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The Louisiana Granting Resources and Autonomies for Diplomas Act: Exploring the Impact of a Performance-Based Funding Policy on Higher Education Effectiveness

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Dedication

To my mother Pauline…words can never express how much I love and miss you

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Abstract

In 2010 the Louisiana legislature adopted the Louisiana Granting Resources and Autonomies for Diplomas (GRAD) Act, a statewide performance-based funding policy designed to improve performance among public colleges. This study, utilizing data collected from the Integrated Postsecondary Education Data System (IPEDS) on 15 two-year public colleges over eight years, applied Generalized Least Squares (GLS) regression to retention rates, graduation rates, and degree productivity. Results suggest that the introduction of the policy had little immediate effect on overall institutional performance; however, there were some modest increases in long-term certificate productivity. Additionally, there were significant improvements in data quality throughout higher education after the introduction of the policy.

Keywords: performance funding; higher education; GRAD Act; Louisiana

Introduction

Funding for higher education in Louisiana has never been robust. In fact, it wasn't until the 2007-2008 fiscal year that the state finally caught up to the Southern regional average in per student funding (Blum 2010b; Public Affairs Research Council, Inc. 2008). Unfortunately soon after, the state suffered one economic blow after another: the 2008 recession hit, newly implemented tax breaks caused income tax revenues to shrink, and Hurricane Katrina recovery funds and federal stimulus dollars began running out and/or expiring (Ballard 2010; Blum 2011; Russell 2016). Postsecondary institutions in Louisiana faced a unique dilemma. They not only had to contend with dwindling state support for higher education, as many states had been dealing with for several years, but they were also not able to generate new revenue since Louisiana requires a two-thirds legislative approval to increase tuition, the only state in the Union to do so (Blum 2010a).

By 2010, state support for colleges and universities had fallen almost 20%, with additional cuts looming on the horizon (Blum 2010a). Since the colleges were not in a position to cover the losses of the state allocation by raising tuition on their own, they were forced to depend on the governor to help fill the budget holes. During the regular legislative session, Louisiana governor Bobby Jindal attempted to address the current budget climate of reduced funds for higher education by backing House Bill 1171. The bill, later Act 741, resulted in the Louisiana Granting Resources and Autonomies for Diplomas (GRAD) Act. The GRAD Act, signed into law in June 2010, instituted performance measures for the colleges that, if met, allowed them to increase their own tuition by up to 10% per year. Additionally, this newly created performance-based funding formula tied 15% of a college's overall state funding to meeting the GRAD Act goals (Addo 2012).

Although similar performance-based funding policies had been implemented in states such as California, Florida, Pennsylvania, South Carolina, Tennessee, Texas, and Washington with limited success, several influential organizations, many powerful state leaders, and the

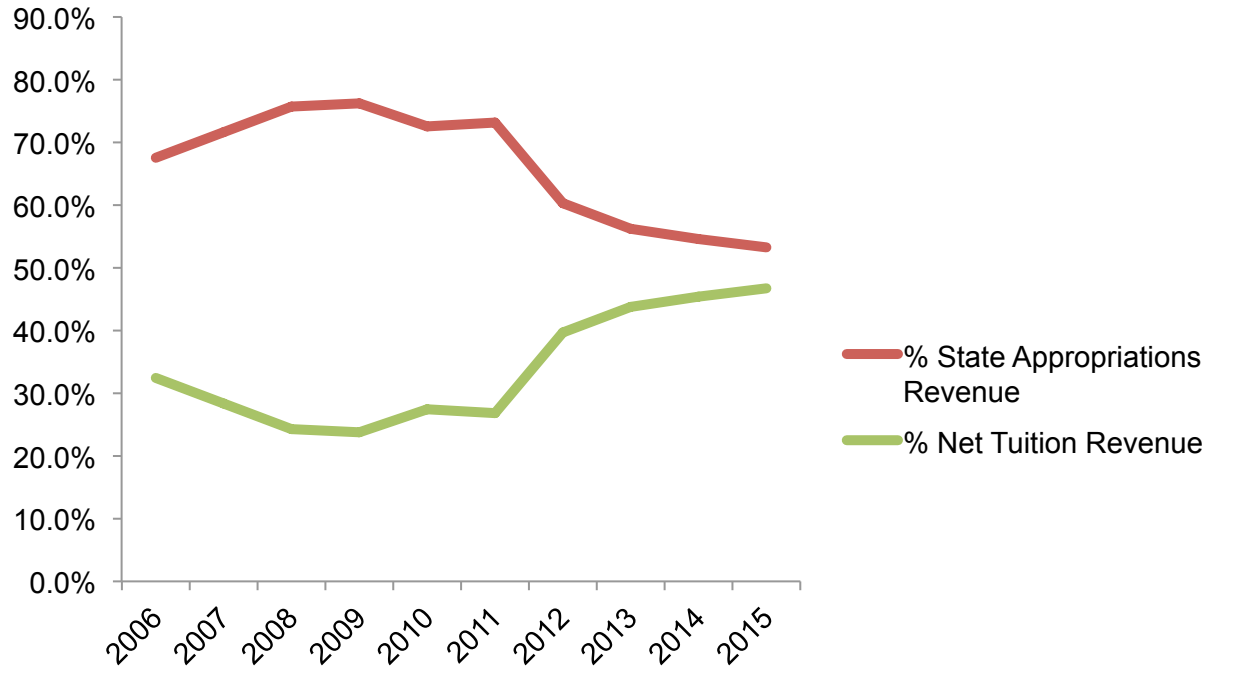
public were in favor of having colleges' budgets tied to performance, obviously believing that doing so would increase graduation rates and make the colleges more accountable (Blum 2010b; Hillman 2016; Hillman, Tandberg, and Fryar 2014; Shuler 2010). Groups such as Blueprint Louisiana, Public Affairs Research Council, and GNO, Inc. touted the policy as the remedy to Louisiana's pitiable graduation rates. At the time, Louisiana colleges graduated only 38% of first-time, full-time bachelor degree students within six years, second-to-last in the Southern region (Blum 2010c). The colleges, specifically, were interested in gaining the autonomy to raise their own tuition, believing it to be a way to cure the ills of the recent state budget cuts (Blum 2010b; Addo 2013c). In due course, the Board of Regents signed six-year agreements with individual institutions in which they committed to meeting specific performance objectives in exchange for authority to increase tuition up to 10% for the following academic year.

However, public opinion quickly turned. In a letter to the editor, one educator made clear that he felt the whole scheme was a farce and that it was simply "an attempt to give the appearance of reform to an ideological agenda that consisted of little more than removing hundreds of millions of dollars from a higher education system that already was drastically underfunded" (Striffler 2012). Soon, the colleges also became disgruntled. Apparently, the reporting process alone consisted of almost 52 different performance benchmarks (Addo 2012). The hurried implementation of the Act and the associated tedious reporting requirements, a common complaint amongst institutions in states with performance-based funding policies, resulted in state auditors finding much of the colleges' data fraught with errors (Addo 2012; Lipinkski 2014; The Advocate 2013). In fact, the first audit of GRAD Act data in 2012 revealed 13 out of the 32 undergraduate institutions reviewed had submitted data that were 'not sufficiently reliable' (Louisiana Legislative Auditor 2012).

The crux of the problem was that the colleges were not actually benefiting from all of the extra work. It seemed that the Act was not about increasing performance or autonomy, but

about mediating cuts to higher education imposed by the state. Evidence of this can be seen as early as 2010 when in response to questions by state lawmakers on the true state of higher education funding, the governor's office asserted that the overall funding for colleges and/or universities had only been slashed by five percent because tuition hikes resulting from colleges meeting the GRAD Act minimum requirements filled the gaps created by the most recent budget cuts (Ballard 2010). This trend of replacing state appropriation funding with increased tuition and fees continued. Since 2009, postsecondary institutions in Louisiana have seen their portion of core revenue from state appropriations fall 30% while their percentage of net revenue from tuition and fees grow 97% (see figure 1).

Figure 1: 2006-2015 % of Core Revenue--State Appropriations versus Tuition & Fees



Source: State Higher Education Executive Officers Association

As the 2016-2017 fiscal year marks the sixth and final year of the initial agreements between the Board of Regents and the colleges, it seems a fortuitous time at which to examine

what effect this experiment in performance-based funding had on higher education in Louisiana. So far, we know that the colleges saw their tuition increases swallowed up by additional cuts in state funding--essentially making them a wash--and students, over the last five years, had their tuition and mandatory fees increase faster than in any other state (Millhollon and Addo 2013; Russell 2016). Obviously, a deeper examination of the effects of the Act is required to discover if colleges were able to improve performance, as had been portrayed as the original purpose of the Act, or if it had simply been political rhetoric in order to stave off complaints about funding. Through this study, I attempt to examine not only if institutions improved performance, but also what external factors may have contributed to their gains and/or losses.

Literature Review

Performance-based funding has existed for the better part of a century. It began when an amendment to the National Security Act of 1949 introduced performance budgeting to the U.S. military. The policy was quickly expanded, through the Budget and Accounting Procedures Act of 1950, to include all federal civilian governmental agencies (Jordan and Hackbart 1999; McLendon, Hearn, and Deaton 2006). Researchers contend that governments use this method of funding, predicated on meeting certain performance measures, to influence behavior and pressure institutions to be more accountable, efficient, and productive in the use of publicly generated funds (Alexander 2000; Bogue and Johnson 2010; Burke and Associates 2002; Dougherty et al. 2011; Fryar 2011; Layzell 1998; Liefner 2003). The reliance on performance outcomes would imply that there is a "massive effort to reform government to become more rational, professional, democratic, authoritative, and honest" (Miller, Robbins, and Keum 2007, 473). Purportedly hoping to achieve the same ends, a majority of state-level agencies, including higher education, likewise adopted the system.

However, many argue that performance-based funding is a much more complicated issue and that other factors including politics, the economy, and timing all play a significant role in a state's decision to adopt the program (Burke and Minassians 2003; McLendon, Hearn, and Deaton 2006; McLendon, Hearn, and Mokher 2009; Melkers and Willoughby 1998; Tandberg 2009; Tandberg and Griffith 2013). Actually, some question whether these 'reforms' are only symbolic and are instead simply a way in which to manipulate the budget process (Fryar 2011; Liefner 2003; Miller, Robbins, and Keum 2007; Rabovsky 2012). In fact, "although most states claim both public accountability and institutional improvement as purposes of performance funding, in some, increased funding seems a critical, although usually unannounced, motive" (Serban and Burke 1998, 160).

The use of performance-based funding (PBF) in higher education began in 1978 when "the State of Tennessee first addressed systemized accountability by establishing a series of

performance or incentive funding initiatives that began shaping a portion of the higher education funding structure based on measurable outcomes" (Alexander 2000, 420). This experiment opened the door for other states to implement their own versions in which achievement of performance measures was directly tied to specific amounts of funding (Burke and Minassians 2003; D'Amico et al 2014; Friedel et al. 2013). In the early to mid-1990s this funding model, now referred to as PBF 1.0, was expanded to states such as Arkansas, Colorado, Florida, Kentucky, Minnesota, Missouri, Ohio, and South Carolina with varying degrees of success. In fact, Arkansas, Colorado, Kentucky, Minnesota, and others quickly either ceased the program altogether or completely revamped it (Burke and Associates 2002; Dougherty and Natow 2009; Friedel et al. 2013; Hermes 2012; Miao 2012). In the PBF 1.0 model, performance funding existed as bonuses or incentives awarded on top of the usual enrollment-based state funding. Most of these models concentrated on the use of outcome measures such as degrees awarded, graduation rates, and time to degree completion with little regard for differences between or among types of institutions (Dougherty et al. 2011; D'Amico et al. 2014; Friedel et al. 2013; Serban and Burke 1998). In most cases, both four-year and two-year schools were held to similar, if not the same, performance indicators.

Recently, budgetary constraints and the expanding appeal of accountability have renewed interest in performance-based funding (Dougherty and Reddy 2011; Hermes 2012; Kelly and Jones 2007; Rabovsky 2012; Rutherford and Rabovsky 2014). After years of insufficient gains under PBF 1.0, many states have moved toward an updated model, so called PBF 2.0, in which the focus has been shifted to include intermediate measures of success as relates to the mission of individual institutions. Indicators like retention rates, transfers, and course completions have been included alongside two-year specific measures such as post-graduate job placement, transfer articulation agreements, and success in remedial course progressions (Bogue and Johnson 2010; D'Amico et al. 2014; Dougherty et al. 2011; Friedel et al. 2013; Mangan 2015). With PBF 2.0, funds are now tied to actual state allocations wherein

which schools that do not meet their required performance levels can be penalized with a reduction in state-level funding.

