Longitudinal Trend Analysis of Performance Indicators for South Carolina's Technical Colleges

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LONGITUDINAL TREND ANALYSIS OF PERFORMANCE INDICATORS FOR SOUTH CAROLINA’S TECHNICAL COLLEGES

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Educational Leadership

by
Mohammad Nurul Hossain
August 2010

Accepted by:
Dr. James Satterfield, Committee Chair
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Dr. Larry Grimes
Dr. Mike Campbell
ABSTRACT

This study included an analysis of the trend of performance indicators for the technical college sector of higher education in South Carolina. In response to demands for accountability and transparency in higher education, the state of South Carolina developed sector specific performance indicators to measure various educational outcomes for each of the 34 public colleges and universities in the state. Performance indicators allow an institution to compare its position in key strategic areas to peers, to past performance, or to previously set goals. The state assigned 13 performance indicators to the technical colleges. The study analyzed six specific indicators which measure faculty credentials, faculty compensation, program accreditation, graduation rates, graduate scores on professional examinations, and institutional accessibility. The results reflected on the effectiveness of the performance system and its impact on two-year technical colleges. The overall mean of the trend data changed from 2.645 in 1998-1997 to 2.703 in 2004-2005. The researcher found that there was a very significant curvilinear relationship between the variables. The average score decreased until year 4 then increased steadily thereafter.

The study was conducted in two phases, where the second phase was built upon the first phase. Phase one involved statistical testing for the differences in the means of the performance indicators among the colleges. One-way ANOVA along with Tukey’s and Games-Howell multiple comparisons statistical techniques were used to test the hypotheses for each of the six performance indicators.
The results of the statistical analysis were mixed. Outcomes supported the null hypothesis that no differences in performance, as measured by the indicators, existed between the technical colleges in terms of faculty credentials, graduation rates, and accessibility to the institution. However, the results refuted the hypothesis that no differences in performance (as measured by indicators) existed between the technical colleges when it comes to faculty compensation, program accreditation, and scores of graduates on professional examinations. ANOVA and multiple comparisons tests Tukey’s or Games-Howell’s established that significant disparities remain among the technical colleges in these critical success areas.

In phase two of the study an online survey was administered to the senior administrators of the selected technical colleges. Analysis of the survey results highlighted the strengths and weaknesses of the performance system as it relates to the critical success areas of technical colleges.
DEDICATION

I dedicate this dissertation to the loving memory of my heavenly parents, the late Sharifun-Neesa (1929-2007) and late Mohammad Nasir Uddin Mollah (1924-1997). It is with deep appreciation that I acknowledge the sacrifices and the investments they made on my behalf by affording me with the opportunities in seeking ethical, cultural, spiritual, and scientific knowledge.
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the bottom of my heart for being there for me, always.

I thank Almighty Allah for all the blessings He has bestowed on me and my
family. I would close this acknowledgement with a prayer from the Holy Quran,
“Rabbee Zidnee Ilm – My Lord, increase me in knowledge” Ameen!
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CHAPTER ONE
INTRODUCTION

Background and Context

Throughout the twentieth century, higher education in the United States has experienced unprecedented growth and vitality. Pundits and scholars of all ages have generally emphasized the virtues of higher education at every possible opportunity. Every level of social status valued post-secondary education as a gateway to a better life and greater economic prosperity (Marcus, 2003). This research study conducts trend analysis of the performance indicators of two-year technical colleges in South Carolina, and highlights the strengths and weaknesses of the higher education performance system. Performance indicator is the metric which measures achievements in critical areas of an institution of higher education (Burke, 2002; Marcus, 2003; and Woodley, 2005). Based on the requirements of the Performance Funding Act 359 of 1996, the South Carolina Commission of Higher Education (SCCHE) in cooperation with each public college or university developed those specific performance indicators (SCCHE Report, 2005a).

Due to increasing political, financial, and enrollment pressures (Alexander, 2000), South Carolina adopted a series of higher education public policy initiatives during the 1990s and joined an increasing number of states to address the issues of accountability in higher education, particularly in the technical college sector. The South Carolina Education Accountability Act of 1998 defines accountability as a commitment to public higher education. South Carolina enacted one of the most comprehensive performance
systems among the peer states that have adopted this system in higher education. During the last 10 years South Carolina’s performance system has gone through a few generational changes to its current state. It is envisioned that the methodology presented in this study will encourage a widespread standardization among technical college administrators in South Carolina and the greater southeastern states. This study builds upon the previous higher education accountability scholarship by situating the research in the technical college sector.

The purpose of the performance system in higher education was to address issues such as transparency, external accountability, enhancing performance, meeting states’ needs, and augmenting funding (Burke, 2002). During the last two decades, higher education has undergone spectacular changes, in terms of new technology, pedagogy, and funding. Katz and associates (1999) noted that, “as information technologies and resources pervade our institutions, the interrelationships among campus citizens, capital resources, technologies, and practices form a crazy quilt that befuddles analysis and decision making” (p. xxi).

**Statement of the Problem**

The higher education performance system in South Carolina has been in effect since fiscal year 1996-97. The performance system was an accountability mandate that had to be implemented over a 10-year period in order for the technical colleges to improve institutional efficiency and effectiveness of the education they offer. The performance indicator is a measure of the institutional health and effectiveness of various
programs it offers. The performance indicators allow an institution to compare its position in critical areas of success to peers, to past performance, or to previously set goals. The South Carolina General Assembly assigned 13 performance indicators to the technical colleges. Nationwide, two-year public technical colleges face challenges that are unique to this sector of higher education. South Carolina technical colleges are fraught with issues such as poor retention, low rate of graduation, and overall image problems among high school counselors, parents, and prospective students.

The available literature revealed some of the fundamental problems of the performance system significant to this study. The evolutionary process used in developing performance indicators did not engage all stakeholders of higher education (Marcus, 2003). Incentives associated with accomplishment of the performance objectives were scarcely adequate (Fulks, 2003). Hopkins (2001) reported that use of performance indicators did not guarantee equal performance for all technical colleges in the system. For South Carolina’s technical colleges all operating funds are generally allocated based on total full-time equivalent (FTE) and not on the institutional performance (Salerno, 2002). Comparative data are not readily available for use by the administrators and educational outcomes based on data are often complicated (Burke, 2002). Constituencies of higher education were not well-informed about the implications of performance systems – even faculty and administrators were uninformed, let alone students and parents (Fulks, 2003; Marcus, 2003).
Purpose of the Study

This study included an analysis of the trend of performance indicators for the technical college sector of higher education in South Carolina. Each year, as a key component of the Educational Accountability Act, the technical colleges in South Carolina devoted considerable efforts and resources in measuring performance indicators, and generating reports for the state. The purpose of the study was (a) to conduct a trend analysis of performance indicators of South Carolina’s technical colleges, and (b) to explore the experiences of senior-level administrators regarding the implementation of the performance indicators. The objective was to highlight key strategic institutional factors that influence the quality and effectiveness of higher education at South Carolina’s technical colleges. The trend analysis was conducted using the SPSS package on all available performance indicator data for the study period.

The study focused on the efficacy of the performance indicators and how they were implemented in measuring institutional achievements in key areas of higher education, especially the technical education in South Carolina. Woodley (2005) recommended a need for a longitudinal study of the performance system of South Carolina’s colleges due to its comprehensive and controversial character.

Justification of the Study

Accountability and quality of higher education have been a national focus since the 1970s (Burke & Serban, 1998; Wilmoth, 1989). South Carolina’s public colleges and universities are accountable to many external and internal stakeholders such as the State
Legislature, the Commission on Higher Education (CHE), and the Southern Association
of Colleges and Schools (SACS). Many attributes of institutional accountability are
measured using the performance indicators in the areas of faculty qualifications, user
friendliness, accessibility, graduation rates, and program accreditation (Regents of the
University of Minnesota, 2005).

The 1990s saw the noteworthy rise in the number of states initiating
accountability programs to hold public institutions of higher learning accountable for its
performance and quality (Naughton, 2004). The instruments of accountability in higher
education, such as performance funding, budgeting, and reporting were adopted from the
corporate management theory of Mintzberg (Woodley, 2005). The goal was to run higher
education like a business, using business principles and utilizing corporate business
models (Fulks, 2003). Fulks also notes that, besides advancing the quality and the
effectiveness of college education, the state and federal legislators introduced the
performance-based funding to improve institutional response to state and legislative
priorities scaffolding economic diversity and workforce development. In her studies,
Fulks (2003) concluded that “Performance based funding represents a convergence of
political, legal, and economic factors in higher education” (p. 21). In addition to
enhancing institutional achievements, the state legislators wanted to see the cost of higher
education go down while increasing accessibility for all students through rigorous control
of the resources (Rupert, 2001). Improving program accreditation, accessibility,
enrollment, graduation rate, and employment of graduates in technical education are
Some of the performance system objectives established by the South Carolina General Assembly.

Some of the early efforts in accountability and efficiency in higher education were voluntarily initiated by the institutions themselves based on the inquiries from the external agencies such as the employers and the lawmakers (Marcus, 2003). However, a considerable amount of time, effort, and costs were associated with their implementation (Woodley, 2005). Public funds have been extended to those institutions of higher studies that have demonstrated efficiency in using resources and effectiveness of the education and training they provide (Burke, 2002). Fulks (2003) reported that inequitable allocation of state funds based on performance had the unintended consequence of increased competition among sister institutions; other consequences she noted resulted in funds being taken away from those schools that needed them the most. Woodley (2005) attributed the growing popularity of the performance system in the United States to comprehensive reduction in funding and at the same time to meeting the demands of higher enrollment. According to Lingenfelter (2003), “Educational accountability systems should be judged not in terms of their justice in rewarding or penalizing performance, but in terms of their effectiveness” (p. 20). Thus, there is a need to reflect and understand the implications of the performance system that has dominated the agenda of higher education in South Carolina for more than a decade.
Theoretical Framework for the Study

Talcott Parsons’ (1978) social action system provides the theoretical lens through which to understand the institutional performance system adopted by the South Carolina General Assembly. The action system of an organization is composed of actions of the individual, groups, or the organization, and can be viewed from the perspectives associated only with performance, with learning, or with both performance and learning.

The system of actions describing organizational performance carries out respective functions using different combinations of the same actions. The performance system is identified and associated with institutional achievements and is designed to produce a report. This action also contributes to institutional learning. Interaction of the institutional effectiveness and learning allows the organization to change and adapt to its new environment. The higher education performance system in South Carolina is an outgrowth of the institutional learning process. Schwandt and Marquardt (2000) claimed that “Organizational learning is manifested through interrelated patterns of human actions, processes, and objectives, and therefore constitutes a system – in fact, a system of human actions” (p. 54) recognized as the performance system.

The performance of an organization consists of behaviors by which it defines the status of its actions when compared to others in its peer group (Schwandt and Marquardt, 2000). The analysis of actions and outcomes has normally required the use of performance management systems. The performance systems depend on subsystems that are each responsible for accomplishing the functional prerequisites identified in Parsons’ (1978) action system.
Accordingly, the performance system in South Carolina represents a complex interrelationship between people, their actions, symbols, assumptions, and processes within each public institution of higher education. The higher education performance system of South Carolina involved major organizational learning for the public colleges and universities and their administrations.

The development of the performance system and its implementation to the public institutions of higher education in South Carolina involved a rigorous learning process both from the perspective of the State Legislature and the public colleges and universities.
The conceptual framework for the study shows that historical data related to performance indicators for South Carolina’s technical colleges were collected and analyzed. In addition, an online survey related to the specific performance indicators was administered to presidents, vice presidents of business, and vice presidents of academic affairs. Findings, conclusions, and recommendations are presented.
Performance Indicators

The South Carolina General Assembly along with the Commission on Higher Education (CHE) identified 13 performance indicators, also known as the critical success factors, for the technical colleges. Since 2003 research universities and four-year colleges in South Carolina have been evaluated based on 14 indicators, and technical colleges evaluated based on 13 indicators (SC CHE Report, 2003). Eight of the 13 performance indicators are evaluated quantitatively and assigned a score from 1 to 3 based on quality. The indicators are sector specific and as such those for research universities are different from those for the technical colleges. For this study, the following six key indicators were considered because only data for these were available for the entire implementation period of seven years.

- 2A – Faculty credentials
- 2D – Compensation of faculty
- 3D – Accreditation of degree-granting programs
- 7A – Graduation rate
- 7D – Scores of graduates on professional and certification tests
- 8C – Accessibility to the institution of all citizens of the state
Quantitative Research Analysis

Based on the available data and the literature, the researcher concluded that a quantitative research study would best address the issues regarding the performance indicators for the technical colleges of South Carolina. The Dependent variables in this case were the performance indicators, and the independent variables were the individual technical colleges. The researcher used seven years of performance indicators data available from the Technical College System website for all 16 technical colleges to answer a set of research questions. The following research questions guide this study:

Phase One Research Questions

1. What are the data trends of the performance indicator scores throughout the implementation phase (seven years) of the performance system?

2. Are there any significant differences among the overall performance indicator scores of the technical colleges?

3. Are there any significant differences among the performance indicator scores of the technical colleges for specific indicators (2A, 2D, 3D, 7A, 7D, and 8C)?

The research was designed as a two-phase inquiry in which the second phase built on the first phase. The first phase involved data analysis using the statistical analysis software SPSS package, and the second phase involved conducting an online survey using Zoomerang. The online survey was administered to senior level college...
administrators of selected technical colleges who have considerable knowledge and experience in the policies and practices in higher education.

**Phase Two Research Questions**

The survey results answered the following additional questions.

1. What are administrators’ experiences regarding benefits of South Carolina’s performance system for the technical colleges?

2. What are administrators’ experiences regarding drawbacks of South Carolina’s performance system for the technical colleges?

3. Which performance indicators are considered most appropriate by the administrators?

**Definition of Terms**

The following terms are used throughout this study.

- *Performance Indicators* refer to “ratios, perceptions, or other qualitative values that allow an institution to compare its position in key strategic areas to peers, to past performance, or to previously set goals” (Marcus, 2003; p. 9).

- *Quality* was referenced within the mission statement of a college (Marcus, 2000). It is assumed that “quality is conformance to mission specification and goal achievement within publicly accepted standards of accountability and integrity” (Bogue & Saunders, 1992; p. 20). Achieving the mission and goals is an integral part of a quality program or institution (Marcus, 2000, p. 14).
• **Productivity** is a measure of efficiency. For an educational institution, productivity indicates measurable outcomes such as the number of completers within the specified amount of time as prescribed by the state, or the number of FTE generated by the institution (Wilmoth, 1989).

