retention, and graduation.” Several quantitative studies confirm the results of this literature review, but there have also been some mixed results. Much of the research is on four-year-or-greater colleges and universities.

Shin and Milton (2004) used IPEDS data from 1997 to 2001 of 456 public four-year institutions to determine if graduation rates increased. When compared with similar institutions from states without performance funding there was no significant positive effect on the growth of graduation rates. Shin (2009) followed up with a quantitative study using IPEDS data from 1997 to 2007 on 467 public four-or-more year institutions. The researcher found no significant effect for graduation rates or research funding.

Another study by Sanford and Hunter (2011) used several data sources to compare public four-year institutions from Tennessee, a state with the longest history of performance funding, to peer institutions from 1995-2009. The researchers found no significant positive outcomes for retention and six-year graduation rates. Dougherty and Reddy (2013) looked at an additional metric of student developmental completion in a review of research studies in eight states with performance funding programs. The researchers also found performance funding does not significantly improve outcomes of developmental completion, retention, and graduation.

Umbricht, Fernandez, and Ortagus (2015) looked at graduation rates by conducting a study using IPEDS and the Bureau of Labor Statistics data from 2003 to 2012 on public four-year institutions from Indiana and three comparison groups, reviewing 90 four-year institutions. Not

only was there no significant increase in the number of graduates when compared to other institutions, but also two negative consequences emerged. There was a decrease in admission rates as compared to both similar public institutions of other states and private institutions from the same state. On average, Indiana institutions admitted fewer racial and ethnic minorities than the comparison public institutions.

Rabovsky (2012) utilized a different approach in his review of IPEDS data from 1998 to 2009 on four-year colleges and universities. He looked at how performance funding programs significantly influence state budgets or institutional spending priorities and found no significant difference. Additionally, state funding correlated positively with performance outcomes. The research suggested institutions might already have the financial incentives, such as accreditation and accountability, to improve performance and performance funding models have made minimal impact to incentivize institutions further.

Researchers have also evaluated the effectiveness of performance funding models on institutions conferring master's degrees. Hillman, Tandberg, and Gross (2014) conducted a study on 13 master's degree institutions within Pennsylvania's performance funding model as compared to 136 master's degree institutions in states without performance funding. Review of IPEDS data from 1990 to 2010 found the model, on average, did not have a positive impact on degree completion.

Despite most researchers finding no significant effect or even a negative effect on student outcomes, researchers have found some benefits. Tandberg and Hillman (2014) compared IPEDS and other related postsecondary data sources from 1990 to 2010 on public four-year institutions. The researchers reviewed baccalaureate degree completion the years before and after implementation of performance funding programs and compared the results to similar states without performance funding. The researchers found limited evidence performance funding

significantly increases completion. By the seventh year, however, performance funding had a positive significant impact on degree completion, though only to a small magnitude.

Rutherford and Rabovsky (2014) conducted a study of over 500 public universities from all 50 states on six-year graduation rates, retention, and bachelor's degree completion. Using IPEDS data from 1993 to 2010, performance funding policies generally did not increase graduation rates. PF 1.0 policies experienced an average 1% loss over six to seven years. PF 2.0 policies actually found positive results, though not significant. There were similar results for degrees awarded as well. The examples of improvements to student outcomes through performance funding policies are limited.

Community colleges. Though much of the research on the effectiveness of performance funding has been on four-year institutions, in recent years more quantitative studies on performance funding's improvement of student outcomes at community colleges has been conducted. Further research on the effect of performance funding on community colleges is still needed, especially on more relevant metrics, such as transfer and the success of "at-risk" student populations.

Tandberg and Hillman (2013) analyzed performance funding states from 1990 to 2010. The study compared the number of degree completions, for associate and baccalaureate degrees, both before and after the state implemented a performance funding model. This difference was also compared to the improvements of states without performance funding during those times. Performance funding models had little to no effect on degree completions. When looking at individual states, more examples of performance funding had a negative effect on degree completion. In a few states, there was a positive effect, but only for four-year institutions. For community colleges, no effect occurred until five years, but it was a significant negative effect (Tandberg & Hillman, 2013).

Tandberg, Hillman, and Barakat (2015) reviewed IPEDS and other related postsecondary data sources from 1990 to 2010. On average, performance funding did not affect associate degree completion, but there were mixed results for individual states. There was lower completion in six states, greater completion in four states, and inconclusive results in nine states.

Hillman, Tandberg, and Fryar (2015) conducted a quantitative study using IPEDS data from 2002 to 2012 on community and technical colleges. The researchers compared 31 community and technical colleges in Washington, a performance funding state, to 176 community and technical colleges from 12 different western states regarding retention rates, certificates awarded, and associate degrees awarded. As compared to the other groups, Washington had the largest growth in short-term certificates, completed normally in less than one academic year, but lower to no growth in long-term certificate completion. The researchers found mixed results on retention rates, mostly negative, although some were positive when disaggregated by year. Overall, there was no significant effect on retention rates. Total associate degree completion had no average effect, but in degrees per 100 FTE, degree completion was negative for the first several years. Positive results did occur in later years, however, for some institutions. The growth in short-term certificates is actually an unintentional impact, as the research indicates limited benefits to students. While long-term certificates often lead to increased wages, most short-term certificates tend to provide few if any benefits as compared to a high school diploma (Dadgar & Trimble, 2015; Hillman et al., 2015).

In a recent study, Li and Kennedy (2018) conducted a quantitative study using a panel dataset of 751 community colleges from 1990 to 2013 using IPEDS data. Through a difference-in-differences approach, the researchers examined the impact of performance funding on completion of short-term certificates, medium-term certificates, and associate degrees. On average, no significant changes were found for any of the variables. Certain types of models, however, such as those including a greater proportion of funding, consideration of mission

differences, “at-risk” student metrics, and longer lasting programs resulted in an increase in short-term certificates and a decrease in associate degrees. Research has found zero or even negative labor market value from short-term certificates in most disciplines (Dadgar & Trimble, 2015).

In another recent study, Hillman, Fryar, and Crespín-Trujillo (2018) used a difference-in-differences design to review the effectiveness of performance funding on certificate and degree completion. The study included a panel dataset of 839 two-year and 500 four-year institutions from 2005-2006 to 2014-2015, with a focus on the performance funding models of Ohio and Tennessee. This study provided an analysis of models, which have followed best practices and tied at least 50% of their funding allocation to performance. Despite this, the study found no increase in bachelor degree completion and a decrease in associate degree completion. Certificate completion increased in Tennessee, which may have partially been a result of changed practices, such as automatically granting credentials as soon as meeting the needed credits towards a certificate.

In addition to the research conducted on community colleges, limited research has been conducted on technical colleges. In 2013, Texas adopted a performance funding model called the Returned Value Funding Model for their technical institution, Texas State Technical College (Texas State Technical College [TSTC], 2018). Hutchison (2018) evaluated the impact of the model on graduation rates, finding no statistically significant impact.

Unintended Consequences

Performance funding has also been found to have unintended negative consequences. This includes compliance costs, narrowing mission, such as reducing general education or restricting admissions, weakening academic standards, and a diminished faculty voice in academic governance (Lahr et al., 2014).

Compliance costs, both in money and time involved in the data collection and reporting, was a significant impact (Dougherty & Hong, 2006; Dougherty et al., 2014). The research on the impact of the costs, however, is limited (Dougherty & Hong, 2006).

Another unintended impact is the narrowing of institutional mission. Decreasing requirements for a degree, such as reduced general education, may increase the likelihood of student completion (Dougherty & Hong, 2006). Additionally, raising admission requirements or targeting student groups who have higher rates of success are other forms of narrowing mission (Dougherty et al., 2014; Natow et al., 2014). Lahr et al. (2014) studied the unintended impacts of performance funding at nine community colleges in Indiana, Ohio, and Tennessee. Interviews with administrators and department chairs mentioned the most common unintended impact to be restricting admissions. This would prevent the acceptance of less prepared students, leading to a stronger student body and improved performance, but would negatively influence “at-risk” populations and the college’s open access mission.

Kelchen and Stedrak (2016) have confirmed these results. They conducted a study using IPEDS data of both public two-year and four-year institutions from 2003 to 2013. There were 538 public four-year and 1,113 public two-year institutions covering all 50 states. There was no significant relationship between performance funding and either institutional revenue and expenditure levels or resource allocations. Some evidence found four-year recruitment strategies changed to target students from higher income families, as the average Pell revenue per student decreased and there was an increase in unfunded grant aid at the four-year institutions, which is generally merit based. This suggests colleges are trying to recruit stronger students, an unintended impact, which may hurt access for “at-risk” populations.

Another impact is weakening academic standards. This could happen by decreasing demands within a course, decreasing degree requirements, grade forgiveness policies, and advising students into perceived easier courses (Dougherty et al., 2014). This impact, however,

was more of a perception by college administrators and usually not observed (Lahr et al., 2014). There is also some evidence of pressure on faculty, even if implicit, to avoid giving students failing grades (Dougherty & Hong, 2006).

A final unintended impact of performance funding is diminished faculty voice in academic governance. Faculty have had limited involvement in the planning and creation of a performance funding model (Dougherty et al., 2013; Dougherty & Reddy, 2013).

Metrics

Performance funding models have used many different types of metrics. Rabovsky (2012) found the two most commonly used metrics included graduation rates, in 15 of the 20 states studied, and retention, in nine of the 20 states. Additionally, common outcomes included racial/ethnic minority or low-income student outcomes, number of degrees produced, measures of cost efficiency, research productivity and external funding for research, student/faculty diversity, and pass rates for licensure tests or other exams. Tandberg and Hillman (2013) found common performance funding metrics to include degree completion, retention, graduation rates, transfer rates, licensure exam scores, job placement rates, faculty productivity, and campus diversity.

Input of community college leaders to design effective systems linked to the institution's mission and goals is essential. Indicators may not be used properly to measure performance of the institution when models do not consider institutional mission and characteristics (Dougherty & Natow, 2009; Dougherty & Reddy, 2011; Dougherty & Reddy, 2013). Institutions in both Missouri and Washington opposed performance funding programs for not using indicators considering differences in institutional mission. The indicators did not distinguish between the mission of research universities, other four-year institutions, and community colleges (Dougherty, Natow, Hare, & Vega, 2010).

Community College Characteristics and Challenges

Community colleges are open access institutions with different missions and characteristics than their four-year counterparts. The mission of the community college includes developmental (remedial) education, workforce development, transfer education, continuing education, and community service, which influences the populations they serve (Cohen, Brawer, & Kisker, 2013).