By the beginning of 2016, at least 30 states had instituted some form of performance-based funding for higher education (Mangan 2015; Supriano 2016). Past research has indicated that performance-based funding is predicated on the belief that in times of scarce resources institutions will alter their behavior in order to increase resource acquisition. If this were true, then it would intuitively follow that providing colleges additional financial incentives based on increased performance during times of economic constraint would result in institutional improvements (D'Amico, et. al. 2014; Schmidt 2002; Titus 2006). In other words, we would expect to see increases in student outcomes. Unfortunately, research has not shown this to be the case (Hillman 2016).

Much of the research related to performance-based funding policies has concentrated on their impact on graduation rates, retention, and degree completions. These studies have tended to rely upon several types of comparative research methods in investigating the effectiveness of these policies. Some have utilized a difference-in-differences Ordinary Least Squares (OLS) estimation strategy to compare student performance changes over time in the treatment group (states/institutions effected by PBF policies) to changes over time in the control group (states/institutions not effected by PBF policies) while others have employed Hierarchical Linear Modeling (HLM) to explore performance growth patterns in states with PBF against those without. These panel data analysis methods assist the researcher in evaluating whether improvements in performance by the treatment group can be attributed specifically to the implemented policy or if some other reason is behind the change. Several recent studies using these techniques have found that PBF policies have not positively impacted graduation rates at four-year institutions (Fryar 2011; Rutherford and Rabovsky 2014; Sanford and Hunter 2011; Shin 2010; Shin and Milton 2004). Other national and some state-level (Tennessee and Washington) studies conducted on retention found similar results at both four-year and two-year

schools (Hillman, Tandberg, and Fryar 2015; Rutherford and Rabovsky 2014; Sanford and Hunter 2011). However, there have been more varied findings related to degree completions. While no increase in bachelor degree productivity has been found (Hillman, Tandberg, and Gross 2014; Rutherford and Rabovsky 2014; Umbricht, Fernandez, and Ortagus 2015), some impact on associate degree and certificate completions at two-year institutions have been discovered (Hillman, Tandberg, and Fryar 2015; Tandberg, Hillman, and Barakat 2015). After the implementation of performance-based funding policies, some states have seen gains, though delayed, in associate degree and short-term certificate attainment.

While recent research on performance-based funding has not shown that opportunities for increased resources directly equal improved student outcomes, there have been some findings that the model has led to enhancements in other areas. Although evidence was minimal, Rabovsky (2012) discovered that those institutions subject to performance funding requirements were more likely to prioritize spending toward instruction. One of the most lauded benefits of the introduction of performance-based funding has been the change in focus of conversation and institutional efforts away from simply increasing enrollment to improving outcomes (D'Amico et al. 2014; Hillman, Tandberg, and Gross 2014; Mangan 2015; Sanford and Hunter 2011). Under these models, colleges are required to prepare and report on performance measures; thus, providing transparency within the institution and the community. These documents can be used as internal tools for administrators and faculty in decision-making and strategic planning and/or as external tools for students and public officials in evaluating institutional performance and responsiveness to regional workforce needs.

Some have suggested that it is not the model itself that should be blamed for the lackluster performance results but instead the minimal amount of funding to which it is tied (Layzell 1998; Miao 2012). This common flaw is supposedly a reason why performance funding has not made the level of impact touted as possible by its proponents. As Burke and Associates (2002) acknowledged, "campus leaders will support programs that may produce more money,

but their enthusiasm wanes when the funding falls below expectations" (226). Enough funding must be at risk to incentivize colleges to alter behaviors and change long-standing systems (Burke and Associates 2002; Hermes 2012; Hillman, Tandberg, and Gross 2014; Layzell 1998; Maio 2012; Rutherford and Rabovsky 2014; Sanford and Hunter 2011). Unfortunately, the perfect level of funding at which motivation kicks in is unknown.

During the almost forty years in which performance-based funding has been in existence, funding levels have varied anywhere from 1% to 100% (D'Amico et al. 2014; Friedel et al. 2013; Maio 2012; Schmidt 2002). On average, higher education performance-based funding, whether in the form of bonuses or portions of state allocations, has hovered around five percent (Mangan 2015; Sanford and Hunter 2011; Supriano 2016). When Tennessee first began its program in the late 1970s, funding consisted of a two percent budget supplement. By 2005, when the state switched away from a traditional PBF 1.0 model to the more progressive PBF 2.0 version, the budget supplement had only reached a high of 5.45% (Sanford and Hunter 2011). In their in-depth study on the impacts of performance funding in Tennessee, Sanford and Hunter (2011) tried to discern whether this increase in the level of funding had motivated institutions enough to do more to advance student success. They found no substantial changes in institutional behavior or performance. They concluded that an amount greater than 5.45% was needed to increase outcomes. Amazingly, even in states with well established programs such as Washington and Pennsylvania, state allocation funds tied to performance max out at one percent and eight percent, respectively, although researchers, in both cases, have found that these amounts were not enough to produce significant results (Hillman, Tandberg, and Fryar 2015; Hillman, Tandberg, and Gross 2014). More recently, there have been efforts in states such as Louisiana (15%) and Arkansas (25%) to increase performance funding to a more meaningful level (Callaway 2012; Friedel et al. 2013).

At the other end of the spectrum, several states have moved to tie almost all of their higher education funding to performance. One of the first states to experiment with this model

was South Carolina. In 1996, legislation was instituted that required 100% of a school's state allocation be based on meeting specific benchmarks (Schmidt 2002). This experiment was quickly abandoned after only two years, having only managed to reach a maximum level of 38% in just one of those years (Dougherty et al. 2011). This failure did not stop others like Ohio and Tennessee from establishing similar performance models. Both now require up to 80% of higher education state funding be based entirely on meeting certain performance levels (Friedel et al 2013). Unfortunately, not enough time has elapsed since these more extreme performance-based funding policies were implemented for studies to have been conducted on their impacts.

Several researchers have cautioned against this rush toward putting such a large percentage of state funding at risk. Although many agree that funding levels should be enough to incentivize institutions to increase performance, some worry about creating an unstable funding system in which basic services are in jeopardy and long-term planning is impossible (Dougherty and Reddy 2011; Hermes 2012; Maio 2012; Shin and Milton 2004). In actuality, almost all of the state-level performance-based policies contain stopgap measures to prevent any wild fluctuations in funding. Examples of these safeguards include employing hold-harmless clauses that guarantee a minimum amount of base funding each year, utilizing three year rolling averages to prevent any one year of down performance from disrupting operations, and setting benchmarks at levels that are easily reachable (Dougherty et al. 2014; Rabovsky 2012; Umbricht, Fernandez, and Ortagus 2015). The risk faced by schools is reduced even further by the fact that, in most states, the current percent of core revenue institutions received from state funding is shrinking (Alexander 2000; Dougherty et al. 2011; Dougherty et al. 2014; Tandberg and Griffith 2013; Titus 2006). These seemingly large percentages actually end up having minimal impact on annual budgets. Furthermore, states have been hesitant to enforce the punitive powers allowable under their performance-based funding policies (Dougherty et al. 2011; Jordan and Hackbart 1999; McLendon, Hearn, and Mokher 2009; Tandberg 2009). Legislators are very aware of the political risks if they defund a prized institution or one with

powerful supporters. Seemingly, the effects of these policies have been mitigated to have little to no real consequences.

Theoretical Expectations

The real question remains, to what extent does performance-based funding actually impact institutional performance? The available empirical work provides limited theoretical guidance on which to build hypotheses. We know that studies have found no evidence of increased graduation rates at bachelor degree granting institutions in states with performance-based funding policies (Fryar 2011; Rutherford and Rabovsky 2014; Sanford and Hunter 2011; Shin 2010; Shin and Milton 2004). Regrettably, since no similar studies have been conducted on graduation rates at two-year schools, we have no indication of whether the policy has comparable effects on associate degree granting institutions. Likewise, research has found that performance funding has had no positive impact on student persistence or retention rates at either four-year or two-year institutions (Hillman, Tandberg, and Fryar 2015; Rutherford and Rabovsky 2014; Sanford and Hunter 2011). However, recent studies on performance funding and degree completions have begun to yield more varied results. While bachelor degree productivity has not grown, there has been some evidence of increases in associate degrees and short-term certificates in states with performance funding (Hillman, Tandberg, and Fryar 2015; Hillman, Tandberg, and Gross 2014; Rutherford and Rabovsky 2014; Tandberg, Hillman, and Barakat 2015; Umbricht, Fernandez, and Ortagus 2015). Unfortunately, these results have only been found in single state case studies so their generalizability is limited.

While most studies concentrate on the limited impact that these funding policies have on increasing institutional effectiveness, some showcase which aspects of policy design have helped to produce the greatest benefit. The most successful policies offer opportunities for adequate input from related stakeholders, differentiate measures between and among two- and four-year colleges in consideration of their diverse missions, set reasonable benchmarks, and provide sufficient funding and guidance to assist institutions in building the organizational capacity needed to increase performance (Burke, Modarresi and Serban 1999; D'Amico et al.

2014; Dougherty et al. 2011; Friedel et al. 2013; Schmidt 2002; Serban and Burke 1998; Shin 2010; Titus 2006; Whissemore 2012).

As research continues to be conducted on performance-based funding, I have to ask myself what I can contribute to the ever-growing literature. As Serban and Burke (1998) declare, longitudinal studies of institutional performance are the best devices for understanding performance-funding effectiveness. I believe that an examination of the GRAD Act provides this opportunity. The case of performance-based funding in Louisiana is unique. Not only did the GRAD Act tie 15% of a college's state allocation to performance, it also gave schools the autonomy to raise tuition up to 10% without prior approval from the legislature. Previous studies on performance-based funding have not considered this added incentive as a factor in determining the effectiveness of these policies. Additionally, this study will be one of the first to explore the relationship between performance-based funding and graduation rates at two-year institutions. Through this analysis of measures related to institutional effectiveness, I may be able to draw some conclusions as to whether the GRAD Act accomplished its stated intentions of improving higher education performance. Prior research detailing the limited impact of performance-based funding policies and the perceived design flaws of the legislation, specifically the absence of adequate funding to build organizational capacity, lead me to hypothesize that the GRAD Act did not increase the overall effectiveness of Louisiana's public post-secondary two-year institutions. I do not expect to find any improvements in graduation rate, retention, or associate degree completions, but I do anticipate some gains in short-term certificates as these provide schools with the simultaneous benefit of helping to meet award productivity benchmarks and increasing revenue.

Research Design

Hearn (2006), in an essay prepared for the 2006 National Postsecondary Education Cooperative Symposium, observed that early studies of performance-based funding relied on simple descriptive and/or correlational analyses. He suggested that in the future, researchers and policymakers should try to "untangle what is merely artefactual and what is truly an effect of some program or policy" (17). Recently, we have seen an increase in quantitative studies such as those by Shin (2010); Sanford and Hunter (2011); Fryar (2011); Rabovsky (2012); Hillman, Tandberg, and Gross (2014); Hillman, Tandberg, and Fryar (2015); and Umbricht, Fernandez, and Ortagus (2015) that aim to understand not only if the presence of a performance-based funding model improves institutional effectiveness, but also what external factors may intercede. In contrast to many previous studies conducted at the macro-level (state or national); Hillman, Tandberg, and Fryar (2015) reveal that utilizing a micro-level approach in studying the Student Achievement Initiative in Washington allowed them to explore more deeply how the performance-based funding policy impacted individual institutions. I believe that the same approach is appropriate for studying the GRAD Act.

It is important to note, "quality--the hallmark of higher education--is an elusive and subjective attribute that is seldom easy to assess objectively and always difficult to measure quantitatively" (Burke and Associates 2002, 40). In evaluating performance relative to the GRAD Act requirements, the Louisiana Board of Regents utilized common measures based on student success, articulation and transfer, workforce and economic development, and efficiency. Some of the specific indicators included first to second year retention rate, same institution graduate rate, award productivity, change in program completers, placement rate of graduates, and number of accredited programs. Over the course of the six-year agreements the type and weight of indicators utilized in the calculations by the Board of Regents were altered. These inconsistencies limit the usability of the GRAD Act reports as functional tools of comparability for the state in evaluating the true impact of the policy. In consideration of this, a string of

unflattering data audit reports, and the need for data from before the implementation of the GRAD Act, I chose to seek out a single source, the Integrated Postsecondary Education Data Survey (IPEDS), for the outcome data for my research. IPEDS has routinely been used as a consistent and reliable source of postsecondary data (Fryar 2011; Hillman, Tandberg, and Fryar 2015; Kelly and Jones 2007; Rabovsky 2012; Shin 2010; Shin and Milton 2004).