• **Efficiency** deals with the use of limited resources to achieve an objective (Blattner, 1998; p. 31). In producing goods and services, efficiency deals with the input aspects of the process, whereas effectiveness focuses on the outcome side of the process.

• **Effectiveness** entails achievements of the organization’s objectives. Keller (1970) noted that the measurement of effectiveness in higher education included issues such as “economic, social and personal attributes of alumni… first offered wage; cumulative income; … voting frequency… book and magazine reading frequency” (Blattner, 1998, p. 12; Keller, 1970, pp. 7-8). External agencies such as Accrediting Board of Engineering and Technology (ABET) and Southern Association of Colleges and Schools (SACS) have identified “a desire to life-long learning” as a determinant of the effectiveness of higher education.

• **FTE** is an acronym for “full time equivalent” – a unit of measurement of productivity in an educational institute. A full-time equivalency student was defined as one taking exactly 15 credit hours of course-load per semester. A full-time equivalency teacher was similarly defined as one teaching exactly 15 credit hours a semester.

• **Public community colleges** are institutions of higher education, supported by public funds and governed by a publicly-appointed board/commission (with member serving a fixed term), that offers courses and programs of study limited to the first two
years of post-secondary education in at least two of the following areas: associate degrees, college transfer credits, occupational-technical training, community service, and continuing education (Arney, 1969; Duffy, 1979, p. 9).

- **Performance-based funding** is the political trend to provide or justify funding contingent upon successful achievement of goals or outcomes (Fulks, 2003).

“Essentially, it (performance funding) seeks to address the qualitative as well as quantitative dimensions of the results generated through the activities or functions of a budget” (Gillet-Karam, Goonern, Mulder, & Roseblum, 2001, p. 65). “Performance funding is a method in which an evaluation of an output mechanism is utilized in an effort to monitor the quality, efficiency, and effectiveness of the institutions within public higher education system” (Williams, 1998, p. 2).

**Research Design and Methodology**

This research study was designed as a trend analysis, based on the research questions and the comprehensive literature reviews. This is a quantitative research study and the necessary data were obtained from printed reports, electronic sources, and surveys. The quantitative data sources included published reports from the South Carolina Legislature, the state statistical reports, the South Carolina CHE website, and the Technical College System websites. Descriptive and inferential statistics were used to analyze the data. The online survey was administered to the college presidents, vice-presidents, vice-presidents of business affairs, and other administrators directly associated with assessment and evaluation of the performance indicators. The survey
instrument was developed using Zoomerang, a web-based resource, based on the literature review and the research questions.

**Delimitations of the Study**

The scope of this case study was limited to the institutional achievement data available from the 16 technical colleges within the South Carolina technical education system. The online survey with technical college administrators highlighted the strengths and weaknesses of the performance system.

The study focused on the specific performance indicators assigned to technical colleges and did a trend analysis of six out of the 13 indicators, since the full range of data is not available for the rest of the indicators. Based on a survey of technical college administrators, the researcher also highlighted the strengths and weaknesses of the performance system as it relates to technical colleges.

**Significance of the Study**

The research contributes to a growing body of knowledge and literature that provides an understanding of the implications of the performance system, state policies and practices, and various accountability initiatives on higher education in order to improve institutional performance. The research identifies the performance indicators that are critical to the institutional mission, and highlights the strengths and weaknesses of the higher education performance system for technical education in South Carolina.
Organization of the Study

Chapter one provides an introduction and a history of the performance system in higher education along with the theoretical perspective that informs this study. This chapter identifies issues related to the performance system and the performance indicators. The purpose of the study along with the research questions are also presented in this chapter.

Chapter two provides a review of the pertinent literature on technical and community college performance systems in the United States as it was initiated in the 1980s. The chapter ends with an overview of the South Carolina performance system and its impact on higher educational institutions. Chapter three elaborates the research design and methodology employed in this study. Methodology employed includes data-mining from various electronic and print media sources, and state and federal government websites. A survey with randomly selected technical college administrators will reveal their experiences and perceptions of the performance system, and its strengths and weaknesses.

Chapter four covers the analysis of the data and findings. Analysis includes discussion of research findings and survey outcomes. Descriptive and inferential statistics were used to analyze the available data. Statistical analysis software SPSS was employed for this purpose.

Chapter five provides conclusions and recommendations. This chapter will include a discussion that links the theoretical framework, literature review, and summary of research findings. This chapter will also put forward general suggestions on higher
education policy matters that impact institution and personnel, and recommendations for future research in the areas of institutional achievements and accountability.
CHAPTER TWO
REVIEW OF THE LITERATURE

Overview

Chapter 1 provided the background and context of performance indicators as they relate to institutional quality, achievements in key success areas, and accountability in higher education. This chapter presents a review of the literature pertinent to higher education policy and practices such as the Educational Effectiveness Act and the Performance Funding Act, along with a context for the depth and scope of available literature in the field. The chapter covers a brief history for the development of performance indicators in response to demands for quality and accountability. The literature review focused on the benefits of performance indicators and the legal protections that these data can provide. A brief background of the performance indicators of other states is also included. The chapter concludes with a summary of the literature review.

Transparency and Accountability in Higher Education

Among many ambitious goals, the purpose of the performance indicator system was to improve transparency, productivity, and accountability in higher education. Martin (2004) articulated a study by Carlin (1999) on the issues of productivity and accountability by stating the following:

Higher education stakeholders are demonstrating a renewed interest in monitoring productivity and accountability, suggesting lost confidence in the academy.
Boards of Trustees and senior leaders across the country are being pressured to run higher education “like a business” with profit/loss statements and improved returns on investments. Tenure is being challenged, with nonacademic leaders referring to tenure as “an immoral business practice with a mandate for faculty to be unaccountable to the customers they serve.” (p. 16)

Also, Martin (2004) highlighted several other issues often associated with higher education in general, such as exorbitant tuition, tenure, unnecessary research with no practical outcomes, low admission and graduation standards, remediation, numerous existing programs, light teaching loads, lack of accountability, narrow-minded faculty unions, and shared governance that leaves nobody in charge. In order to meet the global economic challenges and the social diversity of the twenty-first century, leaders in higher education must provide college goers opportunity, access, and a learning environment that make them fitting for the changing landscape (Marcus, 2003). University and college leadership must adapt to policies and practices that enhance both student access and success. The Performance System Acts enacted by the South Carolina General Assembly purport to do just that (SCCHE Report, 2005b).

**Purpose of the Performance System**

The two-year technical colleges are entirely dependent on public sources such as federal, state, and county governments for their financial supports. These public institutions are under various external mandates and demands, which limit their actions and choices (Marcus, 2003). This study uses Parsons’ (1978) Social Action Theory to
explicate the impact of the accountability acts on the exchange of resources between the state and individual institutions. The performance systems were born out of both political and financial necessity in the 1980s as the focus in public higher education shifted from capacity building to transparency and accountability. Burke (2002) reported that the most commonly listed purposes of the performance systems include (a) institutional improvement, (b) increase of the state appropriations, (c) meeting statewide objectives, and (d) external accountability.

Burke (2002) also noted that “…campus leaders clearly favor institutional improvement, followed closely by increased state funding. Meeting states’ needs came in a trailing third place and external accountability as a distant fourth” (p. 66). A survey conducted by Woodley (2005) established that out of the four listed purposes, only external accountability won the majority consensus from the campus leaders.

**South Carolina Education Accountability Act**

The South Carolina Education Accountability Act of 1998 defines accountability as a commitment to public higher education in the following paragraph:

Title 59 – Education, Article 1, and Section 59-18-100, performance based accountability system for public education established "accountability."

Accountability, as defined by this chapter, means acceptance of the responsibility for improving student performance and taking actions to improve classroom practice and school performance by the Governor, the General Assembly, the
State Department of Education, colleges and universities, local school boards, administrators, teachers, parents, students, and the community. (Ch. 18)

Among the many prevailing theories on accountability and quality in higher education, Bogue and Saunders (1992) offered the most pertinent perspective on issues that are linked to the mission of the institution. Their theory assumes that “quality is conformance to mission specification and goal achievement within publicly accepted standards of accountability and integrity” (p. 20). Marcus (2003) noted that performance indicator is different from management statistic in that the latter is data of interest, which are not associated with institutional goals, whereas the former is linked to a program or institutional goals.

The history of performance systems was grounded in *performance reporting*, required by most states in the U.S. in the late 1990s. The outcomes of such reporting included issues such as quality of education, mandated efficiency, and the quality of graduates (Fulks, 2003). The goal of the state legislators was to establish a link between the capital dollars and the institutional performance in key success areas. The purpose of the performance models has been to define and measure success, which is difficult to assess in higher education. According to Fulks (2003):

Performance measures tend to be quantitative or anecdotal and often do not address the heart of political concerns and priorities. Even total fulfillment of the stated measures may not produce the changes desired by the political policy makers. From the institutional perspective, legislated mandates can diminish or damage institutional diversity (a key mission …), and represent a severe challenge
to institutional autonomy. Institutions have complained that implementation and reporting consumed a majority of the allotted funding that should be invested in improving performance. Competition among campuses may create a situation where those needing to improve the most are continuously outperformed … receiving fewer dollars, (sic) restricting their ability to improve. (p. 10)

Institutional Effectiveness

Starting with the Institutional Effectiveness Act of 1988, South Carolina initiated an early effort in the nation for accountability in higher education and orchestrated funding based on institutional needs and quality of education (SCCHE Report, 2005b). South Carolina received the prestigious Fund for Improvement of Postsecondary Education (FIPSE) grant from the U.S. Department of Education in 1999 for a three-year pilot study of performance funding. Additional FIPSE grants from the U.S. Department of Education were extended to South Carolina in 2002, surpassing four other states – California, Connecticut, Arkansas, and Oklahoma. The objective was to make better use of the accountability acts to contain costs in higher education, improve student learning, and regain public trust (SC CHE Report, 2005b).

Creech (2000) noted that private accrediting agencies list the following measures that are frequently used to assess institutional effectiveness:

- The percentage of entering students who return for their sophomore, junior and senior years and who complete degrees
- Students’ achievement in general education and in their majors
• Survey of students’ perceptions of and satisfaction with their academic programs
• Opinions from students, alumni, and employers about the quality of graduates
• Job placement rates of graduates
• The number of students admitted to graduate and professional schools and their performance in these schools. (p. 10)

The performance indicators were an integral part of the South Carolina Performance Funding Act 359 of 1996. Performance indicator was the metric used in measuring the effectiveness of the performance system in higher education. A set of success factors were developed by the South Carolina Commission on Higher Education (CHE), in cooperation with each public college or university, that measures achievements in key areas of the institution (SC CHE Report, 2005a, 2005b). Marcus (2003) noted that the performance indicators have significant implications for the future of each public college since they heavily depend on public finances. The South Carolina General Assembly along with the CHE identified 13 performance indicators, also known as the critical success factors for technical colleges. Studies conducted by Burke and Serban (1998) and Marcus (2003) recognized that in higher education, the linkage between performance indicators and performance funding is incredibly close. Gaither, Nedwek, and Neal, (1994) identified performance indicators based on assessment of the outcomes, quality of the inputs, and assessment of critical process points in the educational process.

Due to increased financial and political pressures, performance funding schemes have gained strength and popularity among the institutions of higher education (Marcus,
Burke and Serban (1998) noted that the inopportune budget woes of the 1990s were devastating for the public institutions of higher education, since education is the biggest discretionary item in the state budget and has to compete with many other contending needs such as social services, corrections, and K-12 education.

According to Gaither, Nedwek and Neal (1994), the measurement of the institutional outcomes is the most well known of the performance indicators. This type of indicator includes measurable educational outcomes such as percent of graduates, number of degrees awarded, the number of undergraduate students admitted to graduate programs, and the number of publications by faculty. For junior institutions, community and technical colleges, these outcomes include the graduation rates, the number of students transferring to a four-year college, number of job placements relevant to the field of study, and the starting salaries associated with these placements (Marcus, 2003).

**Theoretical Orientation**

The institutional performance consists of behavior by which an organization disrupts or suspends its situation to a degree. The analysis of actions and their products has normally required the use of a performance management system. The performance system is an innovation that was adapted by most states in order to achieve excellence and hold institutions accountable to the stakeholders (Burke, 2002; Marion, 2002). In addition to Parsons’ social action theory (1978), institutional theory (Mintzberg, 1979) provides a practical insight in explaining the introduction of the performance system into higher education policy and practice. South Carolina was one of the late adapters of
performance systems for accountability. Institutional theorists DiMaggio and Powell (1983) argued that legitimization is at the heart of institutionalism. Based on their theory it can be claimed that institutional isomorphism played an important role in adapting performance systems for the higher education system in South Carolina.

Marion and Flanigan (2003) argued that “upward legitimizing pressure is particularly potent when legislative behavior has the appearance of being punitive (i.e., catering to control preferences), but that it is less potent when action is perceived as improving the effectiveness of those targeted by the action” (p. 3). King (2002) articulated a study by Marion (2001) as “mutual interdependence among the organizations leads to common beliefs” (p. 19). King noted that institutionalism can offer insight into the cause-and-effect relationship that is in action in the South Carolina higher education system.

Regardless of orientation, states tend to mimic programs that have shown success in other states. The dynamics that underscore Institutional Theory eventually influence similar organizations (e.g., the states) toward a status of mimetic isomorphism (Marion, 2002). Implementation of education lottery by various states to finance education is an example of such mimicry.

Parsons’ (1978) social action theory provides a lens through which one can understand institutional performance and learning in a social system. This provides a comprehensive framework demonstrating the underlying connections between the social actions and the cognitive capacities of an organization (Parsons, 1978). The action system of an organization is composed of actions of the individual, group or the institution, and
can be viewed from the perspective of association with performance, with learning, or with both performance and learning. The organizational changes transpire through a harmonized effect of performance and learning actions of the various subsystems within the organization. The organizational acts associated with production of institutional effectiveness are designed to produce a report known as \textit{performance}, which is at the heart of the performance system in higher education. Marcus (2003) claimed that the formulation of performance indicators to measure key institutional achievements was an evolutionary idea but at times lacked focus. Parsons (1978) claimed that changes that take place in a social system are achieved through both improved performance and enhanced learning.