Community colleges include a greater number of part-time students, students in need of remediation, older students, minorities, English language learners, low-income students, and students juggling multiple responsibilities including family, jobs, and school (Cohen, Brawer, & Kisker, 2013; Li, Gándara, & Assalone, 2018; U.S. Department of Education, 2018). All of these factors can negatively influence the successfulness of certain metrics.

Researchers found that institutions with high numbers of racial/ethnic minority students and part-time students have lower graduation rates (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006). Calcagno, Bailey, Jenkins, Kienzl, and Leinbach (2008) also conducted a study using IPEDS data on the relationship between minority students and the attainment of community college students. They found colleges with more minority students had lower graduation rates even after controlling for race, test scores, and socioeconomic status.

Additionally, students not academically prepared or with other social disadvantages, have a less likelihood of obtaining a degree (Dougherty & Hong, 2006). Davidson (2015) conducted a study of 2,850 first-time full-time students at Kentucky public community colleges. The researcher looked at leading indicators as predictive factors of associate degree completion and four-year transfer. Low-income and underprepared precollege factors negatively correlated to completing an associate degree or transferring to a four-year in-state public institution as students of those demographics face additional challenges. Underprepared students may struggle in

coursework and often take developmental education, extending their time to completion (Davidson, 2015).

Researchers have also found that specific populations provide more funding than other populations when it comes to performance funding models, even one focused on community colleges. McKinney and Hagedorn (2017) used longitudinal student unit record data from a large community college district in Texas, mainly through student transcripts and the National Student Clearinghouse, to study Texas' new performance funding model and determined the procurement different types of students would provide. African American, older adults, GED holders, part-time students, and students requiring multiple levels of remediation procured significantly less funding. This implies it may not be in the best interest for institutions to recruit these types of students and results in the unintended impact of decreased access.

In recent studies, researchers found evidence that when performance funding models use metrics intended to address underserved populations, the negative impact on these students are minimized or even removed. Gándara and Rutherford (2018) conducted a difference-in-differences study using a dataset of 251 institutions of low-income and minority students at four-year universities from 1993 to 2014. The study determined the impact of performance funding models on the selectivity and enrollment of these underserved populations. The researchers found that the enrollment of low-income and Hispanic students increase for performance funding institutions with premiums for underserved students as compared to those that do not. However, there was a negative effect on Black student enrollments.

Using data from 2004-2005 to 2014-2015, Li, Gándara, and Assalone (2018) conducted a difference-in-differences study comparing state funding of two-year racial/ethnic minority-serving institutions (MSIs) with non-MSIs at both Texas and Washington. Texas and Washington implemented performance funding models, both of which include incentive milestones in addition to completion metrics, which tend to disadvantage racial/ethnic minority

populations. The researchers found that performance funding models do not financially disadvantage MSIs, when milestone metrics are included.

In a study of the 50 public community college districts in Texas, Natale and Jones (2018) found the metrics designated in the Texas Student Success Points Model did not disadvantage low socioeconomic status, part-time, or age 25 or older students.

As described in the research, racial/ethnic minority, part-time, academically underprepared, and low-income students all have increased difficulties in achieving student outcomes. Because these populations are more common to community colleges, achieving success in certain metrics is more difficult, especially metrics from models that develop the same standard for both community colleges and four-year institutions. Additionally, if performance funding models develop metrics that consider milestones or premiums for the underserved, the negative impact is decreased or removed.

Funding

Additionally, funding provided for community colleges is often less than that provided for their four-year counterparts. Rabovsky (2012) reviewed IPEDS data from 1998 to 2009 regarding four-year colleges and universities and found increased state funding positively correlated with performance outcomes. The researcher also found productive research universities and selective colleges receive more state appropriations than other public institutions.

Alternative Metrics

Considering the lack of funding provided for community colleges and the challenges faced by a large portion of their student bodies, it is not reasonable to use the same metrics as those used for four-year colleges. When performance funding models use the same metrics for all institutions, the models often did not have a positive impact on designated metrics (Dougherty, et al., 2012). Administrators have stated this is due to the lack of aligning metrics to institutional mission and the need for alternative metrics for community colleges (Dougherty, et

al., 2012). For example, including transfer as a completion and considering graduation outcomes for longer than the 150% allotted time are important considerations because of the various factors involved for community college students (Community College Research Center, 2014). Other alternative metrics include developmental education progression, gateway course completion, additional points for low-income, racial/ethnic minority, or older students, and associate and certificate completion (Altstadt, 2012; Complete College America, 2017).

Using alternative metrics is also important because of the different goals community college students have for attending a community college. Some desire to complete a degree, others have more pressing need of employment and pursue certificates, others plan to transfer, either before or after completing a degree, and others attend to gain knowledge or expertise for an occupation. Community college officials argue that many students achieve a positive outcome in these cases, though most performance funding formulas do not consider all of these outcomes (Dougherty & Hong, 2006).

Texas and Performance Funding

Texas is comprised of 50 public community college districts, all of which are within the Texas Association of Community Colleges (TACC, 2018b). In fall 2016, these community colleges had a combined enrollment of 712,554, which was 46.8% of the total amount of students enrolled in college within Texas (TACC, 2018c).

According to the Texas Education Code (TEC) §130.0011, the purpose of each Texas public community college includes providing:

- Technical programs through associate degrees or certificates
- Vocational programs leading to employment
- Courses in the arts and sciences
- Continuing adult education

- Developmental education
- Counseling and guidance
- Workforce development programs to meet state and local needs
- Adult literacy and basic skills programs
- Other purposes as prescribed by the Texas Higher Education Coordinating Board or local governing boards (Rios, 2014)

Like most community colleges, these colleges have expansive goals and meet the needs of a wide array of students.

Consideration of performance measures started as early as 1997, where the 75th Texas Legislature required each community college to submit an annual performance report. This included several measures including number of degrees conferred, certificates conferred, pass rates of licensure exam, transfer rates, and several types of demographic information (Rios, 2014). Not until 2013, however, was a performance funding model adopted in Texas, tying funding to measures for community colleges (TACC, 2018a).

In January 2012, leaders of the community colleges within TACC, in collaboration with state officials, began the process to provide recommendations for a new funding approach with the goal of student success (TACC, 2012). In 2013, the 83rd Texas Legislature adopted two performance funding models: one for community colleges and one for Texas State Technical College (TACC, 2018a). Two-year public institutions were primarily receiving funding based on student contact hours. Under the new model, one million was set aside for each institution's core operations. The remaining 90% continues to be based on student contact hours with the final 10% based on performance. Texas' community college model is the Student Success Points Model. Starting in the 2014-2015 academic year, Texas legislatures appropriated \$172 million

through this model. Success points is calculated each fiscal year, but is based on a three-year average (TACC, 2018a).

Texas legislatures implemented the Student Success Points Model for community colleges with the goal of rewarding colleges for improving student achievement (TACC, 2012). It includes achievement over a continuum, from intermediate steps, such as completion of developmental coursework or completion of a first college course, to outcome metrics, such as transfer and program completion (TACC, 2012). Transfer is designated the same number of points as degree completion, which reflects it as a successful metric for community colleges. Degree completion considers both associate degrees and certificates. Using these different measures takes into account the different levels of preparation students come in with as well as their differing goals, key aspects addressed by community colleges (TACC, 2018a). Table 1 provides a comprehensive list of the metrics and their point values.

Table 1

Texas Community College Student Success Points Model: Metrics and Points

Metric	Points
Developmental education in mathematics	1.0
Developmental education in reading	0.5
Developmental education in writing	0.5
First college-level mathematics course with grade of C or better	1.0
First college-level course designated as reading-intensive with grade of C or better	0.5
First college-level course designated as writing-intensive with grade of C or better	0.5
First 15 semester credit hours at the institution	1.0
First 30 semester credit hours at the institution	1.0
Transfer to general academic institution after completing at least 15 semester credit hours at the institution	2.0
Associate degree, bachelor's degree, or certificate recognized for this purpose by the THECB in a field other than science, technology, engineering, or mathematics (STEM) or allied health	2.0
Associate's degree, bachelor's degree, or certificate recognized for this purpose by the THECB in a STEM or allied health	2.25

Legislative Budget Board. (2016). *Financing public higher education in Texas*. Legislative Primer Report – ID: 3148. Austin, TX: Legislative Budget Board Staff.

Summary

The literature review provided a history of performance funding and research on best practices. Researchers on performance funding's impact on student outcomes has generally found no positive, and sometimes negative results on designated metrics. There is, however, some evidence that programs may have a long-term positive impact. In addition, research suggests that there are several unintended impacts resulting from performance funding. When developing metrics for use in performance funding models, considering the mission and characteristics of community colleges is essential, as they are different from four-year

institutions. Texas implemented a performance funding model called the Student Success Points Model, which is the focus of this study. In the next chapter, the research design and methods for the study is discussed in detail.

CHAPTER 3

METHODOLOGY

This chapter includes the research design and methods used for the study. I began with the purpose statement and research questions, followed by the hypotheses. Next, I discussed the research design, which includes the variables, process, and participants. Following this are the sections on data collection procedures and analysis. Lastly, the section concludes with the limitations of the study.

Purpose Statement

The purpose of the study is to compare community college outcomes in Texas, a state that has implemented performance funding, to outcomes in California, a state that has not implemented performance funding. I compared institutions in each group based on institutional characteristics such as race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid. The outcome variables are associate degree completion, certificate completion, and transfer-out rate. Transfer-out rate is defined as the rate of first-time full-time students seeking a degree or certificate, who transfer from the reporting institution within 150% of normal time without a degree or certificate to enroll in another postsecondary institution of the same level (e.g., undergraduate) (NCES, 2018a). In my in-depth review of the literature, no study was found on how performance funding influences transfer-out rate. Normal time to completion is the amount of time to complete a certain type of degree, which for an associate degree, is two years (NCES, 2018a). Certificate completion excluded short-term certificates, which require less than one year of full-time coursework.

Research Questions

The following research questions guided this study:

1. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?
2. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?
3. To what extent is there a statistically significant difference in transfer-out rate for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in transfer-out rate for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance

funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?