In this study, institutional effectiveness will be operationalized through three performance indicators: retention, graduation rate, and award productivity. By including an intermediate measure (retention) alongside conventional output measures (graduation rate and award productivity), I hope to expand on the current research dedicated to discovering the level to which performance-based funding policies impact institutional effectiveness. Specifically, I will explore how the GRAD Act affected part-time and full-time student retention rates, graduation rates, the total awards given, and the number of associate degrees and/or certificates conferred by conducting a longitudinal (panel) time-series analysis based on data from 15 two-year public undergraduate institutions over eight academic years. This time span includes years from both before and after the implementation of the GRAD Act. This sub-group of two-year colleges shares similar, in some cases identical, missions, admission policies, and funding structures. Additionally, their regional focus will allow me to discover if local demographics and/or the state of the area public school system affected college performance. Narrowing my research to concentrate on members of this homogenous group will allow me the opportunity to discover and draw more general conclusions on how the autonomies granted in the Act impacted this specific sector of higher education.

The unit of analysis will be institution by academic year. Each school will be categorized according to its accrediting body: Council on Occupational Education (COE) or Southern Association of Colleges and Schools Commission on Colleges (SACSCOC). COE adheres to the mission of “assuring quality and integrity in career and technical education” (Council on Occupational Education website). This organization accredits schools that seek to expand the

portability of skill-based credentials, increase job placement for their graduates, and explore linkages with business and industry. The mission of SACSCOC is more general in nature. It prefers to focus on the "enhancement of educational quality…and the improvement of the effectiveness of institutions by ensuring that they…address the needs of society and students" (Southern Association of Colleges and Schools Commission on Colleges website). Schools accredited by SACSCOC offer bachelor degrees, associate degrees, certificates, and continuing education programs as well as curricula that are transferable to other colleges and universities.

Table 1: Institutions Categorized by Accrediting Body

SACSCOC	COE
Baton Rouge Community College	Capital Area Technical College
Bossier Parish Community College	Central La Technical Community College
Delgado Community College	Northshore Technical Community College
Fletcher Technical Community College	Northwest Louisiana Technical College
Louisiana State University-Eunice*	South Central La Technical College
Nunez Community College	SOWELA Technical Community College
River Parishes Community College	
South Louisiana Community College	
Southern University at Shreveport*	
SOWELA Technical Community College**	

*Junior colleges. **SOWELA became accredited by SACSCOC in 2014

The Louisiana Community and Technical College System manage all schools within the study except Louisiana State University-Eunice and Southern University at Shreveport. Although these institutions are accredited by the same body as community colleges and offer programs and services normally associated with comprehensive two-year schools, I suspect that these 'junior colleges' may act differently. In order to test this supposition, I will run two versions of each proposed regression model--one that categorizes these two schools as

community colleges and one that categorizes them as junior colleges. Any inconsistencies found may provide evidence that institutions not identified as 'community colleges' react differently to policy changes, at least in this scenario.

Seven measures related to student success will be used to determine institutional effectiveness: graduation, part-time retention, full-time retention, short-term certificate productivity, long-term certificate productivity, associate degree productivity, and total awards productivity (see Appendix A for definitions). The dependent variables for retention and graduation will be the rates for each as calculated by IPEDS for an academic year. I will apply a generalized least squares (GLS) random-effects regression model to each measure. Random-effects GLS is appropriate for longitudinal panel data as it takes into account the correlation that usually exists between repeated observations on the same subject rather than assuming independence among all observations. It also allows for estimates to be calculated for important time-invariant independent variables such as GRAD Act and accrediting body. I employ a slightly different methodology for award productivity. As the number of awards varies so widely across years and within categories, I will attempt to standardize the measure by having each related dependent variable be a dummy variable indicating whether a statistically significant increase in performance occurred from the previous year (1=Yes, 0=No). I will apply a GLS logistic regression model to each of the binary dependent variables.

Graduation rate data for the 2008 academic year are unavailable for several institutions from the New Orleans area. A graduation cohort could not be established for the 2006 academic year because these institutions were either closed or exempt from the Integrated Postsecondary Education Data Survey (IPEDS) reporting requirement due to Hurricane Katrina. As such, the graduation rate analysis will begin with the 2009 academic year instead of 2008 as with the other dependent variables. Additionally, I have chosen to differentiate between the total number of awards and the total number of associate degrees and short- and long-term certificates because of recent findings by Hillman, Tandberg, and Fryar (2015). They discovered that policy

changes related to performance-based funding in Washington caused a significant increase in the number of short-term certificates awarded but not an increase in associate degrees or long-term certificates. In order to understand the true impact of the GRAD Act, I will explore performance related to these individual outcomes.

The main Independent variable of interest is the GRAD Act. This measure will be a dummy variable indicating whether the GRAD Act was in effect during a specific academic year (1=Yes, 0=No). Although the legislation was signed into law in June 2010, institutions were not required to meet established performance measures until 2011-2012. As such, the 2012 academic year will act as the first year in which the variable will equal 1. Also, variables related to institutional characteristics will be used as controls. These include full-time equivalent enrollment, which should mediate any uptick in award productivity simply due to enrollment increases; full-time and part-time enrollment rate; full-time, part-time, and total white enrollment percentage; percentage of revenue from tuition & fees; percentage of revenue from state appropriation; percentage of expenses on instruction; percentage of expenses on student/academic support; and accrediting body. Evidence suggests that since 2012 the student body composition at two-year colleges has altered somewhat because increases in admission requirements and steep tuition hikes have forced many students that would have otherwise attended four-year universities to enroll at a two-year college (Russell 2016). Since all schools across the state were simultaneously affected by these student population changes, I am assuming that this change was random and will not systematically impact the findings. Finally, as studies by Dougherty, et al. (2016); Kelly and Jones (2007); Hillman, Tandberg, and Fryar (2015); and Rutherford and Rabovsky (2014) have shown, regional socio-economic factors may also influence institutional performance. This design includes such regional factors as median household income, white population percentage, and K-12 school district performance score as additional controls.

It is important to note that this study has limitations in regards to available data and breadth of scope. Some of the data in my analysis are based only on full-time, first-time students. This is unfortunate as there is some discussion that this "emphasis on full-time students in many of the indicators, probably due to data availability, slights the growing importance of part-time students, especially in urban institutions and two-year colleges" (Burke 1998, 60). In a 2013 article, University of Louisiana System President Sandra Woodley echoed this sentiment. She argued that "schools that cater to low-income and so-called non-traditional students--older and oftentimes holding down full-time jobs--should not be judged using the same measures as a school that attracts high-achieving, middle-class students straight out of high schools" (Addo 2013b). An example of this can be found in the current graduation rate data available from IPEDS. These calculations do not include transfer, returning, or part-time students. These omissions obviously limit the use of this measure as a true barometer of institutional effectiveness. However, including these data alongside retention rates and award productivity should help to create a fuller picture of the performance level of the two-year institutions included in the study.

Also, it is very likely that an examination of student outcomes other than those included in this paper could yield very different results. Future research should explore the impact of alternative performance goals such as job placement rates, number of transfer students, or changes in program completers. Additionally, inferences to be drawn from this study on the impact of the GRAD Act on institutional effectiveness are limited by its focus on two-year institutions and the finite number in each category. This analysis includes only 15 institutions: six technical colleges, seven community colleges, and two junior colleges. Finally, it may be possible that other events occurring during the same time as the implementation of the GRAD Act could have interceded to either augment or disrupt the policy's effects. Events such as changes in board leadership, technical college mergers, and continuing state-level budget struggles may all have played a part in school performance.

Findings

Institutional Characteristics

I began my analysis by exploring the average values of various institutional characteristics both before and after the implementation of the GRAD Act. I looked at how these variables changed when considering all two-year schools as a whole, then by separating them into three distinct categories: technical colleges, community colleges, and junior colleges (see table 2). I started by comparing differences in enrollment. I found that FTE (full-time equivalent) enrollment increased from 2374.6 to 3006, but the increase was not found to be significant. Of the three types of institutions, community colleges routinely maintain the largest FTE enrollment, but only technical colleges experienced a statistically significant increase. I believe this change is due more to the ongoing mergers of individual sites into single data-reporting technical colleges than a genuine increase in student enrollment. In fact, since 2012 student headcount across all two-year institutions has decreased 13.3% (Louisiana Board of Regents).

Little substantial change in the proportion of full- and part-time enrollment was found. The average percentage of full-time enrollment declined from 46.4% to 45% while the percentage of part time enrollment increased from 53.6% to 55.1%, but neither difference was statistically significant. Likewise, none of the three types of institutions saw any real variation in full- or part-time enrollment. One area that did experience unexpected change was the percentage of white student enrollment. White student enrollment decreased from 55% to 47.6% ($t=2.65$, $p\leq.01$) across all two-year colleges while technical colleges and community colleges, specifically, experienced a decline of 7.5 percentage points ($t=2.12$, $p\leq.05$) and 8.9 percentage points ($t=3.21$, $p\leq.01$), respectfully. Junior colleges also saw a decline in white enrollment, but the difference was not statistically significant.

Trends in state appropriations and tuition and fees revenue were as expected. On average, the percentage of core revenue from state funding decreased from 40.2% to 30.8% ($t=4.83$, $p\leq.001$) as income from tuition and fees increased from 12.8% to 19.5% ($t=-4.23$,

p≤.001). Similar results were found when I examined differences in revenue source per FTE. After adjusting for inflation, I discovered that revenue from tuition and fees grew by $556 per FTE while revenue from appropriations fell by over $1473 per FTE. Even though the typical two-year college had increased their tuition and fees 119% since 2008, it still was not enough to offset the decline in state support. Extraordinarily, there were schools such as Northshore Technical Community College and Capital Area Technical College that actually experienced a 250% increase in tuition during this time span (see Appendix C: Supplemental Table 1).

Interestingly, while examining revenue sources at the institutional level, I found a distinct disparity in the extent to which the different types of schools were dependent on the state for funding. In the years after the implementation of the GRAD Act, community colleges and junior colleges saw their portion of core revenues from state appropriations dwindle to 24.9% and 24.5%, respectively, while technical colleges derived 40.5% of their revenue from state funds. Initially I surmised that this may be a result of the greater amount of revenue that community and/or junior colleges could garner from separate sources such as grants, gifts, investments, etc. that may not be open to technical colleges. However, I found that in every year except 2011, technical colleges received substantially more state funding per FTE than did either community colleges or junior colleges. Unfortunately, as the formula for state appropriations, including the 15% supposedly tied to performance, is tangled up into layers of state and local politics, I could not determine the reasons as to why funds were distributed in this manner.

Evidence suggests that the implementation of the GRAD Act did not influence two-year colleges to increase the proportion of their budget spent on instruction. There were no significant differences for any of the three types of institutions, although on average, technical colleges utilized at least 10 percentage points more of their budgets toward instruction than either community colleges or junior colleges. However, a review of FTE expenses on instruction revealed a different picture. Expenditures per FTE actually fell from $4474 to $4081 (t=1.69, p≤.05). This same trend was seen at all levels, but the greatest decrease occurred at the

technical colleges. They cut spending on instruction by over $490 per FTE. Even with this reduction, technical colleges still consistently spent more than community colleges and only fell slightly below junior colleges in three out of the eight years.

Opposite results were found when I explored expenses on student support services. The overall percentage of expenses for support increased from 14.5% to 17.8% ($t=-2.60$, $p\leq.01$). Although all three types of institutions increased their budget percentages for supportive services, only technical colleges saw a statistically significant increase. Still, I found that actual changes in expenses per FTE were minimal. No substantial differences were found at any institutional level, though junior colleges unfailingly outspent either of the other two categories. These results are consistent with previous findings that PBF caused limited change in expenditure habits of effected colleges (Rabovsky 2012; Kelchen and Stedrak 2016).