\textbf{The Economic and Workforce Development}

In addition to offering associate degrees in engineering technology and health care, business and computer, and providing community services, the technical colleges of South Carolina play a major role in economic and workforce development. More than fifty percent of all college-goers in South Carolina attend the 16 technical colleges. The fifty percent of all technical college attendees participate in credit programs and pursue associate degrees, and the other fifty percent get job training on their own or through their employers. The unemployed and the indigent citizens of the state receive both two-year associate degrees and one-year diplomas through the credit programs, and short-term career development trainings, such as \textit{certificates} through the continuing education efforts paid for by the various state and federal grants programs (Technical College Facts,}
During the 2004-05 fiscal year, the technical colleges in South Carolina contributed nearly $2.5 billion to the state’s economy (SBTCE Report, 2006). The total impact of the 16 technical colleges includes $988 million in direct and indirect spending, $487 million in enhanced earning power of trainees and graduates, and $996 million in economic investment due to the presence of the technical colleges (SBTCE Report, 2006). In 2006, York Technical College, a medium-size technical college in South Carolina, generated over $200 million impact on the local economy from job creation to contribution to the local and state revenues (York Technical College Fact Book, 2006).

In order to meet the requirements of the job market for a skilled workforce, and subsequent public demand for affordable education and training, public technical colleges in South Carolina were established during the 1960s and 1970s. By the 1970s, the political climate of public funding in higher education had changed, and attention was focused from capacity building to institutional performance and accountability (Wilmoth, 1989).

During the period of this study, funding and fiscal responsibilities were the two most critical issues in higher education (Blattner, 1998). Apprehensions surrounding how revenues were generated at institutions of higher learning and how effectively it was being spent led to many legislations and accountability acts (Burke & Serban, 1998). In her critical study of educational funding through *Partnerships for Excellence* for the California community college system, Fulks (2003) found that although funds were reduced or eliminated, the educational outcomes were not compromised or eliminated from the formula making it rather difficult for the community colleges to run. In 1998 the
California legislature introduced performance-based funding, called *Partnership for Excellence*, for community colleges within the higher education system in order to dissuade competition among the sister colleges. Based on these funding acts, community colleges in California were fully funded for the 2001-2002 academic year (Fulks, 2003).

Breneman (2004), in his study on shrinking state support, concluded that recent budget cuts “coincided with a demographic upturn in high school graduates, so that colleges and universities are under pressure to increase enrollments just as state support is dropping sharply” (p. 3). Winston (1999) observed that every institution of higher study in the United States is run like a business, since they produce and sell academic services to clients in exchange for money. In comparing higher education with business, Woodley (2005) noted:

> It (higher education) purchases inputs (a student’s own peer quality being one of those inputs) that it uses to produce that product. Winston (1999) contends that microeconomic theory can be useful in understanding the economics of higher education and how policy leaders can better understand and evaluate the behavior of colleges and universities based on these insights. He also warns that there is a limit to the appropriateness of using the economic analogy in the context of higher education because it is a complicated and unusual industry. (p. 45)

**Organizational Efficiency and Effectiveness**

The self-regulatory processes that dominated the university development for most of the twentieth century were no longer practical to the external agencies
due to the economic recessions of the 1980s and the 1990s (Alexander, 2000). The governmental authorities pressed institutions to become more accountable. Accountability in higher education has been linked to both organizational efficiency and its effectiveness (Wilmoth, 1989). However, there is a dearth of research literature that associates efficiency and effectiveness in higher education. In order to serve the needs of the twenty-first century workplace, external constituents are demanding reasonably acceptable quality in higher education. In higher education, efficiency and effectiveness are almost mutually exclusive where it is difficult to attain them simultaneously; one is gained at the expense of the other as Blattner (1998) noted:

Management literature on organizational efficiency and effectiveness, however, contends that it is not possible to maximize both factors at the same time. Kreitner (1995) noted efficiency and effectiveness are inversely related: if one is raised the other is lowered as a result. The job of management is to find a correct balance between the two in order to run the organization in the best way.” (p. 2)

A study by Wilmoth (1989) concluded that the performance-based funding model produced mixed outcomes, both positive and negative, and varied from state to state. The Colorado performance-based funding model, however, failed to produce the desired outcomes and thus it was discontinued (Marcus, 2003). In order to delineate the organizational differences between the academia and the industry, Winston (1999) mentioned features of colleges and universities that
make them unique from their peer industries; the most significant was “a non-profit objective function that elevates institutional mission and quality (“excellence” or “prestige”) over profits” (p. 2). Winston (1999) noted that “as an industry and market, US higher education is distinguished by a highly differentiated hierarchy that rests on differences in schools’ access to those non-price resources” (p. 2).

**The Performance Indicators**

Performance indicators prescribed by South Carolina were found to be sector specific. In order to measure and report performance in strategic areas of each public college or university, South Carolina established a direct correlation between specific institutional achievements and the state’s objectives of economic and work force development (SC CHE Report, 2005a). The South Carolina Commission on Higher Education (CHE) in collaboration with each public college and university developed the performance indicators. The performance indicators thus closely reflected the institutional mission of each technical college where job training and work force development is an integral part of the institutional mission. Each performance indicator measures a specific institutional achievement in areas of graduation rates, faculty qualifications, program accreditation, and access to the college. Since 2003, research universities and four-year colleges in South Carolina were evaluated based on 14 indicators and technical colleges evaluated based on 13 indicators (SC CHE Report,
Eight of the 13 performance indicators are evaluated quantitatively and assigned a score from 1 to 3 based on quality.

Performance indicators, as a measure of productivity in post-secondary education, were used since the early 1980s. Marcus (2003) provided a historical account in her study concerning use of these criteria as measures of performance and quality control. Performance indicators were more widely utilized in the United States and the developed nations in Europe to measure productivity in higher education.

In summarizing his studies on economic and social benefits of vocational education, Wilmoth (1989) claimed that:

The effectiveness of an education or training program can be measured in terms of benefit to the individual or society. While it is generally accepted that education is a major contributor to the economic productivity and advancements of this nation, questions remain regarding the magnitude of the contribution of vocational education and degree to which the program benefits or exceeds the cost of vocational education programs. Further, the extent of differences in costs and benefits within vocational education… and other educational training programs is unknown. (p. 53)

The challenges in higher education lie in identifying the critical issues that are determinants of quality, efficiency, and effectiveness of vocational and technical educational programs. Hopkins (2001) argued that researchers have yet to come up with a model of measurement that can clearly identify inputs and outputs, and can define the
complex nature of the relationships that exist between the instructor, student, and research, and the interactions that take place among all these entities.

Nicholson (1995) indicated three interrelated measures of efficiency for a non-academic system echoed by modern economists: (a) technical efficiency – related to the utilization of the human resources and the physical facilities in the most effective way possible, (b) allocative or price efficiency – how effectively the available capital funds are disbursed and utilized, and (c) economic or overall efficiency – a product of the former two types of efficiencies. Most researchers in higher education agree that there should be a universally accepted scheme of measuring productivity and effectiveness in higher education; however, there is none in existence at the time of this research that is used by all post-secondary institutions.

Marcus (2003) noted the following in her study about South Carolina’s performance funding system:

Currently, the state of South Carolina Commission on Higher Education establishes funding levels for each institution based upon its mission and upon projected enrollment in each instructional program. Costs include instruction, research, public service, libraries, student services, physical plants and administration. The amount of state funding needed is determined by subtracting projected revenues from the total cost of operations. State funds are then awarded to each institution based upon its performance on key indicators. (p. 32)

The South Carolina General Assembly provided regulations that allowed for a three-year phase-in period for implementing a performance system that would measure
institutional outcomes in key strategic areas (SC CHE Report, 2005b). Marion and Flanigan (2003) claimed that South Carolina legislators institutionalized this act following the normative and the mimicking legitimizing pressure, which was the eleventh performance funding initiative, and thirteenth accountability initiative in the United States. This act followed prior reporting mandates of the 1980s from the legislature which required that “institutes of higher education report (among other things) number of programs accredited; alumni survey reports, placement data reports, and results of professional examinations” (Marion & Flanigan, 2003; p. 11).

The South Carolina Act 629 of 1988 required annual reporting of all 34 public colleges in the following 17 areas of activities:

1. General education
2. Major or concentrations
3. Performance of professional program graduates on licensing and certification examinations
4. Report of changes in academic program evaluations
5. Academic advising
6. Entry level placement and development education
7. Success of entering students in meeting college or university admission prerequisites
8. Achievement of students transferring from two- to four-year institutions
9. Analysis of undergraduates’ retention and attrition
10. Minority student and faculty access and equity
11. Academic performance of student athletes
12. Procedure for student development
13. Library resources and services
14. Administrative and financial processes and performance
15. Facilities
16. Community and public services
17. Research activities and funding generated from research

Subsequently, Act 359 of 1996 specified use of 37 performance indicators in the following nine critical areas of concentration:

1. Institutional mission focus
2. Quality of faculty
3. Instructional quality
4. Institutional cooperation and collaboration
5. Administrative efficiency
6. Entrance requirements
7. Graduates achievements
8. User friendliness of the institution
9. Research funding

Performance Indicators for the Technical College Sector

The performance indicators for the South Carolina technical college sector, which reflect the mission of the college, were developed by the South Carolina Commission on
Higher Education (CHE) in cooperation with the colleges. As mentioned earlier, the performance indicators are sector specific. Table 2.1 lists the performance indicators that are specific to the technical education sector in South Carolina.

Table 2.1

*Technical College Critical Success Factors (Performance Indicators)*

<table>
<thead>
<tr>
<th>Sector</th>
<th>Total Indicators</th>
<th>Number of Indicators Scored 1, 2, or 3</th>
<th>Indicators Specific to Technical Colleges*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Colleges</td>
<td>13</td>
<td>8</td>
<td>1B, 1C, 1D/E, 2A, 2D, 3D, 4A/B, 5A, 7A, 7B, 7C, 7D &amp; 8C</td>
</tr>
</tbody>
</table>

*See Chapter 1 for description of the individual indicators

Among the 37 indicators originally proposed by the CHE for higher education, only 13 indicators apply to two-year technical colleges. Each technical college measured only 8 out of the 13 indicators each year of the study period. Based on CHE recommendation, remaining indicators were evaluated only for three successive years.

**Summary**

Both economic strain and political climate have contributed to the popularity of the accountability systems in higher education in the United States. The literature review provides a chronological account of the performance system, its origin from the corporate management system, and how it has been used by the states for transparency, quality, and accountability in higher education. The literature review established that South Carolina
General Assembly implemented one of the most comprehensive performance systems in the nation.

The literature review also revealed how the sector-specific performance indicators were implemented to measure the key success factors for the public colleges and universities in South Carolina. Due to significant differences in operating principles, culture, decision-making, and products and services between the academia and the corporations, corporate performance theories may not always result in improving performance of post-secondary educational institutions. The literature review highlighted how the performance indicators were developed by the South Carolina CHE and how they were used in measuring quality, efficiency, and effectiveness of public technical colleges.

The literature review indicated that there is a strong correlation between the performance indicators and the institutional mission. The literature survey highlights that efficiency and cost effectiveness of two-year public institutions may be attributed to the contribution by all stakeholders such as students, parents, faculty, staff, and administrators. The literature survey also revealed that technical colleges of South Carolina play a key role in economic development, job training, and workforce development.
CHAPTER THREE

METHODOLOGY

Overview

This chapter is devoted to the research design, methods, and other critical aspects of the process implemented in this quantitative study. Kerlinger and Lee (2000) defined research design as “the plan and structure of investigation, conceived so as to obtain answers to research questions… where structure is the framework, organization, or configuration of elements of the structure related in specified ways” (p. 449). Carducci, Kisker, Chang, and Schirmer (2007) noted that “in spite of rapidly diminishing financial resources higher education scholars and researchers are actively searching for innovative means of evaluating productivity and fiscal responsibility of academic institutions” (p. 01). The primary intent of the Performance Funding Act was to provide a vehicle to meet the demands of increased fiscal accountability, institutional efficiency, and program effectiveness for the post-secondary education system. The objective of the current study was to perform a trend analysis of the most important performance indicators for the two-year public technical colleges in South Carolina. After defining the problem and reviewing the literature, the researcher determined that the quantitative method of study would be most appropriate. According to Creswell (2003), “Quantitative methods involve the processes of collecting, analyzing, interpreting and writing the results of a study” (p. xxiv). Quantitative methods can be used to analyze both numerical data obtained from experimental design and those collected from non-experimental designs such as surveys. The goal of the quantitative research is to describe the cause and effect. Kerlinger and
Lee (2000) noted that the “generalizability of the concepts and hypotheses tested through quantitative research can gain more credibility by obtaining a better link to the real world” (p. 592). A quantitative approach has its unique strengths, weaknesses, and requirements that may affect the researcher’s objectives.

**Hypotheses Testing**

Hypothesis testing is widely used for quantitative research studies in social sciences for comparing means and drawing conclusions based on the outcomes of the test. Hypothesis testing is a multi-step process where the first step is to define null and alternative hypotheses. Hypotheses are stated in terms of the null and relate to testing of the mean performance indicators of the technical colleges for the entire period of study. The following paragraphs define and establish the processes used in this study. The researcher proposes the following two hypotheses which will answer the first-phase research questions with confidence of 95 percent.

- **Null Hypothesis$_1$** – There is no significant difference in the mean of the overall performance indicators for the technical colleges.
- **Null Hypothesis$_2$** – There is no significant difference in the mean of the specific performance indicators (2A, 2D, 3A/B/C/D, 7A, 7D, 8C) for the technical colleges.
Parametric Testing: Analysis of Variance (ANOVA)

A set of six performance indicators was tested for each of the randomly selected nine technical colleges to the above hypotheses. From the value of the $F$-test statistic, and the critical value from the reference table for a given level of significance, $\alpha$, and the value of the test significance $p$, the researcher determined whether to reject the null or reject the test hypothesis in favor of the null. If the null is rejected, a post-hoc test is conducted in order to avoid a Type I error. For this purpose, additional tests were conducted using popular multiple comparison tests, Tukey’s HSD (highly significant difference) or Games-Howell. The former test is used when variances are assumed homogeneous and the latter is used when non-homogeneous variances are assumed. From the results of the multiple comparisons test it can be concluded with confidence whether there is any significant difference between the performance indicator means of various colleges or at least one of the means is significantly different from the rest.