Hypotheses

1. Associate degree completion will not be significantly higher for the community colleges in Texas after the implementation of performance funding as compared to community colleges in California, a state without performance funding.
 - a. Associate degree completion, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid, will not be significantly higher for the community colleges in Texas after the implementation of performance funding as compared to community colleges in California, a state without performance funding.
2. Certificate completion will not be significantly higher for the community colleges in Texas after the implementation of performance funding as compared to community colleges in California, a state without performance funding.
 - a. Certificate completion, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid, will not be significantly higher for the community colleges in Texas after the implementation of performance funding as compared to community colleges in California, a state without performance funding.
3. The transfer-out rate will not be significantly higher for the community colleges in Texas after the implementation of performance funding as compared to community colleges in California, a state without performance funding.

- a. Transfer-out rate, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid, will not be significantly higher for the community colleges in Texas after the implementation of performance funding as compared to community colleges in California, a state without performance funding.

Research Design

Description. I conducted a quantitative study by creating a panel dataset with the use of data from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS). As noted in the appendix, the study was submitted to the Old Dominion University Education Human Subjects Review Committee and approved as exempt from IRB review.

The study was quasi-experimental, obtaining data from preexisting groups, rather than randomly assigning participants to each group (Baldwin & Berkeljon, 2010). Because performance funding is a state policy, randomly assigning control and treatment groups was not possible. The treatment group was public community colleges in Texas after implementation of a performance funding model. Texas was chosen because it was a PF 2.0 model focused on community colleges and related metrics. The control group was the public community colleges in California, a state without performance funding. California was chosen since it encompasses a population with a similar ethnic diversity as Texas and did not have a performance funding model over the duration of the study.

The study used difference-in-differences, a research design used for estimating causal effects when controlling for confounding variables is limited due to no random assignment of groups (Lechner, 2010). It generally consists of two groups over two periods. One group receives the treatment, and both the pre-treatment and post-treatment performance is measured.

No treatment is administered to the second group and it is measured during the same period as the treatment group. The difference in pre- and post-treatment performance for the treatment group is compared to the difference of the untreated group (Bertrand, Duflo, & Mullainathan, 2004).

Dependent and independent variables. Several studies have used graduation rates to evaluate the effectiveness of performance funding (Sandford & Hunter, 2011; Shin & Milton, 2004). Graduation rates consider the rate of first-time full-time degree/certificate-seeking students completing their program within 150 percent of normal time to completion (NCES, 2018a). It is a common variable in research on performance funding because it is easily to obtain and it is one of the main outcomes for implementing both previous PF 1.0 models as well as PF 2.0 models. Institutions, however, can manipulate this measure. By increasing the admission standards or increasing the number of certificates an institution offers, graduation rates will likely show improvements, despite, not really accomplishing the desired results (Hillman, Tandberg, & Gross, 2014).

Following more recent studies, associate degree completion and certificate completion are used as two of the dependent variables for this study (Hillman, Tandberg, & Gross, 2014; Li & Kennedy, 2018). These measures are also specific goals of the Texas model. Additionally, completion includes all types of degree-seeking students, not excluding part-time students, who are not considered in graduation rates. Including certificates also considers the different goals of community college students, as some in need of immediate employment may pursue a certificate as opposed to an associate degree.

The last dependent variable is transfer-out rate. Transfer-out rate is a success metric for community colleges, but often perceived as a student dropout when measuring graduation or

retention rates. Most performance funding models have not considered transfer-out rate, though Texas' model specifically provides points for the measure. Through the extensive literature review, I found no study measuring the relationship of performance funding and transfer-out rate, which is considered in this study. For all of the research questions, the implementation of a performance funding model for community colleges is the independent variable.

Additionally, a gap in the literature exists using quantitative research on specific populations, more common to community colleges. Therefore, the relationship between performance and the dependent variables (associate degree completion, certificate completion, and transfer-out rates) were attenuated by characteristics such as race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid.

Participants. Participants included public community colleges within the Texas Association of Community Colleges (TACC) ($n = 52$), which was compared with the public community colleges in the California Community Colleges System ($n = 85$). Public community colleges in Texas and California were excluded from the study only if they were not in operation during any time of the length of the study or did not provide IPEDS with all necessary data for the study. Since TACC adopted performance funding in 2013, the years from 2010-2011 to 2016-2017 were measured in the study (TACC, 2018). Both urban and rural institutions were included of various institutional sizes. The sample of the study included institutional performance the three years before 2013 and the three years after 2013 for the difference of pre- and post-treatment performance, but did not include the year before and after implementation to provide time for the model to take effect. For transfer-out rates, only first-time full-time students enrolled in a community college were included in the institutional data. Both part-time and full-time students are included in associate degree completion and certificate completion. Short-term

certificates, which typically take less than a year to complete, were not included in certificate completion.

According to the review of several studies, California has not adopted a performance funding model for its community colleges (Dougherty & Natow, 2015; Dougherty, Natow, Hare, Jones, & Vega, 2011; Li & Kennedy, 2018; NCSL, 2015; Snyder & Fox, 2016). In January 2018, however, the governor of California proposed a model. In May 2018, the chancellor's office for the California's Community Colleges System responded by presenting recommendations for adopting a performance funding formula for the 2018-2019 academic year (Oakley, 2018).

Sampling. A purposive, non-probability sampling technique was used to choose Texas and California community colleges. Texas was chosen because it is considered a PF 2.0 model, developing a performance funding model for the community colleges following best practice by including related metrics, such as developmental completion and transfer. Through a review of the literature, there are currently few studies focused on the effectiveness of PF 2.0 models on student performance. Lastly, it is a comprehensive system, which includes 50 community college districts, providing a large sample size to work from for this study. California was chosen as it has a similar racial profile to Texas. In 2016, 38.6% of each states population was Hispanic/Latino (U.S. Census Bureau, 2017). Having a similar racial/ethnic profile is important for this study because it includes race/ethnicity as a control within a research question. Additionally, it is a comprehensive system, which includes 73 community college districts, a large group for comparison. Only first-time full-time students were chosen for transfer-out rates, because these types of data are easily available through IPEDS in order to obtain transfer-out rates.

Data Collection

Data were obtained through IPEDS on all the public community colleges in Texas and California including the academic years from 2010-2011 to 2016-2017. The range of years was chosen to include three years before and after the adoption of performance funding in Texas, which occurred in 2013 and provides the most recent data available. The IPEDS data for 2017-2018 was not available for this study. Data collected included associate degree completion, certificate completion, and transfer-out rates for each community college. Additionally, race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid were collected for use as control variables.

Examining the outcomes of these demographics is important because researchers have found performance funding models may reward institutions for excluding “at-risk” populations, such as racial/ethnic minorities and low-income students (McKinney & Hagedorn, 2017). Researchers have also found more positive outcomes with female students and older students (Porchea, Allen, Robbins, & Phelps, 2010). Additionally, institutional size is negatively associated with student success and the number of students with Pell grants is negatively associated with credits earned towards an associate degree (Calcagno, Bailey, Jenkins, Kienzi, & Leinbach, 2008). Considering enrollment size is also important in controlling for the changes that may occur in associate degree and certificate completion. Tuition and fees was chosen as it is included in other previous studies and relates to student retention (Li & Kennedy, 2018; Porchea, Allen, Robbins, & Phelps, 2010). As institutional characteristics vary significantly across community colleges, controlling for these variables is important.

Control variables. IPEDS groupings of the control variables for this study were used. Gender was divided into two categories: male and female. Age was categorized into the

following groups: “under 25 total” and “25 and over total.” Degree of urbanization was categorized as follows:

- City: Large (city with population of 250,000 or more)
- City: Midsize (city with population between 100,000-249,999)
- City: Small (city with population less than 100,000)
- Suburb: Large (suburb with population of 250,000 or more)
- Suburb: Midsize (suburb with population of 100,000-249,999)
- Suburb: Small (suburb with population less than 100,000)
- Town: Fringe (inside urban cluster 10 miles or less from urbanized area)
- Town: Distant (inside urban cluster, 10-35 miles from urbanized area)
- Town: Remote (inside urban cluster more than 35 miles from urbanized area)
- Rural: Fringe (5 miles or less from urbanized area and 2.5 miles or less from urban cluster)
- Rural: Distant (5-25 miles from urbanized area and 2.5-10 miles from urban cluster)
- Rural: Remote (more than 25 miles from urbanized area and more than 10 miles from urban cluster)

Tuition and fees is a continuous variable based on the in-district published tuition and fees for first-time full-time students over the academic year. Student financial aid considers the number of students with any type of federal, state, local, or institutional grant aid received by a first-time full-time student. Enrollment is the total number of first-time full-time students enrolled at the institution for a given fall semester.

When examining pre- and post-treatment data for the treatment group, it is possible the results of the metrics would have occurred without the implementation of the performance funding model. The use of California community colleges as a comparison group controlled for these effects. This state has not had a performance funding model during the years of this study, from 2010-2011 to 2016-2017 and has never had a model for its community colleges. Additionally, I examined community colleges in California during the pre-treatment period as well as post-treatment period to develop a comparison group.

Data Analysis

The data obtained from IPEDS for the academic years 2010-2011 to 2016-2017 were analyzed using SPSS version 25 statistical software. The analysis included the public community colleges in Texas, which have been under the Student Success Points Model since 2013 as compared to community colleges in California, not under a performance funding model using a difference-in-differences approach.

Data were analyzed to determine if there is a statistically significant difference in completion and transfer-out rate between the institutions of performance funding and non-performance funding states. A linear regression analysis was performed on these outcomes both before and after the implementation of the performance funding model in Texas for community colleges in Texas and California. The outcomes were then analyzed to determine the effects of the following control variables: race/ethnicity, age, gender, degree of urbanization, tuition and fees, student financial aid, and enrollment. The results were used to interpret the effectiveness of performance funding on student outcomes.

Several assumptions were checked using SPSS before interpreting the results of the data analysis including normality, homoscedasticity, linearity, multicollinearity, and auto-correlation.

Normality was tested using the Kolmogorov-Smirnov test to determine if the residuals were normally distributed. The assumption was violated for all three dependent variables. According to central limit theorem, however, because the study had a larger sample size, 137 institutions, the distribution would approximate a normal distribution (McKean, 1975). The study also included seven years of data, allowing the repeated measures to offset erroneous years.

Linearity was determined by use of a scatterplot in SPSS. Linearity was found between associate degree completion and all computed independent variables and certificate completion and all computed independent variables. Transfer rates, however, were not linear with type of state and tuition.

The VIF was used to confirm there was no multicollinearity between the independent variables. As all variables had VIF values between 1 and 10, there was no evidence of multicollinearity. There was homoscedasticity as tested by viewing a scatterplot. No autocorrelation was affirmed through using Durbin-Watson's test, in which all variables fell between 1.5 and 2.5, except for fall enrollment.