Retention Rate

Before the GRAD Act average full-time retention was 52.4%, but after implementation the rate fell to 51.7%. No significant difference was found between the two rates. Likewise, full-time retention remained relatively flat at each of the three types of institutions. However, some improvements were found in part-time retention. Overall, mean part-time retention increased from 38.5% to 43.5% ($t =-2.08$, $p\leq.05$). While technical colleges experienced a 13.3 percentage point ($t =-3.21$, $p\leq.01$) increase, community colleges and junior colleges saw little to no change. Although this increase suggests a correlation between the GRAD Act and part-time retention, I believe this change is more reflective of the types of awards usually conferred by technical colleges and the way in which retention is measured. Retention rate data drawn from IPEDS include both students that re-enrolled from the prior year and those that completed their program. As technical colleges tend to issue more one-year or less certificates than other types of institutions, their retention rates may be inflated simply because of their larger cohort. I imagine if IPEDS only included students that re-enrolled at the same institution in their definition of retention, the technical college rates would not have increased so substantially.

Table 2: Mean Value (SD) of Institutional Characteristics Before (2008-2011) & After (2012-2015) GRAD Act

	Technical Colleges		Community Colleges		Junior Colleges	
	2008-2011	2012-2015	2008-2011	2012-2015	2008-2011	2012-2015
Full-time Retention Rate	56.6 (9.2)	54.9 (10.0)	49.9 (5.0)	49.8 (4.5)	47.9 (3.3)	49.3 (4.0)
Part-time Retention Rate	36.4 (10.6)	49.7* (17.1)	37.6 (14.3)	37.9 (6.3)	48.3 (15.8)	46.0 (6.5)
Graduation Rate	44.2 (9.8)	49.1 (14.6)	8.6 (5.4)	13.1* (6.9)	10.0 (3.8)	12.0 (3.0)
Total awards per 100 FTE	145.9 (219.6)	132.4 (81.8)	26.6 (24.0)	44.4* (33.6)	14.8 (1.7)	17.6* (1.3)
FTE enrollment	1068.1 (638.4)	1635.4* (359.4)	3684.3 (3222.4)	4347.3 (3520.6)	2037.3 (250.5)	2085.3 (274.8)
% Full-time enrollment	42.8 (17.6)	37.3 (11.8)	47.0 (7.6)	47.6 (10.3)	55.1 (5.1)	57.4 (10.5)
% Part-time enrollment	57.2 (17.6)	62.7 (11.8)	53.0 (7.6)	52.4 (10.3)	44.9 (5.1)	42.6 (10.5)
% White enrollment	55.8 (12.8)	48.3† (11.8)	58.3 (10.2)	49.4† (10.4)	41.4 (27.9)	39.1 (30.9)
% Revenues from state funds	46.9 (8.9)	40.5† (8.8)	36.0 (8.3)	24.9† (6.9)	33.0 (10.9)	24.5† (5.1)
% Revenues from tuition & fees	6.9 (3.3)	12.6* (7.4)	18.1 (7.7)	25.5* (6.3)	13.3 (6.5)	17.8 (11.0)
% Expenses for instruction	48.1 (3.9)	50.4 (6.0)	38.8 (8.8)	40.9 (7.1)	34.0 (14.7)	34.5 (17.7)
% Expenses for student support	10.1 (1.2)	14.9* (6.5)	16.7 (5.0)	18.5 (6.1)	20.8 (9.4)	23.5 (11.9)

Note: Graduation rates were not available for 2008.
*Increase found at $p \leq .05$. †Decrease found at $p \leq .05$.

Random-effects generalized least squares (GLS) regression was applied to retention rates. Retention rates are based on the percentage of the fall full-time or part-time cohort of first-time degree/certificate-seeking students from the prior year that re-enrolled or successfully completed their program by the following fall. Two models each were used for both full-time and part-time retention, one that separated institutions into only two categories: community college and technical college and a second model that further differentiated the institutions into three categories: community college, technical college, and junior college.

Model 1: $y=B_0+B_1$lnfenroll (lnpenroll) $+B_2$fwhite% (pwhite%) $+B_3$rstate% $+B_4$rtuition% $+B_5$einstruc% $+B_6$esupport% $+B_7$lnreg_income $+B_8$reg_white% $+B_9$zreg_score $+B_{10}$tech $+B_{11}$grad_act $+u_i$

Model 2: $y=B_0+B_1$lnfenroll (lnpenroll) $+B_2$fwhite% (pwhite%) $+B_3$rstate% $+B_4$rtuition% $+B_5$einstruc% $+B_6$esupport% $+B_7$lnreg_income $+B_8$reg_white% $+B_9$zreg_score $+B_{10}$junior $+B_{11}$grad_act $+u_i$

Model 1, depicting the impact of the GRAD Act on full-time retention rates, was found to be statistically significant (Wald chi2(11)=35.41, p≤.001). The regression output (see table 3) revealed only one significant predictor at p≤.05: percentage of expenses on instruction. These results indicate that a one percentage point increase in the overall percentage of funds expended on instruction, holding all other variables constant, raises full-time retention rates by .248 points. Model 2, which adds a control for junior colleges, was also significant (Wald chi2(12)=31.33, p≤.01). The same significant predictor, percentage of expenses on instruction, was found. This output suggests that accounting for junior colleges increases the predicted average full-time retention rate by an additional .009 percentage point over Model 1. Both models were also applied to part-time retention rates but only Model 2 was found to be significant (Wald chi2(12)=21.01, p≤.05). The regression estimates indicate that, on average, junior colleges have part-time retention rates that are 11.061 points greater than community colleges, the reference group used in the model. This finding is supported by the mean part-time retention rates outlined for each type of institution in table 2.

Table 3: GLS Regression Estimates for Retention & Graduation Rates

	Full-time Retention		Part-time Retention		Graduation Rate	
	Model 1 Coef. (S.E.)	Model 2 Coef. (S.E.)	Model 1 Coef. (S.E.)	Model 2 Coef. (S.E.)	Model 1 Coef. (S.E.)	Model 2 Coef. (S.E.)
Full-time enrollment (log)	1.219 (1.255)	1.540 (1.352)				
Part-time enrollment (log)			0.199 (2.437)	1.676 (2.452)		
FTE enrollment (log)					3.082 (2.542)	2.885 (2.552)
% Full-time white enrollment	-0.068 (0.063)	-0.061 (0.068)				
% Part-time white enrollment			-0.090 (0.119)	-0.040 (0.118)		
% White enrollment					0.147 (0.128)	0.146 (0.128)
% Revenue from state funds	-0.039 (0.085)	-0.020 (0.087)	-0.151 (0.153)	-0.120 (0.150)	0.006 (0.132)	0.004 (0.132)
% Revenue from tuition & fees	0.071 (0.130)	0.098 (0.132)	0.096 (0.224)	0.129 (0.219)	-0.351 (0.185)	-0.358** (0.186)
% Expenses for instruction	0.248* (0.107)	0.257* (0.111)	0.322 (0.212)	0.290 (0.208)	0.283 (0.178)	0.286 (0.178)
% Expenses for student support	-0.075 (0.108)	-0.099 (0.109)	0.383 (0.213)	0.299 (0.211)	0.062 (0.147)	0.061 (0.148)
Regional median income (log)	2.358 (4.900)	4.561 (5.268)	-6.524 (9.836)	-1.411 (9.823)	5.352 (8.074)	5.476 (8.179)
% Regional white population	0.062 (0.107)	0.060 (0.109)	-0.141 (0.199)	-0.099 (0.195)	-0.113 (0.168)	-0.115 (0.168)
Regional (K-12) score	0.980 (1.394)	0.874 (1.398)	1.186 (2.736)	1.173 (2.672)	0.860 (2.245)	0.898 (2.264)
Grad Act	-2.378 (1.616)	-2.387 (1.629)	0.313 (3.207)	0.612 (3.135)	5.753** (2.256)	5.827** (2.270)
Technical College	4.586 (2.633)	4.958 (2.869)	5.205 (4.753)	8.014 (4.776)	28.227** (4.687)	28.650** (4.770)
Junior College		2.879 (3.020)		11.061** (4.433)		1.412 (5.764)
Intercept	7.564 (52.169)	-20.329 (56.924)	105.035 (99.953)	32.145 (101.896)	-77.999 (84.143)	-77.953 (86.532)
Wald chi2	35.41**	31.33**	14.10	21.01*	104.23**	111.91**

Note: Retention Rate models (N=120) include data from 2008-2015. Graduation Rate models (N=105) include data from 2009-2015. *$p \leq .05$. **$p \leq .01$

Graduation Rate

As mentioned previously, graduation rates derived from IPEDS data are based on first-time, full-time degree/certificate-seeking students. In this study, I focus on those students that completed their program within 150% of normal time (the amount of time necessary for a student to complete all requirements for a degree or certificate). On average, rates increased from 23% to 26.8%, but these changes were not found to be statistically significant. Although all types of institutions were able to increase their graduation rates in the years since the GRAD Act was passed, only community colleges demonstrated a significant improvement. They raised their mean rate from 8.6% to 13.1% (t=-2.62, p≤.01). Across all years, technical colleges maintained the highest graduation rate by averaging 46.9% compared to 11.2% by community colleges and 11.1% by junior colleges. As with retention rates, I attribute these sizeable differences to the shorter length of programs that technical colleges tend to offer. Unfortunately, since most studies examining the impact of performance-based funding policies on graduation rates have concentrated on bachelor degree granting institutions, there is currently no research on which to compare these findings.

As with retention, I applied a random-effects GLS model to graduation rates. The models for graduation rates utilized the same estimates as with retention rates, but instead of differentiating between full-time and part-time enrollment, FTE enrollment was used as the control variable.

Model 1: $y=B_0+B_1$lnfte_enroll $+B_2$white% $+B_3$rstate% $+B_4$rtuition% $+B_5$einstruc% $+B_6$esupport% $+B_7$lnreg_income $+B_8$reg_white% $+B_9$zreg_score $+B_{10}$tech $+B_{11}$grad_act $+u_i$

Model 2: $y=B_0+B_1$lnfte_enroll $+B_2$white% $+B_3$rstate% $+B_4$rtuition% $+B_5$einstruc% $+B_6$esupport% $+B_7$lnreg_income $+B_8$reg_white% $+B_9$zreg_score $+B_{10}$junior $+B_{11}$grad_act $+u_i$

Model 1 was found to be statistically significant (Wald chi2(11)=104.23, p≤.001). Two significant predictors were found at p≤.05: GRAD Act and Technical College. These results suggest that

graduation rates, on average, were 5.753 points greater after the implementation of the GRAD Act and technical colleges tend to have graduation rates 28.227 points higher than community colleges. Model 2 yielded almost identical results. The equation was found to be significant (Wald chi2(12)=111.91, p≤.001) and included the same predictors.