Survey Participants

The survey participants for this study were selected at random. The researcher conducted a small sample survey of 29 participants who provided an in-depth perspective of leadership at South Carolina’s technical colleges. The survey was administered and data gathered to answer additional research questions. The survey participants included senior executives and senior academic officers; the president, vice-president of instructions, vice-president of finance, and provost of each technical college selected at random. The chosen sample of 20 technical college administrators represents diversity in
terms of institutional mission, type, and size of the institution that are typical of the technical and community colleges in South Carolina. All survey participants are professionals and over 18 years of age with significant experience in the policies and practices in technical college administration.

Sample Selection and Rationale for Population

The survey participants were selected based on their senior leadership roles and their willingness to participate. The survey participants were randomly selected in order to assure wide representation across the technical college sector (Marcus, 2003). The researcher considered that the survey participants were knowledgeable about the higher education performance system issues; however, the information collected from the participants is used anonymously in the reporting. Typical case sampling allows the researcher to draw conclusions and describe the qualities and characteristics that are typical of the population (Martin, 2004; Marcus, 2003). Based on the official positions held at the technical colleges, the executives were assumed to be well-informed about the policies and practices, especially those related to the performance indicators and their implementation in public technical colleges across South Carolina.

Quantitative Data Collection

In order to understand the impact of the performance system on the technical colleges, financial, enrollment, and performance indicator data were gathered. Sources for data involved technical colleges’ own websites, South Carolina Commission on
Higher Education (SCCHE) website, and South Carolina state government websites. The numerical data highlight the level of success or failure for each technical college, as well as the success or failure of the technical education system in general. Additionally, an online survey was administered to collect information on the implementation process of the performance indicator system. The survey data highlight the challenges and limitations that each technical college faced during the process of implementation, and effectiveness of the performance indicator system that dominated the agenda of higher education for over 10 years.

The initial step before data collection was to obtain the Institutional Review Board (IRB) approval for the survey involving human subjects. Once the IRB approval was obtained, the data collection phase followed. The data were gathered from the technical college websites and the South Carolina Commission on Higher Education (CHE) website. The historical data were gathered on 13 performance indicators over a seven-year period for all 16 technical colleges. The printed sources included annual reports, college fact books, dissertations, and published and non-published research articles.

The Online Survey

A survey provides a forum for gathering qualitative descriptive information about the contemporary policies and practices in the technical college sector of higher education that are fundamental to the problems posed in this study. The web-based survey instrument was developed using an online survey development tool known as
The survey consisted of four sections: (a) an introduction, (b) the question on the general feeling of the participant about the Performance Funding Act of South Carolina, (c) some follow-up questions on the study topic and its link to the propositions, and (d) an offer to the participant to openly share thoughts and concepts on the study topic. The open-ended questions provided much deeper understanding of the current issues in higher education, especially state funding and the future of technical education. The survey was pilot-tested and revised before it was sent out to the participating executives at the technical colleges.

A carefully designed survey questionnaire can function as an appropriate tool to obtain data directly related to the propositions in the study. Survey respondents were asked open-ended questions through which they offered their perceptions and outlined their experiences of the performance indicators relating to accountability and effectiveness.

The researcher of the study directly communicated with the randomly selected technical college administrators or their assistants via electronic mail, which included a link to the survey instrument. A brief foreword of the research study was provided and each administrator was asked to take part in the survey at a convenient time. As previously mentioned, the responders held positions such as presidents, academic vice-presidents, vice-presidents of instructions, and vice-presidents of business. No more than four persons were surveyed from each institution. In order to save time and improve participation, the survey was designed to take no more than 15 minutes. Each executive
taking part in the process was then sent a thank-you note and the researcher made a monetary donation to a local charity in recognition of their participation in the process.

Before taking the online survey, each participant received an electronic consent form. Participants were encouraged to ask questions about the survey before signing and returning the consent form. Preliminary and pilot-test questions were designed based on several variables in mind, such as the title of the executive, size of the institution, and its program offerings. Pilot surveys were conducted at local colleges and universities that are less than 30 minutes of driving distance from the author’s home base. The survey questions were then refined following the pilot-test survey.

The author took particular measures in order to protect the identity of the participants and keep the study anonymous. All documents related to the survey were kept secured in locked file cabinets, and the researcher alone handled the returned surveys so that the identities of the research participants were protected.

The performance ratings data were gathered from the CHE website for the South Carolina technical colleges for an eight-year period. According to the South Carolina CHE, there is a slight variation of the scoring methodologies for the performance indicators; hence this should be kept in mind when comparing year-to-year performance indicator scores. The South Carolina CHE posted the following advisory on its website for all readers when comparing institutional scores:

The South Carolina CHE provides the following explanation of the indicator summary. Each indicator or indicator subpart is scored using a 3-point scale. In some cases, institutions qualified for an additional 0.5 for achieving a certain level of
improvement over past performance. The overall performance indicator score is achieved by comparing the average score on applicable indicators to the maximum possible 3.00 and this is reported as the percentage score (see Table 3.1 below) in the yearly performance indicator report for each technical college. South Carolina technical colleges whose percentage scores are in the same range as the following scale are considered to be performing at similar levels.

Table 3.1

*The Scale for Overall Performance Indicator Scoring Category*

<table>
<thead>
<tr>
<th>Reported Score</th>
<th>Numerical Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substantially Exceeds</td>
<td>95% to 100% or 2.85 to 3.00</td>
</tr>
<tr>
<td>Exceeds</td>
<td>87% to 94% or 2.60 to 2.84</td>
</tr>
<tr>
<td>Achieves</td>
<td>67% to 86% or 2.00 to 2.59</td>
</tr>
<tr>
<td>Does Not Achieve</td>
<td>48% to 66% or 1.45 to 1.99</td>
</tr>
<tr>
<td>Substantially Does Not Achieve</td>
<td>33% to 47% or 1.00 to 1.44</td>
</tr>
</tbody>
</table>

Source: South Carolina CHE website

**Data Analysis**

The data analysis answers the research questions posed for the study. The historical data of performance indicators were gathered from the South Carolina CHE website, and the Technical College System website and the work files were created. The researcher used SPSS, the Statistical Package for Social Scientists, for analyzing and interpreting the data. An analysis of variance (ANOVA) is a statistical method for determining the existence of the differences among several population means. A one-way
ANOVA test enabled the researcher to determine whether any observed differences among the performance indicator means are due to sampling error or due to the differences in the fundamentals.

A series of analysis of variance (ANOVA) $F$-tests were conducted to compare the significant differences between the population means; that is, the performance indicators in this case, for the technical colleges for a period of seven years. When using ANOVA, the three basic assumptions used were (a) the data are normally distributed, (b) the data have homogeneous variances, and (c) the observations are independent (Ott & Longnecker, 2001). The researcher determined the effectiveness of the performance indicators as a measure of the institutional outcomes.

**Limitations**

The sample of study consisted of only the two-year public technical colleges of South Carolina. The performance funding data for individual institutions were not available beyond the 2005-06 academic year. Other limitations of the study include, (a) this study was based on data gathered from the South Carolina technical colleges and may not be generalized outside of the system, (b) quantitative data used in this study are historical data and, (c) while there are other measures of organizational effectiveness and efficiency, this study was limited only to performance indicators measured over a period of seven years.
According to the South Carolina CHE, there was a slight variation of the scoring methodologies for the performance indicators utilized in this study; hence the readers should keep this in mind when comparing year-to-year performance indicator scores.

The online survey of the senior administrators of the randomly selected technical colleges offers a small sample research study with less than 30 participants. The sample of colleges represents a wide range of criteria for this study including the college size, program offerings, and level of funding. This study, however, did not address the issues of race, gender, age, or ethnicity of the college leadership.
CHAPTER FOUR
DATA ANALYSIS AND RESULTS

Overview

The purpose of this chapter is to present the findings from the study. The chapter includes the results of the survey data from nine technical colleges. The descriptive summary of the online survey data is also presented. With the advent of the Performance Funding Act 359, South Carolina technical colleges have adapted many quality and accountability initiatives of their own. The performance indicator scores, the gauge of performance, for the technical colleges over the seven-year study period present a composite mosaic of outcomes of the various institutional initiatives. Although funding was linked to the indicator scores only during the first year of the act’s implementation, technical colleges continued in their own efforts to boost the academic quality, transparency, and accountability beyond the initial year. Based on the literature review and available historical data, the researcher designed this research as a quantitative method of study. The chapter begins with presentation of the research questions that guided this study, the performance indicator data, and statistical analysis.

Phase One Research Questions

The quantitative research questions explored in this study are listed below.

1. What are the data trends of the performance indicator scores throughout the implementation phase (eight years) of the performance system?
2. Are there any significant differences among the overall performance indicator scores of the technical colleges?

3. Are there any significant differences among the specific performance indicator scores (2A, 2D, 3D, 7A, 7D, and 8C) of the technical colleges?

As stated earlier the research was designed as a two-phase inquiry in which the second phase builds on the first phase. The second phase of research, the survey, answers the following research questions.

**Phase Two Research Questions**

The quantitative survey that answers the following research questions is also explored in this study.

1. What are administrators’ experiences regarding benefits of South Carolina’s performance system for the technical colleges?

2. What are administrators’ experiences regarding drawbacks of South Carolina’s performance system for the technical colleges?

3. Which performance indicators are considered the most pertinent by the administrators?

The analysis of the numerical data was performed using the SPSS (Statistical Package for Social Scientists) software. The analysis of the data included both descriptive and inferential statistical testing. Initially, the researcher conducted Levin’s homogeneity
test for equality of variances and normality of the data in order to validate the assumptions on the data. Subsequently, one-way ANOVA $F$-tests were performed on the data to determine the significant differences among the mean performance indicators. Additional tests included two popular methods, either Tukey’s or Games-Howell’s, for pair-wise comparisons of the significant difference of the mean, in order to avoid the $Type I$ error.

**Presentation of Data**

The performance-related historical data on technical colleges were obtained from published electronic and print media sources. The South Carolina CHE website reports performance-related data, and South Carolina Higher Education Statistical Abstract (2007) reports enrollment and state appropriations data. The fall total enrollment data analyzed by Boyd (2008) for a five-year period from 2002 to 2006, reported that South Carolina technical colleges grew at a rate of 6.1 percent. The fall FTE enrollment growth for the same period was 6.9 percent. The total state appropriations during the same five year (2002-2006) period grew only at a 2.3 percent rate (Boyd, 2008). The mean scores of the performance indicators for all technical colleges are presented in Table 4.1. Least-squares Regression analysis was used to determine the trend in institutional performance, accountability, and effectiveness of the technical education over a seven-year period.

**Analysis of Research Questions**

The following are the findings related to Research Question 1.
Research Question 1: What are the data trends of the performance indicator scores throughout the implementation phase (seven years) of the performance system?

The least-squares regression is used as a method to analyze the data in Table 4.1 that provides the trend for the performance indicators for the seven-year study period. During the seven-year period the overall system mean for the technical colleges changed from 2.645 to 2.703, which indicates a slow-moving upward trend. The following graph displays the performance indicator trend from the regression analysis of the data. There was a very significant curvilinear relationship between the variables. That is, the average performance indicator score decreased until year four then increased steadily thereafter.

Figure 4.1
Regression analysis of the overall performance indicator means
Table 4.1

*Technical College Performance Indicators: Overall System Score*

<table>
<thead>
<tr>
<th>ID#</th>
<th>Technical College</th>
<th>98-99</th>
<th>99-00</th>
<th>00-01</th>
<th>01-02</th>
<th>02-03</th>
<th>03-04</th>
<th>04-05</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aiken Tech</td>
<td>2.50</td>
<td>2.32</td>
<td>2.47</td>
<td>2.21</td>
<td>2.67</td>
<td>2.58</td>
<td>2.73</td>
<td>2.50</td>
</tr>
<tr>
<td>2</td>
<td>Central Carolina Tech</td>
<td>2.66</td>
<td>2.49</td>
<td>2.83</td>
<td>2.60</td>
<td>2.77</td>
<td>2.69</td>
<td>2.69</td>
<td>2.68</td>
</tr>
<tr>
<td>3</td>
<td>Denmark Tech</td>
<td>2.74</td>
<td>2.60</td>
<td>2.63</td>
<td>2.40</td>
<td>2.54</td>
<td>2.58</td>
<td>2.60</td>
<td>2.58</td>
</tr>
<tr>
<td>4</td>
<td>Florence-Darlington</td>
<td>2.84</td>
<td>2.38</td>
<td>2.59</td>
<td>2.52</td>
<td>2.71</td>
<td>2.71</td>
<td>2.83</td>
<td>2.65</td>
</tr>
<tr>
<td>5</td>
<td>Greenville Tech</td>
<td>2.71</td>
<td>2.62</td>
<td>2.62</td>
<td>2.65</td>
<td>2.71</td>
<td>2.69</td>
<td>2.69</td>
<td>2.67</td>
</tr>
<tr>
<td>6</td>
<td>Horry-Georgetown</td>
<td>2.76</td>
<td>2.69</td>
<td>2.71</td>
<td>2.65</td>
<td>2.77</td>
<td>2.88</td>
<td>2.88</td>
<td>2.76</td>
</tr>
<tr>
<td>7</td>
<td>Midlands Tech</td>
<td>2.76</td>
<td>2.63</td>
<td>2.55</td>
<td>2.58</td>
<td>2.65</td>
<td>2.90</td>
<td>2.95</td>
<td>2.72</td>
</tr>
<tr>
<td>8</td>
<td>Northeastern Tech</td>
<td>2.53</td>
<td>2.49</td>
<td>2.23</td>
<td>2.00</td>
<td>2.29</td>
<td>2.29</td>
<td>2.55</td>
<td>2.34</td>
</tr>
<tr>
<td>9</td>
<td>Orangeburg-Calhoun</td>
<td>2.61</td>
<td>2.47</td>
<td>2.44</td>
<td>2.52</td>
<td>2.71</td>
<td>2.83</td>
<td>2.90</td>
<td>2.64</td>
</tr>
<tr>
<td>10</td>
<td>Piedmont Tech</td>
<td>2.37</td>
<td>2.61</td>
<td>2.60</td>
<td>2.79</td>
<td>2.44</td>
<td>2.56</td>
<td>2.60</td>
<td>2.57</td>
</tr>
<tr>
<td>11</td>
<td>Spartanburg Tech</td>
<td>2.61</td>
<td>2.67</td>
<td>2.62</td>
<td>2.44</td>
<td>2.63</td>
<td>2.83</td>
<td>2.52</td>
<td>2.62</td>
</tr>
<tr>
<td>12</td>
<td>TC of the Lowcountry</td>
<td>2.79</td>
<td>2.33</td>
<td>2.37</td>
<td>2.73</td>
<td>2.75</td>
<td>2.77</td>
<td>2.81</td>
<td>2.65</td>
</tr>
<tr>
<td>13</td>
<td>Tricounty Tech</td>
<td>2.63</td>
<td>2.49</td>
<td>2.78</td>
<td>2.63</td>
<td>2.60</td>
<td>2.50</td>
<td>2.58</td>
<td>2.60</td>
</tr>
<tr>
<td>14</td>
<td>Trident Tech</td>
<td>2.63</td>
<td>2.44</td>
<td>2.61</td>
<td>2.77</td>
<td>2.83</td>
<td>2.83</td>
<td>2.71</td>
<td>2.69</td>
</tr>
<tr>
<td>15</td>
<td>Williamsburg Tech</td>
<td>2.60</td>
<td>2.44</td>
<td>2.01</td>
<td>2.52</td>
<td>2.08</td>
<td>2.26</td>
<td>2.45</td>
<td>2.34</td>
</tr>
<tr>
<td>16</td>
<td>York Tech</td>
<td>2.58</td>
<td>2.74</td>
<td>2.82</td>
<td>2.77</td>
<td>2.65</td>
<td>2.79</td>
<td>2.76</td>
<td>2.73</td>
</tr>
<tr>
<td></td>
<td>Overall System mean</td>
<td>2.645</td>
<td>2.526</td>
<td>2.555</td>
<td>2.549</td>
<td>2.613</td>
<td>2.668</td>
<td>2.703</td>
<td>2.50</td>
</tr>
</tbody>
</table>