Limitations

There are several limitations to this study. One of the main limitations is generalizability. I analyzed institutions in one state, which focuses on only one performance funding model. Performance funding models vary in several different characteristics including number of metrics, types of metrics, progression of implementation, and percentage of total funding. The results of this model may not be reflective of a model developed differently in any of these areas. Additionally, it applies to only community colleges. No technical colleges or four-year institutions were included in this study.

Another limitation is in regards to the research design. The study is not a true experiment, limiting the ability to control for confounding variables. Therefore, causal inferences between the independent and dependent variables are weaker (Baldwin & Berkeljon, 2010). A difference-in-differences approach enhances the internal validity through limiting biases both in the comparison pre- and post-treatment for the Texas community colleges, as well as for the comparison of Texas and California.

The study also does not consider other goals incorporated in this specific performance funding model. For instance, the Texas model provides the most points for a degree or certificate in a STEM or allied health field. These areas were not considered, and hence evaluating the model's effectiveness is restricted to associate degree completion, certificate completion, and transfer-out rates.

Lastly, IPEDS currently considers the 2016-2017 degree or certificate completion as provisional data. These data are not finalized until 2019, but they are essential to this study to evaluate the success of the performance funding model on associate degree completion three years after its implementation. There are limited revisions to provisional data, ranging from one to seven percent of institutions that revise any aspect of the data (NCES, 2018b). In consultation with an IPEDS representative, provisional data are used reliably for studies such as this one, which reviews a large number of institutions (IPEDS, personal communication, June 11, 2018).

Summary

Through use of a quasi-experimental study, difference-in-differences was used to compare the associate degree completion, certificate completion, and transfer-out rates of community colleges in Texas, before and after implementation of a performance funding model to the student performance of the comparison state of California.

CHAPTER IV

RESULTS

This chapter includes the results of the study. The section begins with a brief summary of performance funding and the research questions the study addresses. I then provided and explained descriptive statistics for each control variable in both the Texas and California community college systems. Next, I summarized the results for each dependent variable separately: associate degree completion, certificate completion, and transfer-out rate. Each section included a graph comparing the community colleges in Texas and California, pre- and post-performance funding, a table comparing the states with a lag year, and a regression table with description of how each variable predicted the dependent variables.

Performance funding is a common strategy used by state legislatures in the United States intending to improve institutional outcomes by tying state funding to those outcomes. The model persists today in more than half the states, despite the research finding older models have not made a statistically significant difference in improving outcomes in higher education (Hillman, 2016). Researchers have provided several strategies for improving performance funding models' effectiveness, many included in the models existing today. Texas' Student Success Points Model has incorporated many of these strategies, including developing a model focused on community colleges, considering metrics for "at-risk" students, and focusing on completion while including intermediary steps toward that goal.

The purpose of this study was to determine if performance funding would be effective when a model had incorporated metrics aligned to the mission of community colleges. The study uses a difference-in-differences approach to compare community college outcomes in Texas, a state that implemented performance funding, to outcomes in California, a state without

performance funding. The outcomes included associate degree completion, certificate completion, and transfer-out rates.

The following research questions guided this study:

1. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?
2. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?
3. To what extent is there a statistically significant difference in transfer-out rate for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?

- a. To what extent is there a statistically significant difference in transfer-out rate for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?

Descriptive Statistics

Table 2 shows the mean and standard error for the control variables of the study including tuition and fees, financial aid, fall enrollment, gender, age, race/ethnicity, and degree of urbanization. The table provides the mean and standard error by state and by pre- and post-intervention.

Tuition and fees. Tuition and fees considered the cost of attendance during an academic year for first-time, full-time, in-district undergraduate students as published by an institution (NCES, 2018a). The mean cost of tuition and fees for a community college in Texas between 2010 and 2012 was \$1,733. Between 2014 and 2016, the tuition and fees rose to \$2,224. Community colleges in California also received an increase in tuition and fees, though originally costing less, from \$858 (2010-2012) to \$1,248 (2014-2016).

Financial aid. Financial aid included the average amount of grant aid awarded to first-time full-time degree- and certificate-seeking undergraduate students. Grant aid includes federal, state, and local governments as well as institutional grants (NCES, 2018a). From 2014 to 2016, Texas community college students averaged \$4,760 in grant aid. In 2015 to 2017, this amount increased to \$4,890. The average grant aid for students also increased in California, but to a greater level, from \$4,364 (2010-2012) to \$4,861 (2014-2016).

Fall enrollment. Fall enrollment encompassed all students enrolled for credit during the fall semester, including both full-time and part-time students (NCES, 2018a). Fall enrollment decreased in Texas, from an average of 12,980 students from 2010 to 2012, to 12,581 students from 2015 to 2017. California enrollment also declined, where the average fall enrollment decreased from 14,501 students (2010-2012) to 13,258 (2014-2016).

Gender. Gender included the percentage of all male and female students enrolled in the fall semester (NCES, 2018a). Between 2010 and 2012, Texas community colleges had 58.9% of females as compared to 41.1% males. During 2014 to 2016, the percentage of females decreased to 58.1%, whereas males increased to 41.9%. California community colleges consisted of 52.6% female and 47.4% male from 2010 to 2012, changing to 53.6% female and 46.4% male between 2014 and 2016.

Age. Age included the percentage of all students either under 25 years old or 25 years and older who were enrolled in the fall semester. The majority of students at Texas community colleges between 2010 and 2012 were under 25 years old, consisting of 65.5% of students enrolled. This number increased to 70.7% between 2014 and 2016. For California community colleges, the percentage of students under 25 years old increased from 58.4% (2010-2012) to 61.5% (2014-2016).

Race/ethnicity. Race/ethnicity consisted of the percentage of all students enrolled for the fall semester, separated into four categories: White, Black, Hispanic, and Other Minority. Other Minority included students who identified as American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Two or More Races, if their race/ethnicity was unknown or if they were a nonresident alien.

The percentage of White students at Texas community colleges decreased from 48.1% (2010-2012) to 42.8% (2014-2016). Black students decreased from 14% to 12.8%. Both Hispanic and Other Minority students increased 28.8% to 35.1% and 9.1% to 9.3%, respectively. The percentage of White students at California community colleges decreased from 34.5% (2010-2012) to 29.3% (2014-2016). Black and Other Minority students also decreased, from 8.7% to 7.4% and 23.1% to 20.1%, respectively. Only Hispanic students increased from 33.7% to 43.2%.

Degree of urbanization. Degree of urbanization included two different types of institutional categories: city or rural/town/suburb. Forty-nine percent of institutions were located within an area considered rural, town, or suburb. Fifty-eight percent of the institutions were within a city.

Table 2

Descriptive Statistics of Control Variables

	TX Pre-PBF (2010-2012)		CA Pre-PBF (2010-2012)		TX Post-PBF (2015-2017)		CA Post-PBF (2015-2017)		Total	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Tuition and Fees	1733	70	858	13	2224	90	1248	12	1404	620
Financial Aid	4760	87	4364	53	4890	75	4861	58	4693	585
Fall Enrollment	12980	1945	14105	841	12581	2013	13258	805	13340	10577
Male	41.1%	0.7%	47.4%	0.8%	41.9%	0.6%	46.4%	0.8%	44.9%	6.9%
Female	58.9%	0.7%	52.6%	0.8%	58.1%	0.6%	53.6%	0.8%	55.1%	6.9%
Age Under 25	65.5%	1.2%	58.4%	1.1%	70.7%	1.2%	61.5%	1.1%	63.1%	10.5%
Age 25 & Over	34.5%	1.2%	41.6%	1.1%	29.3%	1.2%	38.5%	1.1%	36.9%	10.5%
White	48.1%	2.7%	34.5%	1.9%	42.8%	2.7%	29.3%	1.8%	37.1%	19.2%
Black	14.0%	1.5%	8.7%	1.0%	12.8%	1.2%	7.4%	0.9%	10.1%	9.5%
Hispanic	28.8%	2.8%	33.7%	1.8%	35.1%	2.9%	43.2%	1.9%	36.0%	19.0%
Other Minority	9.1%	0.8%	23.1%	1.3%	9.3%	.8%	20.1%	1.2%	16.9%	11.5%
Rural/Town/Suburb	42%	0.1%	49%	0.1%	42%	0.1%	49%	0.1%	46.7%	0.1%
City	58%	0.1%	51%	0.1%	58%	0.1%	51%	0.1%	53.3%	0.1%

Note. TX = Texas. CA = California. PBF = Implementation of Performance funding model. Data includes an average of two years resulting in the possibility that some variables such as gender, race/ethnicity, and age may not be equivalent to 100%.

Difference-in-Differences

When using a difference-in-differences approach it is essential to examine the dependent variable both before and after an intervention as compared to the same period for another state. This helps control for confounding variables that may have existed during the time reviewed. It is important that the period before the implementation of performance funding generally follow

the same trend for the treatment state and comparison state. If the performance funding model was effective, the period after implementation would improve at a statistically significantly higher rate for Texas as compared to California (Hagood, 2019).

Each research question incorporated three steps to evaluate the effectiveness of performance funding. First, a graph was developed to demonstrate the annual rates from 2010-2011 to 2016-2017 for each dependent variable. Before the regression model, a four-by-four table was used to show the difference pre- and post- intervention, the difference for each state, and the difference between those differences to obtain the difference-in-differences estimate. The pre-intervention and post-intervention included a lag year. Therefore, the data obtained used an average of 2010-2011 and 2011-2012 for the pre-intervention and an average of 2015-2016 and 2016-2017 for the post-intervention. Finally, a hierarchical multiple regression was used with the same averages, including controls of race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid.

Associate Degree Completion. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?

Figure 1 shows the percentage of associate degree completion pre- and post-intervention. The intervention is the performance funding model implemented at Texas in 2013-2014. California served as the counterfactual. Both Texas and California followed a similar parallel trend pre- to post-performance funding. There was a steady increase of the percentage of associate degree completion for both states. For 2010-2011, California had a 5.52% completion rate, which increased every year to 9.8% in 2016. Texas started conferring a higher percentage

of associate degrees at 7.1% in 2010-2011 and increased every year to 11.4% in 2016-2017. From 2010-2011 to 2016-2017, California increased 4.28%, while Texas increased 4.32%. As desired in a difference-in-differences approach, the percentage of associate degrees completed pre-intervention for both Texas and California followed a similar trend. Since the similar trend continued post-intervention for both states, performance funding did not affect associate degree completion.