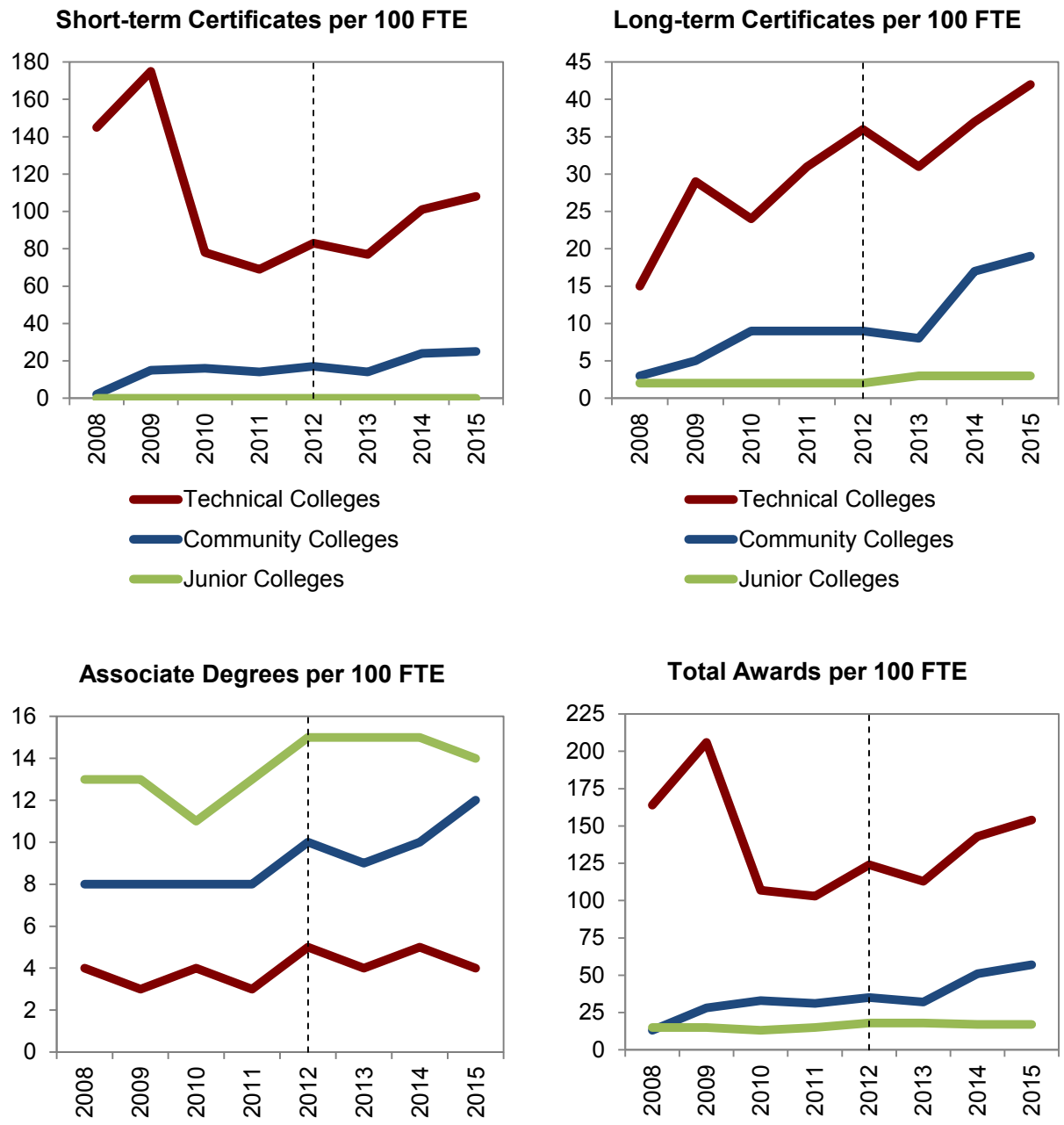
Awards Productivity

As seen in recent studies, I expect an upsurge in short-term certificates and limited increases in long-term certificates and associate degrees (Hillman, Tandberg, and Fryar 2015; Hillman, Tandberg, and Gross 2014; Rutherford and Rabovsky 2014; Tandberg, Hillman, and Barakat 2015; Umbricht, Fernandez, and Ortagus 2015). I did not find the anticipated increase in short-term certificates, but data revealed a slight uptick in the number of long-term certificates and associate degrees conferred. Although the average quantity of short-term certificates increased from 631.5 to 840.6, it was not a significant difference. Community colleges were the only type of institution to increase their short-term certificates. They experienced an average increase of 238.9 certificates (t=-2.12; p≤.05). These results did not hold when I examined short-term certificates per 100 FTE. No significant differences were found across two-year colleges or in any institution type. Actually, short-term certificates decreased by almost 10 certificates per 100 FTE after implementation of the GRAD Act. Seemingly, junior colleges have stayed out of the business of issuing short-term certificates altogether.

Interestingly, as shown in the first graph of figure 2, the number of short-term certificates fell greatly between 2009 and 2010. I surmise that the drop resulted from a change in reporting technique that eliminated the inclusion of non-credit certificates. When I explored this phenomenon further, I found the data on short-term certificates troubling. There are huge disparities not only between institutions, even those in the same category, but also within institutions (see Appendix B). Junior colleges remained consistent in issuing the rare certificate, but some community colleges reported none over the eight years of this study. These numbers do not coincide with those reported to the Louisiana Board of Regents (2016 *Louisiana Higher*

Education Fact Book). Again, perhaps misunderstandings on degree definitions are occurring. However, this does not explain the wide fluctuations within a college's own reporting. I can only presume that some colleges received funds for a specialized short-term program that was not continued in the following academic year.

Figure 2: Awards Productivity per 100 Full-time Equivalent



There were greater consistencies in data on long-term certificates, those taking at least one to two-years to complete. On average, the number of certificates increased significantly from 240.8 to 498.1(t=-4.45, p≤.001). Community colleges and technical colleges saw increases of 202.4% (t=-3.98, p≤.001) and 69.1% (t=-3.58, p≤.001), respectively. The gains for long-term certificates per FTE were likewise significant, although the percentage increases were not of the same magnitude. As with short-term certificates, junior colleges saw little to no movement in their numbers. An examination of associate degrees conferred revealed an overall increase from 201.7 to 292.1 (t=-1.7228, p≤.01). However, in opposition to findings on certificates, the only type of institution to realize gains was junior colleges. They experienced a 15.9% (t=-3.53, p≤.01) increase. Although similar results were found overall and for junior colleges when I standardized associate degrees per 100 FTE, significant increases for community colleges also presented themselves. They grew the number of associate degrees per 100 FTE from 8 to 10.5 (t=-3.76, p≤.001). Technical colleges experienced a slight increase in associate degrees, but the change was not significant. These results tend to fall in line with the given missions of the individual type of institution. Remarkably, while a significant increase of 50% (t=-2.70, p≤.001) in total awards occurred across all two-year colleges, these gains completely disappeared when standardized against 100 FTE. The total number of awards per 100 FTE actually remained flat. It seems that the implementation of the GRAD Act had no real impact on the number of awards conferred.

GLS logistic regression models were applied to the four dependent measures related to awards productivity. All models utilized the same predictors as in the graduation rate equations.

Model 1: $\Pr(y=1)=F(B_0 + B_1\text{lnfte\_enroll} + B_2\text{white\%} + B_3\text{rstate\%} + B_4\text{rtuition\%} + B_5\text{einstruc\%} + B_6\text{esupport\%} + B_7\text{lnreg\_income} + B_8\text{reg\_white\%} + B_9\text{zreg\_score} + B_{10}\text{tech} + B_{11}\text{grad\_act}) + u_i$

Model 2: $\Pr(y=1)=F(B_0 + B_1\text{lnfte\_enroll} + B_2\text{white\%} + B_3\text{rstate\%} + B_4\text{rtuition\%} + B_5\text{einstruc\%} + B_6\text{esupport\%} + B_7\text{lnreg\_income} + B_8\text{reg\_white\%} + B_9\text{zreg\_score} + B_{10}\text{junior} + B_{11}\text{grad\_act}) + u_i$

Significant increases in performance occurred in 2010 and 2014 for short-term certifications; 2010, 2011, 2012, and 2014 for associate degrees; and 2009, 2010, 2011, and 2014 for long-term certificates and total awards. Both Model 1 (Wald chi2(11)=23.32, p≤.05) and Model 2 (Wald chi2(12)=23.76, p≤.05) applied to associate degree productivity were found to be statistically significant. In each equation, two significant predictors were found at p≤.05: percentage of core revenue from state funds and percentage of expenses on student support. The results for Model 1 indicate that for each percentage point increase in revenue derived from state funds, the odds of a significant increase in performance from the prior year decreases by a factor of 0.883, holding all other variables constant. A similar outcome was found for percentage of expenses on student support. Each percentage point increase in expenses on student support decreases the odds of a significant increase in performance by a factor of 0.900. As the odds predicted by Model 2 were identical to Model 1, I can conclude that the added control for junior colleges did not impact associate degree productivity.

Obviously, these results are nonsensical. As noted in the descriptive statistics, state funds fell consistently as a percentage of revenue while the percentage of expenses on student support remained relatively flat except for in 2015 when there was a dramatic 11 percentage point increase. The large increase in 2015 disrupts the equation and allows for improved performance to be aligned with smaller percentages of expenses on student support. If 2015 is omitted from the equation, this variable is no longer a significant predictor. These findings are not an indication that less state funding or decreases in expenses on student support increases performance, but are simply a reflection that these events happened to occur during the time span of this study. Clearly, a longer time frame in which to study the lagged effects of the GRAD Act is needed in order to judge whether increases in performance in associate degree productivity remains related to these predictors.

Table 4: GLS Logistic Regression Estimates for Award Productivity

	Associate Degrees		Long-term Certificates & Total Awards	
	Model 1 OR (S.E.)	Model 2 OR (S.E.)	Model 1 OR (S.E.)	Model 2 OR (S.E.)
FTE enrollment (log)	1.564 (0.697)	1.730 (0.796)	0.992 (0.454)	1.014 (0.478)
% White enrollment	1.014 (0.022)	1.018 (0.023)	0.982 (0.022)	0.983 (0.022)
% Revenue from state funds	0.883** (0.028)	0.883** (0.028)	0.946 (0.028)	0.946 (0.028)
% Revenue from tuition & fees	0.968 (0.042)	0.968 (0.042)	1.044 (0.048)	1.044 (0.048)
% Expenses for instruction	1.011 (0.037)	1.010 (0.037)	0.997 (0.037)	0.997 (0.037)
% Expenses for student support	0.900** (0.038)	0.896** (0.038)	0.945 (0.040)	0.944 (0.040)
Regional median income (log)	2.560 4.241	3.857 (6.632)	0.621 (1.036)	0.688 (1.202)
% Regional white population	0.948 (0.035)	0.948 (0.036)	0.998 (0.037)	0.999 (0.037)
Regional (K-12) score	1.483 (0.712)	1.521 (0.736)	1.136 (0.573)	1.135 (0.570)
Grad Act	0.456 (0.256)	0.460 (0.260)	0.044** (0.029)	0.044** (0.029)
Technical College	2.711 (2.289)	3.293 (2.884)	2.142 (1.891)	2.232 (2.028)
Junior College		2.068 (1.623)		1.178 (0.983)
Intercept	0.011 (0.184)	0.000 (0.001)	17587.52 (312159.6)	4491.622 (85528.23)
Wald chi2	23.32*	23.76*	29.34*	29.32**

Note: Models (*N*=120) include data from 2008-2015. *$p \leq .05$. **$p \leq .01$

As the years in which performance increased were the same for long-term certificates and total awards, the logistic regression outputs were identical. Both Model 1 (Wald chi2(11)=29.34, p≤.05) and Model 2 (Wald chi2(12)=29.32, p≤.05) were found to be statistically

significant. In each equation, only one significant predictor was found at p≤.05: Grad Act. The results indicate that, holding all other variables constant, the odds of an increase in performance in long-term certificates and total awards productivity decreased by a factor of 0.044 after the GRAD Act was introduced. A closer look at the data reveals that of the four years in which an increase in performance was found, three of those were before the GRAD Act. These results do not suggest that the GRAD Act actually caused performance to drop, but that performance did not increase as a result of its implementation. Again, controlling for junior colleges did not impact the overall findings. Their performance was not significantly different from community colleges. Neither model for short-term certificates was found to be statistically significant. The lack of years in which increases in performance occurred reduced the likelihood that the equations would produce meaningful estimates.

Conclusion

The Louisiana Granting Resources and Autonomies for Diplomas Act (GRAD Act), signed into law in June 2010, instituted performance benchmarks for state colleges that, if met, allowed them to increase their own tuition by up to 10% per year. Additionally, the performance-based funding policy tied 15% of a college's overall state funding to meeting the GRAD Act goals. In this study, I attempt to discover if this law and its financial incentives were able to inspire two-year schools to improve performance. My findings were inconclusive. Across all two-year schools, graduation rates remained around 24%. The only type of institution to significantly increase its graduation numbers was community colleges. However, their rates only increased from a paltry 8.6% to 13.1%. However, regression estimates indicated that the GRAD Act was a significant predictor and that graduation rates tended to be 5.753 points higher after its implementation. This provides some confirmation that the GRAD Act had a positive impact on graduation rates of two-year institutions in Louisiana. Similar studies on the impact of performance-based funding policies found no evidence of increased graduation rates at bachelor degree granting institutions (Fryar 2011; Rutherford and Rabovsky 2014; Sanford and Hunter 2011; Shin 2010; Shin and Milton 2004). Unfortunately, no other studies on rates at two-year schools are available for comparison.

Although understandable as a standardizing measure, I find graduation rates a poor comparison tool. Even when narrowing down the pool to only two-year institutions, there were great disparities between types of institution. This highlights the confusing nature of reporting the same measure across schools with different missions. Also, since the measure only includes first-time/full-time students, I believe that it provides little value in an environment in which students may be more likely to attend school part-time, transfer between institutions, and/or have varying educational goals. It seems best to marry graduation rates with other measures such as time-to-degree completion, retention, articulation agreements, and/or degree productivity when evaluating school performance.