Source: South Carolina Commission on Higher Education Website

Additionally, Table 4.2 displays the lowest and highest score recipients among the 16 technical colleges in the system, for each year of performance. The Williamsburg Technical College received the lowest score during four of the seven years, while the Horry-Georgetown Technical College received the highest score among the technical colleges.
Table 4.2

*Highest and Lowest Performance Indicator Score Recipients*

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Lowest</th>
<th>Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-1999</td>
<td>Piedmont Tech</td>
<td>Florence-Darlington Tech</td>
</tr>
<tr>
<td>1999-2000</td>
<td>Aiken Tech</td>
<td>York Technical College</td>
</tr>
<tr>
<td>2000-2001</td>
<td>Williamsburg Tech</td>
<td>Central Carolina Tech</td>
</tr>
<tr>
<td>2001-2002</td>
<td>Northeastern Tech</td>
<td>Piedmont Tech</td>
</tr>
<tr>
<td>2002-2003</td>
<td>Williamsburg Tech</td>
<td>Trident Tech</td>
</tr>
<tr>
<td>2003-2004</td>
<td>Williamsburg Tech</td>
<td>Midlands Tech</td>
</tr>
<tr>
<td>2004-2005</td>
<td>Williamsburg Tech</td>
<td>Midlands Tech</td>
</tr>
</tbody>
</table>

The findings related to Research Question 2 are presented in the following pages.

*Research Question 2: Are there any significant differences between the overall performance indicator scores of the technical colleges?*

**Overall Performance Indicator: All Technical Colleges**

An ANOVA test was run on the data in Table 4.1 for each year of performance to determine the significant differences among the means. All performance indicator data were qualified before proceeding with the ANOVA test. Levene’s homogeneity test on the data was performed to check for homogeneity of variances. Table 4.3 presents the result of Levene’s test, where significance $p = 0.006 < 0.05$ demonstrates that variances are not homogenous, that is, the data have unequal variances. Subsequently, a one-way
ANOVA test was conducted on the overall indicator data. Since the data have unequal variances, Games-Howell multiple comparisons test was performed on the data in order to avoid the Type I error.

Table 4.3

Homogeneity of Variances, Overall Indicators

<table>
<thead>
<tr>
<th>Test of Homogeneity of Variances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene Statistic</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>2.371</td>
</tr>
</tbody>
</table>

* $p < .05$

Levene’s is significant ($p = \text{sig} = 0.006$), therefore the variances are not homogeneous. The researcher used Games-Howell multiple comparisons test to identify the differences. The results of One-way ANOVA test are presented in Table 4.4. The ANOVA is significant ($p = \text{sig} = 0.000$), therefore the null hypothesis is rejected in favor of the alternative hypothesis. Multiple comparisons test was performed on the data using Games-Howell’s in order to avoid Type I error.

Table 4.4

One-Way ANOVA, Overall Indicators

<table>
<thead>
<tr>
<th>Overall Indicators</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>$F$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1.613</td>
<td>15</td>
<td>.108</td>
<td>4.863</td>
<td>.000*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2.123</td>
<td>96</td>
<td>.022</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3.736</td>
<td>111</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$
Multiple comparisons output from SPSS indicates that the overall indicator means of Central Carolina Technical College, Northeastern Technical College, and Williamsburg Technical College were significantly different from the rest of the technical colleges. Interestingly, these three colleges mentioned here are the smallest in the state Technical College System. The researcher concluded with 95 percent confidence that due to their smaller size, location, and limited resources, their institutional performance achievements are quite different from their larger counterparts.

The following hypothesis testing was used to determine the significant differences between the performance indicator means. The hypothesis testing answers phase-one research questions.

**Hypothesis Testing**

$H_0$: *Null Hypothesis*: $\mu_1 = \mu_2 = \mu_3 = \ldots = \mu_{16}$, the overall performance indicator means are equal.

$H_A$: *Alternative Hypothesis*: Not all performance indicator means are equal

T.S.: $F$-test statistic from the output is 4.863, and $P$-value is 0.000.

$F$-critical value obtained from the $F$ table is $F_{15, 97, 0.05} = 1.5691$ (from $F$-Distribution Table); the $F_{\text{output}}$ is greater than the $F_{\text{critical}}$.

$Conclusion$: For a significance level of 0.05, reject the null hypothesis $H_0$, if the computed $P$-value of 0.000 is less than the significance level of 0.05. Therefore, it can be concluded with 95 percent confidence that there is significant difference between the overall performance indicator means of the 16 colleges.
Research Question 3. Are there any significant differences among the specific performance indicator scores (2A, 2D, 3D, 7A, 7D, and 8C) of the technical colleges?

In order to answer Research Question 3, additional statistical analyses were conducted on six specific performance indicators from a sample of nine technical colleges based on the college’s enrollments.

Presentation of the Specific Indicator Score Data

Tables 4.5 through 4.13 on the following pages present the performance indicator scores and their overall averages for the nine technical colleges randomly chosen for this study.

Table 4.5

College 1 – Aiken Technical College

<table>
<thead>
<tr>
<th>Indicator</th>
<th>98-99</th>
<th>99-00</th>
<th>00-01</th>
<th>01-02</th>
<th>02-03</th>
<th>03-04</th>
<th>04-05</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>2D</td>
<td>2.00</td>
<td>3.00</td>
<td>2.50</td>
<td>2.00</td>
<td>2.00</td>
<td>2.50</td>
<td>3.00</td>
<td>2.43</td>
</tr>
<tr>
<td>3A/B/C/D</td>
<td>3.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>1.71</td>
</tr>
<tr>
<td>7A</td>
<td>3.00</td>
<td>1.50</td>
<td>2.50</td>
<td>1.00</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td>2.21</td>
</tr>
<tr>
<td>7D</td>
<td>3.00</td>
<td>1.00</td>
<td>2.00</td>
<td>3.00</td>
<td>3.00</td>
<td>2.00</td>
<td>3.00</td>
<td>2.43</td>
</tr>
<tr>
<td>8C</td>
<td>2.50</td>
<td>2.33</td>
<td>2.67</td>
<td>2.67</td>
<td>2.83</td>
<td>2.67</td>
<td>2.33</td>
<td>2.57</td>
</tr>
</tbody>
</table>
Table 4.6

*College 2 – Central Carolina Technical College*

<table>
<thead>
<tr>
<th>Indicator</th>
<th>98-99</th>
<th>99-00</th>
<th>00-01</th>
<th>01-02</th>
<th>02-03</th>
<th>03-04</th>
<th>04-05</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>2.50</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>2.93</td>
</tr>
<tr>
<td>2D</td>
<td>3.00</td>
<td>3.00</td>
<td>2.50</td>
<td>2.50</td>
<td>3.00</td>
<td>2.50</td>
<td>2.50</td>
<td>2.71</td>
</tr>
<tr>
<td>3A/B/C/D</td>
<td>2.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>2.86</td>
</tr>
<tr>
<td>7A</td>
<td>1.00</td>
<td>2.00</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td>2.00</td>
<td>2.00</td>
<td>2.07</td>
</tr>
<tr>
<td>7D</td>
<td>3.00</td>
<td>1.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>2.71</td>
</tr>
<tr>
<td>8C</td>
<td>2.00</td>
<td>2.33</td>
<td>2.83</td>
<td>2.17</td>
<td>2.67</td>
<td>2.00</td>
<td>2.50</td>
<td>2.36</td>
</tr>
</tbody>
</table>

Table 4.7

*College 3 – Denmark Technical College*

<table>
<thead>
<tr>
<th>Indicator</th>
<th>98-99</th>
<th>99-00</th>
<th>00-01</th>
<th>01-02</th>
<th>02-03</th>
<th>03-04</th>
<th>04-05</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>2D</td>
<td>2.00</td>
<td>3.00</td>
<td>2.50</td>
<td>2.25</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.25</td>
</tr>
<tr>
<td>3A/B/C/D</td>
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</tr>
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<td>3.00</td>
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</tr>
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<td>2.83</td>
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</table>

Table 4.8

*College 5 – Greenville Technical College*

<table>
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</tr>
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<td>2.50</td>
<td>2.00</td>
<td>3.00</td>
<td>2.07</td>
</tr>
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Table 4.9

**College 7 – Midlands Technical College**

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<th>04-05</th>
<th>Mean</th>
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<td>3.00</td>
<td>3.00</td>
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</tr>
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</tr>
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<td>3A/B/C/D</td>
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<td>3.00</td>
<td>3.00</td>
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Table 4.10

**College 11 – Spartanburg Technical College**

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<th>02-03</th>
<th>03-04</th>
<th>04-05</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>2A</td>
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<td>3.00</td>
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<td>3.00</td>
<td>3.00</td>
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<td>2.93</td>
</tr>
<tr>
<td>2D</td>
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<td>2.50</td>
<td>2.00</td>
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</tr>
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<td>3A/B/C/D</td>
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<td>2.00</td>
<td>2.50</td>
<td>1.93</td>
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Table 4.11

**College 14 – Trident Technical College**

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<th>Mean</th>
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<td>3.00</td>
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<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
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<td>3.00</td>
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<td>3.00</td>
<td>3.00</td>
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</tr>
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<td>2.00</td>
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<td>3.00</td>
<td>2.50</td>
</tr>
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Table 4.12

Colleges 15 – Williamsburg Technical College

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<th>02-03</th>
<th>03-04</th>
<th>04-05</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
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<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
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<td>3.00</td>
<td>1.00</td>
<td>1.50</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.50</td>
</tr>
<tr>
<td>3D</td>
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<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
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</tr>
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<td>3.00</td>
<td>2.50</td>
<td>2.00</td>
<td>1.00</td>
<td>2.50</td>
<td>2.43</td>
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<td>1.00</td>
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<td>1.71</td>
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<td>2.83</td>
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Table 4.13

College 16– York Technical College

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<th>01-02</th>
<th>02-03</th>
<th>03-04</th>
<th>04-05</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
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<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>2.93</td>
</tr>
<tr>
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<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>7A</td>
<td>1.00</td>
<td>1.50</td>
<td>2.00</td>
<td>2.00</td>
<td>2.50</td>
<td>2.50</td>
<td>2.00</td>
<td>1.93</td>
</tr>
<tr>
<td>7D</td>
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<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
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</tr>
<tr>
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<td>2.67</td>
<td>2.67</td>
<td>2.33</td>
<td>2.33</td>
<td>2.62</td>
</tr>
</tbody>
</table>

Statistical Results for the Specific Performance Indicators

The means of the six performance indicators, namely 2A, 2D, 3D, 7A, 7D and 8C for nine technical colleges are presented in Table 4.14 in the next page. Presented also are, the results of the Levene’s homogeneity test, the ANOVA test, and Tukey or Games-Howell multiple comparisons test based on the homogeneity of variance of the data.
Table 4.14

Mean of the Performance Indicators – Summary

<table>
<thead>
<tr>
<th>College</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2A</td>
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<tr>
<td>1</td>
<td>3.00</td>
</tr>
<tr>
<td>2</td>
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<td>3.00</td>
</tr>
<tr>
<td>16</td>
<td>2.93</td>
</tr>
</tbody>
</table>

The averages of the six performance indicators presented in Tables 4.5 through 4.13 are tested for equality of variances using Levene’s homogeneity test. The result is presented in the following table.

**Indicator 2A: Academic and Other Credentials of Professors and Instructors**

Table 4.15

Test of Homogeneity of Variances, Indicator 2A: Credentials of faculty

<table>
<thead>
<tr>
<th>Test of Homogeneity of Variances, Indicators 2A</th>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.600</td>
<td>8</td>
<td>54</td>
<td>.002*</td>
</tr>
</tbody>
</table>

*p < .05

For Indicator 2A Levene’s is significant (*p = sig = 0.002*), which indicates that the variances are not homogeneous. Since the data have unequal variances the researcher
used Games-Howell multiple comparisons test to identify the colleges which are different. The result of the ANOVA test is given in Table 4.16 below.

Table 4.16

ANOVA Test Results – Indicator 2A: Credentials of Faculty

<table>
<thead>
<tr>
<th>ANOVA</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>.079</td>
<td>8</td>
<td>.010</td>
<td>.625</td>
<td>.753</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.857</td>
<td>54</td>
<td>.016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.937</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The ANOVA is not significant ($p = \text{sig} = 0.753$), which implied acceptance of the null hypothesis. There is no evidence to state that means are different. There was no significant difference between the institutional achievements for this criterion. The researcher concluded with 95 percent confidence that the technical colleges included in this research study successfully achieved close to a full score of 3.00 for the academic and faculty credentials. Actual indicator average score varied from 2.93 to 3.00.