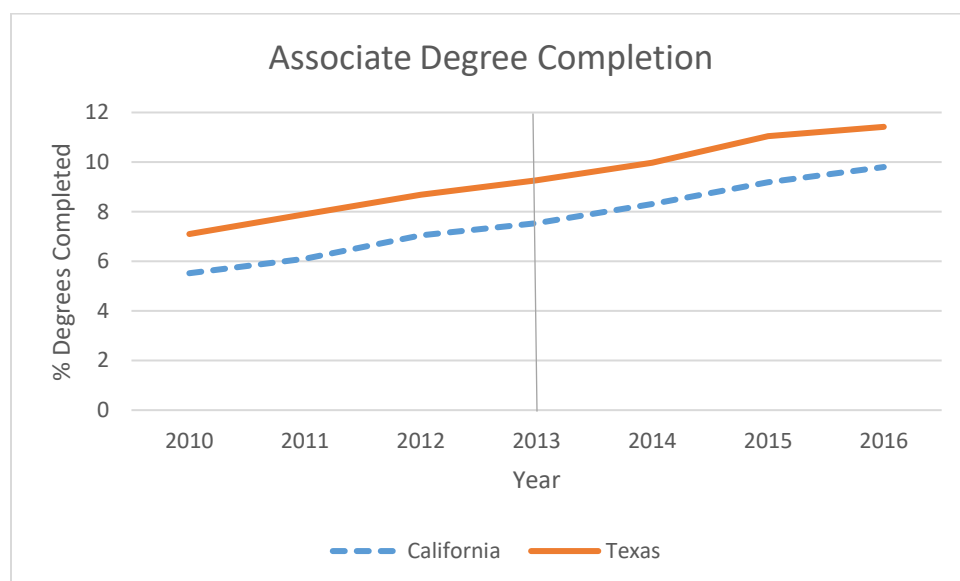


Figure 1. Associate degree completion by state from 2010-2011 to 2016-2017.

Table 3 shows the percentage of associate degrees completed for the years pre- and post-intervention for each state, excluding a one-year lag before and after the implementation of performance funding. The associate degrees completed in California increased from 5.8% to 9.5%. The associate degrees completed in Texas increased from 7.5% to 11.2%. The increases between the states were similar, with California at 3.69% and Texas at 3.74%. Subtracting the pre- and post- differences obtains the difference-in-differences estimate, which is 0.046%. Since the increase in associate degree completion was similar for both Texas and California post-intervention, performance funding does not have a statistically significant effect on that measure.

Table 3

Percentage of Associate Degree Completion

	Pre-Intervention	Post-Intervention	Pre-/Post- Difference
California	5.794	9.491	3.698
Texas	7.485	11.228	3.744
State Difference	1.691	1.737	0.046

After reviewing the difference-in-difference comparison, several controls were included to determine their effect on associate degree completion. A hierarchical multiple regression was run to determine how the variables of performance funding (time*intervention), time, state (intervention), race/ethnicity, age, gender, enrollment, tuition, financial aid, and degree of urbanization, predicted the percentage of associate degree completion. As is shown in Table 4, a combination of all variables accounted for 37.9% of the variance in predicting associate degree completion and was overall statistically significant, $R^2 = .379$, $F(12, 261) = 13.294$, $p < .001$, adjusted $R^2 = .351$.

The race/ethnicity of Black students ($b = -.039$, $p = .050$) and Hispanic students ($b = -.009$, $p = .441$) was not statistically significant in predicting associate degree completion, although other minority was ($b = -.051$, $p = .016$). Individually, age ($b = .018$, $p = .307$), gender ($b = -.003$, $p = .912$), enrollment ($b < .001$, $p = .561$), tuition ($b < .001$, $p = .413$), financial aid ($b < .001$, $p = .323$), and degree of urbanization ($b = .058$, $p = .883$) did not statistically significantly predict associate degree completion.

In this regression model, state was the intervention and the pre- and post-implementation of performance funding in Texas was the time. Combining time and state measured the effectiveness of the performance funding model in Texas. State ($b = 1.234$, $p = .097$) did not

have a statistically significant relationship with associate degree completion. Time ($b = 3.438$, $p < .001$) was the only other variable besides other minority that had a statistically significant prediction of associate degree completion. Finally, performance funding, the intervention researched in the study, ($b = .493$, $p = .499$) was not a statistically significant predictor of associate degree completion. A p-value below .05 would establish statistical significance. It is clear from the regression model that time predicted the increase in associate degree completion, since it occurred in both states, rather than the performance funding model.

Table 4

Regression Model Summary for Associate Degree Completion

Independent Variable	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>Sig.</i>
Time*Intervention	.493	.728	.056	.677	.499
Time	3.438	.500	.496	6.881	.000
Intervention	1.234	.740	.173	1.668	.097
Black	-.039	.020	-.107	-1.966	.050
Hispanic	-.009	.012	-.051	-.772	.441
Other Minority	-.051	.021	-.168	-2.418	.016
Age Under 25	.018	.018	.055	1.024	.307
Female	-.003	.028	-.006	-.111	.912
Fall Enrollment	-1.062E-5	.000	-.032	-.583	.561
Tuition	.000	.000	-.072	-.820	.413
Financial Aid	.000	.000	.058	.990	.323
Urbanization	.058	.391	.008	.148	.883

Note. For the dependent variable of associate degree completion.

Certificate Completion. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?

Figure 2 shows the percentage of certificates completed in Texas and California pre- and post- the implementation of a performance funding model for Texas' community colleges. The percentage of certificates completed in California started at 1.5% for 2010-2011 and steadily increased every year eventually rising to 3.0%. Texas started at 3.3% certificates completed, and would decrease in both 2011-2012 and 2014-2015, before steadily increasing the following years after the decrease, ending at 3.7% in 2016-2017. Certificates completed in California increased by 1.6%; in Texas they increased by 0.4%. The certificate completion pre-intervention for both Texas and California followed a similar trend, increasing in both states. Post-intervention, the number of certificates actually decreased, while California increased. California actually had the greater increase and performance funding was not a predictor in improving certificate completion for Texas.

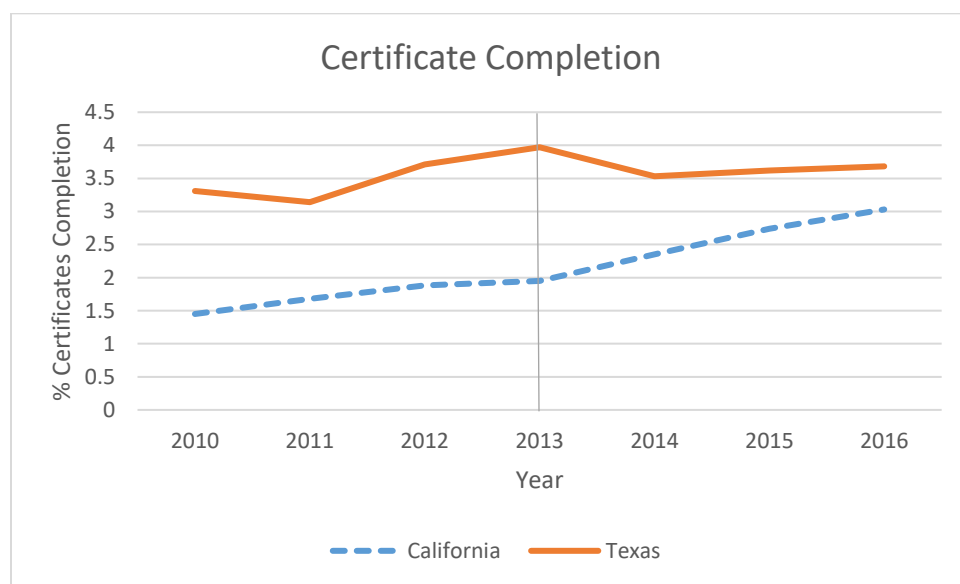


Figure 2. Certificate completion by state from 2010-2011 to 2016-2017.

Table 5 shows the percentage of certificates completed for the years pre- and post-intervention for each state, excluding a one-year lag before and after the implementation of performance funding. The percentage of certificates completed in California increased from 1.6% to 2.9%. The percentage of certificates completed in Texas increased from 3.2% to 3.6%. California had a greater increase of 1.3% as compared to Texas at 0.4%. The difference-in-differences estimate is 0.9%. There was an increase in certificate completion in both states, with California receiving a greater increase. This shows that performance funding, on average, did not improve certificate completion for community colleges in Texas.

Table 5

Percentage of Certificate Completion

	Pre-Intervention	Post-Intervention	Pre-/Post- Difference
California	1.563	2.883	1.321
Texas	3.219	3.647	0.429
State Difference	1.657	0.766	0.891

These two reviews relied on the effect without considering controls. A hierarchical multiple regression was run to determine how the variables of performance funding (time*intervention), time, state (intervention), race/ethnicity, age, gender, enrollment, tuition, financial aid, and degree of urbanization, predicted the percentage of certificate completion. As shown in Table 6, a combination of all variables accounted for 16.4% of the variance in predicting certificates completed and was overall statistically significant, $R^2 = .164$, $F(12, 261) = 4.255$, $p < .001$, adjusted $R^2 = .125$.

None of the control variables predicted certificate completion. The following list provides the unstandardized coefficient and p-value of each variable:

- Black students ($b = -.009, p = .607$)
- Hispanic students ($b = -.015, p = .165$)
- Other minority students ($b = -.020, p = .288$)
- Age ($b = -.004, p = .808$)
- Gender ($b = .011, p = .655$)
- Enrollment ($b < .001, p = .072$)
- Tuition ($b < .001, p = .319$)
- Financial aid ($b < .001, p = .215$)
- Degree of urbanization ($b = -.419, p = .219$)

State was the intervention and time was the pre- and post-implementation of performance funding. The combination of time and state measured the effectiveness of the performance funding model in Texas. State ($b = 1.031, p = .110$) was not a statistically significant predictor of certificate completion. Time ($b = 1.403, p < .001$) was the only variable that statistically significantly predicted certificate completion. Performance funding, the intervention researched in the study, ($b = -1.055, p = .096$) was not a statistically significant predictor of certificate completion. A p-value less than .05 would establish statistical significance. This revealed that time as opposed to performance funding predicted the increase in certificate completion in Texas.