The GRAD Act did not directly increase full-time retention rates, which remained flat across all years included in the study. However, regression estimates did reveal a link between percentage of expenses on instruction and full-time retention. These results indicate that a one percentage point increase in the overall percentage of funds expended on instruction improved full-time retention by about a quarter of a percentage point. Some improvements were also found in part-time retention. The average rate across two-year institutions grew five percentage points after the GRAD Act was introduced. This increase is due largely to the double-digit change in part-time retention rate at technical colleges. As technical colleges tend to offer more one-year or less certificate programs, which usually do not require full-time attendance, their part-time retention rates are most likely inflated by their greater quantity of enrollees and completers. Still, the corresponding regression output did not indicate that any improvements in part-time retention rates were related to the GRAD Act. These results tend to mirror those found in other national and state-level (Tennessee and Washington) studies (Hillman, Tandberg, and Fryar 2015; Rutherford and Rabovsky 2014; Sanford and Hunter 2011).

The data did not indicate the anticipated increase in short-term certificates (Hillman, Tandberg, and Fryar 2015; Hillman, Tandberg, and Gross 2014; Rutherford and Rabovsky 2014; Tandberg, Hillman, and Barakat 2015; Umbricht, Fernandez, and Ortagus 2015), but did reveal an uptick in the number of long-term certificates and associate degrees conferred. On average, the number of associate degrees issued grew by 44.8%, while the number of long-term certificates increased 106.9%. These increases are still visible when the numbers of awards were standardized against 100 FTE. However, the corresponding regression estimates for both associate degrees and long-term certificates/total awards give little indication that the introduction of the GRAD Act was the catalyst for these changes. The models for associate degrees absurdly predicted that a decrease in state funds and expenses on student support increased productivity, while, the models for long-term certificates/total awards indicated that the implementation of the GRAD Act actually caused declines in productivity. I can discern that the

implementation of the GRAD Act had little direct positive impact on awards productivity, regardless of type. Obviously, more time, data, and stability in the community college and technical systems are required before any real conclusions can be drawn about the long-term impacts of the GRAD Act on institutional effectiveness.

Even though findings imply that the financial incentives provided through performance-based funding policies do not greatly contribute to improvements in certain institutional performance measures, there are examples of positive impacts generated by these types of funding models. Some suggest that the performance reporting required by these policies actually produce the greatest benefit. As one article noted in 2002, the "threat of bad publicity and embarrassment associated with poor reviews" may be more impactful than funding schemes in altering institutional behavior (Schmidt 2002). In 2015, Stan Jones from the Complete College America Organization echoed this sentiment. He recommends that states maintain PBF policies because they encourage transparency by forcing colleges to continue performance reporting (Mangan 2015). If done correctly, performance reporting offers the public and lawmakers a barometer against which to compare schools of interest. However, it also provides an avenue for many to misunderstand and incorrectly equate schools of dissimilar mission. Unfortunately, Louisiana's current format of performance reporting does not provide enough differentiation between institution types for the layperson to make intelligent decisions. This muddling could allow a community college to be disparaged because its graduation rate was unfairly compared to the state's flagship four-year university. Regrettably, empirical research that directly links performance reporting and the possibility of resulting embarrassment as a method of improving institutional performance is insufficient from which to draw conclusions.

I contend that the greatest achievement of the GRAD Act has been the improvement in the quality of higher education data. As revealed through performance audits conducted by the Louisiana Legislative Auditor's Office, there has been a significant increase in the reliability of

the data provided to the state by post-secondary institutions. In fact, only one school was found to have had any audit findings during the 2016 audit (see table 5). I also found a greater consistency across data reported to IPEDS once the state instituted the auditing process in response to the GRAD Act. Perhaps the funding model could still have long-term beneficial effects if the colleges utilize the wealth of information provided through performance reporting as an internal management tool to guide decision-making (Miller, Robbins, and Keum 2007).

Table 5: Performance Audit Findings of Not Sufficiently Reliable Data

Institution	2012	2013	2014	2015	2016
Baton Rouge Community College	X	X	X		
Bossier Parish Community College		X			X
Capital Area Technical College*	X		X		
Central Louisiana Technical Community College	X	X		X	
Delgado Community College					
Fletcher Technical Community College	X	X		X	
Louisiana State University-Eunice					
Northshore Technical Community College	X	X			
Northwest Louisiana Technical College	X	X			
Nunez Community College		X			
River Parishes Community College					
South Central Louisiana Technical College	X	X			
South Louisiana Community College	X	X	X	X	
Southern University at Shreveport	X	X	X	X	
SOWELA Technical Community College		X			

Source: Louisiana Legislative Auditor

*In 2014 Capital Area Technical College merged with Baton Rouge Community College so was not audited separately in 2014 and 2015

Regardless of the benefits ushered in by performance-based funding legislation, there remain a plethora of concerns about the unintended consequences that may result from mandated benchmarks. Various researchers and some college officials predict that pressure to

meet these performance standards may force some schools to increase selectivity and/or lower academic standards. Evidence that performance-based funding requirements have forced four-year institutions to increase selectivity through higher admissions requirements has been documented in Indiana, Ohio, and Tennessee (Dougherty et al. 2016; Umbricht, Fernandez, and Ortagus 2015). In Louisiana, increasing minimum standards at four-year schools was actually a tenet of the GRAD Act. The legislation called for four-year institutions to raise their minimum American College Test (ACT) score required for admission, eliminate remedial/developmental course offerings, and discontinue associate degree programs (Louisiana Granting Resources and Autonomy for Diplomas Act 2010). Seemingly, two-year schools have benefited as a result. As previously mentioned, enrollment numbers suggest that tuition hikes and these more restrictive admissions standards are forcing more Louisiana students to choose two-year colleges (Russell 2016). However, while four-year schools may be more likely to meet their benchmarks because of this refined student body, two-year schools have the added burden of fulfilling performance requirements with an even larger population of students who tend to have long-standing academic, social, and financial challenges (Dougherty et al. 2016). Again, this is why it is so important to differentiate between missions in establishing performance measures.

Some fear that increased selectivity might reduce racial and ethnic diversity on college campuses. After decades of concentrating on expanding access for underrepresented and/or disadvantaged students, higher education reformers seem to have shifted focus to maximizing performance (Burke1998). Unfortunately, maximizing performance through raised admission standards may prevent some marginalized students from attending college or even being recruited. Evidence suggests that schools have changed their recruiting habits to focus on those students more likely to meet the new standards and complete their programs instead of broadening their student base (Dougherty, et al. 2016). Diversity can further be stilted when schools switch from issuing need-based financial aid to merit-based. The additional financial resources many minority students require may not be available because schools could transfer

those funds to students they deem more likely to be retained or graduated (Dougherty, et al. 2016; Umbricht, Fernandez, and Ortagus 2015). This can happen at both four-year schools and open-admission colleges. Actually, this study provides some indication that diversity may be declining at Louisiana four-year schools. There has been a 7.3% increase in non-white FTE enrollment at two-year schools since the GRAD Act was signed into law. Although it is impossible to say definitively this change is a result of decreased access for minority students at the state's four-year schools, it is an interesting statistic that should be explored further.

Others worry that increased mandated performance goals may cause schools to lower academic standards (Alexander 2000; Dougherty, et al. 2016; Umbricht, Fernandez, and Ortagus 2015). This can occur when faculty is instructed to reduce failure rates by inflating grades or lessening course rigor. Schools can also scale back the number of required courses needed for graduation. This is a more subtle way in which to fast track completion numbers compared to inflated grades, but still effective for helping to meet performance benchmarks. Yet another concern is the growth in the issuance of worthless degrees. Across the country, there has been marked increases in short-term certificate programs, both credit and non-credit. Although these awards help schools more quickly meet productivity measures and increase revenue, research has shown that they have very limited economic value when compared to associate degrees or even long-term certificates (Dadgar and Trimble 2015; Hillman, Tandberg, and Fryar 2015; Xu and Trimble 2016). Some, mostly those in higher education, assert that short-term successes, like receiving one of these certificates, are important for struggling students (Mangan 2014). They declare that these short-term gains encourage students to later pursue more long-term credentials and/or degrees. Obviously, additional empirical research needs to be conducted on this assertion before any definitive conclusions can be drawn on the true worth of these types of awards.

As much of the literature finds that performance-based funding is not a panacea for all state budgetary and performance ills, why do states still look to PBF as a solution? It seems that

politics is one of the main, if not the most important, influence in turning to a performance-based funding model for higher education (Burke and Minassians 2003; McLendon, Hearn and Mokher 2009; Tandberg 2010). Lawmakers believe that these types of funding programs show their constituents that they are being good stewards of public funding by helping "to reduce or eliminate wasteful activities…and to get more 'bang for the buck' by spending less money on programs that do not work and more on those that do" (Rabovsky 2012, 676). Given its popularity, it seems that performance-based funding will remain part of the higher education landscape (Schmidt 2002).

A number of recommendations exist on how states can design and implement performance-based policies that would help to increase their impact on higher education and reduce any unintended negative consequences (Friedal et al. 2013; Hermes 2012; Miao. 2012). Policy makers must obtain buy-in from key stakeholders such as legislators, college administrators, faculty, and local business and industry leader. Without input from involved parties, implementation of the program will be difficult. States should include both outcome and progress measures that reflect the diverse nature of missions, recognize interim successes, and reflect regional needs. Using these varied types of measures will provide a more complete picture of effectiveness and performance. However, states should be wary of overly complex metrics that can cause confusion and reduce the effectiveness and implementation of performance-based policies. Burke, Modarresi and Serban (1999) tell us that the "most successful programs include from eight to 15 indicators" because "having too few indicators ignores many of the multiple objectives of colleges and universities. Having too many indicators trivializes major priorities by according them very little funding" (22).

New funding models should be phased in so institutions have time to set reasonable benchmarks, adjust procedures, and build organizational capacity. Unfortunately, hurried implementation of performance funding can leave colleges with "little detail on what specific institutional changes are expected and how those changes are to be achieved" (ASHE 2013,

12). This is why it is so crucial that states commit significant stable funding that both incentivizes institutions to increase performance and allows for long-term planning. Institutions need to see that they will be gaining additional resources in order to find performance-based funding worthy of their time and effort. Finally, programs must be given a long enough period in which to be effective. In instances where gains have been found, they did not generally present themselves until six to eight years after implementation (Layzell 1998). Longevity allows for more productive and thorough evaluations of policy tenets and related metrics (Sanford; Hillman, Shin and Milton 2004; Tandberg, and Fryar 2015).

The area of performance-based funding is rife with research possibilities. Additional multivariate research that attempts to disentangle the effects of PBF from other events like political happenings, school mergers, and increased admission requirements needs to be conducted. Although generalizability is gained through national and/or regional studies of this kind, I believe that state-level studies allow researchers to better detail the specifics surrounding a policy's implementation and how those particulars affect its impact. I would also like to see more long-term studies that follow students who have obtained the short and/or long-term certificates seemingly encouraged by performance-based funding policies to see if they return to further their education and to what extent these additional credentials impact earnings. Lastly, there needs to be more scholarship on how substantial shifts in school expenditures away from administrative support and toward instruction and student services affect school performance.

Although the GRAD Act has produced limited gains in institutional effectiveness, I believe that a revamped version could yield the improvements that we all seek in higher education. Most state colleges were excited for the opportunity to utilize the performance-based funding model created in the GRAD Act to increase their coffers with the side benefit of improving graduation rates. Unfortunately, like most performance-based funding legislation, it become a way for colleges to simply maintain budget levels during a time of declining state support rather than an impetus for increasing institutional accomplishments (Alexander 2000;

Serban and Burke 1998). This has to change in order for the policy to be effective. Obviously, the state must provide adequate financial support to the colleges. However, colleges must also make the necessary changes in expenditures and organization needed to facilitate improvement. This will require hard and uncomfortable decisions to be made by administrators, but those decisions should not be made without faculty and staff input. Also, the Louisiana Board of Regents must provide leadership to the colleges on how to build the organizational capacity required to provide the best education for their students. The updated policy should include separate measures for two-year and four-year schools that are specific to their mission. These measures should incentivize schools and not penalize them for providing access to underrepresented groups. Also, benchmarks need to be more robust. Over the course of the six years that the GRAD Act has been in effect, there have only been five instances in which one of the 15 two-year schools did not meet the required minimum level of 80% in student success to gain authority to raise tuition (see Appendix C: Supplemental Table 2). Since findings from this study suggest that the increases in retention, graduation rates, and awards productivity were either limited or nonexistent, I can assume that the required standards were rather minor. Ultimately, in any discussion about money and performance, we need to remember the students and the faculty/staff of the institutions. Institutions do not make improvements; the people who work there do. Liefner (2003) reminds us that colleges “with a large number of highly motivated and qualified faculty will be successful regardless of the form of resource allocation;” a sentiment which should remain at the forefront of any decision regarding higher education (486).