**Indicator 2D: Compensation of Faculty**

Table 4.17

Test of Homogeneity of Variances – Indicator 2D: Compensation of Faculty

<table>
<thead>
<tr>
<th>Test of Homogeneity of Variances, Indicator 2D</th>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.232</td>
<td>8</td>
<td>54</td>
<td>.299</td>
</tr>
</tbody>
</table>
For indicator 2D Levene’s is not significant \((p = \text{sig} = 0.299)\), which indicates that the variances are homogeneous. Therefore, researcher used Tukey’s to identify which indicator means are different. From the multiple comparisons output it was evident that indicator 2D means were significantly different for Aiken Technical College (#1) and Williamsburg Technical College (#15). The ANOVA test results are presented below.

Table 4.18

ANOVA Test Results – Indicator 2D: Compensation of Faculty

<table>
<thead>
<tr>
<th>ANOVA</th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator 2D</td>
<td>Sum of Squares</td>
<td>df</td>
<td>Mean Square</td>
<td>F</td>
</tr>
<tr>
<td>Between Groups</td>
<td>7.496</td>
<td>8</td>
<td>.937</td>
<td>4.505</td>
</tr>
<tr>
<td>Within Groups</td>
<td>11.232</td>
<td>54</td>
<td>.208</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18.728</td>
<td>62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\*p < .05

The ANOVA output is significant \((p = \text{sig} = 0.000)\) which pointed to rejection of the null hypothesis. Therefore, the indicator 2D means are significantly different. The analysis of institutional achievement of faculty compensation indicated that there was significant difference between the institutional achievements for this particular success criterion. Thus, differences in achievement remain among the technical colleges in terms of the faculty and staff salary.

The actual performance indicator 2D means for faculty compensation varied from the lower of 1.5 for Williamsburg Technical College to the higher of 2.71 for Central
Carolina Technical College. The researcher concluded with 95 percent confidence that, despite implementation of the Performance Funding Act, discrepancies remain in the salary structure among the various technical colleges within the system.

**Indicator 3D: Accreditation of Degree-Granting Programs**

Many associate degree programs offered at technical colleges are accredited by independent private external agencies. The external accreditation provides both prestige and recognition to the curriculum, and ensures that the curriculum meets certain minimum state and national standards for transferability and compatibility. Indicator 3D measures these success criteria for the technical colleges.

Table 4.19

*Test of Homogeneity of Variances – Indicator 3D: Accreditation of Degree-Granting Programs*

| Indicator 3D | Levene Statistic | df1 | df2 | Sig.  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.711</td>
<td>8</td>
<td>54</td>
<td>.000*</td>
</tr>
</tbody>
</table>

* p < .05

The Levene’s is significant (p = sig = 0.000), which indicates that the variances are not equal. Therefore, the Games-Howell’s multiple comparisons test for unequal variances was used to determine which means are different. From the multiple difference output it was evident that college 1 was significantly different from colleges 7, 15 and 16.
The researcher concluded with 95% confidence that the achievement level of college 1 was considerably lower than its sister colleges within the system. The results from the one-way ANOVA test are presented in Table 4.20.

Table 4.20

ANOVA Test Results – Indicator 3D: Accreditation of Degree-Granting Programs

<table>
<thead>
<tr>
<th>ANOVA</th>
<th>Indicator 3D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sum of Squares</td>
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<tr>
<td>Between Groups</td>
<td>10.508</td>
</tr>
<tr>
<td>Within Groups</td>
<td>13.143</td>
</tr>
<tr>
<td>Total</td>
<td>23.651</td>
</tr>
</tbody>
</table>

*p < .05

The ANOVA for indicator 3D is significant (p = sig = 0.000), which suggests rejection of the null. Therefore, it was evident that the means were different. Games-Howell’s multiple comparisons test results supported this conclusion that there was significant difference between the system colleges in terms of accreditation of the degree granting programs by external agencies.

Even though there is significant difference in the performance indicator means for the achievement levels among the technical colleges based on the number of externally accredited degree-granting programs, it was interesting to observe that three of the colleges included in the research study received a full score of 3.00 throughout the study period. The researcher concluded with 95 percent confidence that disparities remain
in the way technical colleges achieve external accreditation of all of their degree-granting programs regardless of their sizes.

**Indicator 7A: Graduation Rate**

Table 4.21

*Test of Homogeneity of Variances – Indictor 7A: Graduation Rate*

<table>
<thead>
<tr>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>.675</td>
<td>8</td>
<td>54</td>
<td>.711</td>
</tr>
</tbody>
</table>

The Levene’s is not significant (p = sig = 0.711), which indicates that the data have equal variances. The researcher used Tukey’s multiple comparisons test for equal variances to identify the differences in the achievement levels. It was evident from the output that there was no significant difference in the achievement levels for the technical colleges for this success criterion.

Table 4.22

*ANOVA test results – Indicator 7A: Graduation Rate*

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>5.817</td>
<td>8</td>
<td>.727</td>
<td>1.388</td>
<td>.223</td>
</tr>
<tr>
<td>Within Groups</td>
<td>28.286</td>
<td>54</td>
<td>.524</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>34.103</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The ANOVA test result in Table 4.22 is not significant ($p = \text{sig} = 0.223$). Therefore, there is no evidence to reject the null. Hence, there was no significant difference between the achievement levels of various technical colleges for the performance indicator 7A – the rate of graduation. The actual average varied from 1.43 to 2.50, Table 4.14. The Denmark Technical College received the lowest score of 1.43 and the Trident Technical College received the highest score of 2.50. The researcher concluded with 95 percent confidence that there is no significant difference in the graduation rates among the various technical colleges within the system, and the achievement level is comparatively similar for all technical colleges regardless of their sizes and locations.

**Indicator 7D: Scores of Graduates on Employment Related Examinations and Certification Tests**

The performance indicator 7D was implemented to measure the achievement of the graduates who take standardized tests that are required by certain career fields for entry level positions.

Table 4.23

*Test of Homogeneity of Variances – Indicator 7D: Scores of Graduates on Employment Related Examinations and Certification Tests*

<table>
<thead>
<tr>
<th>Test of Homogeneity of Variances, Indicator 7D</th>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.223</td>
<td>8</td>
<td>54</td>
<td>.005*</td>
</tr>
</tbody>
</table>

*p < .05
The Levene’s is significant \( p = \text{sig} = 0.005 \), which indicates that the data for indicator 7D had unequal variances. Therefore, Games-Howell (G-H) multiple comparisons test was used as a post-hoc to determine which indicator means are different from which. After investigating the G-H output researcher concluded with 95 percent confidence that no significant difference exists between the technical colleges’ achievement levels for this indicator. The ANOVA test results on the data are presented in Table 4.24.

Table 4.24

*SPSS Output – ANOVA test result – Indicator 7D*

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>11.151</td>
<td>8</td>
<td>1.394</td>
<td>2.688</td>
<td>.015*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>28.000</td>
<td>54</td>
<td>.519</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>39.151</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\*\( p < .05 \)

The ANOVA is significant \( p = \text{sig} = 0.015 \) and it is evident that there was significant difference between the indicator 7D means of the nine technical colleges. The average scores for this indicator ranged from 1.93 to 3.0. The York Technical College received the highest score of 3.0 and Williamsburg Technical College received the lowest score of 1.71, see Table 4.14. The researcher concluded with 95 percent confidence that the achievement level for the graduates on the standardized tests for employment and
certifications are significantly different when compared to all other technical colleges in the system.

**Indicator 8C: Accessibility to the Institution**

Performance indicator 8C measured the ease of access to the 34 public institutions of higher studies in South Carolina. The homogeneity of variances for indicator 8C is presented in Table 4.25.

Table 4.25

*Test of Homogeneity of Variances – Indicator 8C: Accessibility to the Institution*

<table>
<thead>
<tr>
<th>Test of Homogeneity of Variances</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene Statistic</td>
<td>.888</td>
<td>df1</td>
<td>df2</td>
</tr>
<tr>
<td></td>
<td>.888</td>
<td>8</td>
<td>54</td>
</tr>
</tbody>
</table>

The Levene’s is not significant ($p = \text{sig} = 0.533$) and it is evident that the data have equal variances. Therefore, Tukey’s multiple comparisons test was used as a post-hoc to determine which indicator means are different from which. The result from the Tukey’s post-hoc test indicated that there was no significant difference in the level of achievements between the colleges for this indicator. The ANOVA test results on the data are presented in Table 4.26.
Table 4.26

ANOVA test results – Indicator 8C: Accessibility to the Institution

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1.103</td>
<td>8</td>
<td>.138</td>
<td>1.887</td>
<td>.081</td>
</tr>
<tr>
<td>Within Groups</td>
<td>3.948</td>
<td>54</td>
<td>.073</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5.051</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The ANOVA is not significant \((p = \text{sig} = 0.081)\) and it is evident that the null hypothesis cannot be rejected. The results indicate that there is no significant difference in the indicator 8C means for institutional accessibility among the various technical colleges. The researcher concluded with 95 percent confidence that all technical colleges in South Carolina, irrespective of their resources and sizes, offer reasonably similar level of access to the students regardless of their background. This conclusion is also supported by the state-wide *open door admissions* policy of all technical colleges. Both Denmark Technical College and Williamsburg Technical College received the highest average score of 2.74, and Central Carolina Technical College received the lowest score of 2.36.

**Analysis of Survey Data**

A total of 29 online surveys were sent to the upper level administrators of the nine technical colleges chosen at random for this study. Respondents were allowed two weeks to complete and return the survey. The researcher followed up with the respondents with emails and phone calls after a week reminding participants to complete the surveys.
Approximately 80 percent of the respondents returned the completed surveys within the time period allowed. The following categories of technical college administrators participated in the survey:

- Presidents
- Immediate Past-Presidents
- Vice-Presidents of Academic Affairs
- Vice-Presidents of Business/Finance
- Directors of Special Projects
- College Statisticians/Data Coordinators

The survey revealed the experiences and perceptions of the technical college administrators concerning the performance system.

**Analysis of Phase Two Research Questions**

1. **What Are the Administrators’ Experiences Regarding Benefits of South Carolina’s Performance System for the Technical Colleges?**

Analyses of the survey data provide answers to this question. The performance system resulted in a multitude of benefits for the technical colleges. The administrators’ direct experiences highlight those benefits. The performance system provided an impetus for internal review and standardization of the processes of data collection, its evaluation, and reporting. This process obliged each institution to focus on educational outcomes and enhanced the process of organizational learning. The survey synopsis provided an understanding of the return on investment (ROI) for technical education. The colleges
learned to report consistently and uniformly and gained better understanding of the state
requirements. The process obligated colleges to seek accreditation of all associate degree
programs. There was increased cooperation among the major units of the college by
bringing them all together in an effort to create a unified response as an institution. It
provided information for benchmarking and offered justification for faculty salary
increase. Besides streamlining of the resources, colleges became efficient in spending the
scarce capitals. The colleges were able to learn about the peer performances and compare
those with their own and remain steadfast in their efforts to improve the quality and
accountability.

Among the positive aspects of the survey, most administrators responded that the
performance system indirectly benefited the college by standardizing the assessment and
evaluation processes. The data on the important benefits of the performance system as
listed by the college administrators are as follows:

1. It provided continued and periodic internal review.
2. It supported increased awareness of various state requirements.
3. It made us look closely at our own institution.
4. Funding was available the first year.
5. It tried to make all colleges equal.
6. Made us focus on outcomes.
7. Collection of data on performance…Get a better feel for ROI.
8. Public colleges working together resulted in agreed-upon and shared data
definitions…It has helped us achieve more uniformity/consistency in
reporting.
9. It forced us to concentrate on our data collection methods.
10. It gave us a comparative view with other colleges in the state within our
(technical college) sector.
11. It served as the impetus to getting one of our degree programs accredited.
12. Provided information for benchmarking…It offered justification for faculty
salary increase… (It emphasized) continued evaluation of the college services.
13. Yearly cycle of internal discussions involving findings resulting from Act 359
data gathering.
14. Increased cooperation between major units within the college…
15. I have only been in the state for one year; however, it appears that the most important benefit is a required close examination of how each college operates. Other than that, it is a fairly generic performance funding system.
16. Streamlining of resources…
17. Standardization of data gathering and evaluation.
18. Better enrollment and better retention.
19. Ranked high by the state process.
20. Peer information.
22. National Accreditation for programs.
23. Generated data for planning.
24. Comparative information on our peers.

Summary of Strengths

The performance system provided an impetus for internal review and standardization of the processes of data collection, its evaluation, and reporting. This process forced each institution to focus on educational outcomes and enhanced the process of organizational learning. The performance system provided an understanding of the return on investment (ROI) for technical education. The colleges learned to report consistently and uniformly and gained better understanding of state requirements. The process forced colleges to seek accreditation of all associate degree programs. There was increased cooperation among the major units of the college by bringing them all together in an effort to creating a unified response as an institution. It provided information for benchmarking and offered justification for faculty salary increase. Besides streamlining of the resources, colleges became efficient in spending the scarce capitals. The colleges were able to learn about the peer performances and compare those with their own. The performance system established a process of assessment and evaluation that the technical colleges continue to use today.
2. What Are Administrators’ Experiences Regarding Drawbacks of South Carolina’s Performance System for the Technical Colleges?

Categorization of the raw survey data on drawbacks of the performance system was vital to providing answers to this question. After coding and analyzing the qualitative descriptions provided by the administrators, various themes emerged. The administrators perceive that there was lack of personnel and financial resources to complete the necessary tasks in assessing data, evaluating them, and generating a report for the State. The majority of the administrators believe that there was also lack of focus and far too many critical success factors or indicators.

The above themes also are validation of the fact that there were widespread disagreements among the college administrators to the approach the General Assembly adopted in implementing the performance system. Administrators also perceive that performance indicators do not reflect the true status of the institution and is not a true measure of the categories that they were created to measure.