Table 6

Regression Model Summary for Certificate Completion

Independent Variable	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
Time*Intervention	-1.055	.632	-.159	-1.670	.096
Time	1.403	.434	.270	3.234	.001
Intervention	1.031	.642	.193	1.605	.110
Black	-.009	.017	-.032	-.515	.607
Hispanic	-.015	.011	-.108	-1.393	.165
Other Minority	-.020	.018	-.086	-1.066	.288
Age Under 25	-.004	.015	-.015	-.244	.808
Female	-.011	.025	.029	.448	.655
Fall Enrollment	-2.862E-	.000	-.117	-1.809	.072
Tuition	.000	.000	.101	.999	.319
Financial Aid	.000	.000	-.085	-1.243	.215
Urbanization	-.419	.339	-.081	-1.233	.219

Note. For the dependent variable of certificate completion.

Transfer-Out Rates. To what extent is there a statistically significant difference in transfer-out rate for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?

Figure 3 shows the transfer-out rates of California and Texas community colleges pre- and post- the implementation of a performance funding model for Texas. Apart from a slight increase from 2012 to 2014, both states have a relatively parallel trend pre- to post-performance funding. California gradually decreased every year, until 2016-2017 where transfer-out rates

decreased slightly. From 2010-2011 to 2016-2017, transfer-out rates decreased from 13.8% to 9.9% for a drop of 3.8%. Transfer-out rates in Texas, which started at 25.5%, dropped for the first two years, then increased slightly the next two years, before decreasing again for the final two years, ending at 19.9% for a decrease of 5.6%. For transfer-out rates, Texas and California followed the same trend both pre-intervention and post-intervention. Since there is no difference between the states during post-intervention, performance funding did not predict improvements in transfer-out rates.

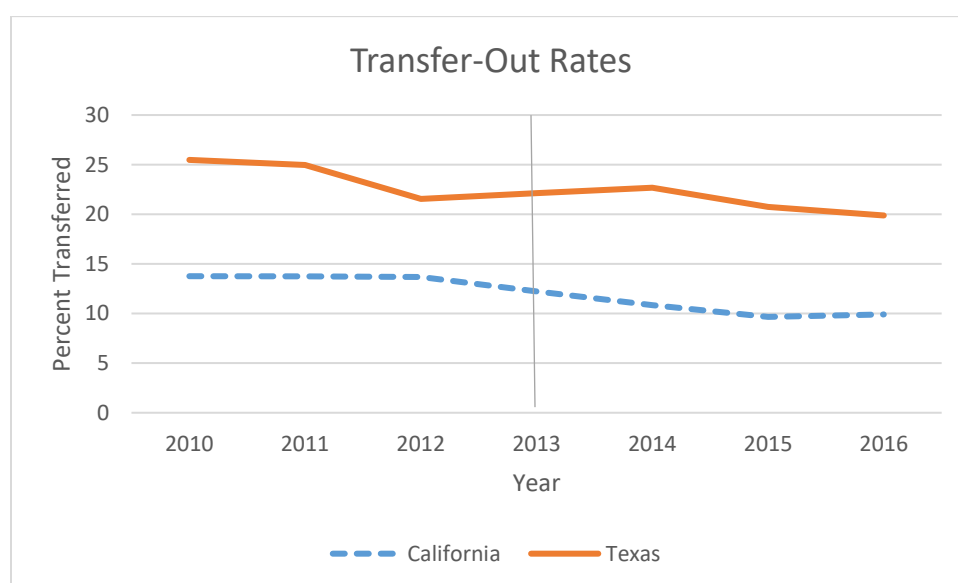


Figure 3. Transfer-out rates by state from 2010-2011 to 2016-2017.

Table 7 shows the transfer-out rates for the years pre- and post-intervention for each state, excluding a one-year lag before and after the implementation of performance funding. The transfer-out rates in California decreased from 13.8% to 9.8%. The transfer-out rates in Texas decreased from 25.5% to 19.9%. California decreased by 4% as compared to Texas by 4.9%. The difference-in-differences estimate is 0.9%. Transfer-out rates for both Texas and California decreased to similar degrees. This demonstrates that performance funding did not predict the decrease of transfer-out rates in Texas.

Table 7

Transfer-Out Rate

	Pre-Intervention	Post-Intervention	Pre-/Post- Difference
California	13.753	9.788	-3.965
Texas	25.221	20.317	-4.904
State Difference	11.468	10.529	0.939

After reviewing the difference-in-difference comparison, a hierarchical multiple regression was run to determine how performance funding (time*intervention), time, state (intervention), race/ethnicity, age, gender, enrollment, tuition, financial aid, and degree of urbanization predicted transfer-out rate. Table 8 shows the combination of all the variables accounting for 55.3% of the variance in predicting transfer-out rate and was overall statistically significant, $R^2 = .553$, $F(12, 261) = 26.872$, $p < .001$, adjusted $R^2 = .532$.

Neither the percentage of Black students ($b = .005$, $p = .905$) nor the percentage of other minority students ($b = .037$, $p = .401$) were statistically significant predictors of transfer-out rate. The percentage of Hispanic students ($b = -.067$, $p = .008$), however, had a statistically significant negative association with transfer-out rate. When taken individually, age ($b = .044$, $p = .233$), gender ($b = -.040$, $p = .496$), enrollment ($b < .001$, $p = .067$) and tuition ($b < .001$, $p = .916$) all did not statistically significantly predict transfer-out rate. Degree of urbanization ($b = -2.253$, $p = .006$) and financial aid ($b = -.002$, $p = .022$) predicted transfer-out rate at a statistically significant level.

In the regression model, state was the intervention, pre- and post-implementation was time, and a combination of both represented the performance funding model. Both state ($b = 12.232$, $p < .001$) and time ($b = -2.551$, $p = .014$) were statistical significant predictors of

transfer-out rate. Because the p-value was over .05, performance funding ($b = -1.623, p = .280$) was revealed to not be a statistically significant predictor of transfer-out rate.

Table 8

Regression Model Summary for Transfer-Out Rates

Independent Variable	<i>B</i>	<i>SE</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>
Time*Intervention	-1.623	1.498	-.076	-1.083	.280
Time	-2.551	1.029	-.152	-2.479	.014
Intervention	12.232	1.523	.706	8.030	.000
Black	.005	.041	.006	.119	.905
Hispanic	-.067	.025	-.150	-2.661	.008
Other Minority	.037	.044	.050	.841	.401
Age Under 25	.044	.037	.055	1.196	.233
Female	-.040	.059	-.033	-.682	.496
Fall Enrollment	6.915E-5	.000	.087	1.842	.067
Tuition	.000	.001	-.008	-.105	.916
Financial Aid	-.002	.001	-.115	-2.308	.022
Urbanization	-2.253	.805	-.134	-2.798	.006

Note. For the dependent variable of transfer-out rates.

Summary

The current study evaluated whether performance funding influenced community college metrics of associate degree completion, certificate completion, and transfer-out rates.

Specifically, data were analyzed from 2010-2011 to 2016-2017 to determine if the Student Success Points Model in Texas, which started in 2013, would improve the designated metrics for the community colleges in Texas, as compared to those in California, which did not have a

performance funding model. A hierarchical multiple regression was applied, controlling for age, gender, enrollment, tuition, financial aid, and degree of urbanization.

Overall, the results of the analysis revealed that the implementation of the performance funding model resulted in no statistically significant difference in associate degree completion, certificate completion, or transfer-out rates.

CHAPTER V

DISCUSSION

Performance funding is a state model in higher education that ties state appropriations to student outcomes. Historically, institutions have received appropriations based on enrollment. In 2018, 35 states use student outcomes to determine at least a portion of appropriations for public higher education institutions (Hillman, Fryar, & Crespín-Trujillo, 2018). The choice of student outcomes varies based on the program, but generally includes graduation or completion rates and retention-related metrics.

Tennessee implemented the first performance funding model in 1979 (McLendon & Hearn, 2013). Since that time there have been several different models utilized throughout the United States with the goal of improving student outcomes in higher education. Despite their popularity, researchers have generally found the models do not produce the desired outcomes. This led to many states abandoning their programs (Burke, 2002; Dougherty, Natow, & Vega, 2012; Miao, 2012). Since the mid to late 2000s, there has been a resurgence of these programs in the United States as state legislatures attempt to improve completion and related student outcomes. These programs are considered Performance Funding 2.0 models (PF 2.0), which generally incorporate best practices learned from the failures of previous models to design the new programs (Dougherty & Reddy, 2013).

Recommended practices have included designing a system specifically aligning metrics to the mission of community colleges, obtaining stakeholder involvement, and increasing the funding percentage allocated (Dougherty et al., 2011; McKeown-Moak, 2013; NCSL, 2015). Despite improvements to the new models, most researchers have still found limited to no effect

in improving student outcomes (Hillman, Fryar, & Crespín-Trujillo, 2018; Hillman, Tandberg, & Fryar, 2015; Li & Kennedy, 2018; Umbricht, Fernandez, & Ortagus, 2015).

At the same time, researchers have found several unintended consequences from these programs, including higher admission standards and recruiting students anticipated to achieve higher rates of success, both resulting in decreased access (Kelchen & Stedrak, 2016; Lahr et al., 2014). Since there are now several newer models and not all of the research has been focused on community colleges, this study set out to explore the effectiveness of a more recent performance funding model, Texas' Student Success Points Model.

Texas' Student Success Points Model was developed specifically for all of the community colleges in the state and aligned the metrics to the mission of those colleges (McKinney & Hagedorn, 2017). Metrics include degree or certificate completion, developmental (remedial) completion, gateway course completion, credit progression, and transfer-out rate. The model was adopted in 2013 (TACC, 2018a). The model increased the funding allocation tied to student outcomes to 10%, higher than most of the previous and current models (TACC, 2018a). By following best practices, this model provides an opportunity to determine if redesigning performance funding models can improve student success.

Purpose Statement and Research Questions

The purpose of the study is to examine the impact of one performance funding model, Texas' Student Success Points Model, on associate degree completion, certificate completion, and transfer-out rate. Transfer-out rate includes only first-time full-time degree or certificate seeking students, who transfer within 150% of normal time without completing a degree or certificate. This examination included a comparison pre- and post- the implementation of performance funding in Texas, as well as comparing completion and transfer-out rate trends

between Texas and California community colleges. California served as a counterfactual, as it does not have performance funding for its community colleges.

The following research questions guided this study:

1. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding, and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in associate degree completion for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?
2. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?
 - a. To what extent is there a statistically significant difference in certificate completion for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?
3. To what extent is there a statistically significant difference in transfer-out rate for community colleges in Texas after the implementation of performance funding and community colleges in California, a state without performance funding?