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Appendix A: Codebook

Variable:	Institution Abbreviation
Variable Name:	inst
Value Labels:	brcc: Baton Rouge Community College; bpcc: Bossier Parish Community College; catc: Capital Area Technical College; cltcc: Central Louisiana Technical Community College; dcc: Delgado Community College; lsue: Louisiana State University-Eunice; ntcc: Northshore Technical Community College; nwltc: Northwest Louisiana Technical College; ncc: Nunez Community College; rpcc: River Parishes Community College; scltc: South Central Louisiana Technical College; slcc: South Louisiana Community College; suas: Southern University at Shreveport; sowela: SOWELA Technical Community College
Data Source & Tables:	Louisiana Community & Technical College System website, Louisiana State University System website, Southern University System website
Definition:	Commonly used abbreviation of an institution's name. Represents the panel dataset-defining variable.
Variable:	Academic Year
Variable Name:	aydate
Data Source & Tables:	IPEDS: HD2014, HD2013, HD2012, HD2011, HD2010, HD2009, HD2008, HD2007
Definition:	An academic year begins with the Fall semester (August-December) and carries over into the Spring semester (January-May) and Summer semester (June-July) of the following calendar year. Represents the time defining variable. Dataset includes date from 2008 to 2015.
Variable:	Total Awards Productivity
Variable Name:	awards
Value Labels:	1=Yes; a statistically significant positive difference was found 0=No; a statistically significant positive difference was not found
Data Source & Tables:	IPEDS: DRVC2015, DRVC2014, DRVC2013_RV, DRVC2012_RV, DRVC2011_RV, DRVC2010_RV, DRVC2009_RV, DRVC2008_RV
Definition:	Dummy variable indicating whether a paired sample t test found a statistically significant difference in means between two consecutive academic years' total number of awards conferred -- including certificates, 1-year certificates, 2-year certificates, and associate degrees.
Variable:	Associate Degree Productivity
Variable Name:	awards_ad
Value Labels:	1=Yes; a statistically significant positive difference was found 0=No; a statistically significant positive difference was not found
Data Source & Tables:	IPEDS: DRVC2015, DRVC2014, DRVC2013_RV, DRVC2012_RV, DRVC2011_RV, DRVC2010_RV, DRVC2009_RV, DRVC2008_RV
Definition:	Dummy variable indicating whether a paired sample t test found a statistically significant difference in means between two consecutive academic years' number of associate degrees conferred. An associate degree requires completion of an organized program of study of at least 2 but less than 4 years of full-time equivalent college work.
Variable:	Long-term Certificate Productivity
Variable Name:	awards_certlong

Value Labels:	1=Yes; a statistically significant positive difference was found 0=No; a statistically significant positive difference was not found
Data Source & Tables:	IPEDS: DRVC2015, DRVC2014, DRVC2013_RV, DRVC2012_RV, DRVC2011_RV, DRVC2010_RV, DRVC2009_RV, DRVC2008_RV
Definition:	Dummy variable indicating whether a paired sample t test found a statistically significant difference in means between two consecutive academic years' number of long-term certificates conferred. A long-term certificate requires completion of an organized program of study in at least 2 but less than 4 full-time equivalent academic years or designed for completion in at least 60 but less than 120 semester credit hours.
Variable:	Short-term Certificate Productivity
Variable Name:	awards_cert
Value Labels:	1=Yes; a statistically significant positive difference was found 0=No; a statistically significant positive difference was not found
Data Source & Tables:	IPEDS: DRVC2015, DRVC2014, DRVC2013_RV, DRVC2012_RV, DRVC2011_RV, DRVC2010_RV, DRVC2009_RV, DRVC2008_RV
Definition:	Dummy variable indicating whether a paired sample t test found a statistically significant difference in means between two consecutive academic years' number of short-term certificates conferred. A short-term certificate requires the completion of an organized program of study in less than 1 academic year (2 semesters), or designed for completion in less than 30 semester credit hours.
Variable:	Part-time Retention Rate
Variable Name:	pret%
Data Source & Tables:	IPEDS: EF2014D, EF2013D_RV, EF2012D_RV, EF2011D_RV, EF2010D_RV, EF2009D_RV, EF2008D_RV, EF2007D
Definition:	Part-time retention rate is the percentage of the fall part-time cohort of first-time degree/certificate-seeking students from the prior year (minus exclusions) that re-enrolled at the institution as either full- or part-time or successfully completed their program by the current fall. Exclusions include students who could not reenroll because of death, permanent disability, armed service duty, foreign aid service duty, or church mission service.
Variable:	Full-time Retention Rate
Variable Name:	fret%
Data Source & Tables:	IPEDS: EF2014D, EF2013D_RV, EF2012D_RV, EF2011D_RV, EF2010D_RV, EF2009D_RV, EF2008D_RV, EF2007D
Definition:	Full-time retention rate is the percentage of the fall full-time cohort of first-time degree/certificate-seeking students from the prior year (minus exclusions) that re-enrolled at the institution as either full- or part-time or successfully completed their program by the current fall. Exclusions include students who could not reenroll because of death, permanent disability, armed service duty, foreign aid service duty, or church mission service.
Variable:	Graduation Rate
Variable Name:	grad%
Data Source & Tables:	IPEDS: DRVG2015, DRVG2014, DRVG2013_RV, DRVG2012_RV, DRVG2011_RV, DRVG2010_RV, DRVG2009_RV

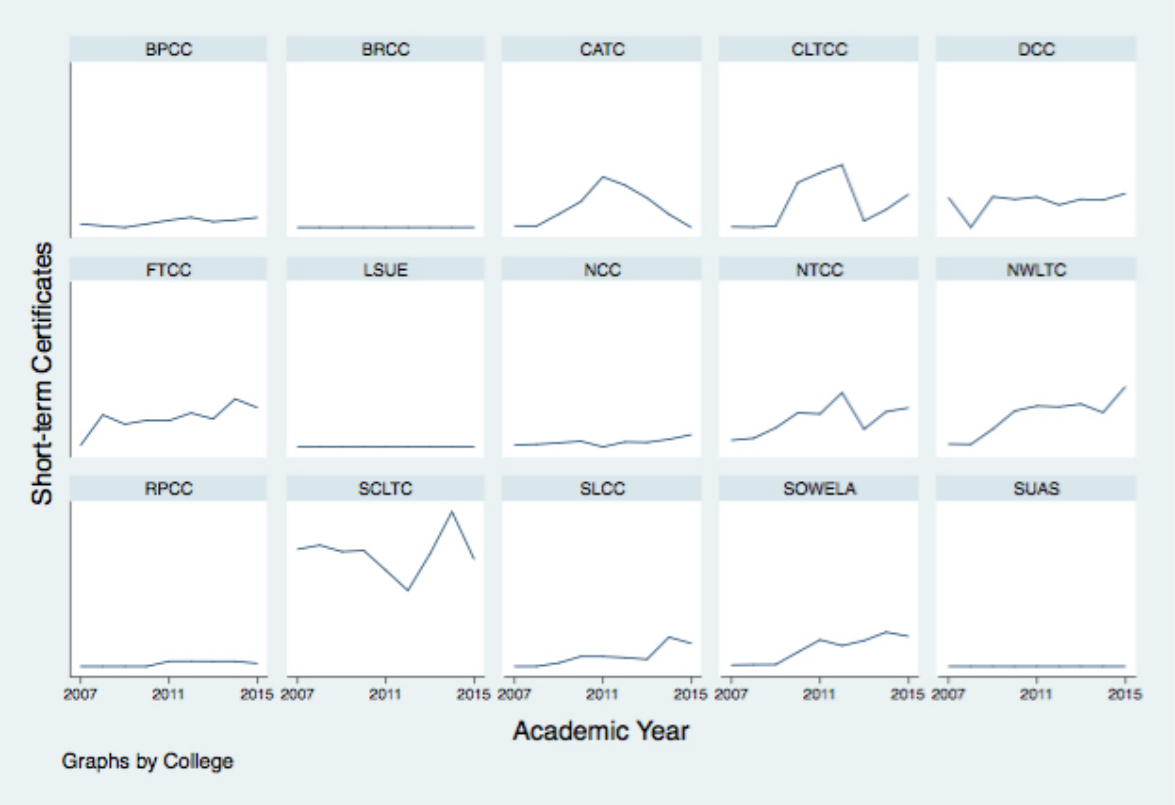
Definition:	Graduation rate is the percentage of the first-time, full-time degree/certificate-seeking graduation cohort that completed a program within 150% of normal time (the amount of time necessary for a student to complete all requirements for a degree or certificate according to the institution's catalog). This rate is calculated as the total number of completers within 150% of normal time divided by the revised cohort minus any allowable exclusions. Exclusions include students who could not reenroll because of death, permanent disability, armed service duty, foreign aid service duty, or church mission service.
Variable:	Part-time Enrollment Rate
Variable Name:	penroll%
Data Source & Tables:	IPEDS: DRVEF2014, DRVEF2013_RV, DRVEF2012_RV, DRVEF2011_RV, DRVEF2010_RV, DRVEF2009_RV, DRVEF2008_RV, DRVEF2007
Definition:	Total number of part-time students enrolled in the fall semester divided by the total number of students enrolled in the same semester.
Variable:	Full-time Enrollment Rate
Variable Name:	fenroll%
Data Source & Tables:	IPEDS: DRVEF2014, DRVEF2013_RV, DRVEF2012_RV, DRVEF2011_RV, DRVEF2010_RV, DRVEF2009_RV, DRVEF2008_RV, DRVEF2007
Definition:	Total number of full-time students enrolled in the fall semester divided by the total number of students enrolled in the same semester.
Variable:	Full-time Equivalent (FTE) Enrollment
Variable Name:	lnfte_enroll
Data Source & Tables:	IPEDS: DRVEF2014, DRVEF2013_RV, DRVEF2012_RV, DRVEF2011_RV, DRVEF2010_RV, DRVEF2009_RV, DRVEF2008_RV, DRVEF2007
Definition:	Log of FTE fall enrollment. The number of FTE students is calculated by adding the full-time fall student headcounts to the part-time fall headcount multiplied by 0.335737 (factor for public 2-year colleges).
Variable:	Part-time White Enrollment Rate
Variable Name:	pwhite%
Data Source & Tables:	IPEDS: EF2014A, EF2013A_RV, EF2012A_RV, EF2011A_RV, EF2010A_RV, EF2009A_RV, EF2008A_RV, EF2007A
Definition:	Total number of part-time white students enrolled during the fall semester divided by the total number of part-time students enrolled during that same semester.
Variable:	Full-time White Enrollment Rate
Variable Name:	fwhite%
Data Source & Tables:	IPEDS: EF2014A, EF2013A_RV, EF2012A_RV, EF2011A_RV, EF2010A_RV, EF2009A_RV, EF2008A_RV, EF2007A
Definition:	Total number of full-time white students enrolled during the fall semester divided by the total number of full-time students enrolled during that same semester.
Variable:	Total White Enrollment Rate
Variable Name:	white%
Data Source & Tables:	IPEDS: EF2014A, EF2013A_RV, EF2012A_RV, EF2011A_RV, EF2010A_RV, EF2009A_RV, EF2008A_RV, EF2007A