The narratives from the survey regarding weakness of the performance system are presented below:

1. Several indicators, such as average class size, had little to do with the performance…
2. Even within sectors, CHE adopted a “one-size-fits-all” philosophy for acceptable ranges to achieve a “meets” score.
3. Overall, the entire process did little to improve performance or evaluate it.
4. It did not take into consideration the multiple missions of the state’s institutions.
5. It’s difficult to get accurate data…No financial benefit (funding) for the efforts.
6. It was an exercise in futility. Amount of time needed to complete reports was too great…
7. Needed a large number of employees involved in data-gathering process.
8. Performance system required study of areas that were marginally related to educational process…
9. The same system cannot be and should not be applied to both universities and two-year colleges…Funding was never allocated.
10. It involved too much paperwork…Not enough resources for creating the reports.
11. No funds attached to the results…It was an unfunded mandate.
12. (The process) Diverted the needed resources from the teaching and the learning processes…
13. There was serious lack of funding…It was very labor intensive.
14. Some of the indicators were not good indicators for technical colleges--i.e. the graduation rate…
15. A large number of our students’ goal is not graduation but employment…
16. The process was time consuming…The process was resource consuming…
17. No funding was attached to results…
18. The process involved far too many indicators…
19. Lack of focus on the unique and diverse role an institution plays in its service area…Lack of resources…
20. It failed to live up to its promises…No funding is currently available…
21. Paperwork did not produce benefits…Funding did not follow performance…Significant amount of time needed in finding data.
22. Huge investment of time and resources for little (if any) return.

Summary of Weaknesses

After categorizing the narrative data presented above, common themes emerged. The administrators perceive that there was lack of personnel and financial resources to complete the necessary tasks in assessing data, evaluating them, and generating a report for the state. The majority of the administrators believe that there was also lack of focus and far too many critical success factors or indicators. The responses above also are authentication of the fact that there were widespread disagreements among the college administrators to the approach the General Assembly adopted in implementing the performance system. Administrators also perceive that performance indicators do not
reflect the true status of the institution and is probably not a true measure of the categories that they were created to measure.

Additional comments by the technical college administrators on the South Carolina performance system were as follows:

1. My understanding from others regarding the value of the system was that it drove everyone to the middle...performance was not rewarded but rather mediocrity promoted. It seemed the goals were to make everyone the same.
2. Without funding there was very little incentive to pursue the goals of the state.
3. The system needed to have effective rewards...
4. The process needed to be more efficient and should measure true performance.
5. In my studied view, one cannot prescribe perfection for individuals or organizations.
6. A supportive, nurturing environment with clear goals, measurable objectives, and adequate resources will go a long way...
7. The key element is that this was not funded adequately and consistently.
8. It is tough to provide information when no dollars are associated with the performance. The South Carolina Act had a close relationship to similar acts in other states; however, they were better funded.

3. Which Performance Indicators Are Considered Most Pertinent by the College Administrators?

The South Carolina General Assembly and the CHE recommended 13 performance indicators for the technical colleges. The survey asked the administrators to rate performance indicators that are most appropriate for the technical colleges. A majority of the survey participants indicated that the most appropriate use of the performance indicators would be to measure institutional accountability. There was a strong response that performance indicator scores should be linked to funding, which provides incentive to achieving institutional excellence.
When asked about the “financial benefit” for the college, only 14 percent of the respondents expressed full satisfaction, whereas 43 percent expressed no satisfaction at all with the performance system; the other 43 percent were neither satisfied nor unsatisfied with the financial outcome. However, in response to the “educational effectiveness” question, 29 percent expressed full satisfaction and none of the respondents expressed any dissatisfaction with the system. There was strong disagreement among the participants regarding use of the performance indicators as the effective tool for measuring educational quality and effectiveness. The participants were equally divided in responding to this question, where 40 percent of them strongly disagreed, 40 percent somewhat agreed and only 20 percent fully agreed that performance indicators represented a good measure of institutional performance and quality.

Survey respondents emphasized more focused and fewer number of performance indicators for the technical colleges. In terms of indicator preference, focus on faculty (indicator 2) was ranked high and graduation rate (indicator 7) was ranked low, because, technical colleges have historically low graduation rates. Indicator 8C, accessibility to institution, was very highly rated since as public two-year institutions, technical colleges in South Carolina offer unfettered access (open-door admissions) to all citizens irrespective of their ability to pay, academic preparation, or backgrounds. However, free-for-all access to the technical colleges does not always produce the desired fruits, rather it often results in high levels of attrition and dismally low graduation rates.
Summary

This study made an extensive use of the historical data retrieved from various online, electronic, and print media sources to refute or support the claims made through the research questions. The data also helped establish the relationship that exists between various performance indicators and the effectiveness and quality of education and training that technical colleges offer. The information gathered from the survey was used to establish the validity of the quantitative data. The various performance indicators used in measuring different institutional aspects corroborate this perception. The recommendation from the state legislature and others in position of authority that “higher education should be run like business” is an oversimplification of the complexities that underlie these organizations. We should not underrate the distinctive nature of these professional bureaucracies and learning organizations, which are unique in terms of mission, vision, culture, and heritage. There are distinctive differences that exist between the for-profit business organization and non-profit higher education. The technical colleges in South Carolina continue to build partnership with the industry by supplying entry-level employees and providing training to employees that are essential for the sustainable growth of the industry and economic development of the state.

Many respondents suggested that there is lack of a coherent approach to the governance of higher education in the state, particularly for the technical colleges. There is no unified statewide master plan or strategic plan for institutions of higher education, although there is a document that one respondent characterized as neither strategic nor a
plan. Each technical college determines its own course of action, and does not coordinate with one another, which leads to duplication of actions and lack of coherent missions.

There was widespread agreement among technical college administrators that only two of the 13 performance indicators for the technical colleges, the requirement that all certifiable programs in an institution be accredited, and that the percentage of students who pass licensing exams (where appropriate) be increased, had potential for improving performance and educational effectiveness. Many academics argue that even if the Act were not implemented, the benchmark regarding external accreditation would have been achieved anyhow because of existing state policies in place.

Overall, there was an upward trend of the performance indicators for most institutions. For some colleges they remained flat over the study period, indicating that the institution concerned did nothing to improve its state of affairs either due to lack of necessary resources (financial or personnel), or for other unspecified reasons. The performance indicator scores of some categories varied widely between 1.0 and 3.0 and certain categories showed no change at all. This makes the researcher conclude that the performance indicator does not truly reflect the true status of the institution and is probably not a true measuring tool, either. It is of concern to the researcher whether subjective bias of the personnel involved in gathering data and reporting them played any role in this type of variation.
CHAPTER FIVE
DISCUSSION AND FUTURE RECOMMENDATIONS

Overview

The mission and goals of two-year technical colleges in South Carolina are unambiguously different from their counterparts, the four-year colleges and universities. Besides offering associate degrees in technology and health care at an affordable cost, the technical colleges of South Carolina play a major role in economic and workforce development. Also, technical colleges are major players in providing community service in their service area. More than fifty percent of all college-goers in South Carolina attend two-year public technical colleges. Due to the open-door admissions policy, a growing population of non-traditional students from all walks of life continues to gather at the doorsteps of the technical colleges with hope of a better life. The mission statements of the technical colleges in South Carolina demonstrate system-wide congruent institutional goals and objectives. Technical colleges emphasize student-centered teaching and learning for the residents of the contiguous communities, and train employees of the local industries, as well as provide a strong community service. Undergraduate teaching is highly emphasized, and the college faculty dedicate most of their time in the classrooms and laboratories delivering instructions, and counseling students in order to maximize student success.

Sixteen technical colleges were established during the 1960s and 1970s in order to serve the un-served and the under-served citizens of South Carolina who needed a college education in order to better their lives and contribute to the economic development of
South Carolina by becoming tax-paying members of the society. Over the last four decades, technical colleges accomplished this goal by educating the majority of South Carolinians, training the local workforce, and adding to the economic development. The technical colleges of South Carolina contribute more than two billion dollars annually to the state economy (CHE Report, 2003). Thus, technical colleges continue to make significant contributions in the lives of the citizens and to the local and state economies.

Summary of the Study

Six research questions were posed to study the trends of the performance indicators for the technical colleges. The research was designed as a two-phase inquiry. First-phase questions involved statistical analysis of quantitative data and the second-phase involved analysis of survey data.

Hypothesis Test Results

Hypothesis testing was used to answer the phase-one research questions. Two hypotheses were used for this purpose:

Hypothesis 1 – There is no significant difference in the mean of the overall performance indicators for the technical colleges.

Based on the results of one-way ANOVA test the study rejects null hypothesis 1 in favor of the alternative hypothesis. The multiple comparison test results support acceptance of the alternative, the researcher concluded with 95% confidence that there was significant difference between the overall performance indicators of the colleges.
Hypothesis 2 – There is no significant difference in the mean of the specific performance indicators (2A, 2D, 3A/B/C/D, 7A, 7D, 8C) for the technical colleges.

The study outcome again rejects Hypothesis 2 based on the results of one-way ANOVA and multiple comparisons tests (either Tukey’s or Games-Howell’s) in favor of the alternative hypothesis. The multiple comparisons test results support acceptance of the alternative, that is, at least one of the specific indicator means is different from the rest.

Phase One Research Questions

Research Question 1: What are the data trends of the performance indicator scores throughout the implementation phase (seven years) of the performance system?

Figure 4.1 displays the regression analysis of the performance indicator data. There was a very significant curvilinear relationship between the variables. That is, the average performance indicator score decreased until year four then increased steadily thereafter. Also, an examination of the data in Table 4.1 provides an answer to this question. The overall system mean for the technical colleges changed from 2.645 to 2.703, a slow moving upward trend, which implied that the organizational performance of the institutions within the technical education system is slowly and steadily improving.
Research Question 2: Are there any significant differences among the overall performance indicator scores of the technical colleges?

The hypothesis test provides an answer to this question. As presented in Chapter 4, ANOVA is significant (p = sig = 0.000), which implied rejection of the null. The researcher concluded with 95% confidence that even after implementation of the Performance Act over 10 years, significant disparities remain in the levels of institutional achievements among the technical colleges.

Research Questions 3: Are there any significant differences among the specific performance indicator scores (2A, 2D, 3D, 7A, 7D, and 8C) of the technical colleges?

The data were analyzed for nine of the colleges on the six indicators over a seven year period. One-way ANOVA, multiple comparison tests, hypothesis tests in Chapter 4, and in the previous section, offer an answer to this question. An assessment of the of the performance indicator 2A means presented in Table 4.14 established that the difference between the means of indicator 2A are statistically insignificant. This conclusion was also supported by the Games-Howell multiple comparisons test and the ANOVA test (p = sig = 0.753), which is insignificant, see Table 4.16.

For indicator 2D for faculty compensation, the ANOVA output was significant (p = sig = 0.000), which implied that there was significant difference in the means. The researcher concluded with 95 percent confidence that discrepancies remain in salary structure among the various technical colleges within the system.
For indicator 3D for accreditation of the degree-granting programs, the ANOVA test was significant \((p = \text{sig} = 0.000)\), which indicated that there was significant difference in the indicator means. An analysis of the Games-Howell multiple comparisons test output indicated that means for college (1), Aiken Technical College, was significantly different from colleges (7), (15), and (16). The researcher concluded with 95 percent confidence that disparities remain in the way technical colleges achieve external accreditation of all of their degree-granting programs regardless of their sizes.

The ANOVA test result for Indicator 7A– the rate of graduation, was not significant \((p = \text{sig} = 223)\), which suggested acceptance of the null hypothesis. This indicated that there was no significant difference between the achievement levels of various technical colleges for the performance indicator 7A. The researcher concluded with 95 percent confidence that there is no significant difference in the graduation rates among the various technical colleges within the system, and the achievement level is comparatively similar for all technical colleges regardless of their sizes.

For indicator 7D – the achievement level for the graduates on the standardized tests for employment and certifications, the ANOVA test result is significant \((p = \text{sig} = .015)\), which suggested rejection of the null. Subsequently, Games-Howell’s multiple comparisons tests were conducted on the data. However, a close examination of the G-H multiple comparisons output could not identify any of the technical colleges standing out from the rest. The researcher concluded with 95 percent confidence that no significant difference exists between the technical colleges’ achievement levels for the graduates on the standardized tests for employment and certifications.
The ANOVA test result for performance indicator 8C was not significant ($p = \text{sig} = 0.533$), which suggested rejection of the alternative hypothesis in favor of the null. Accepting the null hypothesis implied that there was no significant difference of the mean achievement levels for the institutional accessibility among the system technical colleges. The researcher concluded with 95 percent confidence that all technical colleges in South Carolina, irrespective of their sizes, offer reasonably similar level of access to the students regardless of their background. This conclusion is also corroborated by the statewide open door admissions policy of all technical colleges.

**Performance Funding Act as a Valuable Public Policy Tool**

The purpose of this study was to assess the impact of South Carolina Performance Funding Act 359 of 1996 based on the outcomes of select performance indicators pertinent to the technical college sector. The performance funding initiative for financing higher education could be considered one of the most innovative and influential public policy initiatives of the twentieth century in order to trim the cost of higher education, streamline allocation of the resources, and ensure quality and accountability.

The Performance Funding Act of South Carolina was one of the most comprehensive in the nation with broad-based goals; however, it was not without controversies. Notwithstanding, the policy provided the impetus for subsequent changes and restructuring of the technical education system along with the assessment and evaluation of the education offered through the community colleges. This policy reorganized and streamlined the way higher education in South Carolina is funded, and
this momentum will continue to influence and reshape the way we think of productivity, quality, and accountability in higher education. Despite many imperfections and undesired effects of the Accountability Act, the policy will remain an important driving force for quality, accountability, and effectiveness in South Carolina’s higher education system for the foreseeable future. Literature reviews as well as the results of the study have uncovered evidences that, despite rigorous efforts, the system did not necessarily succeed at improving the performances of all institutions of higher study.

Of the 13 indicators specific to the technical college sector, only six were identified as critical for this study. The overall results demonstrated steady improvements of the critical success factors. The quantitative outcome reveals that for certain performance indicators the larger technical colleges have achieved at a higher level than those of the medium or small technical colleges in the system. The level of achievement for performance indicator 2A – faculty salary, was identical for all technical colleges. There was a wide variation in performance indicator scores in other critical areas of the colleges. Overall, the outcomes of this study added to the existing body of knowledge and literature through enhanced understanding of the culture and effectiveness of technical college education in South Carolina. The use of Parsons’ Social Action theoretical perspective has enriched this study.

The study uncovered both the strengths and weaknesses the in many areas of the technical education system in South Carolina. It is ironic that the South Carolina legislature did not fully fund the Performance Funding Act as it was envisioned by the General Assembly beyond the initial year of its implementation. It was indicated by
many among the survey respondents that the lack of funding with the Act was a major source of discontent among the college administrators.