- a. To what extent is there a statistically significant difference in transfer-out rate for community colleges in Texas after the implementation of performance funding, and community colleges at California, a state without performance funding, after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid?

The questions focus on characteristics aligned to community colleges, including associate degree completion, certificate completion, and transfer-out rates, which are aims the model intends to affect.

Methodology and Results

The effectiveness of Texas' Student Success Points Model on student outcomes was determined through a quantitative approach, using difference-in-differences. I examined three student outcomes as the dependent variables: associate degree completion, certificate completion, and transfer-out rate. The performance funding model was the main independent variable. Furthermore, additional controls included the institutional characteristics of race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid.

Data on the student outcomes and institutional characteristics were obtained from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS) for the academic years between 2010-2011 and 2016-2017. Texas implemented the performance funding model in 2013-2014, and a lag year was removed for one year before and after the implementation of Texas' Student Success Points Model in 2013. The lag year was used to provide a year for the performance funding model to start influencing the outcomes. Therefore, the analysis included an average of 2010-2011 and 2011-2012 as the pre-intervention and an average of 2015-2016 and 2016-2017 as the post-intervention. Fifty-two public community

colleges in Texas, all under a performance funding model, were compared to 85 community colleges in California, none under performance funding. All public community colleges in Texas and California were included in the study, except institutions that were not in operation during the entire length of the study or that did not fully report data to IPEDS.

A graph of each dependent variable was plotted for all the years between 2010-2011 and 2016-2017 for both Texas and California. Contrary to what would be expected if performance funding influenced student outcomes, the trend of Texas for associate degree completion, certificate completion, and transfer-out rate remained similar to that of California after the model was implemented. A hierarchical multiple regression was then used to determine the unique influence of each variable on the designated student outcomes of associate degree completion, certificate completion, and transfer-out rate. Texas' Student Success Points Model was not shown to have a statistically significant impact on associate degree completion, certificate completion, or transfer-out rate.

Findings Related to the Literature

The results of this study are consistent with most previous research, finding that performance funding has limited to no impact on improving student outcomes. It expands on the research in looking at a model focused on community colleges and their mission, which used metrics such as associate degree and certificate completion, developmental (remedial) completion, gateway course completion, credit progression, and transfer-out rate. Additionally, 10% of Texas' funding allocation for community colleges was based on performance funding, a higher number than most other models. Despite these changes in design, the model still did not produce an improvement in the intended outcomes of associate degree completion, certificate completion, or transfer-out rate.

Performance funding impact on associate degree completion. The first research question of this study analyzed the impact of performance funding on associate degree completion. Although much of the research on graduation rates or associate degree completion involves four-year institutions or PF 1.0 models, there is also research on community colleges and PF 2.0 models. PF 2.0 models have been emerging since the mid-2000s and have incorporated several best practices found in the study of this initiative (Burke, 2002; McKeown-Moak, 2013; NCSL, 2015; Tandberg & Hillman, 2013). For both types of institutions and kinds of models, most previous studies have found performance funding does not improve graduation rates or associate degree completion. The current study followed this trend as it found no impact of performance funding on associate degree completion. Provided below is an overview of the research.

Both Shin and Milton (2004) and Shin (2009) used IPEDS data from 1997 to 2001 and from 1997 to 2007 respectively and found performance funding had no statistically significant effect on graduation rates. Sanford and Hunter (2011) reviewed public four-year institutions in Tennessee from 1995-2009 and found no significant positive outcomes for six-year graduation rates. Dougherty and Reddy (2013) reviewed research studies in eight states with performance funding programs and found no statistically significant increase to graduation rates. Umbricht, Fernandez, and Ortagus (2015) also reviewed graduation rates on public four-year institutions in Indiana from 2003 to 2012, finding no increase in graduation rates. The present study expanded on this research in several ways: reviewing a PF 2.0 model, which followed best practices, looking at completion rates as an alternative to graduation rates and focusing on community colleges, and by using a difference-in-differences approach. The study supported the previous research, finding no statistically significant increase to associate degree completion.

Although most research has focused on graduation rates, others have looked at a similar metric, degree completion. Tandberg and Hillman (2014) reviewed public four-year institutions between 1990 and 2010 and found no statistically significant increase to completion until the seventh year, however, only to a small degree. Rutherford and Rabovsky (2014) conducted an extensive study of over 500 public universities from 1993 to 2010 and found no statistically significant increase in six-year graduation rates nor bachelor's degrees awarded. The current study found similar results, finding no statistically significant increase to associate degree completion.

More recently, there has also been research on the impact of performance funding on community colleges. Tandberg and Hillman (2013) reviewed states with performance funding from 1990 to 2010 and found no statistically significant effect on associate and baccalaureate degree completion. In some states, no effect occurred until the fifth year, which was a decrease in associate degree completion. Tandberg, Hillman, and Barakat (2015) reviewed performance funding from 1990 to 2010, and, on average, performance funding did not affect associate degree completion. They also received mixed results on individual states, with six experiencing decreased completion and only four with increases. The current study conducted a similar review of community colleges and found no statistically significant increase to associate degree completion after the implementation of performance funding.

Hillman, Tandberg, and Fryar (2015) conducted a study on Washington's performance funding model from 2002 to 2012, a model specifically developed for community and technical colleges, finding no statistically significant increase in associate degrees awarded, but in degrees per 100 FTE, the completion decreased for the first few years. In a recent study, Li and Kennedy (2018) conducted a study on community colleges from 1990 to 2013, finding no statistically

significant changes to associate degree completion. Hillman, Fryar, and Crespin-Trujillo (2018) reviewed two-year institutions from 2005 to 2015, finding a decrease in associate degree completion, specifically in models with 50% or more of appropriations provided through the model. The current study focused on community colleges, like these studies, but also looked at a later period, which may be more reflective of PF 2.0 models. Nevertheless, it did not address a model with 50% or more going towards appropriations, as Texas' model is only at 10%.

This current study added to the literature by researching a model focused on a community college mission, by including metrics such as developmental progression, associate degree and certificate completion, and transfer-out rates. Despite, the model's focus, the study found that although associate degree completion increased by 4.32% from 2010-2011 to 2016-2017, California also increased, by 4.28%. Therefore, this study did not find performance funding to have a statistically significant effect on increasing associate degree completion, even after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid.

Performance funding impact on certificate completion. The second research question of the study was to determine the impact of performance funding on certificate completion. This is especially important since the research on the impact of performance funding on certificate completion is limited. Hillman, Tandberg, and Fryar (2015) conducted a study on Washington's performance funding model from 2002 to 2012, a model specifically developed for community and technical colleges. Overall, performance funding did not affect the growth of certificates, except for with short-term certificates, intended to be less than one academic year. In a recent study, Li and Kennedy (2018) analyzed community colleges from 1990 to 2013, and on average, found no statistically significant changes, although some performance funding models increased

the number of short-term certificates conferred. The increase in the number of short-term certificates may be an unintended negative consequence of performance funding, as short-term certificates generally do not have the same occupational benefits as other certificates (Dadgar & Trimble, 2015; Hillman et al., 2015). Due to the recognition of the lack of occupational benefits of short-term certificates, the current study did not address short-term certificates.

Hillman, Fryar, and Crespin-Trujillo (2018) reviewed two-year institutions from 2005 to 2015, finding an increase in certificates, but also a decrease in associate degree completion. Though unclear from the study, these may have offset each other, resulting in an unintended consequence for the model. The current study reviewed certificates lasting at least a year, and found no statistically significant increase in certificate completion.

The current study focused on certificates that generally require one to two years of coursework. From 2010-2011 to 2016-2017, the percentage of certificate completion increased by 0.4% in Texas and 1.3% in California. California had a greater increase in certificate completion, although not statistically significant. Performance funding in Texas had no statistically significant impact on certificate completion, even after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid.

Performance funding impact on transfer-out rate. The third research question evaluated the impact of performance funding on transfer-out rate. In a comprehensive review of the literature, very few, if any, studies were found on how performance funding impacts transfer-out rates. Transfer-out rates include first-time full-time students who transfer without a degree or certificate to enroll in another postsecondary institution. Examining transfer-out rates is important because it is a metric used by community colleges to demonstrate student success or as an institutional benefit to society. Data focusing on only graduation rates fail to take into

account the success of students who start at a community college and then transfer to another institution before graduation.

The current study found transfer-out rates decreased by 3.84% in California and 5.6% in Texas from 2010-2011 to 2016-2017. There was, however, no statistically significant difference, even after controlling for race/ethnicity, gender, age, enrollment, degree of urbanization, tuition and fees, and financial aid.

Implications for Policy-Makers and Institutional Leaders

Principal-agent theory posits that a principal, such as state legislatures, employs agents, such as community colleges, to accomplish specified goals (Eisenhardt, 1989). The principal, a state legislature may assume their goal of completion conflicts with the priorities of the agent, a higher education institution, resulting in the implementation of performance funding. They believe this model can be used to incentivize the agent's compliance with the principal's goals (Hillman, Fryar, & Crespin-Trujillo, 2018; Kivisto, 2008). Legislatures expect outcomes to improve but instead most empirical studies have found limited to no improvement in the designated student outcomes. The current study affirms this finding on all measures: associate degree completion, certificate completion, and transfer-out rate.

Several reasons may explain the discrepancy between principal-agent theory and the ineffectiveness of performance funding on improving metrics. This includes a few aspects of program design to explore further and that institutions may not have the capacity for change. Although states may want to explore other ways to improve performance funding models, it may be that institutional capacity prevents these models from being effective for improving student success and should be abandoned.

Program design. Several reasons may explain the discrepancy between principal-agent theory and the ineffectiveness of performance funding. One reason state legislatures have considered is poor program design (Hillman, Tandberg, & Gross, 2014). This has been a common problem in many PF 1.0 models (Burke, 2002). Poor design has included complexity of programs, too many metrics, lack of focus on institutional mission, not incorporating progress metrics, not providing enough incentive through funding, and protecting “at-risk” students (Burke, 2002; McKeown-Moak, 2013; NCSL, 2015). Texas’ Student Success Points Model attempted to address poor design in several ways. It kept the model simplified by providing clear categories and the designated points for each, rated from 0.5 to 2.25 (TACC, 2012). It focused on institutional mission by developing a model only for community colleges and focusing on metrics related to their mission, including degree and certificate completion, completion of developmental education, and transfer-out rate. The model included progression metrics such as completion of developmental education, gateway course completion, and completion of the first 15 and 30 credits. The performance funding model encompassed 10% of the state’s appropriations for community colleges, a percentage higher than most models (TACC, 2018a). Lastly, it attempted to protect “at-risk” students through the completion of developmental education metric (TACC, 2012).