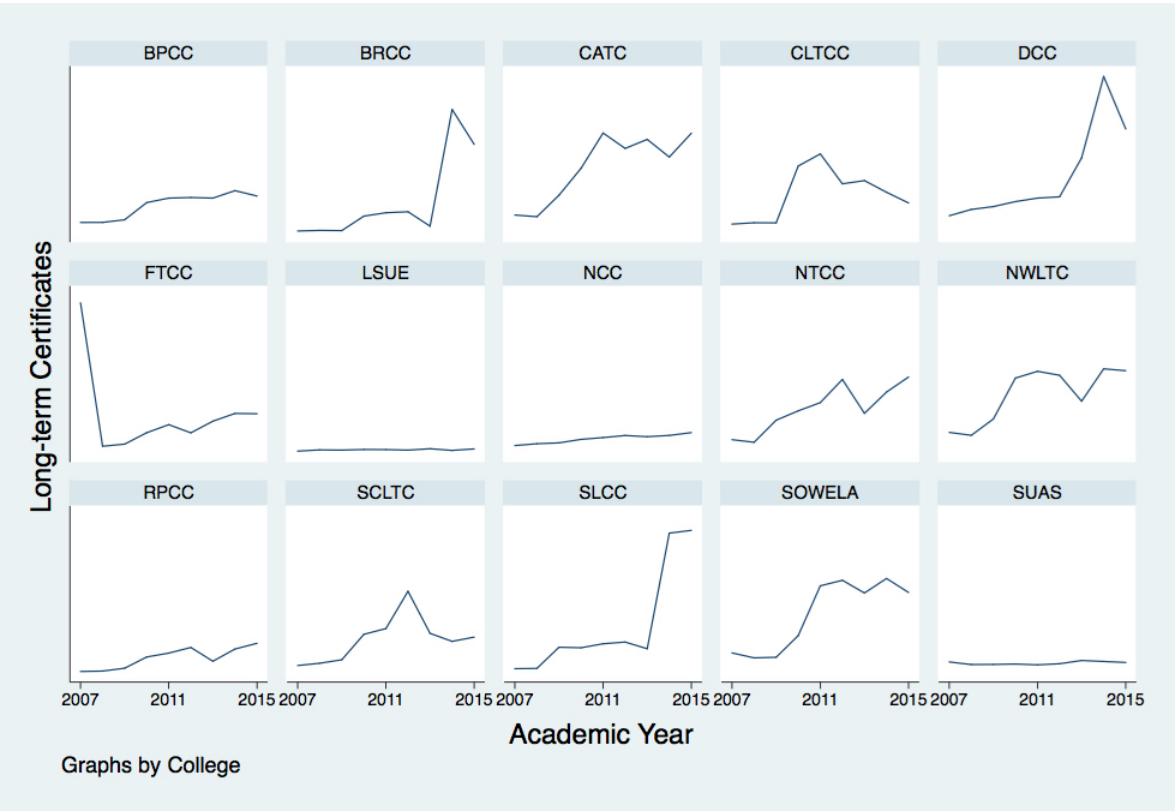
Definition:	Total number of white students enrolled during the fall semester divided by the total number of students enrolled during that same semester.
Variable:	Full-time Equivalent (FTE) White Enrollment
Variable Name:	fte_white
Data Source & Tables:	IPEDS: EF2014A, EF2013A_RV, EF2012A_RV, EF2011A_RV, EF2010A_RV, EF2009A_RV, EF2008A_RV, EF2007A
Definition:	The number of white FTE students is calculated by adding the white full-time fall student headcounts to the white part-time fall headcount multiplied by 0.335737 (factor for public 2-year colleges).
Variable:	Full-time Equivalent (FTE) Non-White Enrollment
Variable Name:	fte_nonwhite
Data Source & Tables:	IPEDS: EF2014A, EF2013A_RV, EF2012A_RV, EF2011A_RV, EF2010A_RV, EF2009A_RV, EF2008A_RV, EF2007A
Definition:	The number of non-white FTE students is calculated by adding the non-white full-time fall student headcounts to the non-white part-time fall headcount multiplied by 0.335737 (factor for public 2-year colleges).
Variable:	Tuition & Fee Revenue Rate
Variable Name:	rtuition%
Data Source & Tables:	IPEDS: DRVF2015, DRVF2014, DRVF2013_RV, DRVF2012_RV, DRVF2011_RV, DRVF2010_RV, DRVF2009_RV, DRVF2008_RV
Definition:	Total percentage of core revenue derived from tuition and fees.
Variable:	State Appropriations Revenue Rate
Variable Name:	rstate%
Data Source & Tables:	IPEDS: DRVF2015, DRVF2014, DRVF2013_RV, DRVF2012_RV, DRVF2011_RV, DRVF2010_RV, DRVF2009_RV, DRVF2008_RV
Definition:	Total percentage of core revenue derived from state appropriations.
Variable:	Instruction Expense Rate
Variable Name:	einstruc%
Data Source & Tables:	IPEDS: DRVF2015, DRVF2014, DRVF2013_RV, DRVF2012_RV, DRVF2011_RV, DRVF2010_RV, DRVF2009_RV, DRVF2008_RV
Definition:	Total percentage of core expenses derived from instruction costs.
Variable:	Support Expense Rate
Variable Name:	esupport%
Data Source & Tables:	IPEDS: DRVF2015, DRVF2014, DRVF2013_RV, DRVF2012_RV, DRVF2011_RV, DRVF2010_RV, DRVF2009_RV, DRVF2008_RV
Definition:	Total percentage of core expenses derived from student services and academic support costs.
Variable:	Grad Act
Variable Name:	grad_act
Variable Labels:	1=Yes; a GRAD Act agreement existed 0=No; a GRAD Act agreement did not exist
Data Source & Tables:	Louisiana Board of Regents

Definition:	Dummy variable indicating whether an institution had an agreement with the Board of Regents in which they received the authority to raise tuition up to 10% if certain targeted performance measures were achieved. Although the GRAD Act was signed into law in June 2010, institutions were not required to meet established performance measures until the 2011-2012 academic year. As such, the 2012 academic year will act as year one of the GRAD Act.
Variable:	Accreditation
Variable Name:	tech
Variable Labels:	1=Yes, the institution was a member of COE during that specific academic year 0=No, the institution was not a member of COE during that specific academic year
Data Source & Tables:	Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) Member and Candidate List (July 2016); Council on Occupational Education (COE) Membership Directory (June 2016)
Definition:	Dummy variable indicating whether an institution is a member of COE, thus considered a Technical College, during that specific academic year.
Variable:	Accreditation
Variable Name:	junior
Variable Labels:	2=No, the institution was not a member of COE during that specific academic year & was managed by a four-year system 1=Yes, the institution was a member of COE during that specific academic year 0=No, the institution was not a member of COE during that specific academic year & was managed by the two-year system
Data Source & Tables:	Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) Member and Candidate List (July 2016); Council on Occupational Education (COE) Membership Directory (June 2016)
Definition:	Factor variable indicating whether an institution is a Technical College, Community College, or Junior College during that specific academic year.
Variable:	Regional Median Income
Variable Name:	lnreg_income
Data Source & Tables:	2008 American Community Survey 3-Year Estimates, United States Bureau: ACS_08_3YR_B19013 & 2014 American Community Survey 5-Year Estimates, United States Census Bureau: ACS_09_5YR_B19013; ACS_10_5YR_B19013; ACS_11_5YR_B19013; ACS_12_5YR_B19013; ACS_13_5YR_B19013; ACS14_5YR_B19013 & 2015 American Community Survey 1-Year Estimates, United States Bureau: ACS_15_1YR_B19013
Definition:	Log of the estimated regional median household income represented in 2015 constant dollars. Regional represents the parish with the greatest level of enrollment at the institution during the academic year.
Variable:	Regional White Population Rate
Variable Name:	reg_white%

Data Source & Tables:	2008 American Community Survey 3-Year Estimates Public Use Microdata Samples, United States Census Bureau; CC-EST2009-6RACE-22; 2014 American Community Survey 5-Year Estimates Public Use Microdata Samples, United States Census Bureau; CC-EST2015-ALLDATA-22
Definition:	Estimated total of white regional residents divided by the estimated total of regional residents. Regional represents the parish with the greatest level of enrollment at the institution during the academic year.
Variable:	Regional Performance Score
Variable Name:	zreg_score
Data Source & Tables:	Louisiana Department of Education
Definition:	Regional school district performance score. Regional represents the parish with the greatest level of enrollment at the institution during the academic year. Standardized per academic year as measurement changed in 2012.

Appendix B: Supplemental Graphs





Appendix C: Supplemental Tables

Supplemental Table 1: In-state Tuition & Fees for Louisiana Public Colleges in 2015 Inflation Adjusted Dollars

Institution	2008	2009	2010	2011	2012	2013	2014	2015	% Change
Baton Rouge Community College	1972	2081	2107	2607	2924	3145	3370	3693	87%
Bossier Parish Community College	1938	2042	2109	2044	2738	2962	3296	3616	87%
Capital Area Technical College	1052	1098	1124	1245	1553	1975	3140	3693	251%
Central Louisiana Technical Community College	1009	1055	1082	1183	1522	1456	1449	1783	77%
Delgado Community College	2143	2151	2680	3114	3438	3043	3306	3625	69%
Fletcher Technical Community College	1629	1715	1765	2205	2655	2881	3246	3596	121%
Grambling State University	3987	4203	4365	4666	5044	5365	5957	6525	64%
Louisiana State University	5001	5619	5688	6073	6559	7111	7882	8750	75%
Louisiana State University-Alexandria	3478	3735	3873	4021	4321	4697	5343	6009	73%
Louisiana State University-Eunice	2439	2562	2500	2622	2831	2869	3202	3522	44%
Louisiana State University-Shreveport	3875	3907	4058	4346	4639	5029	5613	6168	59%
Louisiana Tech University	5039	5563	5674	5843	6087	6689	7311	8052	60%
McNeese State University	3591	3781	3899	4201	4525	5177	5708	6334	76%
Nicholls State University	3958	4034	4310	4522	4890	5778	6476	7234	83%
Northshore Technical Community College	1008	1054	1080	1239	1999	2935	3270	3580	255%
Northwest Louisiana Technical College	865	910	939	1182	1542	2300	2632	2566	197%
Northwestern State University of Louisiana	3884	3975	4274	4619	5133	5576	6253	6786	75%
Nunez Community College	1949	2053	2120	2156	2690	2925	3260	3590	84%
River Parishes Community College	2063	2150	2189	2333	2552	2852	3236	3556	72%
South Central Louisiana Technical College	843	888	1048	1151	1511	1934	2102	2414	186%
South Louisiana Community College	2050	2139	2200	2373	2686	2911	3155	3581	75%
Southeastern Louisiana University	3920	4111	4274	4215	4753	5333	5722	6547	67%
Southern University and A & M College	4036	4315	4457	4830	5238	5913	6638	6630	64%
Southern University at New Orleans	3270	3281	3339	3540	4032	4448	4856	4752	45%
Southern University at Shreveport	2479	2561	2678	2877	3093	3362	3496	3634	47%
SOWELA Technical Community College	1607	1670	1722	2431	2686	2921	3247	3662	128%
University of Louisiana at Lafayette	3745	3948	4365	4664	5021	5468	6199	6872	83%
University of Louisiana at Monroe	3971	4188	4145	4885	5266	5538	6325	6963	75%
University of New Orleans	4386	4664	4693	5015	5383	5952	6586	7392	69%

Source: Integrated Post-Secondary Data System

Supplemental Table 2: Two-Year Institutions Not Meeting Minimum GRAD Act Requirements

Institution	2011	2012	2013	2014	2015	2016
Acadiana Technical College*						
Baton Rouge Community College						X
Bossier Parish Community College						
Capital Area Technical College**						
Central Louisiana Technical Community College						
Delgado Community College						
Fletcher Technical Community College						
Louisiana Delta Community College						
Louisiana State University-Eunice		X				
Northeast Louisiana Technical College*						
Northshore Technical Community College						
Northwest Louisiana Technical College						
Nunez Community College						
River Parishes Community College						
South Central Louisiana Technical College						
South Louisiana Community College						
Southern University at Shreveport				X	X	X
SOWELA Technical Community College						

Source: Louisiana Board of Regents

*In 2013 Acadiana Technical College and Northeast Louisiana Technical College were merged with South Louisiana Community College and Louisiana Delta Community College, respectively so were not evaluated separately in 2013, 2014, 2015, & 2016. **In 2014 Capital Area Technical College merged with Baton Rouge Community College so was not evaluated separately in 2014, 2015, & 2016.

Vita

Bridget Smith Peters was raised in Prairieville, Louisiana. In 1992, she moved to New Orleans to attend Tulane University. She graduated in 1996 with a Bachelor's degree in Political Science and History. In 2014, she joined the graduate program in the Department of Political Science at University of New Orleans. She and her husband currently live in Metairie, Louisiana.