**Changing Landscape of Higher Education**

As institutions of higher education, the technical colleges are continually evolving and the leaderships in these institutions are concurrently re-inventing the college. Higher education is facing enormous challenges due to a rapid shift in socio-economic, political, and technical paradigms. The leadership has to quickly respond to the demands of the twenty-first century challenges or become irrelevant. The leaders of the technical colleges must lead proactively and be looking ahead during times of economic uncertainty – not just react to changes when it becomes indispensable. Technical education must meet the needs of all stakeholders – the students, parents, legislators, and community leaders. Martin (2004) claimed that “Leaders are responsible not only for monitoring and encouraging the emergence of strong network with other systems in the environment, but also for monitoring and encouraging strong networks within their organizations” (p. 30). In light of the outcomes of this study, and review of the pertinent literature, the following reflections and recommendations for further actions and research are presented.

**Recommendations for Actions**

The performance indicator scores highlighted some of the endemic problems common to all public two-year technical colleges in South Carolina and throughout the
United States for that matter. These are namely, low retention rate, low graduation rate, and low rate of student success. A system-wide consortium should be created that represents stakeholders from all groups, such as students, parents, employers, faculty, staff, and policy makers with a wide range of capacity to identify the causes and provide recommendations. At-risk students should be positively identified with help from the faculty and student affairs professionals. Technical colleges need to provide more proactive student affairs support so that students do not fall through the cracks of the system.

The author’s personal experience is that technical colleges in South Carolina are capable of doing a much better job of providing proactive support to at-risk students. Although most technical colleges do have a student affairs department, they need to work closely with those students needing continued support to be successful in school and on the job. Supporting students through implementing student development theories is very rare in technical colleges. Timely involvement by the student affairs professionals should be an integral part of any student intervention program to ensure student success. When appropriately applied, student development theories can help students cope with academic, emotional, and social issues they face. The efforts by the student affairs personnel should be appropriately funded to resolve the underlying causes fundamental to the problems all technical colleges facing today. The cause-and-effect issues must be identified, intervened, and resolved before it becomes too late.
Limitations of the Study

One of the major limitations of the study was unavailability of data before 1998-1999 and after 2005-2006 academic years. Other limitations included the inconsistency in the implementation of the rules of the Act. For certain indicators, no numerical data were available, for some indicators data collection was deferred, and for others data was reported only for two to three years. The gaps in available indicator data made the analysis more challenging. The study minimized these limitations by selecting specific indicators that were evaluated each year for the duration of the performance study. Among other limitations, out of the 13 indicators specified for the technical colleges, only six were fully evaluated each year during the study period. These were the only indicators analyzed using the statistical process.

Recommendations for Research

Future research can be designed to study the performance indicators that had minimal or no impact on any aspects of technical education over the period of study. Being a complex social entity, as the educational institution is, it cannot be defined through mathematical formulations, nor can it be run like a business. Student-learning not only takes place in the classroom setting, but also outside of the classroom, such as in the library, in the dining rooms, or in the residential halls through camaraderie between peers. Students learn as much from the instructor as they do from each other. Future research could include a study by clustering technical colleges with similar program offerings and creating a survey instrument with an expanded set of questionnaires.
Analysis of historical data provided a good basis for judgment of the educational effectiveness for the technical colleges selected for the study. Additional inquiries can be explored based on all four areas that a performance system was intended to cover.

Summary

The discussion and recommendations made in this chapter are based on the findings of the study of the quantitative historical data gathered from electronic and print media sources and those data collected from the online survey of the senior administrators. The selection and development of the performance indicators involved the CHE and the technical colleges. A better approach to selection of the indicators would be to engage everyone with a stake in technical education. This would garner support and cooperation from everyone, both internally and externally for the technical education system.

All quantitative data were analyzed using SPSS. The descriptive data collected from the online survey were used to answer the Phase 2 research questions. The findings from the statistical analysis of quantitative data were presented in tabular format, and those from the analysis of survey data are presented in narrative format in response to the particular research questions.
Appendix A

Description of the Performance Indicators

The following paragraphs obtained from the South Carolina CHE website provide a detailed description of the performance indicators used for the technical colleges. Descriptions are summarized for brevity.

Indicator 1B, Curricula Offered to Achieve Mission
What: A measure of programs that are appropriate per Act 359 of 1996 to the degree level of the institution, appropriate per the institution’s mission statement, and are in full approval status as of the most recent CHE review.

Applies to: Research and Teaching sectors as a scored indicator. Regional Campuses and Technical Colleges as a “compliance” indicator since the third condition is not applicable to these sectors.

Indicator 1C, Approval of a Mission Statement
What: Requires that institutions have a CHE approved mission statement

Applies to: All Institutions as a “compliance” indicator.

Institutions report to CHE “Yes” or “No” as to changes. Any changes are reviewed and approved by CHE.

Indicator 1D/E, Combination of Indicators 1D (Adoption of a Strategic Plan to Support the Mission Statement) and 1E (Attainment of Goals of the Strategic Plan) to provide for a campus-specific indicator related to each institution’s strategic plan

What: An indicator that measures success on an institutional goal and annual targets over three years as identified by the institution and approved by CHE.
Indicator 2A, Academic and Other Credentials of Professors and Instructors

What: A measure of the academic credentials of faculty.

Applies to: All Institutions as a “scored” indicator with differences in definitions across sectors.

Indicator 2D, Compensation of Faculty

What: Measure of average faculty salary.

For Research and Teaching, average by rank, excluding Instructors, is considered.

For Regional Campuses and Technical Colleges, average faculty salary is considered.

Applies to: All Institutions as a “scored” indicator with differences in definitions applying across sectors.

Indicator 3D, Accreditation of Degree-Granting Programs

What: A measure of the percent of accredited programs.

Applies to: All Institutions with eligible programs* as a “scored” indicator.

Note: Eligible programs* are those accreditable by a CHE approved accrediting agency.

Indicator 3E, Institutional Emphasis on Quality Teacher Education and Reform

What: A three-part measure related to teacher education considering:

1) NCATE accreditation status, 2) student performance on professional knowledge and specialty area, certification examinations and, 3) teacher education graduates filling critical needs areas including critical shortage teaching areas and minority teachers.

Indicator 4A/B, Combination of Indicators 4A (Sharing and Use of Technology, Programs, Equipment, and Source Matter Experts within the Institution, with Other Institutions, and with the Business Community) and 4B (Cooperation and
Collaboration with Private Industry, defined tailored to each sector)

**Indicator 5A, Ratio of Administrative Costs as Compared to Academic Costs**

What: In past years, a measure of the ratio administrative costs (fund expenditure categories of institutional support) to academic costs (fund expenditure categories of instruction, research, academic support, and scholarships/fellowships).

**Indicator 6A/B, Combination of Indicators 6A (SAT and ACT Scores of Student Body)** and **6B (High School Class Standing, Grade Point Averages and Activities of Student Body)**

What: A measure assessing entrance credentials including SAT/ACT scores and high school GPA and class standing.

Applies to: **Research, Teaching, and Regional Campuses** as a “scored” indicator with differences in definitions applied to MUSC.

**Indicator 7A, Graduation Rate**

What: A measure of student performance defined differently across sectors and institutions as indicated below:

For Clemson, USC Columbia and Teaching Sector Institutions, a cohort-based measure of graduation within 150% of normal program time applies.

For MUSC, a comparable cohort-based measure of completion of degree programs by graduate students (excluding PhD candidates) and first professional students applies.

For Regional Campuses and Technical Colleges, a cohort-based measure of graduation within 150% of normal program time, transfer-out within 150% of normal program time or continued enrollment following the 150% of program time applies.
Applies to: **All Institutions** as a “scored” indicator with differences in definitions for MUSC and across sectors.

*Indicator 7B, Employment Rate for Graduates*

What: Measurement definition under review at present. A measure utilizing a survey of graduates and possible employment rate data from a third party, the Employment Security Commission (ESC), is under discussion and is expected to be piloted during the current year.

Applies to: **Technical Colleges**

*Indicator 7C, Employer Feedback on Graduates Who Were Employed or Not Employed*

What: Measurement definition under review at present. A measure utilizing a third party (ESC) to survey employers of technical college graduates is under discussion and is expected to be piloted during the current year.

Applies to: **Technical Colleges**

*Indicator 7D, Scores of Graduates on Post-Undergraduate Professional, Graduate, or Employment-Related Examinations and Certification Tests*

What: A measure of the percent of graduates taking examinations who pass the examinations.

Applies to: All Institutions that have programs for which there is an identified exam as a “scored” indicator.

*Indicator 7E, Number of Graduates Who Continued Their Education*

What: A cohort-based measure of the percent of students who earn a baccalaureate
degree within six years from a CHEMIS reporting institutions or from other institutions provided data are available sector-wide.

Applies to: **Regional Campuses** only as a scored indicator.

**Indicator 8C, Accessibility to the Institution of All Citizens of the State**

What: A four part measure considering:

1) The percent of undergraduates who are SC citizens who are minority, 2) fall-to-fall retention of minority degree-seeking undergraduates who are SC citizens, 3) the percent of graduate students who are minority, 4) the percent of faculty teaching in the fall who are minority.

Applies to: **All Institutions** as a “scored” indicator with the exception of the graduate student part that applies only to the Research and Teaching Sector institutions.

**Indicator 9A, Financial Support for Reform in Teacher Education**

What: For Clemson, USC Columbia and Teaching sector institutions, the measure applied is the ratio of expenditures of grants/awards to support teacher preparation or training to the expenditures of such grants/awards for the prior three years.

For MUSC, a comparable measure was developed effective in Year 6 (2001-02) that measures the ratio of expenditures of grants/awards to support the improvement in child and adolescent health to the expenditures of such grants/awards for the prior three years.

Applies to: **Research** and **Teaching** sector institutions as a “scored” indicator with differences in definitions applied to MUSC.

**Indicator 9B, Amount of Public and Private Sector Grants**

What: In the past, this measure has applied considering the ratio of the current year
restricted research fund expenditures to the past three-year average.

 Applies to: Research Sector Institutions. This indicator is being scored in Year 7 (2002 – 03) as an average of the scores earned for the past three years. The measure is deferred until it can be re-aligned with the new federal financial reporting standards.

(Source: SC Performance Funding Indicators in Brief, 2002)
Appendix B

Cover Letter for Validation

Dear ________________:

Thank you for agreeing to assist me with my study: Longitudinal Study of Performance Indicators for South Carolina Technical Colleges- A mixed Method Study, by evaluating the questionnaire I plan to use to assess the performance system which was implemented by Act 659 of 1996.

You have been identified as a technical college administrator who has significant knowledge and understanding of the policies and practices in the South Carolina higher education system, especially in the technical college sector of South Carolina. As a senior level administrator, I would be interested in your candid opinion on the issue of performance funding of technical education in South Carolina. What are some of the strengths and weaknesses of the performance system which has been in place since 1996?

In order to accomplish the goals of this study I will be addressing the following research questions:

1. How did the performance system affect the three colleges at the institutional level selected for this study?

2. How did the performance system affect the personnel at the three colleges selected for this study?

3. Do performance indicators reflect the true educational outcomes for the technical colleges?

4. What performance indicators should be considered the most critical for the technical colleges in South Carolina in order of importance?
Thank you in advance for assisting me in my endeavor to complete my research.

The questionnaire and directions for determining content validity are attached.

Sincerely,

Mohammad Hossain
Appendix C

Introductory Letter for Survey

Information Concerning Participation in a Research Study

Clemson University

(LONGITUDINAL TREND ANALYSIS OF PERFORMANCE INDICATORS FOR SOUTH CAROLINA TECHNICAL COLLEGES)

Description of the research and your participation

You are invited to participate in a research study conducted by Dr. James Satterfield, along with Mohammad Hossain. The purpose of this research is to investigate the factors which influenced performance funding and how it has shaped higher education in general and technical education in particular. Performance indicators, the metric of performance funding, will be compared among various technical colleges and reported how technical education in South Carolina has changed over a ten-year study period. The amount of time required for participation will be approximately one hour for the initial interview and the possibility of one or more follow up interviews.

Risks and discomforts

There are no known risks or discomforts associated with this research. Participants will remain anonymous throughout data collection and reporting.

Potential benefits

There are no known benefits to you that would result from your participation in this research; however, this research may highlight the implications of performance funding for technical education and its weaknesses and strengths.

Potential of confidentiality

We will do everything we can to protect your privacy. Your identity will not be revealed in this study or any publication that might result from this study.

Voluntary participation

Your participation in this study is voluntary. You may choose not to participate and you may withdraw your consent to participate at any time. You will not be penalized in any way should you decide not to participate or withdraw from this study.
Contact information

If you have any questions or concerns about this study or if any problems arise, please contact Dr. James Satterfield at Clemson University at (864) 656-5111. If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at (864) 656-6460.
1. Please select your position title with the college
   - President
   - Vice President – Academic/Instructions
   - Vice President – Business/Finance
   - Vice President – Student Affairs/Admission
   - Vice President – Corporate/Development
   - Dean of Instructions
   - Dean of Student Affairs
   - Director of Research and Planning
   - Other, please specify

2. How informed would you say you are with the issue of South Carolina Performance Funding Act 359 of 1996?
   - Not informed at all
   - Not that informed
   - Somewhat informed
   - Well informed
   - Fully informed

3. What were the three important benefits that your college gained from the South Carolina performance funding system? (Please list them in order of importance.
4. What were the three drawbacks that you experienced from implementation of the performance system at your college?

5. Please tell us which officers were responsible for implementation of the performance system at your college?

(Mention their position title only, names not needed)

6. Please briefly describe the process of gathering and evaluating the performance data?

7. Was there any lack of resources during the implementation stage of the Performance Funding Act at your institution?

8. How satisfied are you with the overall outcomes for the performance system?
   - Not satisfied
   - Somewhat satisfied
   - Neither satisfied nor unsatisfied
   - Satisfied
   - Very satisfied

9. How interested are you in knowing more about this issue?
   - Not at all interested
   - Not that interested
   - Somewhat interested
   - Very interested
   - Extremely interested
10. Please share any additional thoughts you have about the performance funding system that you think would be important to this study.

11. How satisfied are you with the overall outcomes of the performance system at your college for the indicators representing following issues? Please use a scale from 1 to 5, where 1 means very dissatisfied and 5 means very satisfied

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REFERENCES


Marion, R., & Flanigan, J. (2003). Legislative control and legitimacy preferences in higher education accountability. Unpublished manuscript, Clemson University at Clemson, South Carolina.


Salerno, C. S. (2002). On the technical and allocative efficiency of research-intensive higher education institution. (Doctoral dissertation, the Pennsylvania State University, 2002). UMI number: 3136573