Despite the several ways Texas’ model addressed program design, it still did not improve student outcomes in associate degree completion, certificate completion, and transfer-out rate. Legislatures may consider revising different aspects of these models including increasing the percentage of the funding based on performance and developing metrics to protect other “at-risk” populations, such as those with a low socioeconomic status and racial/ethnic minorities.

Dougherty and Reddy (2013) recommended legislatures provide more performance funding to improve metrics. This aligns with resource-dependence theory, which posits that an institution's dependence on provided resources from state legislatures influences their response to expectations (Nisar, 2015). Though Texas' appropriations included a higher percentage of funding based on outcomes, the majority still comes from enrollment. Institutions may still focus on enrollment over improving designated student outcomes. One recent study has found that even with 50% or more of the appropriations in the form of performance funding, the results were limited, with associate degree completion decreasing and certificate completion increasing (Hillman, Fryar, & Crespín-Trujillo, 2018).

Additionally, using metrics to protect other "at-risk" populations, such as those of low socioeconomic status and racial/ethnic minorities, is important. Research is mixed regarding these populations. This is the case even when specifically evaluating Texas' model. McKinney and Hagedorn's (2017) research on Texas' model found that it could negatively affect specific races/ethnicities. Natale and Jones (2018), however, found the metrics designated in the Texas Student Success Points Model did not disadvantage low socioeconomic status, part-time, or age 25 or older students.

Institutional capacity. Another reason for the failure of performance funding models may be institutional capacity. When developing performance funding models, an assumption is made that institutions have the knowledge and capacity to improve student outcomes. However, an institution's student demographics, personnel, infrastructure, and financial resources influence institutions, affecting their response to improving student outcomes (Dougherty et al., 2011; Dougherty & Reddy, 2013).

Organizational change is also a difficult process in higher education and can impede the effectiveness of improving student outcomes. Providing resources to develop data management systems, expanding institutional research, and training faculty about evidence-based decision-making not only costs significant resources, but also may not solve the problem (Dougherty & Reddy, 2013). Additionally, resources are needed to implement initiatives. State legislatures need to be aware of institutional capacity and how it impacts the effectiveness of implementing a performance funding model. If institutions do not know how to improve metrics, then no incentive will directly enable them to make gains regarding student metrics. State legislatures may want to focus resources on determining best practices and cost-effective strategies to increasing student outcomes and provide the resources for institutions to develop these strategies rather than focus on an ineffective model.

Although this study has provided several potential strategies for improving current performance funding models, which should then be evaluated, state legislatures need to be informed of the current research. Unless research shows models can be effective, legislatures need to start considering other evidence-based alternatives. Performance funding models cost both state governments and higher education institutions significant resources both in personnel and in budget. With the abundance of research on these models, and the potential of unintended negative consequences, they should not continue to be supported. This study only adds to the research, showing that even when a performance funding model considers several related community college metrics, it does not result in a significant improvement to student outcomes. Student success and completion of credentials may already be a priority for both state legislatures and higher education leaders. The development of performance funding models may be ineffective at improving student outcomes, because of reasons beyond what the model can

accomplish, such as knowledge or capacity on how to bring about those improvements. As a result, performance funding may be resulting in unintended consequences, such as an increase in short-term certificates at the expense of other credentials or other ways of gaming the system.

Recommendations for Further Research

Although, research has concluded, over time and through the evaluation of various different models, that performance funding does not improve student outcomes, a few more aspects can be studied to ensure this initiative should be abandoned. Future research can include evaluating Texas' model several years from now, qualitative studies on how institutions respond to PF 2.0 models, and quantitative studies on models that contribute to 50% or more of the funding allocation to colleges.

Similar research on Texas' model can be conducted several years from now. Since the model was implemented in 2013, changes in student outcomes should now be apparent. Community colleges are, however, complex institutions that may need more time to produce change. Change could include determining what initiatives would be effective, obtaining, or redirecting funding to related resources, and obtaining institutional buy-in from stakeholders such as staff, faculty, and administration. These organizational changes may need more time than three years to take effect.

In addition, qualitative research should be conducted on how institutions are responding to Texas' model and other PF 2.0 models with outcomes aligned to community colleges. This may include perceived benefits or consequences of specified metrics, institutional response, and results from the perspective of staff, faculty, and administration.

Lastly, researchers have reviewed several different models of performance funding. These include models focused on a college's mission, such as with community colleges, and

have followed best practices with the intent on improving outcomes. Most of the research points to the ineffectiveness of this model, despite when following best practices. More research, however, is needed on models using performance funding for at least 50% of the funding allocation, such as in Tennessee, Massachusetts, and Ohio. Texas used the model for 10% of the total funding, which is higher than many other models, but the difference may not be great enough for a significant impact on student outcomes. Recently, Hillman, Fryar, and Crespin-Trujillo (2018) found a decrease in associate degree completion and an increase in certificate completion when examining recent data on Tennessee and Ohio. More research is needed on these types of performance funding models, but initial results are finding the programs ineffective despite the increase in the percentage of funding allocation based on performance.

Conclusion

Performance funding is an initiative first implemented in 1979, and it has been developed in many different states in many different forms. A theme has emerged both for earlier models, such as PF 1.0, and for even the newer models, PF 2.0; performance funding does not significantly improve student outcomes. Although ongoing research about these models may be beneficial, legislators as well as higher education leaders and stakeholders must accept the empirical evidence and explore new initiatives to address improving higher education student outcomes.

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APPENDIX

Appendix: Human Subjects Review Exempt Status



OFFICE OF THE VICE PRESIDENT FOR RESEARCH

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Mailing Address

Office of Research
1 Old Dominion University
Norfolk, Virginia 23529
Phone(757) 683-3460
Fax(757) 683-5902

DATE: October 30, 2017

TO: Mitchell Williams

FROM: Old Dominion University Education Human Subjects Review Committee

PROJECT TITLE: [1140980-1] Mid-Level Female Leaders' Perceptions of Challenges at Urban Community Colleges in Virginia

REFERENCE #:

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: October 30, 2017

REVIEW CATEGORY: Exemption category # 6.2

Thank you for your submission of New Project materials for this project. The Old Dominion University Education Human Subjects Review Committee has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact Jill Stefaniak at (757) 683-6696 or jstefani@odu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Old Dominion University Education Human Subjects Review Committee's records.

VITA

Matthew Okerblom

Education

Ph.D., Community College Leadership, Old Dominion University, 2019
 M.A., Higher Education Administration, State University of New York at Stony Brook, 2015
 M.S., School Counseling, Long Island University, 2007
 B.A., Psychology, State University of New York at Stony Brook, 2005
 A.A., Liberal Arts and Sciences: General Studies, Suffolk County Community College, 2002

Professional Experience

Suffolk County Community College

College Assistant Dean for Curriculum Development	(September 2015-Current)
Counselor – Disability Services/Generalist	(July 2011-September 2015)
Student Support Services Campus Coordinator	(February 2008-July 2011)
Instructor: College Seminar	(September 2008-Current)

Campus Committee Membership

9/11-8/15	Academic Standards Committee - <i>Secretary</i>
9/09-8/15	Academic Standards Committee - <i>Member</i>
9/10-8/15	Scholarship Committee - <i>Chair</i>
2/09-8/10	Scholarship Committee - <i>Member</i>
2/12-8/15	“Stay on Long Island” Scholarship Committee - <i>Member</i>
2/10-8/15	Faculty Governance: Executive Committee & Congress - <i>Secretary</i>

College-Wide Committee Membership

1/18-Current	Guided Pathways - <i>Member</i>
9/16-Current	Website Steering Committee - <i>Member</i>
9/16-Current	Achieving the Dream - Data Team - <i>Member</i>
1/16-Current	College Seminar Advisory Council - <i>Member</i>
9/15-Current	Catalog Committee - <i>Chair</i>
9/15-Current	Calendar Committee - <i>Chair</i>
9/15-Current	Class Size Committee - <i>Member</i>
9/15-Current	Banner User Group – <i>Member</i>
6/15-Current	Joint Planning and Assessment Council - <i>Member</i>
6/15-Current	Strategic Planning Council – <i>Member</i>
1/17-12/17	MSCHE Verification of Compliance Report Committee - <i>Member</i>
1/16-12/17	MSCHE Self-Study Steering Committee - <i>Subcommittee Co-chair</i>
5/15-8/15	College Governance Council - <i>Member</i>
9/10-8/15	Scholarship Committee - <i>Member</i>
8/14-4/15	Administrative and Educational Support (AES) Unit Review - Disability Services
9/13-9/14	Student Affairs Assessment Council - <i>Member</i>
9/13-5/14	Faculty Association New Member Program - <i>Campus Coordinator</i>
10/12-12/13	Scholarship Task Group - <i>Member</i>
10/12	College Selection Committee: Chancellor’s Awards - <i>Member</i>

- 4/11-6/12 “Get There From Here” Scholarship Committee - *Member*
 5/11 Honors Program Convocation: Day of Committee - *Member*
 12/10-3/11 Search Committee: Reader Services Librarian (215) - *Member*
 10/09 College Selection Committee: Chancellor’s Awards - *Member*
 9/08-5/09 Foundations of Excellence: Roles and Purposes Dimension - *Member*

Presentation Highlights

- 2/6/15 “Advising Students with Disabilities”
 33rd Annual LICSPA Conference - Suffolk County Community College, NY
 3/28/14 “You Mean I Actually Have to Pay Attention Here? Dealing with Difficult
 Students in the Community College Classroom”
 The Third Annual Unlocking Potential Conference - Nassau Community
 College, NY
 3/26/14 “I Have to Pay Attention in Community College?” –
 25th International Conference on College Teaching and Learning - FL
 6/1/12 “Education and Our Economy: Working with Adult Students through Difficult
 Times” SUNYCDO Conference - NY
 3/24/09 “Transitioning At-Risk Students from High School to College”
 Western Suffolk Counselor’s Association 20th Annual Conference - NY

Professional Contributions & Awards

- 5/13 Junior Faculty Award for Excellence – Eastern Campus
 5/13 Eastern Campus Experiential Learning Certificate – Academic Coordinator
 9/11 Above & Beyond Service Award – Honors Program
 3/10 Celebrate Long Island’s Young Professionals: “Top 30 Award”